Report
on

Smart Fisheries e-traceability implementation piloting activities

Ministry of Commerce-Fishery Products Business Promotion Council
(FP-BPC)
&
Fish Farm Owners Association, Bangladesh
(FOAB)

Contents

Executive Summary

The global demand for transparent and sustainable seafood is increasing, making traceability a critical component in the seafood supply chain. This proposal outlines the development and implementation of a fish e-traceability system targeted at enhancing the export market. By integrating on-field data collection, mobile applications for farmers, and QR code technology, we aim to ensure the traceability, quality, and safety of fish products from farm to market. This system will not only improve operational efficiency for fish farmers but also build consumer trust and open new opportunities in international markets.

Through the fish e-traceability piloting initiatives IT company Tech Analytica Ltd and farmers association FOAB team identified the existing shrimp supply chain model. Within this model, after completing several initiatives with cluster base shrimp farmers it was identified that local farias/local collectors and paikers/local traders have vital role into shrimp trade forward supply chain but there had no formal (Govt. entity) registration and others as a tracking tool. But for smooth maintenance of shrimp supply chain through traceability and e-traceability process, government authority needed to attention.

In this fish e-traceability piloting initiatives, shrimp farmers to auction centers e-traceability apps already active through **FOAB e-traceability Apps,** where farmers can upload their back ward and forward information and during sales of products, products details can share with auction center.

1. Introduction:

Traceability comprises two words i.e., trace and ability. Trace means to find someone or something and ability means to a skill or capability or talent to do something. Therefore, traceability simply means the ability to trace the requirement, to provide better quality, to find any risk, to keep and verify the record of history and production of an item or product by the means of documented identification. Due to this, it's easy for the suppliers to reduce any risk or any issue if found and to improve the quality of the item or product. So, it's important to have traceability rather than no traceability. Using traceability, finding requirements, and any risk to improve the quality of the product becomes very easy.

Traceability is the ability to trace something as it moves through a process. In product development, it refers to the ability to track and trace requirements to artifacts, test runs, and anything else in the product lifecycle.

The food traceability in Bangladesh is not up to the mark, even though food safety risks are high, given the in efficiencies in food transportation, handling, and storage. How-ever, as the Bangladeshi economy continues to grow and consumers become more selective, there is likely to be increased focus on food safety and food origin. Out of the international market's food safety requirements, seafood traceability is a vital issue for

Bangladeshi producers. Therefore, an adverse impact will occur if preventive action is not Taken with regard to seafood safety by ensuring traceability in food production, processing, and marketing. As part of seafood safety measures, with the government's help, the Bangladesh Frozen Food Exporters Association introduced paper based traceability for prawns in 2009. However, in terms of documentation and data analysis, the initiative was unsuccessful [68]. In

January 2016, they introduced an e-traceability system. However, before launching such traceability projects, consumers' perceived value of food traceability was not examined thoroughly. Therefore, this study aims to fill this knowledge gap, with consumers interviewed in a stated preference experimental design.

2. Objectives of this initiatives:

Traceability is used to identify the origin of a particular batch or unit load. It allows you to explore the stages that the product has gone through, from its processing to its final delivery, including the identification of raw materials used and the production operations carried out.

The project goal is to have a Apps-based traceability system for the shrimp farms, depots/auction center and the associated processing industry

- A buyer will be able to trace the shrimp back to the specific collection center and the farmers who have provided shrimp to the center on a specific day
- The hatchery source of shrimp post larvae and feed input will also be recorded.
- The new app will transform the critical work of traceability for shrimp farmers and will make the process faster, easier and efficient,
- Centralized data storage and online analysis tools by a central data base system
- Person independent organizational structures by standardizes processes and applications.
- Optimization of collection and receiving of shrimps.
- Better quality monitoring along with complete traceability of the product and data capturing of Quality Management data.
- Paperless Food safety management System in place by digital archiving functions
- Savings in administration through elimination of double data entries and more flexible labor.
- Reduction of internal and external logistics costs in the areas of product labelling and picking through improved performance and reliability.

