Study on Fish demand and supply and engagement of private sector in the fish sub sector in Jharkhand: Draft Report

Submitted To
Jharkhand State Livelihoods Promotion Society (JSLPS)

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Executive Summary

- India is the second largest fish producing country in the world with a production of about 11.41 million tonnes in 2016-17. Indian fisheries and aquaculture is an important sector of food production, providing nutritional security to the food basket, contributing to the agricultural exports and engaging about fourteen million people in different activities. The fishery sector (capture fishery and aquaculture) in the state of Jharkhand has been found to be viable and productive with 39% growth rate in the last 5 years. The Jharkhand State Livelihood Promotion Society (JSLPS) is implementing World Bank Funded JOHAR Project in Jharkhand. Under this project fishery is identified as a major livelihood opportunity for rural households.

- Market information with regards to demand and supply gaps and identify role of private sector across value and supply chain is very important for planning the various interventions related to fish production. Mr. Nirmallya Mandal, an experienced market consultant had been assigned by JSLPS to conduct a market study for fishery with the following major objectives:
  
  - Estimate current and future demand and supply of fish in the Jharkhand State
  - Assess the consumer preference for fish buying in terms of fish varieties preferred, price points and point of purchase
  - Map the presence of private sector across value chain and supply chain of fishery sub sector in the state.
  - Present the findings to enable planning of various fish production and marketing activities under JOHAR project.

- A qualitative and quantitative research methodology was undertaken to conduct the study. Multiple stakeholders involved in the value and supply chain of fisheries were interviewed using questionnaire and discussion guides. More than 35 markets across 4 states of Jharkhand, West Bengal, Odisha and Andhra Pradesh were covered in the study. A quantitative consumer study involving rural and urban consumers across Ranchi, East Singhbhum, Gumla, Latehar and Bokaro districts was conducted.

Market level findings from Jharkhand, Andhra Pradesh, West Bengal and Odisha:

- The primary market survey of Jharkhand portrays a picture of high inflow of fish from Andhra Pradesh and West Bengal; around 57% of the State’s fish source is from Andhra Pradesh and 17% from West Bengal. Rural consumption of local and indigenous fish is around 43% in Rural areas of Jharkhand as compared to only 7% in urban areas. Rural consumption of small fish like Pontius is more. Urban Jharkhand on the other hand consumes majorly fish coming from Andhra Pradesh (71%) and other areas like West Bengal (17%) and Odisha. Marine and brackish water fish are majorly sourced from Odisha, sometimes via Kolkata.
The main entry points of AP fish into Jharkhand is via Dhanbad, Jamshedpur and a little through Ranchi. Around 55% of AP fish lands at Dhanbad, 35% at Jamshedpur and remaining 10% at Ranchi, Ramgarh, Jaina more etc. places combined respectively. The average monthly fish sold in the markets of Ranchi Shalimar Market, Dhanbad and Bistupur market of Jamshedpur are 3506, 24050 and 14517 quintals respectively.

One truckload of 10 tons carry 240 boxes and each box carry 40 kgs of fish. Weight of ice is extra and often to the tune of 10 kgs. 12 tons truckload carry 300 boxes but Jharkhand is mainly serviced by 10 tons (ten wheeler trucks) from AP. A minimum of 12-15 such trucks daily enters the markets of Jamshedpur and Dhanbad. The trade of fish from AP is found to involve a lot of investment and risk which is controlled by 8-10 big traders who are primarily from Dhanbad.

Since 2-3 years Moyna area of Purba Medinipur in West Bengal has come up as a major supplier for Jharkhand, especially for live fish. Live Fish from Moyna is supplied to distant markets of Jharkhand including Jamshedpur, Ranchi, Bokaro, Dhanbad etc. regularly in large quantities. This live fish from Moyna has actually captured around 50% of the market share of Andhra fish. It is found that 10-12 such pickup trucks carrying approximately 7 tons of fish arrive at Ranchi every day from September to February every year.

The bordering areas of the state of Jharkhand focuses on logistics more than any other factor since logistics are directly associated with the price of the fish. The area which lies north to Latehar like Daltonganj is found to be serviced from supplies from Aurangabad, Sasaram, Dehri on Son and Bihar. Likewise supplies of AP fish are found to be catered to Silli from Jhalda market of West Bengal. Gumla is sometimes serviced from Rourkela. The areas of Sahebganj are serviced from Malda.

8-10 different riverine fish which are self-stocking in nature but in very less volumes are often found in rural markets or haats and referred to as local fish. There is no consistency in supply of these fish varieties since catch is not guaranteed and markets are also not present for bigger size catch of these fish. Small variety fish like Murola and punti are also coming into Jharkhand from Bihar’s Sasaram and other areas which are also sold as local.

The seasonal variation highlights that fish sales are more just before the monsoons owing to the marriage season and also in winters. Ranchi level market players have reported that availability of ice during summers is a major issue. The price of ice blocks go up to Rs 500 per piece during summers from the normal rates of Rs 150-170 per piece. Local fish generally sells at higher rates than AP fish but storage of this fish is generally not as successful as their AP counterparts. Hence the price fluctuation of local and live fish is quite high.

Rural Markets are quite price sensitive although there is a preference of fresh fish. Andhra fish in distant places from Ranchi, Dhanbad or Jamshedpur like Latehar have retail prices more than that of Ranchi by around Rs 20 per kg. The preference
of rural people including tribal populations have been found to be more on fish like Magur, supplied from West Bengal, which are generally live and appear fresh but at the same time is cheaper than other variants. Local fish generally sells at higher rates than AP fish but storage of this fish is generally not as successful as their AP counterparts. Hence the price fluctuation of local and live fish is quite high.

- It is observed that all value chain players support each other since the perishability of the produce dictates that sale of the produce is very important. Hence relationships between various players are very critical. A fish seller generally does not promote local fish because of the lack in consistency in supply. Secondly the fish farmer seldom focuses on building relationships with the seller which builds trust and dependability.

- There exists a network between sellers of AP fish. Also the produce from AP has longer shelf life. These factors are missing for the local fisherman who has no idea of demand, marketing skills or adequate storage. Local fishermen also are not skilled in cleaning, scaling and cutting the fish to cater to consumers, especially in urban and semi urban areas. No service providers exist to assist these direct sellers unlike the AP fish seller who keeps 2-3 additional labour specialized for this.

- With 23.52 lakh MT, in 2015-16, Andhra Pradesh is the largest fish producing state in the country. Since the late 1970s, fish culture in AP has undergone a boom (first with Indian major carps, then pangasius), resulting in expansion of pond area to 142,000 ha, and massive increases in inland farmed fish production, to 1.5 million tons. Andhra Pradesh’s major inland fish output comes from the 3 districts of East Godavari, West Godavari and Krishna which is more than 85% of the total fish production of the state. The Andhra Pradesh fish market relevant to the supply in Jharkhand constitutes of MSMEs, Companies and exporters having own large scale production of fish as well as procurement of fish from large farmers to pack and send the same to different states across India. This constitutes only of Indian Major Carps, with 80% Rohu, 20% Katla and 10% others constituting mainly of Pangus, Roopchand and Koi. Fish is systematically reared by fish farmers following an elaborate package of practices which ensures a high productivity in the region.

- Companies generally use their trade names as initials of the proprietor or company name. Some renowned names are DNS, KS, NGS, AFI, LFS etc. West Godavari district alone is reported to supply 1500 tons of fish every day to different market of India across various states. The companies generally have in-house production of ice, thermocol boxes and other packing materials and transport. They operate in all three districts of the region and have multiple ice production centres. The companies have a direct engagement with farmers in a radius of 15-20kms and sometimes also through agents. The fish farming in Andhra is professionally managed to have 2 harvests in a year. The package of practices for farmer fishermen is managed in a manner so as to have a consistent supply all the year round. The planning is quite meticulous and farmers generally know the quantity of expected produce to be harvested in upcoming months.
These companies regularly supply to markets of Kolkata, Siliguri, Howrah, Guwahati, Agartala, Dimapur, MP, UP, Gujarat, Uttarakhand, etc. The farthest point is reported to be Agartala which is 3500 kms away and takes 8 days to reach.

- Packaging of Andhra fish is its unique selling proposition. The truckloads are thus specially packed for the purpose. There is a layer of thick thermocol sheets which envelops the entire packaging. After placing the thermocol insulated boxes, the empty spaces between the boxes are filled with paddy husk and the entire truckload is wrapped in tarpaulin sheets making them weatherproof. This arrangement keeps the fish frozen and insulated for up to 10 days.

- West Bengal on the other hand, had an estimated annual fish production in the year 2015-16 is 16.71 lakh MT where production growth rate has increased 13.52% compared to annual fish production 14.72 lakh ton during 2011-12. Fresh water fisheries cover about 80 to 85% of total closed water system. The average productivity in inland has been 4000-4750 Kg /ha/ annum by 2015-2016 while the maximum achieved has been more than 13 tons/ha. West Bengal contributes approximately 21-23% of Inland fish production of the country. The state also tops the list of fish seed-producing states. The fish seed production in the year 2015-16 reached 17521 million and enabled West Bengal to supply seed to adjacent states including Jharkhand.

- Naihati and Bankura are 2 major centres for fish seed production apart from numerous other places. Fish seed available range from Rohu, Katla, Mrigel, Silver Carp, Bata, Grass Carp, JapaniPunti etc. Price of 135 ml bowl containing around 40000 spawns cost around Rs 150 to 200 per bowl. It is reported that officials from fishery department of Jharkhand regularly visits the cooperative and the department of Jharkhand has also empanelled some suppliers for fish seed supply to beneficiaries in Jharkhand. However, the quality of these fish seeds is reportedly not very good to promote good stocking.

- West Bengal markets offer a wide range of fish to consumers who have a special knack for different varieties of fish. This includes marine and brackish water varieties along with a large portion of crabs, prawns and shrimps. This trend is minimal in Jharkhand where the major focus is only on Indian Major Carps, Pangus and sporadically Magur in some clusters. Jamshedpur, Bokaro and some parts of Dhanbad and Ranchi are the only markets which receive a regular supply of such high value fish but in very small quantities.

- Odisha produces 5.21 Lakh Metric tons of fish (2015-16) annually. The major contribution to Jharkhand from Odisha is the brackish water and marine fish which enters Odisha through Jamshedpur and Dhanbad sometimes via Kolkata. The value of marine fish from Odisha is growing steadily over the years, the same being Rs. 181481 Lakhs in 2013-14. Fish supplies from Odisha to Jharkhand include varieties like Bhetki, Bhola, Mackerels, Pompphret, Prawns, Lobsters, Crabs, Fesa etc. These fish generally are packed in refurbished thermocol boxes and completely sealed with ice using brown tapes. These boxes are then sent to Jharkhand on transport as well as on bus tops. Being high valued fish, these fish
have a small circle of consumers and was found to be sold only through specific
canals in cities like Jamshedpur, Ranchi, Bokaro and Dhanbad only. These fish
has very little penetration in rural areas. 2-3 boxes in 3-4 days a week is the
average entry of these fish in Ranchi.

**Analysis of Fish Consumption in Jharkhand**

The following analysis is derived from primary information collected during the study
across different rural and urban pockets of Jharkhand.

- The fish consumption frequency is observed to be changing in different seasons
where fish consumption in winter in urban areas goes upto 62% respondent
consuming fish every week from 35% consuming in Summers. Consumption in
monsoons is found to go up in the urban areas as compared to reduction of fish
consumption in Monsoons in rural areas.
- Rohu among all varieties is the most chosen fish in rural areas with 55%
consumers preferring Rohu as their first choice in rural areas. Magur has 8%
preference in rural areas by consumers as their first choice. Likewise Rohu is
also preferred by 45% urban consumers as their first preference followed by
Katla (23%).
- While 72 % urban consumers reported buying fish sourced from ice boxes, 60 %
rural consumers reported buying fish fresh from river/pond. Ice box fish ideally
refers to fish from Andhra Pradesh or unsold fish stored in ice.
- 94% of rural consumers were found to buy fish without any preference of
specific market or vendor. On the contrary, 32% urban consumers buy fish from
specific markets.
- Urban consumers generally buy more quantity of fish per market visit to the tune
of 67% buying 1-2 kgs per visit. The average quantity of fish purchased by
different categories of consumers show that 92% ST category consumers buy 1-2
kgs of fish every time and 65% ST in the rural setting buy less than a kg of fish
every time.
- The price elasticity of fish with respect to other non-vegetarian products bring to
light that a decrease in price of fish by 20% will trigger more fish consumption in
31% consumers but an increase in price of fish by 20% would not affect around
76% consumers. While the same prices of chicken and fish would instigate more
chicken consumption and lesser fish consumption to the tune of 48% consumers
reducing fish consumption.
- The annual average per capita purchase of fish is found to be 10.3 kgs for the
state. This is 9.29 kgs in Rural and 11.32 kgs in urban.
The current estimated annual demand of fish in the state of Jharkhand is 377347 MT under the existing rate of population growth and per capita growth in consumption of fish. This annual demand is 251997 MT in rural and 97437 MT in urban. Assuming the same growth rate this is expected to be 442415 MT in 2023.

The department of Fisheries reports an estimated annual fish production in the state of 190099 MT for 2018-19. This falls short of the demand by 187248 MT. The department reports the growth of the annual fish production to be 326739 MT by 2022-23. This will still fall short from the annual demand by 115376 MT at the growth existing rate. A hypothetical situation where the per capita demand of fish reduces by 50% over the last decade, the annual demand of fish in the state comes to 356913 MT by 2023.

