Policy Brief

Upgrading Pangas and Tilapia Value Chains in Bangladesh (BangFish)



EXECUTIVE SUMMARY

The purpose of BangFish was to promote efficient and green growth in freshwater pangasius and tilapia aquaculture by providing knowledge on how to improve water quality and farm management, improving value chains functioning and exploring the market potential for these species. The findings of the project include (i) the yellowish color of pangasius appears to be related to maize as a feed ingredient, which seems to be the main barrier to access to high value consumers in domestic and international markets; (ii) due attention is needed to monitor the antibiotic contamination in the fast-growing aquaculture sector of Bangladesh to reduce the potential risks of antibiotics on aquatic organisms as well as human health; (iii) a huge market potential exists for pangasius and tilapia both at domestic and international market if fish quality and safety standard can be improved; (iv) the improved management practices, especially business planning, budgeting, accounting practices together with managerial abilities in terms of education, training and experience can improve the financial performance of the farms; and (v) farm level technical efficiency can be improved if technology is chosen specific to location and species and also by regional clustering of farms given that the negative externalities are controlled. The major challenges of the project are the lack of reliable data on farm economics and markets. The main impact of the project is in capacity building of the scientific communities engaged in aquaculture research and policy formulation. In addition, the information on potential growth opportunities in and barriers to high value domestic and international markets are communicated among the producers, processors, regulators, and policy makers.

INTRODUCTION

In Bangladesh, aquaculture has expanded rapidly across the country during the last three decades, with total aquaculture production increasing from 211 thousand MT in 1990 to 2405 thousand MT in 2018 and an annual increase in aquaculture areas by 4.3% covering 798 thousand hectares of land during that period. The annual production growth of aquaculture during the same period is 9.4%, however, pangasius and tilapia production are growing annually at 12% and 9% respectively. The current production growth of pangasius and tilapia remarkable among different aquaculture species, which contributes about 19% and 16% to total aquaculture fish production respectively. These two species gradually gained popularity among farmers and consumers due to its fast-growth, higher yield, higher response to external feeding, suitability to available natural freshwater, and homogenous culture patterns. The most important issues that hamper the desired growth of the sector both domestically and internationally are-pond water quality, feed ingredients, and production systems affecting the quality of farmed fishes with respect to flesh colour and taste. On the other hand, poor quality fishes can affect human welfare if the fish contain human pathogens, pollutants such as arsenic, lead, and toxins. On top of that, demand for farmed fishes specially pangasius and tilapia is increasing in global and in domestic markets due to increasing economic growth, rapid industrialization, urbanization and shrinking supplies from the capture fisheries. On the other hand, in recent years, the market price of pangasius and tilapia is decreasing which is much lower than the other carp fishes. Besides, farm level profitability is decreasing due to the decreasing output price, and increasing inputs costs specifically the feed cost. The rising costs of production specially feed cost makes the small-scale farmers increasingly dependent to feed suppliers and wholesale fish buyers leading to a locked relationship due to financial constraints. It means that there do not exist a win-win relationship between actors of value chain. Furthermore, the export path for new species like pangasius and tilapia are not even despite its remarkable production growth potential. However, the country has a developed good industry background for shrimp both at domestic and international markets in terms of safety, quality, certification, product grading, quality control during marketing and production process, and thus, the pond aquaculture industry has the opportunity to grow further by learning and sharing together with shrimp industry. These two species could be a source of foreign currency and a source of low cost protein and nutrition for the country if quality, safety, productivity, and competitive price can be ensured.

RESULTS

Water quality and fish production

The most important factor for successful and profitable aquaculture production is clean water. Low water quality in terms of pollution, lack of oxygen, toxic algae and transfer of diseases, etc. can have numerous negative effects such as higher mortality, non-optimal growth rates, and lower quality of the fish. However, none of the estimated hazard quotients (HQ) is greater than 1, indicating that there are no adverse health effects for adult males or females by consumption of pangasius and tilapia. Aquaculture production is prone to stimulate growth of microorganisms in water in fish farms. For instance, dense fish stocks, regular feeding, production of fecal matter, debris from fish, excretion of organic and inorganic phosphorus and nitrogen compounds stimulate bacterial growth. The dissolved nutrients can cause eutrophication, blooms of algae, growth of toxic species, and reduction of oxygen in water and sediments, which may modify pelagic and benthic food chains. However, proper water quality management and increasing salt content, either by application of salt or by intrusion of seawater might reduce the risk for spreading of these genes and abundance of obnoxious bacteria. A high abundance of algal cells is commonly observed during spring and summer in fishponds due to increasing temperature and precipitation. Furthermore, metals are naturally present in all environments, but anthropogenic sources of metals such as mining, industry, traffic, domestic sewage, and atmospheric deposition vastly elevate the metal concentration in the environment, including also the aquatic environments, which has found within the allowed range for human health. The off flavors in fish flesh and yellowish color that occasionally observed making these two species, the fishes for the poor, are often caused by feed ingredients or plankton in the water.

Market and value chain

Bangladesh has an immense opportunity to export pangasius and tilapia at international markets with huge production and good taste. At present, large portion of the pangasius and tilapia production is domestically consumed often at low quality with lower price. The domestic markets for these two species are mostly limited to a particular segment of consumer (lower income class), who have limited available alternatives to switch. In addition, the demand for processed fish is also increasing in domestic market. Although there is a few pangasius and tilapia processing plants available in Bangladesh, these are not functioning right now. About 100 processing plants are available for processing other fishes which can be devoted to process pangas and tilapia species or are capable of meeting desired quality of these fish for both domestic and international markets. The quality deterioration and price escalation occur both at farms and processing plants when passing along the value chains before reaching to the final consumers. The major challenges in connection to this are to improve the quality of fish and the functioning of the value chains by ensuring quality inputs, and increased cooperation among actors of the chain. Bangladeshi consumers are willing to pay higher price for the quality attributes of pangasius and tilapia, which has also found important to the international consumers. However, to take advantage of the favorable market situation, quality of the Bangladeshi pangasius and tilapia must be improved and it must live up to a few certification schemes such as ASC, BAP and Global G.A.P especially in the production level. The food safety and quality requirements of the international markets have to be complied for exporting these fish. Otherwise, the fish can be exported to the low product quality markets. The domestic value chains were found well-functioning except for between feed sellers and farmers whereas, the extensive use of trade credits as a means of financing due to lack of formal credits, makes farmer dependent to feed sellers who use it as a tool for exploiting farmers.

