



8TH GLOBAL CONFERENCE ON

GENDER IN AQUACULTURE & FISHERIES

Oral Presentation
on

ASSESSMENT OF WASTE GENERATED IN THE FISH MARKETS OF MUMBAI

Presented by:-

Shubham Soni

Authors:-

Shubham Soni, Arpita Sharma, Martin Xavier

Nidhi Katre, Gitashree Thengal, Mehul Patel,
Anurag Singh and Swadesh Prakash



ICAR – Central Institute of Fisheries Education, Mumbai



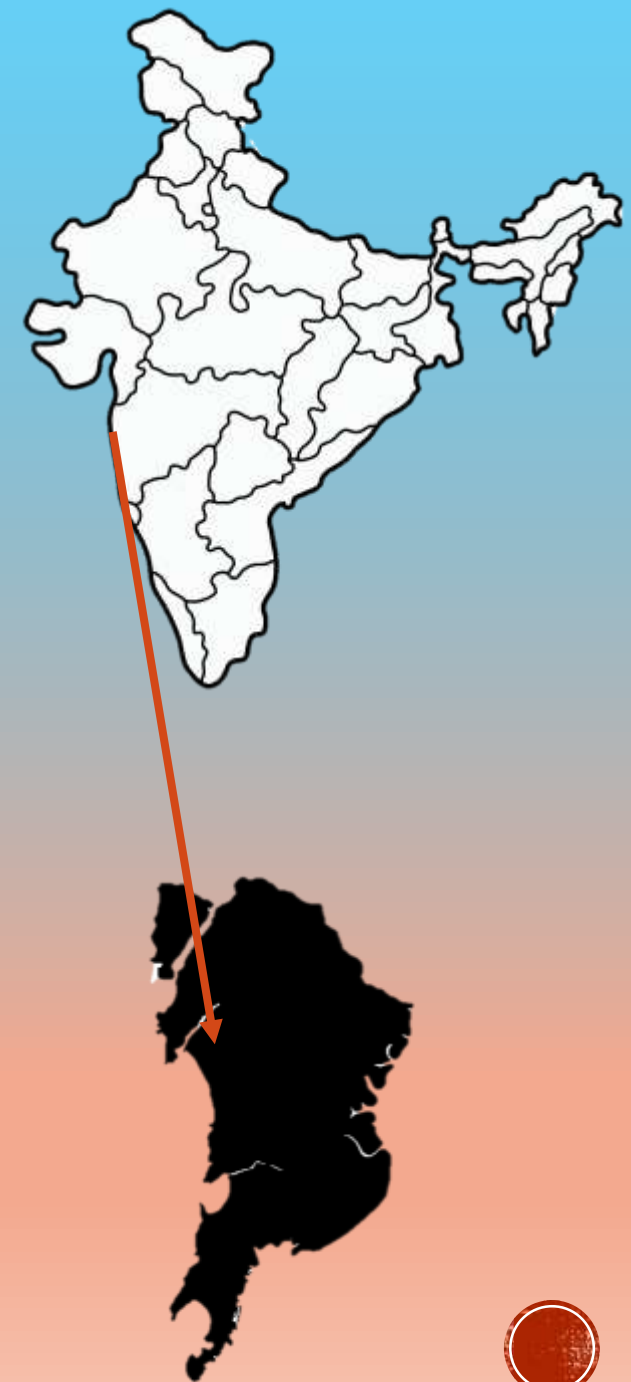
WORLD FISHERIES AT A GLANCE

- The world fisheries production reached 178 million tonnes in 2020, and with the growing demand for fish as food this is expected to increase more (SOFIA, 2022)
- However, more than 50 million tonnes of fish are wasted every year (FAO, 2018).
- More than 27% of all captured fish is either thrown away or rots on decks or is left unattended or untreated.
- It is estimated that 30 -35% of waste is generated in various value chain stages (SOFIA, 2020)



THE MUMBAI SCENARIO . . .