**Major Issues identified**

- There is considerable shortfall in supply compared to the estimated demand of fish in the state
- There is a dearth of effective market channels for marketing enhanced production. The current production of the state is finding its way into the market in a sporadic and unsystematic manner. The producers are highly disintegrated in Jharkhand. They produce fish without proper planning or market information.
- Fish seed availability, variety and quality is a major constraint where majority of the fish feed is sourced from West Bengal.
- The water availability across tanks and ponds in the dry seasons are a big hurdle coupled with extreme weather conditions in many districts.
- Fish feed availability and access to good quality fish feed commercially is a challenge across the state.
- The post-harvest management of fish, especially market based practices have been more or less ignored. Farmers are more or less clueless about the ideal package of practices for effective post-harvest management of fresh fish.
• Local fishermen have reported poaching to be a major issue across the state where cases of theft of fish from ponds overnight are quite common.
• There is dearth of entrepreneurship in local fishermen since selling of fish is a different skill altogether.
• Local fishermen also are not skilled in cleaning, scaling and cutting the fish to cater to consumers, especially in urban and semi urban areas.
• Farmers do not invest in fishery adequately to harness the full potential. Neither fishery is undertaken as an enterprise.
• Existing cooperative societies are institutionally weak and seldom act as efficient marketing institutions for producers.
• Production in West Bengal is on the rise as well and a massive drive to supply live fish in Jharkhand markets is on. Cost and efficiency wise, local production is yet to catch up.

**Suggested intervention points:**

• Synchronization of the PGs to be formed under JOHAR with the existing Cooperatives may enhance marketing avenues for producers as well as provision of inputs and better package of practices.
• Creation of a larger network among all PGs is essential to ensure flow of market information so as to effectively plan harvests and stocking of fish seeds as well. This network needs to include traders, market players, technology providers, service providers and resource agencies apart from PGs and PAs.
• The MatsyaMitras need to be equipped with adequate market knowledge and information so as to provide marketing services to fish farmer members of PG/Cooperatives.
• It is important to create sustainable enterprises which would support cluster based market interventions in Fishery under JOHAR. More enterprises on some of the following may be promoted to support the interventions;
  o Ice factories around all critical markets to supply adequate ice for fish storage.
  o Transport systems near the important markets and production centres like Vans, trolleys, pick-up trucks, Tata Ace kind of vehicles.
  o Fish seed producing enterprises in the form of
    ▪ Portable FRP carp hatcheries
    ▪ Carp seed rearing and fingerling producing ponds
    ▪ Breeding and Seed producing units of Magur, Koi, fresh water prawns etc.
  o Fish feed producing enterprises
  o Enterprises producing/procuring and selling nets and other fishing equipment
  o Thermocol box making enterprises for low cost packaging of fish
• Developing proper infrastructure like raised platforms, storage counters, sewerage and water facilities, etc. for the major markets across the state is necessary for enhancing efficiency of the marketing system.

• JOHAR may undertake water resource development initiatives in collaboration with appropriate partners and agencies. Also climate resilient fishery plans and integrated fishery along with other activities where maximum output from fishery can be achieved during the period of water retention may be planned.
1. Introduction: Fishery in India and Jharkhand

Indian fisheries and aquaculture is an important sector of food production, providing nutritional security to the food basket, contributing to the agricultural exports and engaging about fourteen million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence. India is the second largest fish producing country in the world with a production of about 11.41 million tonnes in 2016-17. Fish and fish products have presently emerged as the largest group in agricultural exports of India, with 10.761 lakh tonnes in terms of quantity and Rs.33,442 crores in value during 2016-17, constituting about 6.3% of the global fish production, the sector contributes to 1.1% of the GDP and 5.15% of the agricultural GDP. This accounts for around 10% of the total exports of the country and nearly 20% of the agricultural exports. More than 50 different types of fish and shellfish products are exported to 75 countries around the world. The total fish production presently has nearly 65% contribution from the inland sector and nearly the same from culture fisheries. Paradigm shifts in terms of increasing contributions from inland sector and further from aquaculture has been a significant development over the last decade.

The fishery sector (capture fishery and aquaculture) in Jharkhand State has been found to be viable and productive. This is despite recurrent drought and a large number of seasonal water bodies (as opposed to perennial water bodies). The growth rate of the fishery Sector in the State is rapid and reported at 39%, in the last 5 years.

Background of the project

The fisheries sector has significant potential in fish production resources in the form of ponds, tanks, reservoirs, farm ponds, rivers for enhancing fish production, employment generation, improving nutrition, strengthening economic status by reducing poverty. The Jharkhand State Livelihood Promotion Society (JSLPS) is implementing World Bank Funded JOHAR Project in Jharkhand. Under this project fishery is identified as a major livelihood opportunity for rural households.

Jharkhand State has an effective fishery development programme, but there are still significant constraints on how to impact larger number of farmers, particularly those that are relatively unskilled and lack access to funds to improve their production. To meet ambitious fishery growth targets and demand there is a need to greatly increase
number of ponds being brought under culture and improve productivity from intensified culture. This requires a major boost to accelerate ongoing programmes to impact a broader range of potential fish farmers state-wide. The distributed nature of water bodies in the State offers considerable opportunity to increase rural income generation through improved fish production and more effective marketing of fish products in a relatively low risk manner. The approach of using Producer Groups linked to SHG savings groups as an entry point offers the opportunity to link credit provision to improved production techniques, thereby filling a gap that currently exists with access to rural credit.

**Key Challenges of the Fishery Sector**

The fisheries sector, especially in Jharkhand, is believed to have number of challenges that constrain fishing and fish culture, in turn livelihoods development of the rural poor in the state. Major challenges are as follows-

- Low fish productivity of seasonal water bodies
- Limited seed supply and other inputs
- Unutilized large number of private tanks for aquaculture.
- Constraints on accessibility to formulated feed and supplemental agri-by-products as pond feed inputs
- Weak extension support especially technology transfer to fish farmers.
- Limited marketing channels and expensive harvesting arrangements
- Lack of access to credit for operational inputs to intensify production
- No insurance support
- Risk averse nature of poorer farmers and inexperience in entrepreneurship
- Need for appropriate pro-poor policy for enhancing access and use of water bodies for fish production.

**Opportunity for improving incomes and livelihoods**

Fish farming is considered a relatively low risk animal production venture. It is suitable for risk-averse, lower-income households that have access to a water body. There is potential for incremental improvements in productivity and profitability that can be made with relatively simple technical improvements. Fish culture has rapid turnover, with a seasonal crop taking 6-7 months and monthly crops possible for seed nursing operations.

These production systems are suitable for the seasonal tanks which are typical for the
State. The investment in fisheries activities is relatively low compared with other agriculture and allied sectors and return on investment is quite high. These features provide considerable scope for fish culture to strengthen livelihood basket for rural poor in Jharkhand State.

**Relevance of this study**

Market information with regards to demand and supply gaps and identify role of private sector across value and supply chain is very important for planning the various interventions related to fish production. Mr. Nirmallya Mandal, an experienced market consultant had been assigned by JSLPS to conduct a market study for fishery. This report constitutes the presentation of the major findings of the study.

**Objectives of the study**

Following are the objectives of the study

I. Estimate current and future demand and supply of fish in the Jharkhand State

II. Assess the consumer preference for fish buying in terms of fish varieties preferred, price points and point of purchase

III. Map the presence of private sector across value chain and supply chain of fishery sub sector in the state.

IV. Present the findings to enable planning of various fish production and marketing activities under JOHAR project.

**2. Approach and Methodology of the study:**

The Terms of reference of this study has been summarized in following diagram
I. To have a better representation of entire state, the study was conducted in rural and urban locations of Jamshedpur, Palkot, GumlaSilli, Bokaro, Ranchi and Latehar.

II. Fish is supplied in Jharkhand from other states as well. During the study 3 other states; Andhra Pradesh, West Bengal and Odisha were also visited and different markets were studied in each location.

A qualitative and quantitative research methodology was undertaken to conduct this study. Multiple stakeholders involved in the value and supply chain of fisheries within the state and outside the state were interviewed using questionnaire and discussion guides. Study had extensive secondary research where available reports, data, literature were analysed to assess the scenario of fisheries sub sector in the state. Secondary literature also helped in understanding the existing policy framework and support available to promote production, market facilities, infrastructure, research & development and other relevant things for the growth of the fisheries sub sector.

The entire study was conducted in four stages with the following analytical framework;

2.1. Analytical Framework for the study

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<th>Study stage</th>
<th>Activity</th>
<th>Outcomes</th>
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<tr>
<td>Study Planning</td>
<td>• Detailed discussion with the JSLPS to understand the study in detail</td>
<td>• Comprehensive understanding of the study</td>
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<tr>
<td>Planning (Inception)</td>
<td>• Finalize the study geography with blocks &amp; villages and finalize the markets in 3 other states to be visited</td>
<td>• Research tools developed and shared with JSLPS</td>
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<td>• Develop research tools (Questionnaire and discussion guides to interact with various stakeholders)</td>
<td>• Study geography for market study and field visits finalized</td>
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<td>• Conduct secondary study to understand the scenario of</td>
<td>• Detailed study plan shared with JSLPS</td>
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<td>• Initial secondary research done</td>
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<td><strong>Markets study and mapping of private sector players across value chain of fisheries and consumers interview</strong></td>
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<td>fisheries in the state and identify other players for discussion</td>
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<td>• Finalize the study plan and share the same with JSLPS</td>
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<td>• Finalized the analytical framework and study report format</td>
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<td>• Submit the inception report</td>
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<td>Submission of inception report with study plan, research tools, methodology, analytical framework and study report format</td>
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<td>Detailed understanding of fisheries sector in the state</td>
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<td>Private sector players mapped across value and supply chain</td>
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<td>Data from consumers collected for further analysis</td>
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<td>Value chain of fisheries is done and Gaps are identified</td>
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<td>Survey of consumers is done in both rural and urban markets to forecast the demand.</td>
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<td>Market study and mapping of private sector players across value chain of fisheries and consumers interview</td>
<td>Visit the district, block and village level traders in finalized geography to understand the market dynamics</td>
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<td>• Visit the fish markets in 3 other states to understand the dynamics of these markets with a special focus upon supply of fish to Jharkhand</td>
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<td>• Interact with wholesalers, commission agents, traders, retailers, suppliers and other market players to get the insight on market dynamics and assess the fish market demand</td>
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<td>• Meet the private sector players involved across value chain of fisheries in the state (Input suppliers; Fishing net, seeds, feed, equipments etc., Service providers (Veterinary, extension, Ice suppliers etc.), transporters and logistic players, fish market committees, packaging material (Ice boxes), Government agencies, fisheries experts, research institutions and other relevant stakeholders to the study.</td>
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<td>• Conduct meeting with JSLPS</td>
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fisheries experts and other stakeholders in the project to get their thought.

- Interact with consumers to get their preference and inclination for fish
- Interact with consumers in rural and urban markets to get their eating habits and preferences.

### Data analysis and Secondary research

- Collected data was collated and further analysed to assess the demand and supply
- Scientific projection techniques were applied to project the supply and demand for next 5 years.
- Relevant secondary data for report such as production data, number of water bodies in the state, historical growth, demographic profile etc. were collected from relevant secondary sources.

### Report writing

- Writing and of draft report taking in to consideration all the deliverables mentioned in the ToR
- Submission of draft report to JSLPS for the suggestions and feedback
- Incorporate the suggestions and feedback in final report
- Submission of final report

### Data collation and analysis

- Data collation and analysis is done
- Historical data of fish production and consumption is collected
- Existing and projected production collected from fisheries department
- Projected demand and supply is collected through scientific technologies

### 2.2. Study Coverage:

The following markets were covered during the study:

<table>
<thead>
<tr>
<th>State</th>
<th>Place</th>
<th>Markets Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jharkhand</td>
<td>Ranchi</td>
<td>Shalimar Hygiene Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily Market</td>
</tr>
<tr>
<td>State</td>
<td>Place</td>
<td>Markets Covered</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kokar Fish market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DharvaHaat</td>
</tr>
<tr>
<td>Silli</td>
<td></td>
<td>Daily Market</td>
</tr>
<tr>
<td>Dhanbad</td>
<td></td>
<td>SilliHaat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jona Bazaar Haat</td>
</tr>
<tr>
<td>Bokaro</td>
<td></td>
<td>Dhanbad Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bokaro Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chas Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jaina More fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peterwar</td>
</tr>
<tr>
<td>Jamshedpur</td>
<td></td>
<td>Chandil Dam / market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sakchi Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bistupur Wholesale fish market</td>
</tr>
<tr>
<td>Gumla</td>
<td></td>
<td>PalkotHaat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GumlaHaat</td>
</tr>
<tr>
<td>Latehar</td>
<td></td>
<td>Latehar Daily Market</td>
</tr>
<tr>
<td>West Bengal</td>
<td>Durgapur</td>
<td>Benachity Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muchipara Market</td>
</tr>
<tr>
<td></td>
<td>Asansol</td>
<td>Asansol Fish Market</td>
</tr>
<tr>
<td>Ramsagar</td>
<td></td>
<td>Ramsagar Fish Seed producers’ Cooperative and Association</td>
</tr>
<tr>
<td>Midnapore</td>
<td></td>
<td>Moyna</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digha/ Tajpur</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>Eluru</td>
<td>Eluru Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eluru Industrial Area</td>
</tr>
<tr>
<td>Akkivedu</td>
<td></td>
<td>Akkivedu Fish Market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Akkivedu Industrial Area</td>
</tr>
<tr>
<td>Bhimavaram</td>
<td></td>
<td>Bhimavaram</td>
</tr>
<tr>
<td>Narayanapuram</td>
<td></td>
<td>Narayanapuram</td>
</tr>
<tr>
<td>Vijayawada</td>
<td></td>
<td>Daily Market</td>
</tr>
<tr>
<td>Odisha</td>
<td>Bhubaneswar</td>
<td>No. 4 wholesale fish market</td>
</tr>
<tr>
<td></td>
<td>Cuttack</td>
<td>Daily Market</td>
</tr>
<tr>
<td></td>
<td>Balasore</td>
<td>Balasore Fish Market</td>
</tr>
</tbody>
</table>

Apart from the above consumers from the following areas in Jharkhand were covered separately for fish consumer analysis:

<table>
<thead>
<tr>
<th>Urban Areas</th>
<th>Rural Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi, Jamshedpur, Bokaro,</td>
<td>Silli, Gumla, Palkot, Latehar, Petarwar,</td>
</tr>
<tr>
<td></td>
<td>Patamda, Jona Bazaar</td>
</tr>
</tbody>
</table>
4. Findings and Market Dynamics

4.1. Jharkhand

The fishery sector in the state of Jharkhand has been growing at a CAGR of 14.9 and the value of output of fishing and aquaculture has been reported to be Rs. 1126 crores in 2016-17\(^1\). The reported increase in fish production from 2014 to 2017 is 39%. However, this primary market survey of Jharkhand portrays a picture of high inflow of fish from Andhra Pradesh and West Bengal; around 57% of the State’s fish source is from Andhra Pradesh and 17% from West Bengal.