3. Materials & Methods:

Initially select clusters according to organized shrimp farmers in Dumuria area of Khulna those are involved in GAqP followed shrimp farming practices. Identified 08 clusters along with 200 farmers, in association with 15 arotdars (auction centers) & local traders(paikers) and 10 stakeholders for this piloting initiatives through conduct the FGD. Agreement with the private IT company (Tech Analytica Ltd) for the developed of survey tools (KOBO collect) and a mobile apps for shrimp farmers and local auction centers through a structured questionnaires for survey on baseline and end line status of back word and forward marketing system. Before that we have organized an inception workshop with all levels of stakeholders about the piloting plan and activities.

1. Field Data Collection:

- Conduct baseline surveys to enlist fish farmers.
- Collect data on farming practices, fish species, and production volumes.

2. Mobile Application Development:

- Design and develop a user-friendly mobile app for fish farmers.
- Features include farmer login, data entry for harvested fish, price information, and QR code generation.
- Integration of photo capture functionality for product verification.

3. QR Code System:

- Generate unique QR codes for each batch of harvested fish.
- QR codes to contain detailed information about the fish, including farming practices, harvest date, and price.

4. Market Integration:

- Enable buyers to scan QR codes to access detailed product information.
- Ensure compatibility with market and export requirements.
- Provide training for farmers and buyers on using the e-traceability system.

5. Monitoring and Evaluation:

- Continuous monitoring of system performance and user feedback.
- Regular updates and improvements based on user needs and technological advancements.

Through the discussion with cluster farmers into farm house meetings, and identified the supply chain actors for the trade of shrimp.