- Mumbai is one of the largest metropolitan cities in Asia and the financial capital of India (Peke, 2013).
- Mumbai is the 2nd most populous city in the country with 20.9 million people residing in 4355 sq km, making it one of the most densely populated city (WPR, 2022).
- It is also generates the most amount of solid wastes across all the metropolitan cities of the country (7,500 MT waste per day) (HT, 2019).
- Several efforts have been taken by the Gol and the local municipal corporations to reduce the wastes however much waste is left untreated (HT, 2019).



KOLIS OF MUMBAI...

- The Kolis (fisher community) of Mumbai are the original inhabitants of Mumbai since time immemorial (Peke, 2013).
- The Kolis catch fish from the sea and sell it across the Fish Markets of Mumbai to earn their living.
- The koli people engaged in the fishing sector are either fishers, or fish wholesalers/ retailers/ vendors (Wavare, 2015).
- With the growth of Mumbai the population has also grown, which has also led to an increase in the business of Kolis.



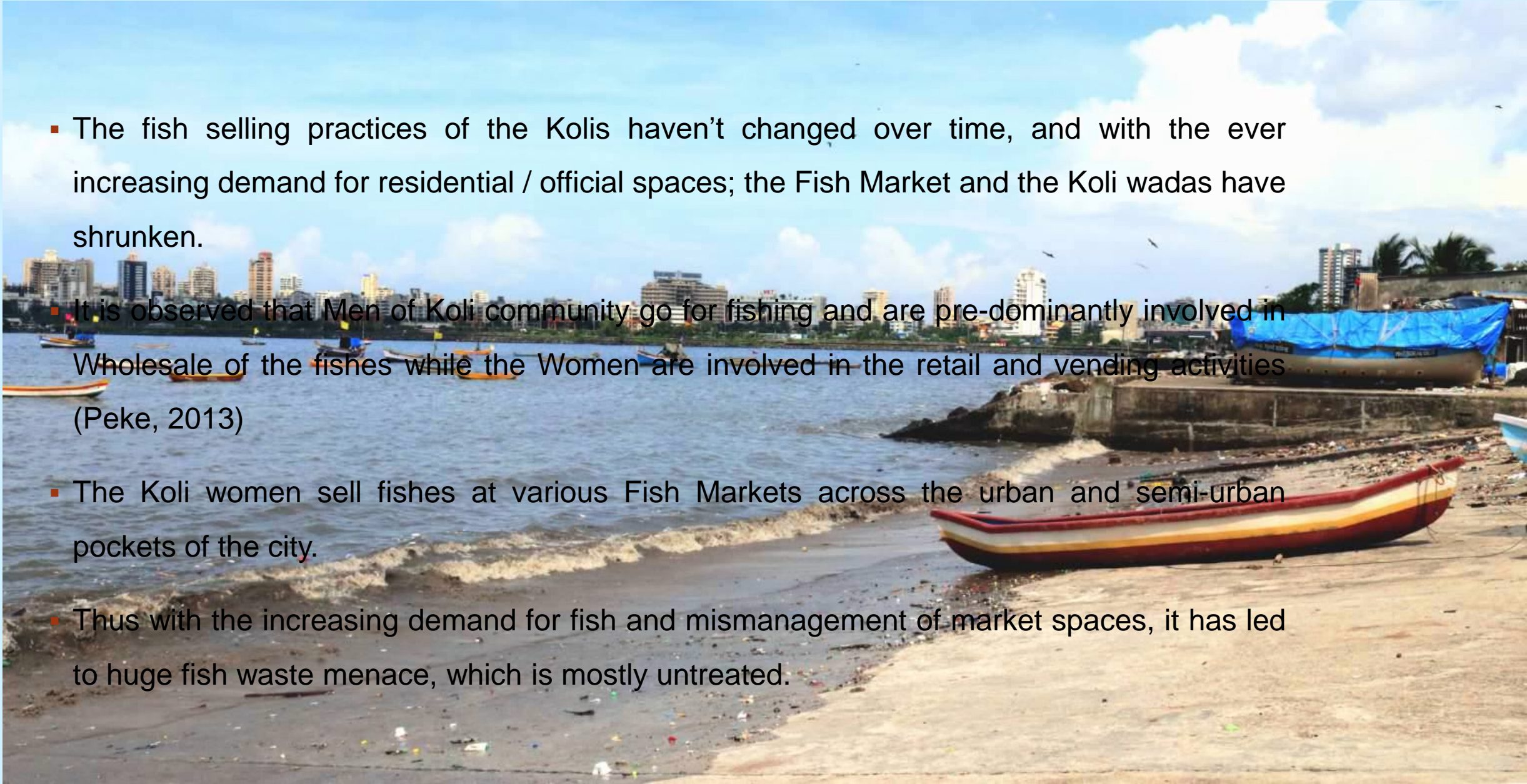


THE KOLIS OF MUMBAI



KOLI AND MUMBAIKARS ...

