

## Sustainable freshwater aquaculture in the mangrove-dominated Indian Sundarbans



Collecting Porteresia, West Bengal, India © University of Calcutta

mercially available bivalves are used as feed, this practice also degrades water quality, reducing the survival and growth of prawns. The key elements of this project included developing an alternative mangrove-flora-based feed to make scampi culture more sustainable and environmentally friendly, and raising awareness among farmers of the importance of maintaining water quality.

### Target beneficiaries

Local freshwater aquaculture farmers of the Indian Sundarbans.

### Outputs

- ▶ Water quality was tested in culture ponds using floral feed and the results compared with those from control ponds using commercial meat-based feed.
- ▶ Locally appropriate feed-preparation technology was developed using locally sourced marsh grass pulp as the main feed ingredient.
- ▶ The impact of formulated feed on prawn biomass, survival rate, condition index (length and weight) and feed conversion ratio was investigated.
- ▶ The relationship between protein-rich feed and protein levels in prawn tissue was tested through regular monitoring.



#### LOCATION

Sundarbans, West Bengal, India

#### PRIORITY POWS

- Knowledge for Management
- Strategies for Management
- Coastal Governance

#### DURATION

2 December 2009 to 1 January 2011

#### MFF GRANT AMOUNT

US\$12,000

### Objectives

This project examined the protein content of salt marsh and seagrass flora, with a view to developing an eco-friendly, nutritious feed for freshwater prawns. It adapted feed preparation technology to local conditions by using locally sourced floral pulp as the main feed ingredient, and assessed the impact of this floral feed on prawn biomass, survival rate, condition index and feed conversion ratio. The goal of the project was to determine whether floral feed can offer better aquaculture nutrition and cleaner, more eco-friendly prawn farming.

### Background

Aquaculture farmers in the Indian Sundarbans are increasingly using organic fertilizer and feeds for freshwater culture of scampi (*Macrobrachium rosenbergii*), a species of prawn that commands high export prices. In recent times, interest has grown in the nutritional quality of mangrove flora when used as the main ingredient in scampi feed, instead of the trash fish and mollusc flesh which have been found to be extremely polluting to waterbodies. Although in some areas com-

### Accomplishments and challenges

The project successfully used science to enhance traditional aquaculture practices. By demonstrating improved productivity and culture pond health from using the new floral feed, the project won support from local prawn farmers. At the same time, the new feed enhanced water quality, removing the need to clear mangroves for wastewater removal systems such as canals and ditches. This in turn protected the existing mangrove

habitat and helped stabilize mudflats. Prawns reared on floral feed also exhibited greater weights and redder colouring (both attributes with high consumer appeal), and grew more quickly than prawns in control ponds.

Demonstrating the increased effectiveness of locally sourced floral feed has motivated aquaculture farmers in the area to adopt the practice on a larger scale. The survival rate of floral-fed prawns is 76%, compared with 70% for prawns fed on commercial meat-based feed. The project also found that using floral feed produces less waste and so helps to improve water quality. The project had the dual benefit of developing an eco-friendly prawn culture practice and creating an alternative livelihood for women through feed preparation and establishment of a nursery of salt marsh grass (*Porteresia coarctata*) for raw material. The government of West Bengal has agreed to train local communities in feed production, thus guaranteeing sustainability.

### Challenges

The challenge for this initiative lies in market-

ing the floral feed product to encourage its uptake by aquaculture farmers regionally and nationally, and to ensure it can compete successfully with commercial feeds.

### Contributions to cross-cutting themes

#### Communications and gender equality

A guide (in Bengali) was developed to create awareness among local communities of scampi and the benefits of rearing them on floral feed. The project provided an alternative livelihood for women in the form of preparing feed and developing a *P. coarctata* nursery to provide raw feed material.

### Lessons learned

Thanks to intensive participatory testing with local communities and other stakeholders, this small-scale aquaculture initiative was readily adopted and has strong prospects for alleviating poverty, being environmentally sustainable and locally appropriate. Full ownership and participation by beneficiaries and land owners are vital if such scientific exercises are to be sustainable.

*“Commercial feed contains trash fish and shrimp dust as a source of protein. The residual commercial feed degrades water quality by increasing the organic carbon, nutrient load, biochemical and chemical oxygen demand, and total coliform bacteria.”*

– DR ABHIJIT MITRA  
PROJECT DIRECTOR

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