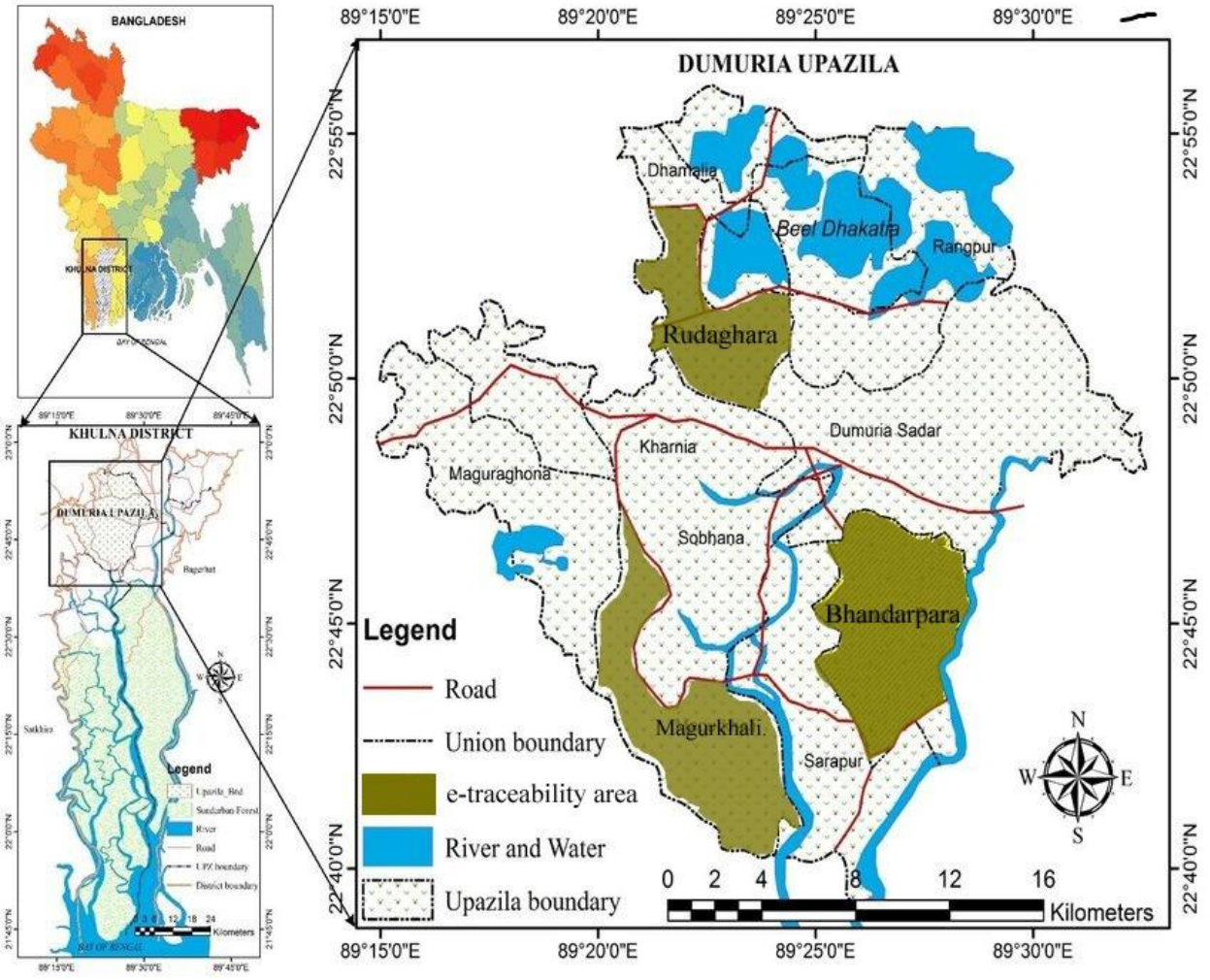


Figure-1: Fish e-traceability piloting site in Dumuria, Khulna

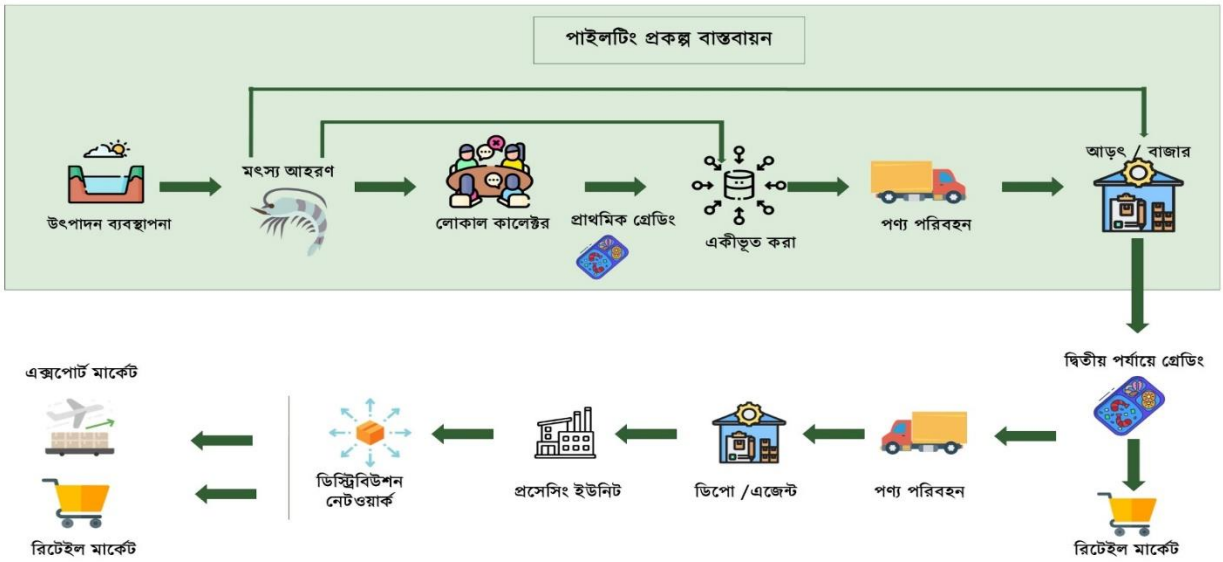


Figure-2: Existing shrimp supply chain

4. Activities and achievement:

Activities	Target	Achievement	Percentage
Cluster area selection	8	8	100%
Cluster Mapping	1	1	100%
Firm House meeting	5	5	100%
Baseline survey on the necessity of implementing e-traceability system in fishery sector into cluster area	200	200	100%
Working group meeting	5	5	100%
Inception workshop for the pilot project of Smart fisheries with e-traceability system in Bangladesh	1	1	100%
Stakeholder meeting	2	3	100%
e-traceability app development	1	1	100%
Hands on training on e-traceability	2	2	100%
National conference on Smart Fisheries e-traceability system	1	1	100%
Visualization (Signboard, Leaflet, festoons etc)	1	1	100%
Monitoring and Evaluation report	1	1	100%
Quarterly report	3	3	150%
End line survey and report	1	1	100%