- The fish selling practices of the Kolis haven't changed over time, and with the ever increasing demand for residential / official spaces; the Fish Market and the Koli wadas have shrunken.
- It is observed that Men of Koli community go for fishing and are pre-dominantly involved in Wholesale of the fishes while the Women are involved in the retail and vending activities (Peke, 2013)
- The Koli women sell fishes at various Fish Markets across the urban and semi-urban pockets of the city.
- Thus with the increasing demand for fish and mismanagement of market spaces, it has led to huge fish waste menace, which is mostly untreated.



THE STUDY FOR ASSESSMENT OF WASTE GENERATED IN THE FISH MARKETS OF MUMBAI

- It is known that Mumbai city generates at least 7,500 MT (27.37 lakh MT/yr.) of solid wastes per day, a part of this is the Fish Waste generated through various fish markets of Mumbai (HT, 2019)
- However, there are certain research gaps on the quantity of the waste generated in the city, how is this waste being managed or being recycled or being converted to certain useful products or just simply being dumped in the landfills of the city?
- An effort has been initiated to address these research gaps.
- Preliminary studies were done in four fresh fish markets operated by Brihanmumbai Municipal Corporation namely **Dadar, Worli, Khar Danda and Versova** fish markets of Mumbai.



METHODOLOGY...

- The information for the study was collected using markets visits, and interviews with fish vendors, market and fisheries societies representatives.
- The data was elicited from 60 (15 x 4) fish vendors using an Interview Schedule consisting of 30 questions under different heads as Information on the Market operating in, Information of the species sold, Information on Waste and its disposal.
- Sampling was done through Stratified Random Sampling.
- The information was assessed through qualitative: descriptive analysis and quantitative: through simple percentage and graphical analysis.



DADAR FISH MARKET

- Official Name: Swatantrayveer Savarkar Mandai
- No. of licensed retailers in the Market : 129
- Species sold in the markets : Tuna, Mackerel, Sardine, Pomfret, Bombay Duck, Seer Fish, Hilsa; they also sold Shrimps and other crustaceans.
- Waste Generation: 100 kg per day approximately ranging from 50 – 100 kg per day.
- The waste consisted of mostly (90%) of fish waste (fish intestine, bones, viscera, scales, head and fins; shrimp head and shell) while including other wastes (10%) like plastic cups, bags and plates and paper wastes.
- The waste generated through out the day is collected and kept near the retailers' space in the market for the BMC garbage facility to collect and dispose.



WORLI FISH MARKET

- Official Name: Dr. Dharmaji Hari Kharude Mandai Vyapari Mandal
- No. of licensed retailers in the Market : 50
- Species sold in the markets : Tuna, Mackerel, Sardine, Pomfret, Bombay Duck, Seer Fish, Ribbon Fish, Hilsa, Tilapia, IMC, Pacu; they also sold Shrimps and other crustaceans and molluscs.
- Waste Generation: **100 kg per day** approximately ranging from 80– 120 kg per day through the week.
- The waste consisted of mostly (91%) of fish waste (fish intestine, bones, viscera, scales, head and fins; shrimp head and shell) while including other wastes (9%) like plastic cups, bags and plates and paper wastes.
- The waste generated is collected by BMC workers from each retailer at the end of the day which is then segregated into Dry and Wet waste. The dry waste is disposed or recycled while the wet waste is sent for bio-degradation in the landfills.