Rural consumption of local and indigenous fish is around 43% in Rural areas of Jharkhand as compared to only 7% in urban areas. Rural consumption of small fish like Pontius is more. Urban Jharkhand on the other hand consumes majorly fish coming from Andhra Pradesh (71%) and other areas like West Bengal (17%) and Odisha. Marine and brackish water fish are majorly sourced from Odisha, sometimes via Kolkata.

Following tables highlights the respective detailed sources of fish

**Share of fish (Based on the source of production)**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>District</th>
<th>Place &amp; Market Name</th>
<th>Weekly Sale of fish –(Urban Markets)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local</td>
<td>Andhra</td>
</tr>
<tr>
<td>1</td>
<td>Ranchi</td>
<td>Shalimar Hygiene Fish Market</td>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Ranchi</td>
<td>Daily Market</td>
<td>5</td>
<td>70</td>
</tr>
</tbody>
</table>

\(^1\) Source: Jharkhand Economic Survey 2017-18
Study on Fish demand and supply and engagement of private sector in the fish sub sector in Jharkhand

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>District</th>
<th>Place &amp; Market Name</th>
<th>Weekly Sale of fish –(Urban Markets)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local</td>
<td>Andhra</td>
</tr>
<tr>
<td>3</td>
<td>Ranchi</td>
<td>Kokar Fish market</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>Dhanbad</td>
<td>Dhanbad Fish Market</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Bokaro</td>
<td>Bokaro Fish Market</td>
<td>10</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>East Singhbhum</td>
<td>Sakchi Fish Market, Jamshedpur</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>7</td>
<td>East Singhbhum</td>
<td>Bistupur Wholesale fish market, Jamshedpur</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

All figures are in %

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>District</th>
<th>Market Name &amp; Place</th>
<th>Weekly Sale of fish –(Rural Markets)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local</td>
<td>Andhra</td>
</tr>
<tr>
<td>1</td>
<td>Ranchi</td>
<td>DhurvaHaat, Ranchi</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>Ranchi</td>
<td>Daily Market, Silli</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Ranchi</td>
<td>SilliHaat</td>
<td>60</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Ranchi</td>
<td>Jona Bazaar Haat</td>
<td>70</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Bokaro</td>
<td>Jaina More fish Market</td>
<td>5</td>
<td>90</td>
</tr>
<tr>
<td>6</td>
<td>Bokaro</td>
<td>Petarwar</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>7</td>
<td>Gumla</td>
<td>PalkotHaat&amp; daily Market</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>8</td>
<td>Gumla</td>
<td>GumlaHaat&amp; Daily Market</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>9</td>
<td>Latehar</td>
<td>Latehar Daily Market</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

All figures are in %

The main entry points of AP fish into Jharkhand is via Dhanbad, Jamshedpur and a little through Ranchi. Around 55% of AP fish lands at Dhanbad, 35% at Jamshedpur and remaining 10% at Ranchi, Ramgarh, Jaina more etc. places combined respectively. The trade of fish from AP is found to involve a lot of investment and risk which is controlled by 8-10 big traders who are primarily from Dhanbad. The history of this trade from Andhra Pradesh dates back to late 80s when a group of traders from Dhanbad used to form a ‘syndicate’ and procure truckloads of fish to be later shared among themselves. Later this system evolved in the form of an informal agency which now accumulates orders from different retailers and passes on the same to suppliers in AP. These agents
are locally called ‘syndicate’. Dhanbad also services adjoining markets of West Bengal like Asansol and Durgapur.
Major Movement of Fish in Jharkhand

- Freshwater Fish from AP, via Sasaram
- Freshwater Fish from Bihar – Murola, Pontius etc.
- Marine/ Brackish water fish from Balasore / Kolkata
- Live fish from Moyna, Medinipur, West Bengal
- AP Fish supplied to Durgapur / Raniganj / Asansol
- Freshwater Fish direct from Andhra Pradesh, mainly Rohu, Katla & Mrigel

- Delivered in pickup vans / Tata Ace holding 1-2 tons
- Delivered in sealed boxes through transport
- Delivered in boxes, cartons on bus-tops
- Delivered in full truckloads of 10 tons
- Delivered in pickup vans holding 600-700 kgs
Fish from Andhra Fish is generally not auctioned. Rate fixation of this fish happens at Rs. 90 to 100 per kg beforehand with the trader in AP. The cost of transport and packing along with a margin for the trader is added to this base rate and fixed for the destination market. The supply of fish is arranged in a manner where and 1 Kg Catla is supplied for every 10 kgs of Rohu. This ratio converts to 4 boxes of Rohu and 1 box of Catla after it reaches Jharkhand. Catla demand is more in West Bengal and at times whole truckload of Catla not sold in Jharkhand is diverted to West Bengal especially during wedding seasons. Credit is often provided among known players. Once a year, the credit outstanding is nullified.

One truckload of 10 tons carry 240 boxes and each box carry 40 kgs of fish. Weight of ice is extra and often to the tune of 10 kgs. 12 tons truckload carry 300 boxes but Jharkhand is mainly serviced by 10 tons (ten wheeler trucks) from AP. A minimum of 12-15 such trucks daily enters the markets of Jamshedpur and Dhanbad. Dhanbad and Jamshedpur based traders who deal with AP based suppliers directly generally sells off the boxes without opening to retailers. Smaller players sometimes sell fish in lower denominations after opening the boxes as well.

The market at Bistupur in Jamshedpur operates from 4 Am to 7 AM in the morning but not one box is opened. The market daily deals in at least 7-8 truckloads. The same happens in Dhanbad as well. The main trading of Dhanbad happens outside the main market before 6 AM. After arriving to its destination anywhere in Jharkhand, the packaging is often maintained till the entire truck load is exhausted. Each truckload often takes 2-3 days on an average to get exhausted completely. Andhra fish, due to the consistency of supply round the year, helps in keeping prices of fish constant throughout the year.

Since 2-3 years Moyna area of PurbaMedinipur in West Bengal has come up as a major supplier for Jharkhand, especially for live fish. The place is being developed by govt. of West Bengal as a special cluster for fisheries and a lot of enterprises have come up in the area resulting in the overall fish production growth and marketing channel establishment all around. Live Fish from Moyna is supplied to distant markets of Jharkhand including Jamshedpur, Ranchi, Bokaro, Dhanbad etc. regularly in large quantities. The fish is kept alive by converting the load area of a pickup truck into a tank using tarpaulin and plastic sheets along with a diesel pump set used to aerate the water. One such pickup truck arrangement holds around 600-700 live carps (photo alongside). They are also called CharaPona and weigh 600-700gms each of Rohu, Katla and Mrigel. Hybrid Magur is also supplied from West Bengal to Jharkhand in
cylindrical drums.

The quantum of live fish arriving in various urban markets of Jharkhand has been quite high from Moyna and some traders reported that particularly in winters, the demand for fish is on a higher side when this live fish from Moyna has actually captured around 50% of the market share of Andhra fish. It is found that 10-12 such pickup trucks carrying approximately 7 tons of fish arrive at Ranchi every day from September to February every year. When questioned, these players generally lie about their source of fish to be from local areas like Bundu to evade the notice of authorities. However, they can be easily identified from the West Bengal registration of the vehicles that are used for the purpose. Live fish and local fish are often auctioned in all the major urban markets through commission agents. Live fish from Moyna generally command a better rate than their counterparts from Andhra Pradesh but run the risk of plummeting rates after these fish die.

The area which lies north to Latehar like Daltonganj is found to be serviced from supplies from Aurangabad, Sasaram, Dehri on Son and Bihar. Likewise supplies of AP fish are found to be catered to Silli from Jhalda market of West Bengal. Sometimes Jhalda market is also serviced from Jamshedpur. This highlights that the bordering areas of the state of Jharkhand focuses on logistics more than any other factor since logistics are directly associated with the price of the fish. Gumla is sometimes serviced from Rourkela as well as Ranchi since distance of AP fish via Ranchi to Gumla is higher. Thus the areas of Sahebganj are expected to be serviced from Malda due to its geographical proximity. Each AP fish seller generally sells fish in 3-4 markets in a week and has a consistent supply. The local seller on the other hand has a constraint of catch volumes and thus at times misses markets as well.

Following is an analysis of the quantities of fish varieties which are sold monthly;

### Fish Variety wise monthly sale in Urban Markets

<table>
<thead>
<tr>
<th>District</th>
<th>Name of market &amp; place</th>
<th>Average monthly sale</th>
<th>Rohu</th>
<th>Catla</th>
<th>Mrigel</th>
<th>Pangus</th>
<th>Magur</th>
<th>CharaPon (Small sized mix IMC)</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
<td>Shalimar Hygiene Fish Market</td>
<td>3506</td>
<td>2384</td>
<td>421</td>
<td>70</td>
<td>175</td>
<td>175</td>
<td>105</td>
<td>175</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Daily Market</td>
<td>160</td>
<td>109</td>
<td>19</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Kokar Fish market</td>
<td>117</td>
<td>80</td>
<td>14</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Dhanbad</td>
<td>Dhanbad Fish Market</td>
<td>24050</td>
<td>16354</td>
<td>2886</td>
<td>481</td>
<td>1203</td>
<td>1203</td>
<td>722</td>
<td>1203</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Bokaro Fish Market</td>
<td>1473</td>
<td>1002</td>
<td>177</td>
<td>29</td>
<td>74</td>
<td>74</td>
<td>44</td>
<td>74</td>
</tr>
</tbody>
</table>
Fish Variety wise monthly sale in Rural Markets

<table>
<thead>
<tr>
<th>District</th>
<th>Name of market &amp; place</th>
<th>Average monthly sale</th>
<th>Rohu</th>
<th>Catla</th>
<th>Mrigel</th>
<th>Pangus</th>
<th>Magur</th>
<th>CharaPona (Small sized mix IMC)</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
<td>DhurvaHaat</td>
<td>52</td>
<td>34</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Daily Market (Near Railway track)</td>
<td>72</td>
<td>46</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ranchi</td>
<td>SilliHaat</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Jona Bazaar Haat</td>
<td>15</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Jaina More fish Market</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Petarwar</td>
<td>87</td>
<td>56</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Gumla</td>
<td>PalkotHaat &amp; daily Market</td>
<td>35</td>
<td>23</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Gumla</td>
<td>GumlaHaat &amp; Daily Market</td>
<td>69</td>
<td>45</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Latehar</td>
<td>Latehar Daily Market</td>
<td>100</td>
<td>65</td>
<td>10</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

All figures in quintals

8-10 different riverine fish (annexed with this report) which are self-stocking in nature but in very less volumes are often found in rural markets or haats. There is no consistency in supply of these fish varieties since catch is not guaranteed and markets are also not present for bigger size catch of these fish. Small variety fish like Murola and Punti are also coming into Jharkhand from Bihar’s Sasaram and other areas which are also sold as local.
Latehar market which has 2 haat days every week on Saturday and Tuesday is found to have a requirement of 6 quintals on Saturday alone. Daily requirement is 3-4 quintals every day with 4-5 quintals on Tuesday. The fisheries department had supplied 412 farmers with fish feed supplied from Bengal. 50-60% of markets of Latehar are being serviced from local fish.

Following is the depiction of the entire supply chain of fish in Jharkhand:
Study on Fish demand and supply and engagement of private sector in the fish sub sector in Jharkhand

Fish Supply Chain of Jharkhand

Urban Consumers

- Retailers in urban centres e.g Ranchi, Jamshedpur, Bokaro, Dhanbad

Hotels, Canteens, Institutions

- Cleaning, Scaling & cutting (Urban)

Rural Consumers

- Fish from local ponds, rivers and reservoirs – Rohu, Katla, Mrigel, Common carp, Pangus, Tilapia

- Smoking of fish

Fish from Andhra Pradesh – Rohu, Katla, Mrigel, Pangus

- Syndicate / Commission Agents / Traders exclusively dealing in Andhra Fish at Dhanbad, Bistupur, Ranchi, Ramgarh, Jaina More

Fishing communities

- Fishermen / women selling in haats

- Fish from local ponds, rivers and reservoirs – Rohu, Katla, Mrigel, Common carp, Pangus, Tilapia

- Indigenous Fish from local ponds & rivers – Goby, catfish, snakehead, Shrimps, snails

Marine/ brackish water fish from Odisha / Disha / Basirhat – Bhetki, BholaPomphret, Prawns, Crab, Hilsa, Pabda, etc.