5. Result & Discussion:

5.1 Expected Outcomes

1. Increased Transparency: Enhanced consumer confidence through transparent and accessible product information.

2. Improved Market Access: Greater acceptance in international markets due to compliance with traceability standards.

3. Higher Income for Farmers: Farmers benefit from premium pricing due to verified and high-quality products.

4. Operational Efficiency: Streamlined data management and reduced paperwork for farmers and buyers.

5. Buyer Satisfaction: Increased satisfaction for buyers due to ease of access to product information, ensuring quality and safety, and simplifying compliance with import regulations.

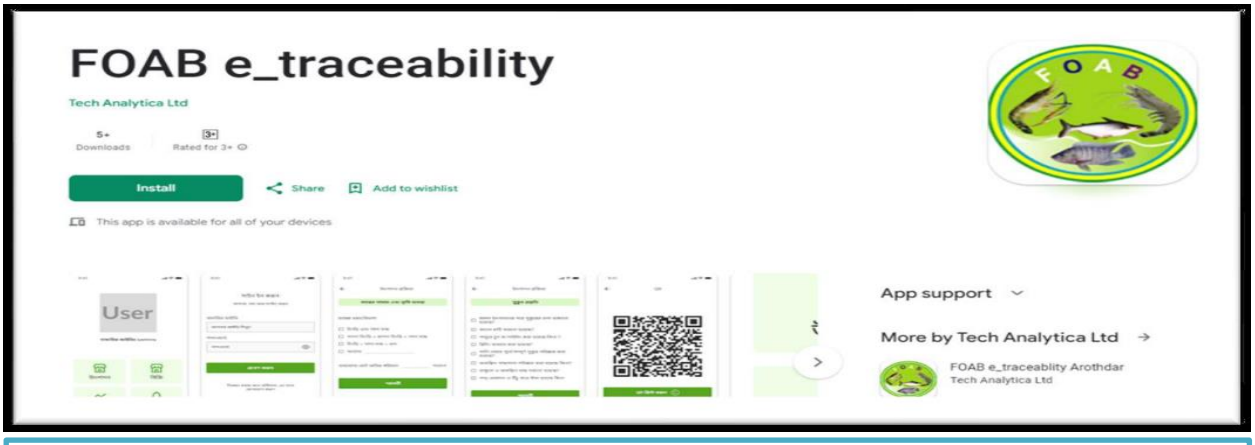
5.2 Benefits to Stakeholders

1.Fish Farmers: Access to new markets, better prices, and simplified record-keeping.

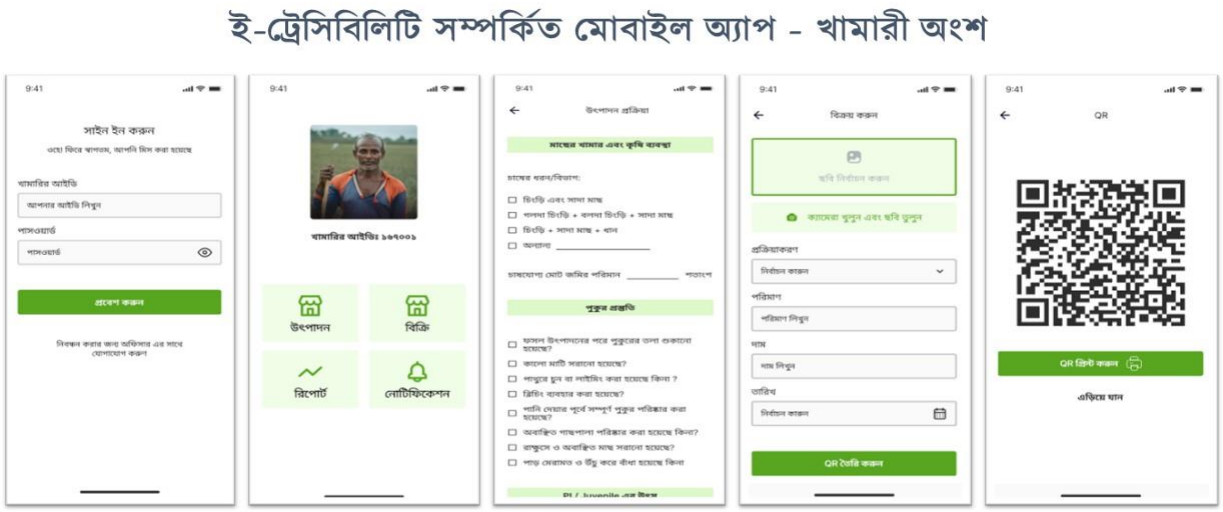
2.Buyers/Exporters: Assurance of product quality and legality, ease of compliance with import regulations.