KHAR DANDA FISH MARKET

- Official Name: Mahadeobuva Dandekar Mandai
- No. of licensed retailers in the Market : 75
- Species sold in the markets : Tuna, Mackerel, Sardine, Pomfret, Bombay Duck, Seer Fish; they also sold Shrimps and other crustaceans.
- Waste Generation: 40 kg per day approximately ranging from 30 – 50 kg per day.
- The waste consisted of mostly (85%) of fish waste (fish intestine, bones, viscera, scales, head and fins; shrimp head and shell) while including other wastes (15%) like plastic cups, bags and plates; paper wastes and other organic wastes.
- The waste generated through out the day is collected by hired labour and kept near the retailers' space in the market for the BMC garbage facility to collect and dispose.



VERSOVA FISH MARKET

- Official Name: Sw. Bhanumati Motiram Bhave Mandai
- No. of licensed retailers in the Market : 35
- Species sold in the markets : Tuna, Mackerel, Sardine, Pomfret, Bombay Duck, Seer Fish, Croakers, Trevallies; they also sold Shrimps and other crustaceans.
- **Waste Generation: 30 kg per day approximately ranging from 20 – 50 kg per day.**
- The waste consisted of mostly (90%) of fish waste (fish intestine, bones, viscera, scales, head and fins; shrimp head and shell) while including other wastes (10%) like plastic cups, bags and plates and paper wastes.
- The waste generated through out the day is collected and kept near the retailers' space in the market for the BMC garbage facility to collect and dispose.



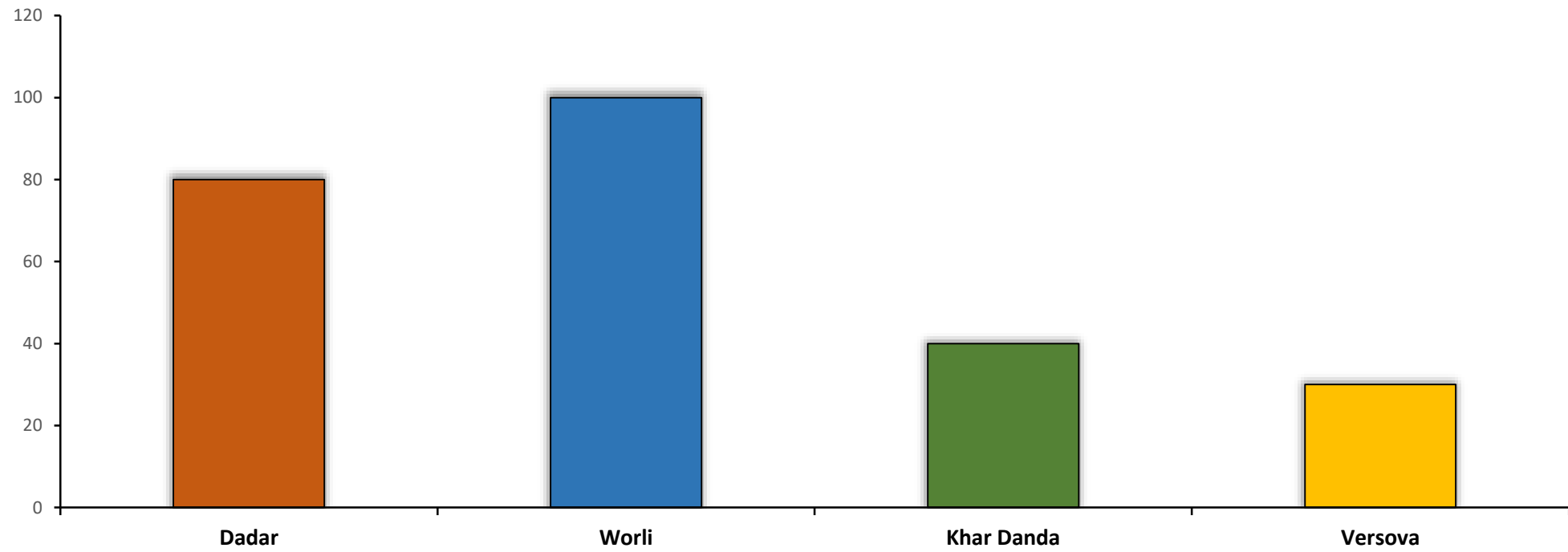
FINDINGS:

- All the markets were run by Koli Women.
- They sell fishes as whole or dressed or filleted or steaked; whole or peeled or deveined shrimps as per the customers' demand. Eventually these activities generate huge quantities of fish waste in each fish market nearing **5-10 kg per vendor per day (~1.5 tons/yr.)**.
- The wastes in fish markets contain 60% fish waste (20% viscera, 10% bones, 30% scales, head and fins), 30% shrimp waste (20% shell and 10% head waste) and 10% is plastics, paper and other waste. (Approximately).