- Live Magur, Koi, Tilapia from West Bengal

- Live Fish from Moyna - Rohu, Katla, Mrigel, CharaPona

- Small Fish from Bihar – Murola, Ponthi, Chuna

- Fish from Andhra Pradesh – Rohu, Katla, Mrigel, Pangus

Commission Agents / Traders dealing in Marine Fish at Ranchi, Sakchi, Bokaro and Dhanbad

- Commission Agents / Traders in Ranchi, Sakchi, Dhanbad, Bokaro, Gumla, Latehar, Lohardaga, Khunti, Chaibasa, Dumka, etc.

Bihar Markets (Pangus)

Cleaning, Scaling & cutting (Rural)

Fish retailers in towns and haats like Gumla, Latehar, Lohardaga, Khunti, Chaibasa, Dumka, etc.

Smoking of fish

- Rural Consumers

- Fish from Odisha / Disha / Basirhat – Bhetki, BholaPomphret, Prawns, Crab, Hilsa, Pabda, etc.

- Marine/ brackish water fish from Odisha / Disha / Basirhat – Bhetki, BholaPomphret, Prawns, Crab, Hilsa, Pabda, etc.

- Live Magur, Koi, Tilapia from West Bengal

- Live Fish from Moyna - Rohu, Katla, Mrigel, CharaPona

- Small Fish from Bihar – Murola, Ponthi, Chuna

- Fish from Andhra Pradesh – Rohu, Katla, Mrigel, Pangus

- Fish from local ponds, rivers and reservoirs – Rohu, Katla, Mrigel, Common carp, Pangus, Tilapia

- Indigenous Fish from local ponds & rivers – Goby, catfish, snakehead, Shrimps, snails

- Bihar Markets (Pangus)

Cleaning, Scaling & cutting (Urban)

- Retailers in urban centres e.g Ranchi, Jamshedpur, Bokaro, Dhanbad

- Fish retailers in towns and haats like Gumla, Latehar, Lohardaga, Khunti, Chaibasa, Dumka, etc.

Urban Consumers

- Hotels, Canteens, Institutions

- Cleaning, Scaling & cutting (Urban)

- Fish from Andhra – Rohu, Katla, Mrigel, Pangus

- Fish from local ponds, rivers and reservoirs – Rohu, Katla, Mrigel, Common carp, Pangus, Tilapia

- Indigenous Fish from local ponds & rivers – Goby, catfish, snakehead, Shrimps, snails

- Bihar Markets (Pangus)

Cleaning, Scaling & cutting (Rural)

- Fish from local ponds, rivers and reservoirs – Rohu, Katla, Mrigel, Common carp, Pangus, Tilapia

- Indigenous Fish from local ponds & rivers – Goby, catfish, snakehead, Shrimps, snails

- Bihar Markets (Pangus)
**Weekly selling pattern of fish:** A look into the total quantity of the surveyed fish markets in Jharkhand reveals the following selling pattern over the week:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Place</th>
<th>Market Name</th>
<th>No. of traders</th>
<th>Weekly Analysis of sales (Quintals) - Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>T</td>
</tr>
<tr>
<td>1</td>
<td>Ranchi</td>
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<td>33</td>
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<td>100</td>
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<tr>
<td>2</td>
<td>Ranchi</td>
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<tr>
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<td>Ranchi</td>
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<td>4</td>
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<td>2</td>
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<td>4</td>
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<td>6</td>
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<td>7</td>
<td>East Singhbhum</td>
<td>Bistupur Wholesale fish market, Jamshedpur</td>
<td>6</td>
<td>300</td>
<td>300</td>
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</table>

*All figures are in quintals*
Seasonal variance in the arrival of fish in markets

Following is an analysis of the change in fish sales based on different seasons.

**Urban Markets**: January to June

<table>
<thead>
<tr>
<th>District</th>
<th>Market name &amp; Place</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
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<td>323</td>
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<td>18</td>
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<td>12</td>
<td>11</td>
<td>13</td>
<td>13</td>
<td>17</td>
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<td>2542</td>
<td>2213</td>
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<td>156</td>
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<td>E. Singhbhum</td>
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<td>164</td>
<td>149</td>
<td>130</td>
<td>154</td>
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<td>E. Singhbhum</td>
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<td>1691</td>
<td>1534</td>
<td>1336</td>
<td>1590</td>
<td>1625</td>
<td>2065</td>
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*All figures are in MT (Metric Ton)*

**Urban Markets**: July to December

<table>
<thead>
<tr>
<th>District</th>
<th>Market name &amp; Place</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
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<td>331</td>
<td>250</td>
<td>312</td>
<td>250</td>
<td>316</td>
<td>374</td>
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<tr>
<td>Ranchi</td>
<td>Daily Market</td>
<td>15</td>
<td>11</td>
<td>14</td>
<td>11</td>
<td>14</td>
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<td>Ranchi</td>
<td>Kokar Fish market</td>
<td>11</td>
<td>8</td>
<td>10</td>
<td>8</td>
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<td>12</td>
<td>140</td>
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<tr>
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<td>131</td>
<td>105</td>
<td>133</td>
<td>157</td>
<td>1768</td>
</tr>
<tr>
<td>E. Singhbhum</td>
<td>Sakchi Fish Market, Jamshedpur</td>
<td>133</td>
<td>100</td>
<td>125</td>
<td>100</td>
<td>127</td>
<td>150</td>
<td>1690</td>
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<tr>
<td>E. Singhbhum</td>
<td>Bistupur Wholesale fish market, Jamshedpur</td>
<td>1368</td>
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<td>1308</td>
<td>1548</td>
<td>17420</td>
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</tbody>
</table>

*All figures are in MT (Metric Ton)*

**Rural Markets**: January to June

<table>
<thead>
<tr>
<th>District</th>
<th>Market name &amp; Place</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
<td>Dhurva Haat, Ranchi</td>
<td>61</td>
<td>55</td>
<td>48</td>
<td>57</td>
<td>58</td>
<td>74</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Daily Market, Silli</td>
<td>83</td>
<td>76</td>
<td>66</td>
<td>78</td>
<td>80</td>
<td>102</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Silli Haat</td>
<td>13</td>
<td>11</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Ranchi</td>
<td>Jona Bazaar Haat</td>
<td>17</td>
<td>15</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Jaina More fish Market</td>
<td>13</td>
<td>11</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Petarwar</td>
<td>101</td>
<td>92</td>
<td>80</td>
<td>95</td>
<td>97</td>
<td>123</td>
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<tr>
<td>Gumla</td>
<td>Palkot Haat &amp; daily Market</td>
<td>40</td>
<td>37</td>
<td>32</td>
<td>38</td>
<td>39</td>
<td>49</td>
</tr>
<tr>
<td>Gumla</td>
<td>Gumla Haat &amp; Daily Market</td>
<td>81</td>
<td>73</td>
<td>64</td>
<td>76</td>
<td>78</td>
<td>99</td>
</tr>
<tr>
<td>Latehar</td>
<td>Latehar Daily Market</td>
<td>116</td>
<td>105</td>
<td>92</td>
<td>109</td>
<td>112</td>
<td>142</td>
</tr>
</tbody>
</table>

Nirmallya Mandal
Study on Fish demand and supply and engagement of private sector in the fish sub sector in Jharkhand

All figures are in MT (Metric Ton)

Rural Markets - July to December

<table>
<thead>
<tr>
<th>District</th>
<th>Market name &amp; Place</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
<td>DhruravaHaat, Ranchi</td>
<td>49</td>
<td>37</td>
<td>46</td>
<td>37</td>
<td>47</td>
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<tr>
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<td>Daily Market, Silli</td>
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<td>64</td>
<td>51</td>
<td>64</td>
<td>76</td>
<td>858</td>
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<tr>
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<td>10</td>
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<td>12</td>
<td>130</td>
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<tr>
<td>Ranchi</td>
<td>Jona Bazaar Haat</td>
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<td>13</td>
<td>10</td>
<td>13</td>
<td>15</td>
<td>174</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Jaina More fish Market</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>130</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Petarwar</td>
<td>82</td>
<td>62</td>
<td>77</td>
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<td>78</td>
<td>92</td>
<td>1040</td>
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<tr>
<td>Gumlha</td>
<td>PalkotHaat&amp; daily Market</td>
<td>33</td>
<td>25</td>
<td>31</td>
<td>25</td>
<td>31</td>
<td>37</td>
<td>416</td>
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<tr>
<td>Gumlha</td>
<td>GumlaHaat&amp; Daily Market</td>
<td>65</td>
<td>49</td>
<td>62</td>
<td>49</td>
<td>62</td>
<td>74</td>
<td>832</td>
</tr>
<tr>
<td>Latehar</td>
<td>Latehar Daily Market</td>
<td>94</td>
<td>71</td>
<td>89</td>
<td>71</td>
<td>90</td>
<td>106</td>
<td>1196</td>
</tr>
</tbody>
</table>

All figures are in MT (Metric Ton)

As is evident from the tables, the seasonal variation highlights that fish sales are more just before the monsoons owing to the marriage season and also in winters.

Ranchi level market players have reported that availability of ice during summers is a major issue. The price of ice blocks go up to Rs 500 per piece during summers from the normal rates of Rs 150-170 per piece.

**Pricing of fish**

An analysis of the pricing structures of the studied Jharkhand fish market with respect to common varieties of fish is as follows:

<table>
<thead>
<tr>
<th>Type of variety</th>
<th>Urban (Price range) Rs./kg</th>
<th>Rural (Price range) Rs./kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wholesale</td>
<td>Retail</td>
</tr>
<tr>
<td>Rohu - 1 Kg size (AP)</td>
<td>105-120</td>
<td>125-150</td>
</tr>
<tr>
<td>Rohu live (WB)</td>
<td>140-160</td>
<td>150-180</td>
</tr>
<tr>
<td>Rohu local</td>
<td>180-200</td>
<td>200-225</td>
</tr>
<tr>
<td>Catla - 1 Kg size</td>
<td>140-160</td>
<td>160-200</td>
</tr>
<tr>
<td>Catla live</td>
<td>150-175</td>
<td>180-220</td>
</tr>
<tr>
<td>Catla local</td>
<td>180-220</td>
<td>220-250</td>
</tr>
<tr>
<td>Magur</td>
<td>80-100</td>
<td>100-120</td>
</tr>
<tr>
<td>Pangus</td>
<td>90-110</td>
<td>110-130</td>
</tr>
<tr>
<td>Common Carp</td>
<td>100-120</td>
<td>120-150</td>
</tr>
<tr>
<td>Bata</td>
<td>75-100</td>
<td>80-120</td>
</tr>
<tr>
<td>Tilapia</td>
<td>60-80</td>
<td>80-120</td>
</tr>
<tr>
<td>Tengra</td>
<td>120-150</td>
<td>140-160</td>
</tr>
<tr>
<td>Bam</td>
<td>180-220</td>
<td>200-250</td>
</tr>
<tr>
<td>CharaPona (Small sized mix IMC)</td>
<td>40-60</td>
<td>50-75</td>
</tr>
</tbody>
</table>

Rural Markets are quite price sensitive although there is a preference of fresh fish. Supply of Andhra fish in Latehar is forwarded from Ranchi and hence retail prices of
Latehar are more than that of Ranchi by around Rs 20 per kg. The preference of rural people including tribal population have been found to be more on fish like Magur which are generally live and appear fresh but at the same time is cheaper than other variants. However, Magur is primarily supplied from West Bengal.

Local fish generally sells at higher rates than AP fish but storage of this fish is generally not as successful as their AP counterparts. Hence the price fluctuation of local and live fish is quite high.

A typical dynamics of local fish is that there are generally more local fish sellers in rural market than sellers of AP fish but the majority of them are direct fishermen and the quantity of these fish vary largely depending on catch, day of the week, season, etc. factors. The sellers of AP fish are on the other side more consistent and regular. The total quantity sold by each of them is quite more than the local fish sellers. This signifies the lack of consistent marketing channels of local fish as compared to that of AP Fish. Some sellers sell local as well as AP fish from the same counter. Fish carried by local fishermen is often carried in a special bamboo or cane basket called *Kholi* (picture alongside) specially designed to carry live fish.

It is observed that all value chain players support each other since the perishability of the produce dictates that sale of the produce is very important. Hence relationships between various players are very critical.

A typical dynamics of rural haats as markets is that small amounts of fish displayed on a Sal leaf plate constitutes a unit which is sold at a fixed price. This type of arrangement is often done by women sellers who sell very less quantity of fish and do not have weighing scales. This type of arrangement also connects well with rural illiterate consumers who find it difficult to calculate quantum of fish with per kg price.

A fish seller generally does not promote local fish because of the lack in consistency in supply. Secondly the farmer never focuses on building relationships with the seller which builds trust and dependability.

The consumer also plays an important role here. Preference of fish based on specific species is not as strong in rural and low income areas as in other districts with non-tribal population. Thus demand for low cost Magur is more in Latehar and Gumla which is both live and less costly.
Production in the last 5 years in Jharkhand has enhanced considerably both in reservoirs as well as ponds. However, focus on marketing has not been provided much from the government. Pangus from Jharkhand’s cage cultures is being supplied to Bihar markets. Demand of Pangus in Jharkhand is less.

Selling is a typical skill which the seller is equipped with. There also exists a network between sellers of AP fish. Also the produce from AP has longer shelf life. These factors are missing for the local fisherman who has no idea of demand, marketing skills or adequate storage. Thus only production will not suffice. The lopside of high productivity may result in glut in some days where more production comes in the local market. It is thus important to create a management network or portal where the total production of Jharkhand will be mapped with respect to the local market capacity. Also the choice of geographies based on market requirements need to be planned to reduce logistics issues.