Farm economics and the environment

Aquaculture is experiencing increasing growth, competition, specialized production processes, species diversification, and technological innovation, rising input prices, and falling output prices. Therefore, knowledge of fish farming and farm management has become more important in order to stay competitive and economically sustainable. Furthermore, fast growing aquaculture is exposed to more risks and uncertainties regarding environmental and regulatory issues, yield loss due to diseases, environmental degradation, increasing costs on inputs, and fluctuating price on outputs. Accordingly, many types of risks are associated with farming, i.e., production, marketing, financial, human and institutional risks. In addition, small-scale farmers often do not have the required knowledge, skills, and financial capacity to cope with the changing market environment. Furthermore, farm level productivity and technical efficiency are influenced by the regional differences in environment and production technology, hence spatial plan for locating farms closer to each other and selecting technology suiting the local production environment are important. The most benefits of technological progress are cashed by few front running farms whereas, average farms are lagging behind which will widen the gap in economic performance between best practicing and average farms. Besides, the production within more commercial farms requires more high quality inputs such as feed, fingerlings, water management, fertilizer and medicine. However, these inputs are costly and require more capital in order to purchase them. Collateral is a precondition for receiving institutional credit, and land, house and other durable properties are being used as collateral. Although, most farmers do not have sufficient assets that can be used for collateral, leading to a credit constrained situations. On the other hand, tenure systems are being changed due to upward shift in scale of operation and higher capital intensity in aquaculture. It is because farms are shifting from subsistence owner operated to commercial cash tenant.

CONCLUSIONS

- The contribution of this sector to foreign earnings, GDP, poverty alleviation, nutritional intake and rural economy can be increased substantially if the large potentials and challenges in both domestic and international markets of these two species are tapped and addressed.
- The main challenge for export market is to improve fish quality and safety and comply with HACCP rules, meet standards of international aquaculture certification schemes and document it.
- The presence of yellowish color of pangasius flesh prevents international consumers from buying, and appears related to maize as a common ingredient in both industrial and farmer-produced feeds. Possibly, plankton in the pond water may also contribute to pigments in the flesh.
- Various off-flavors were occasionally observed in pangasius and tilapia and may also be related to specific feed ingredients.
- Improved management practices, especially business planning, budgeting, accounting together with improving managerial abilities; education, training and experience can help improve the financial performance of the farms.
- Location of farms in suitable areas and forming farming clusters can improve farms profitability and farmer's ability to produce the most output from a limited set of inputs.
- Choosing technology specific to location and species may improve the technical efficiency and profitability at farm level.

IMPLICATIONS

The main impact of the project is in capacity building of the scientific communities engaged in aquaculture research and policy formulation. Furthermore, the information on potential growth opportunities in and barriers to high value domestic and international markets are communicated among the producers, processors, regulators and policy makers.

RECOMMENDATIONS

- Farmers should be made aware of that the fish quality can also be improved by depuration system, where fishes are starved for 24 to 72 hours so that all ingested artificial feeds are digested and no residual stuffs or effects remain within the fish, which will lead to high quality and prices of pangas and tilapia;
- Further research may be conducted giving more emphasis on formulating low cost feed and removing off-flavor and yellowish flesh color;
- Farmers can develop teams or cooperatives to share risk, acquire more bargaining power when using trade credits, and in relation to the possible new development of contract farming with fish processors;
- The fish quality and safety conditions both for domestic and international markets can be improved by providing training to the value chain actors on fingerling production, feed formulation, fish preservation, handling, icing and storing with the help of DoF, BFRI and NGOs and;
- Efforts should be extended to develop suitable market infrastructure with respect to transportation, proper storage and other physical facilities;
- Introducing certification schemes in aquaculture may ensure the quality fish and enhance the export potentiality by supporting the preparation of the sector to live up to HACCP requirements. The farmers and processors should develop documentation systems for their production in order to be able to achieve certification and export;
- The extension service can play important role improving the knowledge on farm management practices and managerial ability of farmers, which will results in higher financial performance, productivity and efficiency at farm level;
- The government can motivate the formal institutional lenders to ease the credit policy and sanction credit with less collateral or at lower interest rate for aquaculture farmers, which could reduce the underutilization of inputs and technology and thereby increase productivity;
- The different actors in the pangasius and tilapia supply chains including retailers should be aware of the importance of using good transporting and proper storage systems to keep the fish fresh.

Hon'ble State Minister of Fisheries and Livestock Md. Ashraf Ali Khan Khasru is delivering speech in the Final Stakeholders Conference

Project Coordinator Max Nielsen handed over the BangFish Crest to the Hon'ble State Minister

A photograph of audience in the Final Stakeholders Conference

Hon'ble Vice-Chancellor, PSTU, Dr. Md. Harun-Or-Rashid is delivering speech at PhD seminar

Leader WP-3, Dr. Md. Akhtaruzzaman Khan is presenting research output in the mid-term conference

Leader WP-1, Dr. Niels Jorgensen is presenting research output in the mid-term conference