WASTE GENERATION:

Waste Generated per fish market per day



LEARNINGS FROM WORLI FISH MARKET:

- Nearly 100kg of waste is generated from Worli Fish Market.
- The waste is collected and segregated by the BMC workers into Wet Waste consisting of Fish waste and other organic waste and into dry waste consisting of plastics, paper and other non-biodegradable and recyclable materials.
- The Worli Koliwada Fish Market was awarded with **Best Clean Market Award** and was felicitated by Mumbai Hon'ble Mayor Kishori Pednekar in the year 2020.



SWACHH WORLI KOLIWADA:



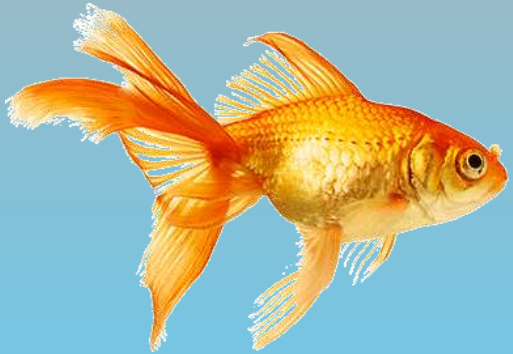
- Stree Mukti Sangathan and BMC in collaboration with IDFC First Bank (through CSR initiative) ran Swachh Worli Koliwada a project for effective waste management.
- The waste generated from Fish Market was collected, segregated into Dry Waste and Wet Waste. The dry waste was recycled, further the Fish waste was used to develop organic manure along with other organic waste in dedicated shipping containers installed at Worli Koliwada.
- Alas! This activity came to a halt, when the nearby residents complained of stinking smell and the fly menace that it created.





CONCLUSIONS . . .

- Mumbai is home to the Koli community, who are known for their fishing, marketing and cultural heritage.
- With the city's expansion and the emerging online marketplaces their existence and business opportunities is vulnerable.
- The Koli women are still practicing the age old methods of fish retailing and vending.
- A huge amount of fish waste is generated from each fish market per day.
- This fish waste generated in the market has huge potential for developing various fish by-products like chitin and chitosan from shell wastes, foliar spray for plant nutrition, silage, fish meal and as feed for other culture animals (ICAR, 2020).
- Proper Utilization of the waste generated from the fish markets can help achieve the Circular Economy (Soni et al., 2021).