Local fishermen also are not skilled in cleaning, scaling and cutting the fish to cater to consumers, especially in urban and semi urban areas. No service providers exist to assist these direct sellers unlike the AP fish seller who keeps 2-3 additional labour specialized for this.

**Value Addition of Fish:**

While no organized MSME or enterprise was reported to be processing fish in Jharkhand, sale of dry fish and smoked fish in rural haats is common. Dry fish in Jharkhand follows a different channel which arises from Kolkata and haat level vendors procure the same directly from Kolkata. Dry fish sold constitutes both marine and fresh water fish varieties like shrimps, Bombay duck, Murola etc.

Smoked fish on the other hand is local phenomenon where mainly tribal women procure fresh fish from traders and smokes them at home using indigenous fire wood. This smoked fish is then sold in the haats directly by these women (picture alongside). The ratio of fresh fish (from all sources) with that of smoked fish and dry fish is less than 1% and thus has not been included in the calculation of per capita consumption or demand estimation.
4.2. Andhra Pradesh

Andhra Pradesh is strategically located on the South-Eastern coast of India and is the natural gateway to East and South East Asia. Andhra Pradesh has fertile river basins, extensive canal system and conducive agroclimatic conditions for fishery promotion. The state has 974 kms of coastline and is one of the largest producers of marine products. The state’s coastline is also dotted with numerous major and minor ports and has a long sea faring tradition. Besides, the state has around 8.11 lakh inland water bodies which encourage inland fish production. With 23.52 lakh MT in 2015-16, Andhra Pradesh is the largest fish producing state in the country. Since the late 1970s, fish culture in AP has undergone a boom (first with Indian major carps, then pangasius), resulting in expansion of pond area to 142,000 ha, and massive increases in inland farmed fish production, to 1.5 million tons.

Andhra Pradesh’s major inland fish output comes from the 3 districts of East Godavari, West Godavari and Krishna which is more than 85% of the total fish production of the state. The vast network of fresh water canals from Krishna and Godavari rivers along with the ideal weather conditions and enabling business environment has helped fish farmers of the area to produce fish as a business. There are 2 different kinds of market in this region which are

- Typical wholesale and retail markets catering to cities like Vijayawada, Guntur, Eluru etc. cities, local towns and villages and also nearby areas of neighbouring Tamil Nadu. These markets are supplied by fish farmers from the nearby vicinity and constitute a range of fish which are Shelavati (Rohu), Bocha (Katla), Bangur Thega (Gold Fish or Thai Punti), Jella (Pangus), Oak Jella (Tengra), Gadichappa (Grass Carp), Karramosu (Mrigel), Pilot Gorkha (Tilapia), Nat Gorkha (Koi), Ingele (Singhi), etc.
- MSMEs, Companies and exporters having own large scale production of fish as well as procuring fish from large farmers to pack and send the same to different states across India. This constitutes only of Indian Major Carps, with 80% Rohu, 20% Katla and 10% others constituting mainly of Pangus, Roopchand and Koi. Fish is systematically reared by fish farmers following an elaborate package of practices which ensures a high productivity in the region.

A typical market like Eluru in West Godavari district, there are around 50-60 wholesalers who also work as commission agents. There are around 50 retailers in the same market who procures fish from these wholesalers and each have an average sale of 25 to 30 kgs. While Sundays and Wednesdays see a surge in the sales, Mondays and Thursdays are days with lesser sales. Thus the town has an average daily sale of around 1 to 1.5 tons per day. In addition to this, there are around 10-12 dry fish retailers. The wholesale market operates from 4AM till 7 AM while the retail
market, adjacent to the wholesale yard operates from 7 AM till noon and again in the evening.

Eluru retail market in AP

Loading of drums containing live Koi-AP

Infrastructure in these markets is generally well organized with cemented raised platforms for most sellers and cleaning of the premises being done by the local municipal authorities. These retail markets were found to sell fish as whole pieces only without actually weighing. The retailers however buy fish from wholesalers on weight basis. A customer who buys the fish gets it cut and dressed by separate dressers who charge around Rs 30-35 per fish. All these sellers are primarily women sellers. There is a fish seller union which also helps the members in loaning amounts for day to day business. Some of these retailers also procure fish from local level farmers directly but such numbers are very less.

The wholesalers also act as commission agents where 8% is charged as commission on the fish sold. Fish is sold through auction. There are several intermediary sub-wholesalers in Eluru market who also procure fish from local fish farmers and earn a commission of Rs 1-2 per Kg of fish. The wholesalers in the Elurumarket has around 20 of them sending fish to places like Kolkata, Khammam, Warangal, Vijayawada, Hyderabad etc. Around 60-70% of the fish of this market goes to Kolkata and other places of West Bengal. The major fish being supplied to Kolkata markets is live Koi which is packed in drums containing 15 kgs of koi fish and water. 250 such drums constitute one truckload of 10 tons. Other fish traded by the Eluru based wholesalers include Singhi, Rohu, Katla, Mrigel, Tilapia, prawns etc. Some wholesalers also have trade links to Jharkhand. But as mentioned earlier, Jharkhand has a supply of only Rohu, Katla and Mrigel with a little quantity of Pangus. During the off seasons of the summers and monsoon, the rates go down and activity in the fish market reduces. The companies however trade all through the year. Rohu fish is the main decision maker for market rates. Katla is always Rs 20/kg dearer than Rohu.

The companies which operate out of these districts have a different business model altogether. Companies generally use their trade names as initials of the proprietor or company name. Some renowned names are DNS, KS, NGS, AFI, LFS etc. West Godavari district alone is reported to supply 1500 tons of fish every day to different market of
India across various states. These companies regularly supply to markets of Kolkata, Siliguri, Howrah, Guwahati, Agartala, Dimapur, MP, UP, Gujarat, Uttarakhand, etc. The farthest point is reported to be Agartala which is 3500 kms away and takes 8 days to reach. Arnav Fish International is a player in Narayananpuram near Eluru which has a direct connection with Dhanbad and Jamshedpur markets of Jharkhand.

The companies generally have in-house production of ice, thermocol boxes and other packing materials and transport. They operate in all three districts of the region and have multiple ice production centres. The companies have a direct engagement with farmers in a radius of 15-20kms and sometimes also through agents. The fish farming in Andhra is professionally managed to have 2 harvests in a year. The package of practices for farmer fishermen is managed in a manner so as to have a consistent supply all the year round. The planning is quite meticulous and farmers generally know the quantity of expected produce to be harvested in upcoming months. Majority tank owners are not farmers and have leased out their tanks at Rs 1 lakh per acre. The production cycle of fish has been reduced to around 6 months where the farmer stocks 200 gms size fingerlings for faster growth. There are also ample suppliers of fingerlings in the local vicinity who run a business model of rearing spawns to fingerlings.

Prices are negotiated before-hand and advances are paid to seal the deal. Sometimes the farmer directly makes contact with traders in other states and takes the services of these companies to pack and transport the fish only. Packing costs of 1 truckload of 10 tons is around Rs 85000. Nowadays, packing material used is thermocol boxes of standard size which holds 40 kgs of fish. One truckload of 10 tons hold 240 boxes while a 12 ton truckloads holds 300 boxes. Fish to Jharkhand is supplied only in 10 tons truckloads. For every 10 boxes of Rohu, 1 box of Catla is supplied.

Preference of fish sizes in different markets is as follows:

<table>
<thead>
<tr>
<th>Size of each Fish</th>
<th>Markets where supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3 Kg Size</td>
<td>Bengal</td>
</tr>
<tr>
<td>700 - 800 gms size</td>
<td>Bhubaneswar, Cuttack, Mumbai, Pune</td>
</tr>
<tr>
<td>1 Kg size</td>
<td>Delhi</td>
</tr>
<tr>
<td>1kg – 1200 gms</td>
<td>Jharkhand, UP, Bihar</td>
</tr>
</tbody>
</table>

2 days before the fish is to be harvested, the farmer stops feeding and reduces the water level. On the day of harvesting, plastic crates are loaded with crushed ice and taken to the tank where the fish is immediately chilled and frozen after the harvest. The chilled fish is then brought back to the factory premise where they are reloaded in thermocol boxes with ice and loaded on the truck after coding. The coding system of all boxes which is an alphabet followed by a number. The alphabet is generally R for Rohu, K for Catla and F for Pangus and the number signifies the number of pieces in the specific 40
kg box. This is noted down on the challan of transport.

Packaging of Andhra fish is its unique selling proposition. The truckloads are thus specially packed for the purpose. There is a layer of thick thermocol sheets which envelops the entire packaging. After placing the thermocol insulated boxes, the empty spaces between the boxes are filled with paddy husk and the entire truckload is wrapped in tarpaulin sheets making them weatherproof. This arrangement keeps the fish frozen and insulated for up to 10 days.

As a result of this packaging, the fish stays fresh for a long time and enhances the shelf life. Live fish sold in different markets, on the other hand, starts deteriorating in quality after the fish dies. Freezing the fish after it dies do not help in preserving the fish. The boxes also have a better distribution dynamics since they need not be returned and are kind of disposable unlike plastic crates which need to be returned.

There are regular exports of Andhra fish to other countries like Bangladesh, Mayanmar, Nepal, Bhutan etc. West Bengal absorbs almost 60% of the entire produce of this region and is thus the rate decider as well. Average wholesale prices of procurement of Rohu vary from Rs 93 for cash to 94 per kg for credit as offered to farmer. The rate rises in summer due to the rate hike in price of ice which goes up from 170-180 per block to 300-350 per block.

Payment systems of Andhra Fish generally run into credits and there are often bad debts as well. Jharkhand markets are often reported to bring up issues of non-payments and over dues. There is a union of all fish supply companies in the region and to control bad debts, this union facilitates the meeting of debtors with these companies once a year where pending debts are negotiated and written off. This is done under the knowledge of the union to ensure that no other company supplies fish to the buyer whose debts are not cleared with one of the members.
The value chain system of movement of fish from Andhra Pradesh to Jharkhand is as follows:

Contrary to earlier systems, nowadays the fish supplied from Andhra Pradesh do not go through auctions in the destination markets including Jharkhand. Rate fixation of this fish happens at Rs. 90 to 100 per kg beforehand with the trader in AP. The cost of transport and packing along with a margin for the trader is added to this base rate and fixed for the destination market. The supply of fish is arranged in a manner where and 1 Kg Catla is supplied for every 10 kgs of Rohu. This ratio converts to 4 boxes of Rohu and 1 box of Catla after it reaches Jharkhand. Catla demand is more in West Bengal and at times whole truckload of Catla not sold in Jharkhand is diverted to West Bengal especially during wedding seasons. Credit is often provided among known players. Once a year, the credit outstanding is nullified.

Fish procured by the companies are packed and dispatched to specific markets through local agents located there. These agents are generally responsible for collecting dues and sending the money back to the supplier and also raise fresh demand from buyers. The commission system in AP fish has slowly replaced itself by the fixed pricing system to reduce risks of the farmers and also bring stability in the market as far prices are concerned.
Akividu is one such market where there are around 1000 traders coming in from different markets. While fish is supplied to markets of Tamil Nadu, Bangalore, Tirupati, Kerala, Howrah, Jharkhand, etc. markets, the place is also dotted with quite a few fish supply companies. Mister International, one such big company deals in 10-12 truckloads every day. Other brands include BKB, DRC, KRD etc.

4.3. West Bengal

West Bengal is one of the maritime states in the country located within 21°38’ – 27°10’ N (Lat.) and 85°38´- 89° 50´E (Long) with an area of 87,853 sq. km. Bestowed with all types of fisheries resources of immense potentiality spread over the State from the south in marine jurisdiction in the Bay of Bengal to the north with the cold water region at the base of the Himalayas. It is considered to be the nature’s best boon to provide the scope for development in the sector through different disciplines and directions of the fisheries economic activities. There is about 3.2 million fishermen population out of 91.3 million human populations.

The estimated annual fish production in the year 2015-16 is 16.71 lakh MT where production growth rate has increased 13.52% compared to annual fish production 14.72 lakh ton during 2011-12. Fresh water fisheries cover about 80 to 85% of total closed water system. The average productivity in inland has been 4000-4750 Kg /ha/ annum by 2015-2016 while the maximum achieved has been more than 13 tons/ha.

West Bengal contributes approximately 21-23% of Inland fish production of the country. West Bengal tops the list of fish seed-producing states. The fish seed production in the year 2015-16 reached 17521 million and enabled West Bengal to supply seed to adjacent states including Jharkhand. West Bengal is the pioneer and leader in production of fish seed in India. It contributes approximately 37-40% of the total seed production in the country. Two major fish seed markets of the state are (i) Rajendrapur (Naihati) and (ii) Ramsagar (Bankura) facilitates fish seed trade to be more competitive, maintaining quality for both domestic and national market. Fish Seed selling in Naihati is decades old. Local fish farmers cultivate seedlings and sell it at Naihati, Rajendrapur, even during summer and monsoon (picture alongside). About 100 Crore of fish seedlings are being sold every day during the peak season of 8 (eight) months starting from June and ending in February. For the remaining four months, the seedlings seedlings are sold but the number is not appreciable appreciable.

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3 Source: Handbook of Fisheries Statistics 2015-2016, Govt. of West Bengal
Variousspecies of seedlings like Rohu, Katla, Mrigel, Punti, Tangra, Shrimps, Pangas and Bhetki are sold through this market.

Likewise, Ramsagar in Bankura District has been a pioneer in fish seed production since long. The place houses a cooperative of more than 150 fish seed producers who have a joint capacity of supplying 200 crore fish seedlings per day (picture alongside). Fish seed available range from Rohu, Katla, Mrigel, Silver Carp, Bata, Grass Carp, JapaniPunti etc. Price of 135 ml bowl containing around 40000 spawns cost around Rs 150 to 200 per bowl. It is reported that officials from fishery department of Jharkhand regularly visits the cooperative and the department of Jharkhand has also empanelled some suppliers for fish seed supply to beneficiaries in Jharkhand. However, the quality of these fish seeds is reportedly not very good to promote good stocking.

