New opportunities for aquaculture in Sri Lanka

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Key messages

- The establishment of oyster farming in two coastal communities has led to Sri Lanka’s first ever oyster exports.
- A new monitoring and testing system is preventing oyster mortalities and providing assurance of food quality and safety in the market.
- Forty rice growing communities in Sri Lanka have begun rearing fish in seasonal reservoirs, increasing household incomes by up to 18%.
- New mini-nurseries are supporting timely delivery of fingerlings of appropriate species.
- In shrimp production, use of SMS messaging has boosted the adoption of better management practices, reducing risks and improving productivity.

Context

In Sri Lanka, fish are a vital food source, comprising over 50% of animal protein in human diets. Currently, the government is aiming to almost double fish consumption per capita, from 11.4 kg per year in 2009 to 22 kg in 2014. In this context, the development of aquaculture, such as shrimp farming, oyster cultivation and rearing of fish in seasonal reservoirs, has significant potential. Researchers from Wayamba University of Sri Lanka, the University of Calgary and the British Columbia Aquatic Food Resources Society are therefore collaborating with provincial government ministries of fisheries in the North Western (NWP) and Eastern Provinces (EP), the National Aquatic Resources Research and Development Agency (NARA) and private sector organizations. Their work aims to enhance community-level skills and knowledge on aquaculture and promote sustainable development in the country.

Shrimp farming in Sri Lanka was once a major source of income and a provider of high quality animal protein for local people. Starting in the early 1970s, it rapidly expanded in the NWP, reaching a peak in 1998. But outbreaks of disease and degradation of water bodies resulted in high production losses, the disappearance of jobs, and abandoning of farms. In order to support the development of location-specific better management practices to address past problems, researchers from Sri Lanka and Canada have examined how knowledge is used and shared in the shrimp farming sector.

Oyster farming has been attempted but never sustained in Sri Lanka. Prior to the project,
Oysters had little commercial value; only the poorest cooked and ate them, as a supplement to their diet in months when they could not fish. Now, two communities in Puttalam Lagoon, NWP, have started to grow oysters. Researchers have studied local conditions and knowledge and linked them to sustainable cultivation techniques, leading to the first commercial exports of oysters from Sri Lanka. Through the work of a private sector company, the oysters are being sold for fresh consumption in local hotels and restaurants, as well as frozen for export markets in Thailand and other Southeast Asian countries.

In the NWP and EP, around 4,000 seasonal, rain-fed reservoirs known as ‘tanks’ are traditionally used to irrigate rice paddies. Only 3% of them, however, have been used for aquaculture. Forty communities are working with the project to develop effective mechanisms to co-manage fish and farm activities. Research has shown that during the six to seven month period when water is available, stocking fish in multi-species combinations under locally appropriate conditions leads to higher productivity and provides a diversity of products for home consumption and sale. The five fish species, tilapia (Oreochromis niloticus), common carp (Cyprinus carpio), and three species of Indian carp - catla (Catla catla), rohu (Labeo rohita) and mrigal (Cirrhinus cirrhosus) - occupy different niches in the reservoir. But availability of young fish (fingerlings) to stock the tanks has emerged as a significant constraint, with central government hatcheries the primary supplier. Development of community mini-nurseries is therefore underway, to help boost supplies at a local level.

Emerging outcomes

ICT helps shrimp farmers minimize risks and increase incomes

The government of Sri Lanka has recognized the growth potential for shrimp farming and is intervening to address problems and constraints. The project worked with farmers and industry stakeholders to develop locally relevant management interventions that would lead to more farmers implementing better practices. This was integrated in a pilot knowledge mobilization program with 60 farmers, using an SMS and web platform to alert them to critical factors affecting farm performance and risks, such as disease outbreaks and poor water quality. It advised them on whether water should be pumped into ponds, when to increase biosecurity measures, how to improve pond water and how to avoid over-feeding. As a result, 80% of farmers took actions to implement 75% of the key practices recommended to improve production outcomes. For example 93% of farmers took actions to increase biosecurity when informed of a disease outbreak in the area. This pilot is now being expanded to 500 farmers receiving SMS and sharing localized information through a web platform.

Village seasonal reservoirs enhance food production and rural income

An initial pilot project introduced aquaculture activities in 10 communities in the NWP, each community having access to a seasonal reservoir capable of being stocked with 15,000 fish fingerlings. Each community established a committee responsible for aquaculture and received training on rearing fish. Fish were harvested six months after stocking, reaching an average weight of 500-600 g. Even with some losses before and after harvest, the yield of fish from a 10 hectare reservoir was around 4,000 kg, translating into approximately 30,000 Sri Lankan rupees (LKR) (US$230) per family, an increase in annual income of up to 18%. Following this initial success, around 30 communities in NWP and EP are participating in the project with partial financial support from the respective provincial councils. Further improvements such as increasing fingerling availability, improving survival post-stocking,
increasing stocking densities with multiple species, and reducing post-harvest losses, are needed in order to promote aquaculture to more communities and increase fish production for local consumption and regional markets.