3.Consumers: Trust in the safety and sustainability of the fish they purchase.

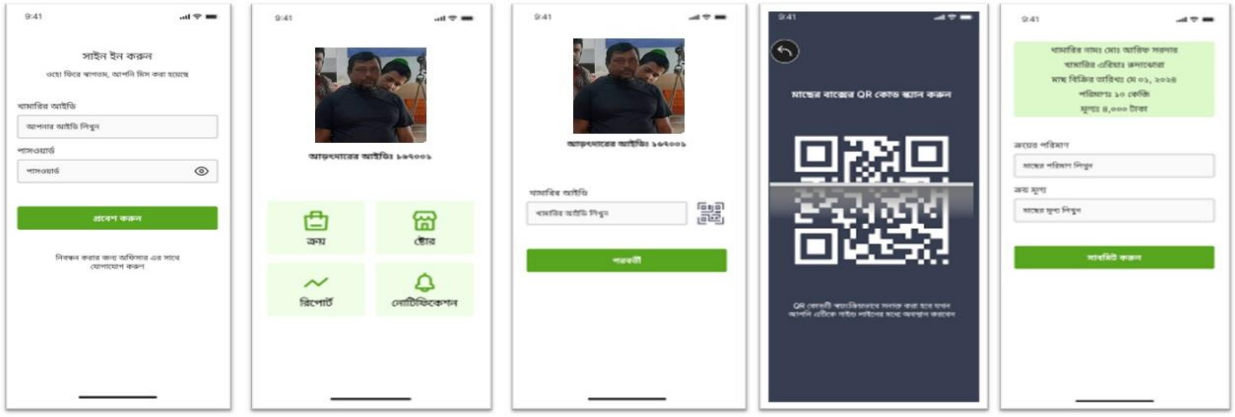
4.Regulatory Bodies: Improved monitoring of fishing practices and reduced illegal fishing activities.



Pictures: e-traceability mobile apps



Pictures: Fish e-traceability mobile apps for farmers:



Picture: Fish e-traceability mobile apps for shrimp auction center.

6. Challenges:

To effectively manage a contamination event, a fast response is needed. Although there are existing regulations in place establish traceability recordkeeping to enhance food safety measures, where inefficiencies still exist. These are the top three most common issues putting at risk on business, customers, and the industry.

6.1. Spotty Data

The number one thing preventing you from tracking and tracing food fast during a recall is insufficient data.

For instance, while the Produce Traceability Initiative, or PTI, is a universal standard, it's still not universally adopted across the supply chain because of the costs to build an effective process. Not having this information creates incomplete data about a product's origin, which is key during a recall and incident alert.

To track and identify food as it moves through the supply chain needed to modern, unified data that can be understood and seen at every point in the supply chain.

6.2. Limited Visibility

Being able to trace products throughout the supply chain requires full path visibility. when a recall alert happens, each part of the supply chain acts using only the data they have available, which may only provide insight into a small part of the bigger problem.

Because data is not shared or unified, buyers and suppliers can't truly gain the end-to-end visibility required to identify compromised goods and remove them quickly from the supply chain. Instead, the information and efforts are siloed, creating confusion and a lack of trust during a crucial time when everyone should be working together.