There are about 477 wholesale and 3157 retail markets in our state. Nearly, 3717 wholesalers and 44349 retailers are doing their trades in those markets. The whole sale & retail market prices of different fish species varies from market to market and also place to place. The markets which are in close vicinity to Jharkhand often affect the supply in the neighbouring areas. E.g. Jhalda in Purulia district being in close proximity to Silli town of Ranchi district, has an established channel of supply of Andhra fish through suppliers and traders in Jhalda. Asansol Market near the eastern border of Jharkhand also is the epicentre of around 4-5 truckloads of Andhra fish and other variety fish coming from other places. Likewise markets in Malda of West Bengal cater to areas of Sahebganj and Pakur districts of Jharkhand. This market also supplies fish to the bordering and neighbouring villages of Jharkhand. However, Dhanbad being a major center for Andhra fish also supplies fish to towns and cities in West Bengal like Durgapur and Raniganj.

West Bengal markets offer a wide range of fish to consumers who have a special knack for different varieties of fish. This includes marine and brackish water varieties along with a large portion of crabs, prawns and shrimps. This trend is minimal in Jharkhand where the major focus is only on Indian Major Carps, Pangus and sporadically Magur in some clusters. Jamshedpur, Bokaro and some parts of Dhanbad and Ranchi are the only markets which receive a regular supply of such high value fish but in very small quantities.

Since 2-3 years Moyna area of PurbaMedinipur in West Bengal has come up as a major supplier for Jharkhand, especially for live fish. The place is being developed by govt. of West Bengal as a special cluster for fisheries and a lot of enterprises have come up in
the area resulting in the overall fish production growth and marketing channel establishment all around. Live Fish from Moyna is supplied to distant markets of Jharkhand including Jamshedpur, Ranchi, Bokaro, Dhanbad etc. regularly in large quantities. The fish is kept alive by converting the load area of a pickup truck into a tank using tarpaulin and plastic sheets along with a diesel pump set used to aerate the water. One such pickup truck arrangement holds around 600-700 live carps. They are also called CharaPona and weigh 600-700gms each of Rohu, Katla and Mrigel. Hybrid Magur is also supplied from West Bengal to Jharkhand in cylindrical drums.

The quantum of live fish arriving in various urban markets of Jharkhand has been quite high from Moyna and some traders reported that particularly in winters, the demand for fish is on a higher side when this live fish from Moyna has actually captured around 50% of the market share of Andhra fish. It is found that 10-12 such pickup trucks carrying approximately 7 tons of fish arrive at Ranchi every day from September to February every year. When questioned, these players generally lie about their source of fish to be from local areas like Bundu to evade the notice of authorities. However, they can be easily identified from the West Bengal registration of the vehicles that are used for the purpose. Live fish and local fish are often auctioned in all the major urban markets through commission agents. Live fish from Moyna generally command a better rate than their counterparts from Andhra Pradesh but run the risk of plummeting rates after these fish die.

Hybrid Magur is another big area of supply from West Bengal which is generally reared in Basirhat area of North 24 Parganas or Digha area of Purba Medinipur. Hybrid Magur is transported in drums with water to keep them alive.

It is observed that all value chain players support each other since the perishability of the produce dictates that sale of the produce is very important. Hence relationships between various players are very critical. In Asansol it was observed that the trader bears some expenses of the retailers and also provides regular tiffin to attract them and maintain relationships.

4.4. Odisha

Odisha is one of the major maritime states, offering vast scope for development of inland, brackish water and marine fisheries. The State’s 480 km long coastline with 24,000 sq. km area within the continental shelf has ample potential for marine fisheries development. Freshwater resources of the State are estimated to be 6.76 lakh ha comprising 1.25 lakh ha of tanks/ponds, 2 lakh ha of reservoirs, 1.80 lakh ha of lakes, swamps & jheels and 1.71 lakh hectares of rivers and canals. The State’s brackish water resources are of the order of 4.18 lakh ha with a breakup of 0.79 lakh ha of Chilika Lake, 2.98 lakh ha of estuaries, 32,587 ha of brackish water area and 8,100 ha of backwaters.

4 Source: Odisha Fisheries Policy 2015, Govt. of Odisha
Odisha produces 5.21 Lakh Metric tons of fish (2015-16) annually. The major contribution to Jharkhand from Odisha is the brackish water and marine fish which enters Odisha through Jamshedpur and Dhanbad sometimes via Kolkata. The value of marine fish from Odisha is growing steadily over the years, the same being Rs. 181481 Lakhs in 2013-14

Inland fishery production of Odisha is way below its demand and consumption and like other states in the region, sources fish from Andhra Pradesh to meet its fresh water fish demand. Important urban centres like Rourkela are found to be a hub for Andhra Fish which also supplies to neighbouring areas of Simdega and Gumla, especially for the typical Andhra Rohu, Katla, Mrigel and Pangus.

The major fish supplied to Jharkhand from Odisha include marine and brackish water varieties like Bhetki, Bhola, Mackerels, Pomphret, Prawns, Lobsters, Crabs, Fesa etc. Sometimes the same fish enter Jharkhand markets via Kolkata where the fish is traded from Kolkata. These fish generally are packed in refurbished thermocol boxes and completely sealed with ice using brown tapes. These boxes are then sent to Jharkhand on transport as well as on bus tops. Being high valued fish, these fish have a small circle of consumers and was found to be sold only through specific channels in cities like Jamshedpur, Ranchi, Bokaro and Dhanbad only. These fish has very little penetration in rural areas. 2-3 boxes in 3-4 days a week is the average entry of these fish in Ranchi.

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5 Source: Ministry of Statistics and Programme Implementation, Govt. of India
5. Fish Consumer Analysis in Jharkhand

Under the Study a quantitative fish consumer study was undertaken in 4 rural location; Latehar, Gumla, Silly block of Ranchi district and Paterwar block of Bokaro district and 3 urban locations; Ranchi, Bokaro and Jamshedpur (Tata Nagar). Primary data from fish consumers was collected with the help of duly structured schedule in electronic format. The selection of respondents was undertaken using random stratified sampling method.

During the study a total of 120 fish consumers were interviewed from both urban and rural locations. The following is the geographical distribution of the samples.

<table>
<thead>
<tr>
<th>District</th>
<th>Location</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranchi</td>
<td>Ranchi</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silly</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>East Singhbhum</td>
<td>Jamshedpur</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Bokaro</td>
<td>Bokaro</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paterwar</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Gumla</td>
<td>Gumla, Palkot</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Latehar</td>
<td>Latehar</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

Profile of the respondents

Majority of the respondents were in the age group of 20 to 50 years while 83% were male respondents.

Focus was given to have an adequate representation of all social categories in the respondent group both in rural and urban areas.
Average family size of the respondents

The Average Family size of respondents was found to be 7.13 in Rural and 6.5 in Urban. 96% family members of respondents in Urban and 100% in family members of respondents in rural respectively were found to be eating fish. It is thus assumed that the quantity of fish purchased by the respondent is consumed by all fish eating members of the family.

Preference for different Non-vegetarian items

The following charts and the one above depict the first preference of rural and urban consumers respectively for different types of non-vegetarian food items. The same has been analysed category wise to reveal that chicken is by far the most preferred non-vegetarian food item followed by fish.

17% OBC respondents in Urban areas prefer fish as their first preference.
Seasonal frequency of eating fish

This chart depicts the frequency in which fish is consumed by the respondent family. This frequency is observed to be changing in different seasons where fish consumption in winter in urban areas goes up to 62% of respondents consuming fish every week from 35% consuming in Summers. Consumption in monsoons is found to go up in the urban areas as compared to reduction of fish consumption in monsoons in rural areas.

Preference for fish varieties

Rohu among all varieties is the most chosen fish in rural areas with 55% consumers preferring Rohu as their first choice in rural areas. Magur has 8% preference in rural areas by consumers as their first choice. Likewise, Rohu is also preferred by 45% urban consumers as their first preference followed by Katla.
Source of fish in the markets as per respondent

While 72% urban consumers reported buying fish sourced from ice boxes, 60% rural consumers reported buying fish fresh from river/pond. Ice box fish ideally refers to fish from Andhra Pradesh or unsold fish stored in ice. This showcases the knowledge level of consumers as well since in some rural markets, fish from Andhra Pradesh is also sold as fresh fish from local river or ponds. Also some rural markets have both types of fish in the same retail counter.

Preferences for fish vendors

94% of rural consumers were found to buy fish without any preference of specific market or vendor. On the contrary, 32% urban consumers buy...
fish from specific markets.

**Average quantity of fish purchased per market visit**

Urban consumers generally buy more quantity of fish per market visit to the tune of 67% buying 1-2 kgs per visit. The average quantity of fish purchased by different categories of consumers show that 92% ST category consumers buy 1-2 kgs of fish every time and 65% ST in the rural setting buy less than a kg of fish very time.

**Purchase preferences for whole fish and cut fish**

Only a section of urban consumers have a practice of buying a whole fish by weight. Cut
pieces are a regular affair in rural markets preferred by rural consumers more.

**Relation between the prices of other non-vegetarian products (Chicken) and fish purchase**

The price elasticity of fish with respect to other non-vegetarian products bring to light that a decrease in price of fish by 20% will trigger more fish consumption in 31% consumers but an increase in price of fish by 20% would not affect around 76% consumers. While the same prices of chicken and fish would instigate more chicken consumption and lesser fish consumption to the tune of 48% consumers reducing fish consumption.

6. **Demand and Supply estimation of fish in Jharkhand**

As per the findings of consumer study average quantity of fish purchased at one time by the rural and urban consumers are as follows.

**Estimation of per capita fish purchase as per the consumer study**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Rural</th>
<th>Urban</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Average quantity purchased each time/household (Kg)</td>
<td>1.1</td>
<td>1.26</td>
<td>1.2</td>
</tr>
<tr>
<td>B</td>
<td>Average Purchase frequency (times/week)</td>
<td>1.15</td>
<td>1.14</td>
<td>1.14</td>
</tr>
<tr>
<td>C</td>
<td>Average quantity purchased/week/household (Kg)</td>
<td>1.27</td>
<td>1.44</td>
<td>1.36</td>
</tr>
<tr>
<td>D</td>
<td>Average quantity purchased/annum(52 weeks)/household (Kg)</td>
<td>66</td>
<td>75</td>
<td>71</td>
</tr>
<tr>
<td>E</td>
<td>Average family size per household</td>
<td>7.13</td>
<td>6.5</td>
<td>6.81</td>
</tr>
<tr>
<td>F</td>
<td>Average % of fish eating members in family</td>
<td>100</td>
<td>96</td>
<td>98</td>
</tr>
<tr>
<td>G</td>
<td>Annual Average per capita purchase (kg)</td>
<td>9.29</td>
<td>11.32</td>
<td>10.3</td>
</tr>
<tr>
<td>H</td>
<td>Population of Jharkhand</td>
<td>25055073</td>
<td>7933061</td>
<td>32988134</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Scenario-1</td>
<td>Scenario-2</td>
<td>Scenario-3</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>I</td>
<td>Population of Jharkhand (0-6 years)</td>
<td>4367507</td>
<td>1021988</td>
<td>5389495</td>
</tr>
<tr>
<td>J</td>
<td>Net fish eating population (Total population-population of 0-6 years) as per census 2011 (H-I)</td>
<td>20687566</td>
<td>6911073</td>
<td>27598639</td>
</tr>
<tr>
<td>K</td>
<td>% of Non vegetarian population in Jharkhand-As per SAMPLE REGISTRATION SYSTEM BASELINE SURVEY 2014</td>
<td>96.75</td>
<td>96.75</td>
<td>96.75</td>
</tr>
<tr>
<td>L</td>
<td>Annual fish demand of the state (MT) on the census figure of 2011</td>
<td>186058</td>
<td>75702</td>
<td>274885</td>
</tr>
<tr>
<td>M</td>
<td>Decadal population growth (%)</td>
<td>19.5</td>
<td>32.3</td>
<td>22.4</td>
</tr>
<tr>
<td>N</td>
<td>Annual population Growth of Jharkhand (%)</td>
<td>1.95</td>
<td>3.23</td>
<td>2.24</td>
</tr>
<tr>
<td>O</td>
<td>Estimated population for year 2018 (Above 6 Years)</td>
<td>23501075</td>
<td>8472975</td>
<td>31904027</td>
</tr>
<tr>
<td>P</td>
<td>Net fish eating population in year 2018 (Non vegetarian and above 6 years)</td>
<td>22737290</td>
<td>8197603</td>
<td>30867146</td>
</tr>
<tr>
<td>Q</td>
<td>% Annual growth in per capita fish consumption (From year 1999-2000 to 2009-10) as per National Council of Applied Economic Research</td>
<td>2.77</td>
<td>0.82</td>
<td>1.82</td>
</tr>
<tr>
<td>R</td>
<td>Estimated demand of fish in year 2018 considering the growth in population and per capita consumption of fish</td>
<td>251997</td>
<td>97437</td>
<td>377347</td>
</tr>
<tr>
<td>S</td>
<td>Population estimated in 2023(Above 6 years)</td>
<td>25528456</td>
<td>9585658</td>
<td>35114115</td>
</tr>
<tr>
<td>T</td>
<td>Net fish eating population in year 2023 (Non vegetarian and above 6 years)</td>
<td>24698782</td>
<td>9274124</td>
<td>33972906</td>
</tr>
<tr>
<td>U</td>
<td>Estimated demand of fish in year 2023 considering the same growth rate in population and per capita consumption of fish</td>
<td>305630</td>
<td>110232</td>
<td>442415</td>
</tr>
</tbody>
</table>