Oysters provide new income opportunities for coastal communities

A pilot project working with 26 families in Gange Wadiya and 20 women from 10 families in Kandakuliya, NWP, has demonstrated that oysters can be successfully cultured to marketable size in 12 months or less using simple rack and pouch or tray systems set in suitable areas of the lagoon. These are resource-poor coastal communities dependent almost entirely on a seasonal fishery. NARA monitors sites for optimizing growth, for seed (‘spat’) collection, for water quality, and for protection of the oyster and mangrove resources necessary to support oyster farming.

In both communities, participants have tested the technical feasibility for resource-poor coastal communities to grow oysters using common water resources. Community members formed two oyster farming organizations, each linked to a private sector entrepreneur, who provides technical support and equipment, buys oysters, and is developing domestic and export markets. At present, community members receive a farm gate price of about 10 LKR (US$0.07) and are slowly amassing equipment, with a target of producing 200,000 oysters each year, providing a net income of an additional 60,000 LKR (US$460) per individual or household. This would increase average annual household income by 15-30%.

Reducing production risks

As filter feeders, oysters are susceptible to environmental change. Large influxes of freshwater entering estuaries and lagoons reduce salinity levels leading to mortalities. Such influxes can also carry contaminants from agriculture, industry and waste. NARA is conducting research to identify such risks and develop strategies, with private sector partners, to mitigate and manage them. These include identification of sites to which oysters can be transferred, monitoring and laboratory analysis for contaminants, providing alerts when risks are present, and development of purification systems using sterilized seawater - called depuration. Ensuring that public health is protected from contaminants (both natural and man-made) has constituted a major part of the research activity.

If communities are to develop sustainable production systems using seasonal reservoirs, a reliable supply of the required species of fish fingerlings is necessary, available at the correct time to take advantage of the available water during the six to seven month culture cycle. A key strategy employed in the project is to enhance the availability of fingerlings through community mini-nurseries. As a first step, three mini-nurseries in NWP and one in EP will be improved, creating 10-12 nursery ponds with a capacity of 30,000 fry per pond, able to supply 20 reservoirs in surrounding local areas. This strategy also increases the survival rate of fingerlings, by reducing the distance (and transportation time) between nursery and reservoir.

Increasing livelihood opportunities for women

In Kandakuliya, the community depends primarily on income generated from seasonal activities.
fishing. While women contribute significantly by preparing and repairing nets, harvesting fish from nets for sale, and earning income from other sources such as vegetable harvesting in commercial farms, few men acknowledge their contribution to household income. The opportunity to culture oysters close to their homes is enabling women to manage production and gain a new source of income for which they take complete responsibility. They have earned some initial income from harvesting oysters from the natural stocks in the lagoon and from collecting oyster seed to supply the production system. Twenty women have formed an oyster production society and have been trained in oyster culture techniques. From an initial stocking of 10,000 oysters, production activities are continuing to expand, with an aim to produce at least 100,000 oysters per year in the lagoon.

Conclusion

Based on the positive responses of shrimp farmers and industry stakeholders, the knowledge mobilization program (i.e. the use of SMS, farm data and better management practices) can be institutionalized and scaled up. The value of underutilized seasonal reservoirs for fish production has also been demonstrated, and could be maximized by addressing constraints in the production and supply of fingerlings. Further establishment of oyster culture with additional communities, and developing the capacity and infrastructure for safety and quality assurance are necessary, in order to fully commercialize oyster production by low-resource coastal communities. Institutional partnerships between local communities, private sector organizations, provincial ministries, and central government agencies are forming as a result of developing these opportunities in aquaculture, building the foundation for effective governance and co-management of aquatic resources and ensuring a sustainable future for aquaculture development in Sri Lanka.

References


Acknowledgements

Grateful thanks to all the aquaculture farmers, women and men, who worked with us on this project, and the teams from the Sri Lanka Aquaculture Development Alliance, the North Western and Eastern Provincial Councils, NARA, Tropical Oysters Pvt., Eastern University, Wayamba University, the University of Calgary and the Centre for Coastal Health (Canada).

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This outcome story is one in a series that reports on research supported by the Canadian International Food Security Research Fund (CIFSRF), a program of Canada’s International Development Research Centre (IDRC), undertaken with financial support from the Government of Canada, provided through Foreign Affairs, Trade and Development Canada (DFATD). Produced by WREN media in April 2014.