6.3. Lack of Coordination & Collaboration

Inefficient data and limited visibility contribute to the third problem that still exists with a traditional traceability food safety process: Coordination and collaboration. The more complex in supply chain is, the more essential it is to coordinate across the entire path. But if don't have shared data or visibility, then mobilization is nearly impossible to achieve during a food safety event.

6.4. Local context

- Distance of farms areas from depots/auction venture and many farmers sell their catch to farias (middlemen) who normally do not keep records of raw materials collected from farmers.
- Inadequate logistic support for enforcement in depots/auction centers in case of any violation of law;
- Large number of farms in an Upazilla where official control from the LCA is difficult.
- Very long and complicated shrimp value chain and sometimes information obtained are not reliable;
- Majority of shrimp farmers still not yet received traceability training;
- Many depots are still out of licensing system because they are functioning seasonally and their activities are not visible round the year;
- More than 20-30% farmers do not know how to read and write and they are reluctant to fill up farm information forms and maintain it while selling their raw materials to depots/auction centers etc.

7.0 Recommendations:

Consumers who do prefer fish are interested in local fish and are ready to pay more For them than for imported fish, as they appreciate their freshness compared to imported fish. At present, consumers are less likely to prefer farmed fish and are prepared to pay less for them than for wild fish. They are more sensitive to health issues resulting from consuming fish containing formalin and other additive and to different food sensory at tributes such as nutrition value and taste, and thus they consider farmed fish to be inferior to wild fish. Furthermore, consumers who possess food safety information want to consume formalin free fish instead of fish with no guarantees.

In Bangladesh Context, shrimp supply chain is more critical then other agri products. According to supply chain model, it has a clear picture that 4-5 actors (faria, mid level collector, Local paikar, representatives of supplier/agents, Depot etc) involved for shrimp trade facilitation whose has no formal authentication/certification. Whereas these middle actors took the smooth supply chain of shrimp from farm gate to processing industry. If they borrowed the formal business entity from DoF, it would be tracked to trace the products,

8.0 Conclusion:

Government agencies and NGOs should focus on labelling, including detailed information from farm to fork. Such labelling information could play a crucial role in a food traceability program to build trust among consumers about food safety and quality. Furthermore, the HACCP and Codex standards should be incorporated into the existing diverse regulations to prevent the adulteration of fish and fish products. Then, the regular surveillance, inspection, and random sampling of fish by concerned food safety officers of the state could contribute to the institutionalization and good governance of fish and fish products control systems in value chains. Increasing the safety standards and levels of product knowledge will improve consumer protection from deceptive trading and change consumers' attitudes, resulting in fish buying decisions.

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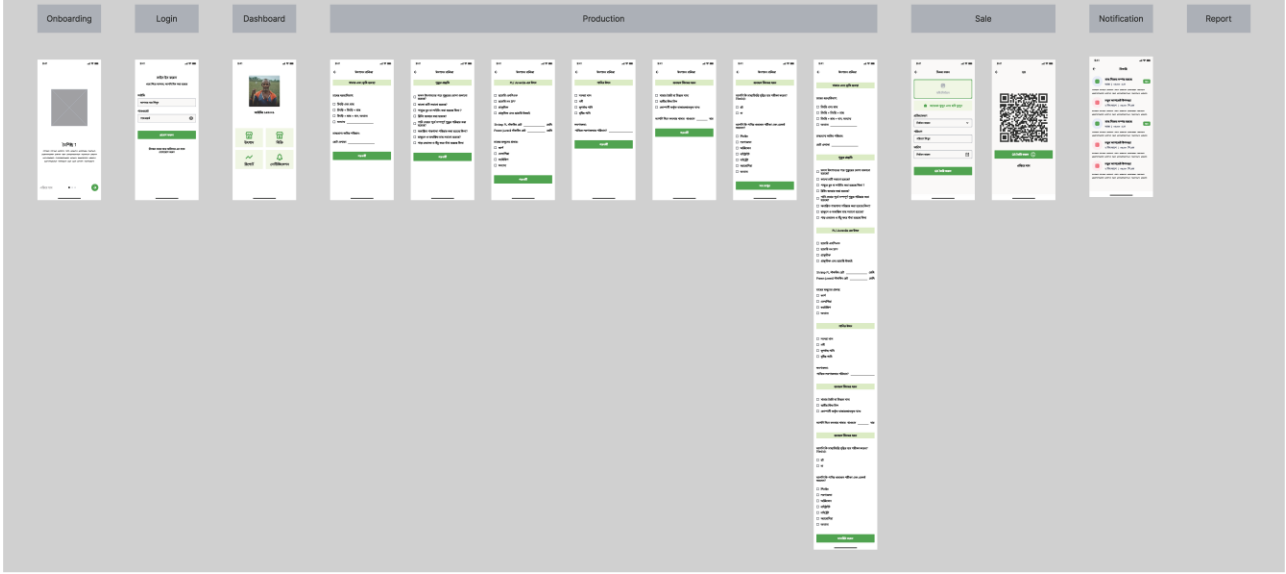
preference for fish consumption in general and are willing to pay less for them, because that they are more concerned about food contamination in Bangladesh. They are thus more likely to eat formalin-free fish and are ready to pay a price premium. Overall, regardless of low or high income, education, or safety awareness, everybody is looking for safe fish with adequate and explicit safety and traceability information. Therefore, locally produced fish can be marketed as having been supplied in a way that provides a formalin-free label, and then producers and marketers can impose a price premium for their fish products. The study's main contribution concerns consumers' consciousness of food traceability information in the significant seafood market of an emerging economy.