The estimated demand and current production are mapped in the following chart with variance across 3 different scenarios when per capita fish consumption growth rate changes;
**Projection of Fish Demand and Production for Jharkhand State (All figures in Metric Tons)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated annual fish Production of Jharkhand</td>
<td>71890</td>
<td>91680</td>
<td>96600</td>
<td>104820</td>
<td>106430</td>
<td>116000</td>
<td>145000</td>
<td>166025</td>
<td>190099</td>
<td>217663</td>
<td>249224</td>
<td>285362</td>
<td>326739</td>
</tr>
<tr>
<td>Annual fish demand of Jharkhand (Scenario-1)</td>
<td>274885</td>
<td>285989</td>
<td>297542</td>
<td>309562</td>
<td>322067</td>
<td>335077</td>
<td>348613</td>
<td>362695</td>
<td>377347</td>
<td>392590</td>
<td>408449</td>
<td>424949</td>
<td>442115</td>
</tr>
<tr>
<td>Estimated annual fish demand of Jharkhand (Scenario-2)</td>
<td>274885</td>
<td>280933</td>
<td>287113</td>
<td>293430</td>
<td>299885</td>
<td>306483</td>
<td>313225</td>
<td>320116</td>
<td>327159</td>
<td>334356</td>
<td>341712</td>
<td>349230</td>
<td>356913</td>
</tr>
<tr>
<td>Estimated annual fish demand of Jharkhand (Scenario-3)</td>
<td>274885</td>
<td>288602</td>
<td>303004</td>
<td>318124</td>
<td>333998</td>
<td>350665</td>
<td>368163</td>
<td>386535</td>
<td>405823</td>
<td>426074</td>
<td>447335</td>
<td>469658</td>
<td>493094</td>
</tr>
</tbody>
</table>

**Assumptions:**
- Annual population growth rate remain same.
- Scenario-1: Annual per capita fish consumption and population grows as per the growth of previous decade
- Scenario-2: Growth rate in per capita fish consumption reduces by 50% over the previous decade
- Scenario-3: Growth rate in per capita fish consumption increases by 50% over the previous decade.

The current estimated annual demand of fish in the state of Jharkhand is 377347 MT under the existing rate of population growth and per capita growth in consumption of fish. This annual demand is 251997 MT in rural and 97437 MT in urban. Assuming the same growth rate this is expected to be 442415 MT in 2023.

The department of Fisheries reports an estimated annual fish production in the state of 190099 MT for 2018-19. This falls short of the demand by 187248 MT. The department reports the growth of the annual fish production to be 326739 MT by 2022-23. This will still fall short from the annual demand by 115376 MT at the growth existing rate. A
hypothetical situation where the per capita demand of fish reduces by 50% over the last decade, the annual demand of fish in the state comes to 356913 MT by 2023.

Following are some of the factors (indicative only) which may impact the supply and demand of fish over the years:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Sub Factor</th>
<th>Effect on per capita consumption of Fish and Demand*</th>
<th>Effect on Production and Supply of local fish*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatic Factor</td>
<td>Quantum and spread of rainfall resulting in drought/flood.</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Resource Factors</td>
<td>Availability and access to of fish seed</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Availability of finance</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Programmatic support (Government programs to promote aqua culture)</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Development of fish markets</td>
<td>-</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Establishment of cold storages</td>
<td>-</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Maintenance of cold chain logistics</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Establishment of ice factories</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Processing industries and processed fish products</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Digging and restoration of ponds for aqua culture</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td>Government Policies</td>
<td>Leasing of water bodies</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Market regulation act</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Support for processing and export industry</td>
<td>-</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Transportation policies</td>
<td>-</td>
<td>H</td>
</tr>
<tr>
<td>Disease out break</td>
<td>Major disease outbreak with in or near by state</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Demographic &amp; economic Factors</td>
<td>Population growth</td>
<td>M</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Percentage of fish eating population</td>
<td>H</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Changes in consumption of fish varieties</td>
<td>H</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Industrial Development</td>
<td>H</td>
<td>-</td>
</tr>
</tbody>
</table>

*H: High, M: Medium, L: Low
7. Issues and Recommendations

Jharkhand's department of fisheries has aggressively focused on many innovative interventions which is believed to have given a boost to the fishery sector in the state. The capacity building programs conducted by the department is reported to be quite comprehensive and effective in motivating new fish farmers to join the cause. The cage culture promoted in major reservoirs across the state is also believed to have harnessed a lot of growth in fish production of the state. The department has also prepared a large pool of MatsyaMitra or specialized resource persons for fishery extension and support. The entire interventions of Fishery department have been through fishermen cooperative societies which have strengthen local institutions.

However, the fish market study of Jharkhand has brought to light certain critical gaps and issues in the value chain which are causing a major hindrance in the path of growth for the sector.

- The local fish production of Jharkhand may have increased in the recent times but effective market channels for marketing the same has not been planned or implemented. The current enhanced production is finding its way into the market in a sporadic and unsystematic manner. The producers are highly disintegrated in Jharkhand. They produce fish without proper planning or market information. This is clubbed with the fact that they receive spawns and fingerlings brought in from West Bengal only after a lot of coordination with the fishery department and only few farmers really plan their production properly. Also farmers do not understand or even try to understand how the market operates. There are many instances when the especially markets of rural areas like Gumla and Latehar face shortage of fish on some day and glut on other days due to lack of planning in harvest and supply.

- The water availability across tanks and ponds in the dry seasons are a big hurdle. Coupled with extreme weather conditions in many districts, naturally the productivity of the state is not expected to match that of other progressive states. This calls for more water resource infrastructure development along with climate resilient fishing and marketing.

- The availability of fish seed is a major bottleneck not only in productivity enhancement but also in appropriate marketing of fish since the varieties of seed available are often restricted and not market based. As a result the production is expected to fetch much lesser revenue in the market later. E.g. Although Rohu sells more across Jharkhand, the prices of Katla are always Rs 20-30 more than that of Rohu. However availability of Katla seeds during the time of stocking is an issue.

- Fish feed availability and access to good quality fish feed commercially is a challenge across the state. The fishing cooperatives have been manufacturing and marketing fish feed but not in adequate quantities. Feed is also only available in a few retail counters along with other agriculture inputs. Furthermore, very few farmers actually use fish feed due to costs associate with the same.
While a lot of focus has been given on productivity enhancement, the post-harvest management of fish, especially market based practices have been more or less ignored. Farmers are more or less clueless about the ideal package of practices for effective post-harvest management of fresh fish. The Andhra Pradesh value chain of fish shows that post-harvest storage of fish do not require high end expensive freezers or maintenance of cold chain to transport. Low cost innovative technologies with ice boxes can be put to use for packaging and transport.

It is observed that all value chain players support each other since the perishability of the produce dictates that sale of the produce is very important. Hence relationships between various players are very critical. In Asansol it was observed that the trader bears some expenses of the retailers and also provides regular snacks and tiffin to attract them and maintain relationships. A fish seller in Jharkhand generally does not promote local fish because of the lack in consistency in supply. Secondly the farmer never focuses on building relationships with the seller which builds trust and dependability.

Local fishermen have reported poaching to be a major issue across the state where cases of theft of fish from ponds overnight are quite common. Local fishermen thus find it discouraging to invest on their own apart from the fish feed provided from department sources. The lack of adequate security in interior rural areas like Latehar, Gumla etc. districts have also resulted in low investments in ponds and discouraged leasing of ponds by professional marketers of fish. Malhar community or traditional fishermen folk in Ranchi have slowly given up fish production and have entered into trading due to these constraints.

Enterprise management of fish and producing fish are totally different aspects and skills. Many tenets of entrepreneurship are not consciously developed among fish farmers. E.g. Selling is a typical skill which the seller is equipped with but unfortunately not presents with fish farmers. There also exists a network between sellers of AP fish. This network helps in disposing of unsold fish to different areas and reduces losses. The absence of such a network with fish farmers is a major hindrance in effective marketing of fish.

Local fishermen also are not skilled in cleaning, scaling and cutting the fish to cater to consumers, especially in urban and semi urban areas. No service providers exist to assist these direct sellers unlike the AP fish seller who keeps 2-3 additional labour specialized for this.

Farmers do not invest in fishery adequately to harness the full potential. Neither fishery is undertaken as an enterprise. Access to mainstream finance for fishery is not a regular phenomenon among fish farmers which is difficult on the part of the farmer himself/herself without further ice breaking and facilitation.

The Cooperative Societies as institutions are not very well equipped to manage the marketing needs of the members. There is dearth of market information and logical approaches among these cooperative societies along with institutional issues. E.g. marketing of Pangus fish from Chandil dam is a struggle for the associated
The pricing of the fish is also not consistent with the market.

- In the times to come, West Bengal is undertaking a massive drive in Fishery development in Moyna and thus the marketing of live fish is expected to go up in the Jharkhand urban markets. The challenge of Jharkhand fish farmers will be to establish a consistent flow of live fish into these markets at competitive prices. Existing market infrastructure is not appropriate to support this. Transport and storage is not adequate. Traders and market players mentioned that the plan of the market promoted at the Hygiene market is not appropriate for wholesale trading and thus the open parking space at the back of the market is currently being used by the market players. Transport service to and from these markets are also reported to be not adequate enough for fast and efficient movement of produce. Likewise both Dhanbad's and Jamshedpur's existing infrastructure is not at all adequate for wholesale trading of fish. The rural markets are also not well equipped as well with very little amenities for sellers and buyers. Ranchi level market players have reported that availability of ice during summers is a major issue. The price of ice blocks go up to Rs 500 per piece during summers from the normal rates of Rs 150-170 per piece.

**Recommendations**

JOHAR is set to address a critical area of fishery development in the state of Jharkhand with the following approach:

- Organization/group formation and development of Producer Groups (PG)
- Develop capacity and mobilize fishery community professionals AjeevikaMatsyaMitra (AMM)
- Convergence DOF service delivery and development of “Aqua-support “centers
- Improving productivity and household incomes to target farmers
- Increase State capacity for fish seed production
- Capacity building and training of various stakeholders
- Training partners
- Facilitating access to low interest credit
- Gender mainstreaming and Equity in Fisheries Sector
- Using ICT for communication, extension and marketing

The most critical differentiator between the growing fishery sector in Jharkhand and that of an already mature counterpart in Andhra Pradesh and West Bengal, is identified as the enabling environment growth in these 2 states focused at holistic development compared to a unilateral productivity development approach of Jharkhand. It is pertinent to understand that a rather complex activity like fishery needs to be promoted in association with development of ancillary enterprises and in a cluster based
approach. This fish market study along with JOHAR’s approach recommends the following:

- The PGs to be formed under the project may sync with the existing fishing cooperatives to avoid duplication of resource allocation and overlap at the ground level. But since these cooperatives follow the fisheries department mandate, it is important that a system of collaboration and convergence be designed with the fisheries department. The marketing mandate of these cooperatives/PGs are weak and need to be built through adequate training, exposure visits to other markets along with handholding support. This will ensure efficient marketing service delivery by the institutions to its members.

- This also calls for creating a network of information between PGs and markets for efficient business management by the PGs/Cooperatives. The ideal network would include fish farmers, service providers, traders and other market players on an easy to use online platform. Such a system may be promoted through the use of mobile apps and soft-wares which may double up as marketing platforms for PGs as well. The primary objective of such networks and platforms would be to pass on real time information of demand and supply to all concerned stakeholders for efficient marketing management. The platform may also act as key information dissemination as well as monitoring tool for government as well as private sector collaborations. Such platforms will also help in gelling relationships between the fish farmers and private players which now is not prominent.

- The MatsyaMitras need to be equipped with updated market information and critical knowledge of marketing systems so as to provide marketing services to fish farmer members of PG/Cooperatives. Being spear heads of operations, they need to go through a structured capacity building program on business and marketing around fishery. This capacity building program should involve adequate trainings, exposure visits and handholding. A revenue based model also needs to be attached for engaging these MatyaMitras in a sustainable manner as service providers.

- It is important to create sustainable enterprises which would support cluster based market interventions in Fishery under JOHAR. Since a number of gaps have been identified in essential amenities and services, more enterprises on some of the following may be promoted to support the interventions;
  - Ice factories around all critical markets to supply adequate ice for fish storage.
  - Transport systems near the important markets and production centres like Vans, trolleys, pick-up trucks, Tata Ace kind of vehicles.
  - Fish seed producing enterprises in the form of
    - Portable FRP carp hatcheries
    - Carp seed rearing and fingerling producing ponds
- Breeding and Seed producing units of Magur, Koi, fresh water prawns etc.
  - Fish feed producing enterprises
  - Enterprises producing/procuring and selling nets and other fishing equipment
  - Thermocol box making enterprises for low cost packaging of fish

- Developing proper infrastructure like raised platforms, storage counters, sewerage and water facilities, etc. for the major markets across the state is necessary for enhancing efficiency of the marketing system. Different urban development projects or Urban local bodies may be collaborated with for such infrastructure development. Such infrastructure may also be created through public private partnership mode involving large fish companies in AP who are also interested to establish formal business base in Jharkhand. These private companies may also be harnessed for disseminating and engaging high end technological interventions to enhance shelf life of fish, process fish and engage with export markets.

