

TECHNICAL BULLETIN

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Fresh Water Fish: Post-Harvest Loss Reduction

Bangladesh is ranks third in the world in inland fish production, accounting for a total fish production of 4.76 million metric tons in 2021-22, of which, about 85% came from freshwater fisheries and aquaculture and the rest from marine sources. Small-scale fisheries and aquaculture produce about 97.30% of the fish and only 2.70% is produced by medium to large-scale commercial fisheries. Unfortunately, due to improper handling during fish transport and marketing, small-scale fisheries and aquaculture enterprises suffer huge post-harvest losses to the tunes of 28-30% in respect of quantity of wet fish and 15.5% in terms of quality, the penalty being a staggering figure of around Tk. 20,000 crore annually. Such post-harvest losses do not bode well for food security and nutrition of the



Fig. 1. Distribution of improved fish handling materials, e.g., stackable crates to fish farmers and dealers

Bangladeshi populace on the one hand and loss of incomes of small-scale fishers, fish traders and processors on the other. It is, therefore, imperative to reduce post-harvest loss of fish through improved fish handling, transportation, preservation and distribution methods and devices. Also, value addition through different fish processing methods, productive use of underutilized fish species etc. may be an important tool in post-harvest loss reduction. This project tested different improved fish handling, preservation and distribution techniques, devices and practices, and tried value addition measures like making fish fillets, fish powder, fish soup, etc. aiming to reduce post-harvest loss of fish in Bangladesh.

Methodology

The Department of Fisheries Technology, Bangladesh Agricultural University (BAU), Mymensingh implemented the project in collaboration with the Department of Farm Power and Machinery (BAU), and two NGOs, Organization for Rural Advancement (ORA) based in Kishoreganj. A model package comprising different improved fish handling, preservation and transportation distribution techniques and devices developed by the Department of Fisheries Technology and Department of Farm Power and Machinery, BAU, improved and standardized methods of preparation of value-added fish products was developed and then disseminated to



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fish farmers and dealers (Fig. 1) in *Haor* and floodplain areas to promote good fishing and fish business practices and enhance profits by reducing post-harvest loss (PHL) and preserving the quality and safety of fish.

Results and Outputs

Development of fish handling tools

Several useful, easy to handle, cheap fish handling and preservation tools were developed such as, (i) manually operated ice crusher machine, (ii) self-powered aerator-cum-oxygen accumulator (Fig. 2), (iii) portable folding SS-table, (iv) insulated tank ice box (TIB), (v) solid stackable plastic crates and (vi) improved ice crushing petty with pestle. These tools were field tested and fine-tuned for field use and handed over to fish trader groups (FTGs), and they are using these tools to preserve fish quality during transport from landing centers to markets. In addition, the design of a country fishing boat was improvised installing cold chain facilities on the decks equipped with TIB ice box in deck-hold, ice crushing petty, plastic crates, etc. for



Fig. 2. Self-powered aerator-cum-water agitator used during fish transport

capture fishing and fish transport demonstrated to capture fishermen. Capture fishermen were well motivated, most of them installed TIB on their boats to keep harvested fish fresh on board. Five country boats are being revitalized for the fishermen FTGs by the project on a cost-sharing basis.

The country fishing boat has been renovated equipping it with on-the-deck cold chain facilities for capture fishing. The renovation includes a partitioned engine room to prevent oil spills into the fish hold, insulated tank ice box in the deck-hold, provisions of ice crushing petty and pestle, plastic crates, etc. on board.

Value added products and entrepreneurship

Value added ready-to-cook or ready-to-eat products from different freshwater fish (Fig.3), predominantly from tilapia and pangas, such as, (i) stabilized mince from pangas/tilapia to produce mince-based products, (ii) powder products from tilapia and pangas, (iii) cooked pickles or condiment type products, and (iv) bone-free wet fish products were developed for the first time in the country with appropriate levels of ingredients, additives, spices and stabilizers considering local taste preferences have been developed.



Fig. 3. Tasty value-added products developed from low-cost fish

Entrepreneurship development training programs were conducted and 12 value-added fish products were introduced to both rural and urban consumers throughout the country. Two fisher women and 12 fishermen entrepreneurs of value-added fish product marketing were developed (Fig. 4). Later on, several corporate

business groups, like Y-PA Agro Tech Ltd., Heaven Fisheries Ltd., ACI Consumers Ltd. (Swapna Super Shop), etc. became involved in fish product marketing (Fig. 5).



Fig. 4. Entrepreneurship development training for women



Fig. 5. Heaven Fisheries, a corporate group, launches fish product business

Post-harvest Loss Reduction Laboratory and Fisheries Resource Center

Two new well equipped laboratories, “Post-harvest Fish Loss Reduction Laboratory” and “Cold Room Laboratory” have been established and equipped with machinery at the Department of Fisheries Technology, BAU. A Fisheries Resource Center (FRC) has been established at Balikhola near Chamra Ghat, the biggest fish landing center and arot in the Kishoreganj haor area, where about 70% of the exclusive haor fishes are landed and huge numbers of tourists, businessmen and passengers gather and pass this port for various reasons every year. This FRC will act as a common training-cum-community facility center where stakeholders of the fish value-chain can receive services related to post-harvest fishery loss reduction in the supply chain and improve skills and capacity for the development of their trades.

Expected impact

- (i) Enhanced capacity of fishing communities and fish traders groups to reduce post-harvest loss of fish and achieve greater profits through the use of improved protocols, tools and devices like revitalized country fishing boats for fish handling and distribution and trade with innovative value-added fish food products
- (ii) Entrepreneurship development among fishermen and traders who have been empowered to run their business sustainably. Several corporate business groups have started manufacture of value-added fish products and develop marketing networks. Beyond targeted project beneficiaries, new stakeholders are coming to adopt innovative technologies for greater incomes and profits
- (iii) Establishment of a modern fish laboratory and a Fisheries Resource Center will strengthen research on post-harvest fish loss and development of value-added fish products, and community motivation, awareness creation and skill development
- (iv) An end line (EL) survey confirmed that average post-harvest loss in wet fish was reduced to 5 to 7 % at both auction centers and retail fish shops nearby. Both individual and house hold incomes were increased because of post-harvest loss reduction, fish quality improvement, and economic activities were intensified through rural entrepreneurships and mobility of FTG members. Because of a positive change in fish trading from harvest to auction, the average monthly income and savings of all stakeholders were increased by 10-15%

- (v) The Department of Fisheries (DoF) has incorporated the post-harvest fish loss issue in its core program and initiated new projects on reduction of post-harvest fish loss country-wide in collaboration with several international development partner agencies (FAO, WFC, etc.).

Recommendations

Dignitaries including local administration and local government leaders, national policy makers, regulatory agencies, academia, NGOs, press and electronic media, etc. participated in the project completion workshops. Some of the recommendations of the workshops are summarized as follow:

- i. Post-harvest fish loss reduction campaign should be expanded in wider areas, i.e., throughout the entire capture fishery areas of the country, and all fish value chain actors of the capture fisheries-inland and marine, should be targeted in the awareness development campaigns
- ii. This project should be extended for a fresh term for areas covering *Hoars* of Kishoreganj, Netrakona, Sylhet, Sunamganj, Moulvibazar and Habiganj of Bangladesh
- iii. Value-added fish product recipes should be disseminated to all corners of the country, especially nutritious fish value-added products should be made popularized among school children through feeding campaigns.

This Technical Bulletin has been prepared on the basis of technical information available from a completed BKGET-KGF Funded CGP Project, the details of which are given below:

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