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SUCCESS STORY

Novel method for growing *Pangasius* in hyposaline ponds unlocks the aquaculture potential of southern Bangladesh

Researchers test catfish species to address salt-water intrusion as a barrier to fish farming

A fish farmer shows off his successful catfish harvest from a pond in Bangladesh.

"Opportunities exist to expand [Pangasius'] culture to coastal regions impacted by seawater incursion and in communities impacted by overfishing and inadequate food security."

— Dr. Md. Lokman Ali, AquaFish Host Country Co-PI, Patuakhali Science and Technology University

In Bangladesh, a poor nation situated almost entirely on a low-elevation river delta, sea level rise is inundating many freshwater systems in coastal areas with hyposaline water. This salt-water intrusion has presented an ongoing challenge to expanding freshwater pond aquaculture in the region, as many freshwater culture species cannot tolerate the elevated salinity.

The southern, low-lying regions of Bangladesh have traditionally relied on fishing or aquaculture of marine species like shrimp for both nutrition and income. However, overfishing, increased frequency of damaging storms, and disease epidemics in shrimp culture have left the communities of coastal Bangladesh with more than half a million fishers living in severe poverty in the Barisal region of southern Bangladesh alone. The result is thousands of displaced fishers and people whose livelihoods depended on that industry to survive.

Maintaining sustainable growth in aquaculture is critical for meeting the demand for seafood in a nation that sources up to sixty percent of its animal protein from the fisheries sector. Aquaculture of Indian carps, non-native carps (such as silver, common and grass carp species), tilapia, and Pangasius catfish account for the lion's share of fish farming in Bangladesh. Shrimp farming is still the leading aquaculture product by value in the nation, though it remains an industry with significant challenges to sustainability.

The river catfish *Pangasius hypopthalmus*, a freshwater species well suited for aquaculture, was introduced to Bangladesh in the 1990s. Since then, *Pangasius* aquaculture has grown rapidly, yielding over 300,000 tons of product every year. Farmers have achieved economic success in culturing this species in the northern parts of the country. However, expanding aquaculture to the southern regions of the country is more challenging, since pond water is becoming increasingly saline due to rising sea levels.

Recognizing the potential of southern coastal areas for *Pangasius* farming, and aware of the challenge of seawater incursion, AquaFish researchers from the US and Bangladesh wanted to test whether these fish could be cultured in higher salinity water. Working with local fish farmers in the Barisal region of coastal Bangladesh, *Pangasius* catfish were stocked in ponds with two salinity ranges — 2-5 ppt and 5-8 ppt — and reared for a period of 180 days to evaluate growth performance. The results of the experiment demonstrate for the first time that *Pangasius* catfish can be successfully grown in hyposaline waters.

This study has important implications for the future of aquaculture in the southern regions of Bangladesh, and further afield in southeast Asia. To date, aquaculture of this species has been limited to freshwater systems along the Mekong Delta region in Vietnam and Cambodia, and to locations in Thailand and the central and northern regions of Bangladesh.

"Opportunities exist to expand its culture to coastal regions impacted by seawater incursion and in communities impacted by overfishing and inadequate food security," said Host Country Co-PI Dr. Md. Lokman Ali of Patuakhali Science and Technology University. The coastal areas along the Ganges River Delta in Bangladesh and the Mekong River Delta in Vietnam will continue to be impacted by rising sea levels, where freshwater bodies along inland coastal areas are already experiencing salinization. This project provides a precedent for culturing Pangasius in areas of higher salinity, expanding the potential for aquaculture to contribute to food security and fish protein production throughout the region.

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