- As mentioned earlier, sufficient water availability throughout the year for fishery is a challenge across the state. JOHAR may undertake water resource development initiatives in collaboration with appropriate partners and agencies. Also climate resilient fishery plans and integrated fishery along with other activities where maximum output from fishery can be achieved during the period of water retention may be planned. A fish wholesaler cum retailer in Latehar was found to rear Khakhi Campbell ducks along with his business where the ducks get a regular feed of fish waste and generates additional revenue as well.
8. Annexure

8.1. Members of Fish Feed producers’ Cooperative Society, Ramsagar

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swarup Dutta (Office Secretary)</td>
<td>9933831164</td>
</tr>
<tr>
<td>Haradhan Mukherjee</td>
<td>7908179455</td>
</tr>
<tr>
<td>Sushanta Pratihar</td>
<td>9800443443</td>
</tr>
<tr>
<td>Partha Chatterjee</td>
<td>9647507296</td>
</tr>
<tr>
<td>Ashwini Patra</td>
<td>9434008835</td>
</tr>
<tr>
<td>Sudeb Chandra</td>
<td>9609528245</td>
</tr>
<tr>
<td>Kartik Sebait</td>
<td>9635075909</td>
</tr>
<tr>
<td>Raju Kundu</td>
<td>9434254338</td>
</tr>
<tr>
<td>Himadri De</td>
<td>7679943516</td>
</tr>
<tr>
<td>Ashok Sheet</td>
<td>9434160281</td>
</tr>
<tr>
<td>Nikhilesh De</td>
<td>9002440542</td>
</tr>
<tr>
<td>Niranjan Kha</td>
<td>9002236216</td>
</tr>
<tr>
<td>Mintu Dhibor</td>
<td>9832125202</td>
</tr>
<tr>
<td>Nishit Gorai</td>
<td>9434160331</td>
</tr>
<tr>
<td>Asit Patra</td>
<td>9434101534</td>
</tr>
<tr>
<td>Kripasindhu Dhibor</td>
<td>9932669884</td>
</tr>
</tbody>
</table>

8.2. Contact details of Fish Seed suppliers from West Bengal:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name</th>
<th>Address</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Biswanath Dey, S/O Kalipada</td>
<td>Vill-Barpetia, P.O.-Ramsagar, Pin-722147, M-9434216714</td>
<td>Dey Brother’s</td>
</tr>
<tr>
<td>2</td>
<td>Mansaram Dey</td>
<td>Vill - Berpetia, PO- Ramsagar, Pin-722147,M-9434025049</td>
<td>Mansa Mata Matsu Utpadak Centre</td>
</tr>
<tr>
<td>3</td>
<td>Aswani Patra, S/O</td>
<td>Vill-Barpetia, P.O.-Ramsagar, Block-Ona, Pin-722147, M-9434008835 / 9126275875</td>
<td>Parta Hacheries</td>
</tr>
<tr>
<td>4</td>
<td>Deb Dulal Kundu, S/O Muruli</td>
<td>Vill. Berpelia, P.O. Ramsagar, P.S. &amp; Block- ONDA, Pin-722147, Ph. 9932398514</td>
<td>Radhadamodar Matsya Dimpona Utpadan</td>
</tr>
<tr>
<td>5</td>
<td>Kousik Nayak, S/O Nanda Dulal Nayek</td>
<td>Chheripur, P.O. Patpur, Pin-722147, Ph. 9635825371</td>
<td>Maa Ganga Fisheries,</td>
</tr>
<tr>
<td>6</td>
<td>Bipad Taran Chauraj, S/O Nirmal</td>
<td>Vill. Hatibari (Barperia) P.O. Ramsagar, Pin-722147, Ph. 9932323671</td>
<td>Tarama Fish Spawn Centre.</td>
</tr>
<tr>
<td>7</td>
<td>Siddheswar Sakha, S/O Sudhir Kumar</td>
<td>Vill-Ramsagar Station Road, P.O. Ramsagar, Pin-722147, Ph. 9732282820</td>
<td>Annessha Fisheries.</td>
</tr>
<tr>
<td>8</td>
<td>Ganesh Sakha, S/O Sudhir Kr.</td>
<td>Vill-Ramsagar Station Road, P.O. Ramsagar, Pin-722147, Ph. 9732054122</td>
<td>Anannya Fisheries</td>
</tr>
<tr>
<td>9</td>
<td>Krittibus Sannyasi, S/O Sahadeb</td>
<td>Vill. Chhinpur, P.O. Patpur, Ph. 9434108385, 900217090 Block &amp; P.S. ONDA.</td>
<td>Chandimata Fisheries</td>
</tr>
<tr>
<td>10</td>
<td>Biswanath Dey, S/O Kanai Dey</td>
<td>Vill. Barpetia, P.O. Ramsagar, Ph. 9434652972 Block &amp; P.S.</td>
<td>Maa Tara Fisheries</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of the owner</td>
<td>Contact Details</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
<td>----------------</td>
<td></td>
</tr>
</tbody>
</table>
| 1      | Mr. Suman Adhikary | Gourango Fish House  
No. 6, Bijoy Nagar, Naihati,  
Kolkata-743165, West Bengal, India  
Mobile No.- 07890980433 |
| 2      | Sanjib           | Paul Brothers  
No. 62 B, N.S. Road, Barabazar,  
Kolkata-700001, West Bengal, India  
Mobile No- 09831550544 |
| 3      | Ananta Deb       | AnantadebMadanmohan& Company  
No. 55, Jamunatalal Bajaj Street, 2nd Floor, Burra  
Bazaar, Kolkata-700007, West Bengal, India  
Mobile No-09830390869 |
| 4      | Bablu            | Fishing Net  
GokulShirgaonMidc, GokulShirgaonMidc,  
Kolkata-416234, West Bengal, India  
Mobile No- 09545755206 |
| 5      | Santosh Koibarto | Sunarpada, Jalda,  
District-Purulia, West Bengal  
9083606740 |
## 8.4. Index of local fish of Jharkhand apart from IMC

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Photograph</th>
<th>Photo Location</th>
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<tbody>
<tr>
<td>Banspata</td>
<td>Honey Gourami / Chuna</td>
<td><em>Trichogasterchuna</em></td>
<td><img src="image1.png" alt="Photograph" /></td>
<td>Jamshedpur Sakchi Market</td>
</tr>
<tr>
<td>Bele</td>
<td>Scribbled Goby / Tank Goby</td>
<td><em>Awaousgramme pomes</em></td>
<td><img src="image2.png" alt="Photograph" /></td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District / Gumla Haat</td>
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<tr>
<td>Ghorei</td>
<td>Spotted Snakehead</td>
<td><em>Channapunctata</em></td>
<td><img src="image3.png" alt="Photograph" /></td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District</td>
</tr>
<tr>
<td>DehatiMagur</td>
<td>Walking Catfish</td>
<td><em>Clariusbatrachus</em></td>
<td><img src="image4.png" alt="Photograph" /></td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District</td>
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<tr>
<td>Chela</td>
<td>Silver razorbelly minnow</td>
<td><em>Salmostomaacinaces</em></td>
<td><img src="image5.png" alt="Photograph" /></td>
<td>Jamshedpur Sakchi Market</td>
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<tr>
<td>Poli / Foli</td>
<td>Featherback</td>
<td>Notopterus notopterus</td>
<td>Jamshedpur Sakchi Market</td>
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<tr>
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<td>------------------------</td>
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<tr>
<td>Ponthi</td>
<td>Punti</td>
<td>Chaguniuschagunio</td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District</td>
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<tr>
<td>Chalwa</td>
<td>Chalwa</td>
<td>Clopeacultrata</td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District</td>
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<tr>
<td>Tengra</td>
<td>Tyangra</td>
<td>Mystustengara</td>
<td>Jona Bazaar Haat, Silli Block, Ranchi District</td>
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</tr>
<tr>
<td>Location</td>
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<tr>
<td>------------</td>
<td>-------------------------</td>
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<tr>
<td>Gaskap</td>
<td>Grass carp</td>
<td><em>Ctenopharyngodonidella</em></td>
<td>Silli Market</td>
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<tr>
<td>America</td>
<td>Buffalo fish / Ictiobus</td>
<td><em>Catostomusrubalbus</em></td>
<td>Silli Market</td>
<td></td>
</tr>
<tr>
<td>n Rohu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murla</td>
<td>Indian Carplet</td>
<td><em>Amblypharyngodonmola</em></td>
<td>Dhanbad Market</td>
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<tr>
<td>Chinghdi</td>
<td>Fresh water Shrimps</td>
<td><em>Macrobrachiumrosenbergi</em></td>
<td>Gumla Haat</td>
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</table>
8.5. Some relevant Market Players met during the study

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Address</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Abdul Basit</td>
<td>Fish trader and commission agent</td>
<td>Main road fish market, Ranchi</td>
<td>9031927858</td>
</tr>
<tr>
<td>Mr. Ramesh</td>
<td>Fish Commission agent</td>
<td>Dhanbad wholesale market (Purana Bazar, Dhanbad)</td>
<td>9006072656</td>
</tr>
<tr>
<td>Mr. Mausam Nishad</td>
<td>President and commission agent of AP Fishes</td>
<td>Hygiene fish market, Ranchi</td>
<td>9835168399</td>
</tr>
<tr>
<td>Mr. Zahid Khan</td>
<td>Secretary and Commission agent of AP Fishes</td>
<td>Hygiene fish market, Ranchi</td>
<td></td>
</tr>
<tr>
<td>Mr. Naga</td>
<td>Transporter-Andhra Pradesh</td>
<td>Narayanpuram, Nirdavelly, Tadepalligulam, Eluru, AP</td>
<td>7386936999</td>
</tr>
<tr>
<td>Mr. Manoj Kumar Sonkar</td>
<td>Fish supplier from AP and Exporter</td>
<td>Arnav fish International Narayanpuram, Eluru, AP</td>
<td>9848855699</td>
</tr>
<tr>
<td>Mr. Sitaram Anjani</td>
<td>Fish Wholesaler and</td>
<td>Akkividu, West</td>
<td>9010733335</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Contact Details</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Mr. Suresh</td>
<td>Commission agent, Live fish</td>
<td>Hygiene fish market, Ranchi</td>
<td></td>
</tr>
<tr>
<td>Mr. Ganesan</td>
<td>Company Manager</td>
<td>DNR Fish Pvt. Ltd Satrampadu, Industrial Estate, Eluru, AP</td>
<td></td>
</tr>
<tr>
<td>Narayan Raju</td>
<td>Manager</td>
<td>DNR Fish Pvt. Ltd Satrampadu, Industrial Estate, Eluru, AP</td>
<td></td>
</tr>
<tr>
<td>Mr. Fahim</td>
<td>Commission agent and trader, AP Fishes</td>
<td>Hygiene fish market, Ranchi</td>
<td></td>
</tr>
<tr>
<td>Mr. Nadeem Khan</td>
<td>Commission agent, AP Fishes</td>
<td>Hygiene fish market, Ranchi</td>
<td></td>
</tr>
<tr>
<td>Mr. Angad Sunar</td>
<td>Fish retailer</td>
<td>Near railway gate, Block-Silly, Ranchi</td>
<td></td>
</tr>
<tr>
<td>Mr. Shashikant Gupta</td>
<td>Fish Wholesaler and Commission Agent</td>
<td>Balaji Fish Centre, Jaina More, Bokaro</td>
<td></td>
</tr>
<tr>
<td>Mr. Raju Bhai</td>
<td>Fish Retailer</td>
<td>Fish Market, Jalda (West Bengal)</td>
<td></td>
</tr>
<tr>
<td>Mr. Santosh Koivarto</td>
<td>Fishing net trader</td>
<td>Sunarpada, Jalda, District-Purulia, West Bengal</td>
<td></td>
</tr>
<tr>
<td>Mr. Asif (MMS)</td>
<td>Wholesale Fish trader</td>
<td>Fish market, Munshi Bazar, Asansol</td>
<td></td>
</tr>
<tr>
<td>Mr. Mohan Sonkar</td>
<td>Wholesale Fish trader</td>
<td>Purana Bazar, Fish Market, Dhanbad</td>
<td></td>
</tr>
<tr>
<td>Mr. Aftab Ahmad (LFS Brand)</td>
<td>Wholesale Fish trader</td>
<td>Purana Bazar, Fish Market, Dhanbad</td>
<td></td>
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<tr>
<td>Mr. Juber Alam (JMM Brand)</td>
<td>Wholesale Fish trader</td>
<td>Purana Bazar, Fish Market, Dhanbad</td>
<td></td>
</tr>
<tr>
<td>Mr. Shankar Ji</td>
<td>Wholesale Fish trader</td>
<td>Sector 9, Fish Market, Bokaro</td>
<td></td>
</tr>
<tr>
<td>Mr. Anand Kumar</td>
<td>Fish Trader</td>
<td>Sector 9, Fish Market, Bokaro</td>
<td></td>
</tr>
<tr>
<td>Mr. Saurabh Das</td>
<td>Wholesale Fish trader</td>
<td>Bistipur wholesale fish market, Tata</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Occupation</td>
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<td>Contact</td>
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<tr>
<td>Mr. Monu</td>
<td>Fish Retailer</td>
<td>Sakchi Fish Market, Tata Nagar</td>
<td>9709109942</td>
</tr>
<tr>
<td>Mr. Md. Tanvir Ahmad (Dilavar)</td>
<td>Fish Trader</td>
<td>Bistupur wholesale fish market, Tata Nagar</td>
<td>8986634786</td>
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<td>Mr. Mohammad fiaz Alam</td>
<td>Fish Trader</td>
<td>Gumla Daily Market, Gumla</td>
<td>9471328578</td>
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<tr>
<td>Mr. Madan Kumar Sahu</td>
<td>Fish Trader</td>
<td>Latehar</td>
<td>8521441872</td>
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<tr>
<td>Mr. GoputraBihij</td>
<td>Professional Fish Farmer</td>
<td>Narayanpuram, AP</td>
<td>9848861999</td>
</tr>
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