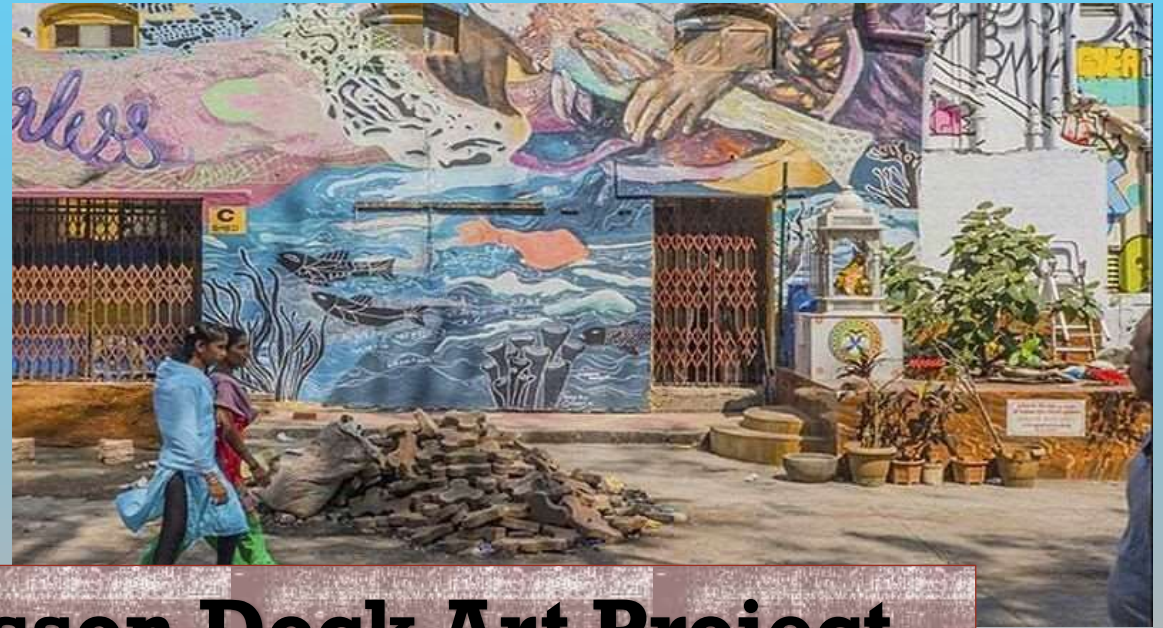


SUGGESTIONS FROM THE STUDY:



- There is a growing demand for fish food, and the city's fish markets are capable to deliver, but the hygiene factor drives the consumer to other alternatives.
- There is a need to revive these fish markets through cleaning activities and swacchta drives.
- This can be achieved by beautification and performing social gathering and painting events.
- There have been several successful art projects like the Sasson Dock Art Project where urban art combining street art and graffiti gave a colorful makeover to the Sasson dock and the market. Such events shall bring forward the cultural heritage of fishing communities to the forefront.
- Several projects where fish vendors, youth from the fishing community, and fisheries colleges with a vision to renovate, repair and vivify fish markets can be planned.
- Some DIY activities for effective fish waste utilization can be implemented.





Sasson Dock Art Project



REFERENCES:

- Narayan, B., 2012. Fish Market Management: Vendors Status in Mumbai. *International Indexed & Referred Research Journal*, 3(32), pp.61-63.
- Peke, S., 2013. Women fish vendors in Mumbai: a study report.
- Shubham Soni, 2021. Utilization of Fish Waste as a Resource Strategy of Circular Economy to Develop Novel Fish Skin Leather. M.F.Sc. Dissertation, ICAR-Central Institute of Fisheries Education (University Established Under Section 3 of UGC Act 1956) Panch Marg, Off Yari Road, Versova, Andheri (W), Mumbai – 400 061
- Wavare, A.K., 2015. A study of dry fish markets in Mumbai City. *Ethos*, 8(2), pp.11-17. (Accessed on 15-09-2022)
- <https://www.globalcitizen.org/en/content/world-wastes-50-million-tons-of-fish-each-year/> (Accessed on 10-09-2022)
- <https://www.hindustantimes.com/mumbai-news/maharashtra-topmost-solid-waste-generator-in-india-in-2018/story-gBaHAupqW1cShdM2OihWzJ.html> (Accessed on 15-10-2022)
- <https://thewire.in/environment/indias-megacities-mumbai-and-delhi-sitting-on-a-pile-of-waste> (Accessed on 15-11-2022)
- <https://www.populationu.com/cities/mumbai-population> (Accessed on 07-11-2022)
- <https://worldpopulationreview.com/world-cities/mumbai-population> (Accessed on 22-10-2022)



Acknowledgements

- Dr. Arpita Sharma, Principal Scientist, FEES Division, ICAR-CIFE, Mumbai
- Dr. Martin Xavier K. A., Senior Scientist
- Smt. Jagruti Bhanji
- Shri. Rajesh Mangela
- Dr. C. N. Ravishankar, Director / VC, ICAR-CIFE, Mumbai
- Dr. N.P Sahu, Joint Director, ICAR-CIFE, Mumbai
- Shri Anurag Singh, Shri Mehul Patel, Ms. Gitashree, Shri Rajpal Yadav
- Dr. P. A. Telvekar, Asst Professor, COFS, Nagpur
- Shri Rajiv Rathod, Asst Professor, COFS, Nagpur
- All the Koli Tai and Dada (All fisherwomen and fish vendors)





WORLD
FISHERIES DAY

THANK YOU!