Considering Such an emerging market (e.g., Bangladesh) in a traditional value chain, exploring consumers' perceptions of fish traceability attributes is vital to estimating the demand for safe Fish and fish products. Bangladeshi consumers prefer to eat safe fish, with traceability information helping to indicate the safety of fish. Therefore, to meet the increased fish consumption demand with food safety controls, policymakers, marketers, and producers should focus on food traceability programs, as consumers prefer formalin-free fish. These initiatives will provide information to consumers about the quality and health benefits of fish (i.e., better safety and fewer chemical residues) and significantly improve the WTP for such products.

Consequently, the traceability information could optimize the production process and supply chain and help make seafood recall management more effective. The piloting may have attention bias as it follows a choice experiment approach in Which participants were requested to select from a given number of fish attributes and different levels of them. Therefore, in future research, other valuation approaches such as auctions or real choice experiments could be used to

measure choices and WTP. Therefore, it is not easy to ensure that the study sample represents all Bangladeshi consumers' concerns because of variances in economic development, education levels, and food consumption habits across the country. More classification of fish and fish products (coastal and marine version, whole and fillet) and Bangladesh's all divisions could be considered in future research, representing potential fish markets with food traceability systems to elicit better results. Despite the imitations, this study could be the base for conceptualizing other studies that aim to be related to other food traceability attributes and food safety programs.

9.0 Annex:



Fish e-traceability Apps step to step work process for cluster base shrimp marketing system

e-traceability data sheet attached in this report

10.0 Photos Gallery:

Inception Workshop on Fish e-traceability piloting activities in Khulna

Uses Mobile apps for cluster farmers baseline data collection through KOBO tools

Cluster Shrimp Farmers End line data collection through mobile apps

Stakeholder Meeting with DoF High Officials, Fish Processors, agent, and others into DoF Divisional Director office conference room.

Farm House Meeting with Cluster Shrimp Farmers in Different clusters of Dumuria area

KII with Cluster base auction center owners for the implementation of E-traceability apps base marketing system

Farm House Meeting with Cluster Shrimp Farmers

ফোয়াবের ব্যবস্থাপনায় মৎস্য শিল্পে ই-ট্রেসিবিলিটি বিষয়ক পাইলটিং প্রকল্প শীর্ষক ক্লাস্টার ফার্মারদের নিয়ে উঠান বৈঠকে প্রধান অতিথির বক্তৃতা করেন ফোয়াবের সভাপতি মোল্লা সামছুর রহমান (শাহীন)।

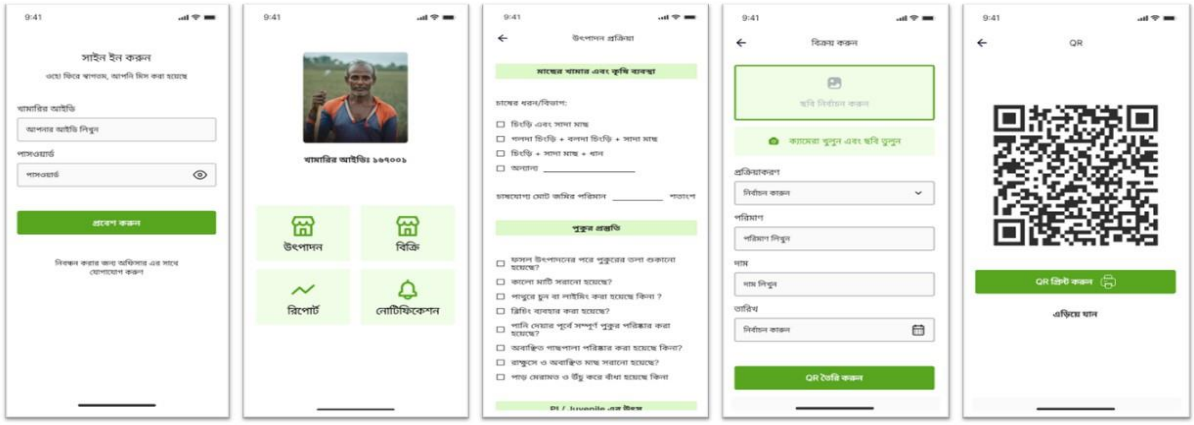
Stakeholder meeting with cluster shrimp farmers into farmers school on fish e-traceability

Bi-monthly Working Group meeting into FOAB regional office, Khulna

FGD meeting on fish e-traceability mobile apps with cluster shrimp farmers

FGD meeting on fish e-traceability apps base marketing system with cluster base auction center

ই-ট্রেসিবিলিটি সম্পর্কিত মোবাইল অ্যাপ - খামারী অংশ



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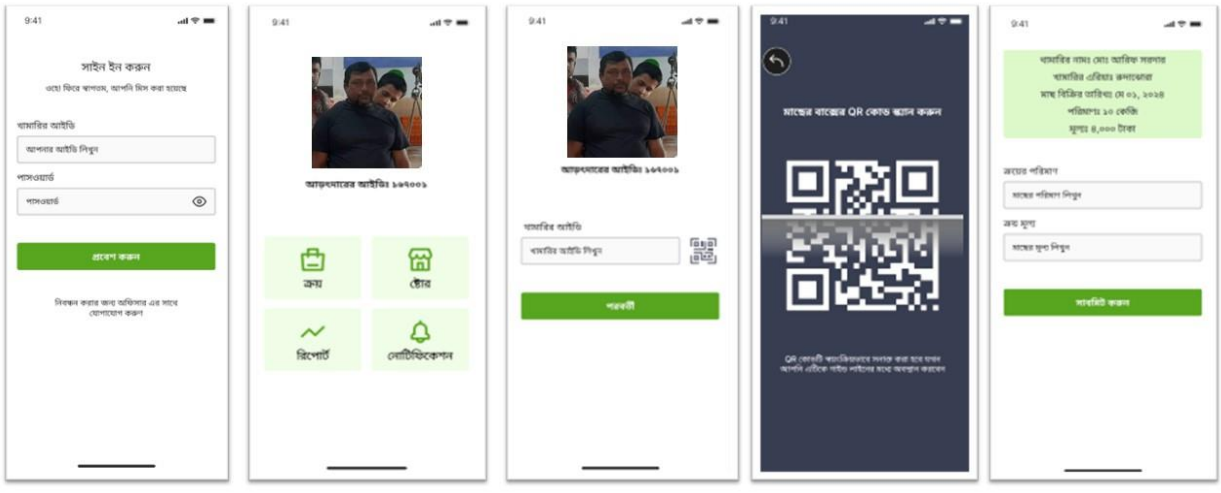

Hands on Training and Demonstrate fish e-traceability mobile apps with cluster shrimp farmers

National Seminar on findings of E-traceability piloting activities held in DoF conference room Dhaka, where DoF DG, ADG, other senior officials, University professors and elite persons participated