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Fish Farmers Meet New Technology Raising Aquaculture Productivity of Small Farmers in Assam

ABOUT THE AUTHOR

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One of the real successes of the Assam Agricultural Competitiveness Project[1] (AACP) has been intensification of fish farming. So far, the Fish Intensification program has improved the lives of nearly 43,000 families and increased fish production by some 7,000 tonnes annually. And it generates an additional gross income of about $12.25 million per year, of which about half is incremental income (extra money in farmers' pockets) for small, marginal, and landless farmers. This SmartLesson describes the approach used in the program's two components — Ponds and Tanks[2] — and the positive changes that have resulted.

Background

Although fish consumption is extremely popular in Assam, it is estimated that the state imports annually about 40,000 metric tons of fish, worth some $60 million. The AACP baseline survey revealed that fish yields were low — 500 kilograms per hectare in ponds and 875 kilograms per hectare in community tanks — among the small-scale farmers who were the project's beneficiaries.[3] The survey showed low levels of management. Typically, a few small fingerlings were released once a year, with no regard for either stocking density or quality. Little, if any, feeding was carried out, and there was no attempt to manage the water's pH.

Lessons Learned

Lesson 1: Develop solutions that directly address the small farmers' needs.

Fish farming is an enterprise that is particularly suitable for farmers with small areas of land, because it can generate very high incomes from such areas. In the irrigation-tank enterprises, which are community based, many of the farmers are landless. The technology is scale neutral; that is, it incurs small incremental increases in costs, rather than large individual investments, which are more suitable for large-scale farmers.

Located in northeastern India, Assam has an excellent subtropical climate for the development of aquaculture in a variety of freshwater bodies. But of the large number of fisheries in the state, few apply modern technology or scientific techniques.

[1]See the SmartLesson: "Revised Supervision Strategy: Whatever you attend to, you get more of! Improving Agricultural Competitiveness in Assam," by Grahame Dixie, Manivannan Pathy, and Kalesh Kumar.
[2]A tank is a large-scale traditional water catchment system used in South Asia to store rainwater for surface irrigation.
[3]Larger, more commercial fish farming yields were typically about 1,000 kilograms per hectare per year.

Based on proven best practices and with the help of a specialist fish consultant, the project developed a semi-intensive production package. The main elements are specific stocking densities (6,000 fingerlings per hectare), the introduction of larger fingerlings, the use of lime to deacidify the water (1 metric ton per hectare), and much greater use of fish feed. This higher level of inputs was expected to result in fish yields of 3,000 kilograms per hectare per year. The unit cost of production would be Rs[4] 30 (about $0.66) per kilogram, as compared with a market price of about Rs 70 ($1.55) per kilogram.

Improved stocking, control of acidity, and better feeding increase the yield of ponds such as this one.

Photo Credit: Ramen Barman, Project Fisheries Coordinator

Lesson 2: Make it possible for farmers to test the new techniques on their own farms.

Enabling smaller-scale farmers to directly try out the new techniques on their own farm was far more convincing than the traditional approach of asking them to visit a field trial. The project used nongovernmental organizations, operating at a district level, to mobilize CIGs (common interest groups) of typically 8–20 pond fish farmers and CTGs (community tank groups) of 10–50 people who collectively farm irrigation tanks. These groups received four one-day training sessions covering all aspects of prestocking, stocking, and poststocking management of pond and tank operations. Progressive local fish farmers served as resources.

Lesson 3: Provide a smart subsidy (time-bound, targeted, and transparent) — and balance it with sound advice to help farmers handle the income spike.

The project provides a one-off 90 percent grant for fish inputs and a 50 percent grant for civil works (pond and tank renovation and clearance). During training the point is strongly made that this is a single opportunity for farmers to make a "super profit" because of the combination of input subsidy and increased production. The message is clear: this one-time windfall should not be wasted; it should be saved for use as working capital in the subsequent year. This subsidy helps overcome two of the key difficulties that projects face:

- Getting farmers to actually take up new technology or new techniques; and
- Overcoming the problems that poorer or smaller farmers have in affording the working capital required for these more intensive, higher-input systems.

Lesson 4: Have appropriate procurement and financial safeguards in place.

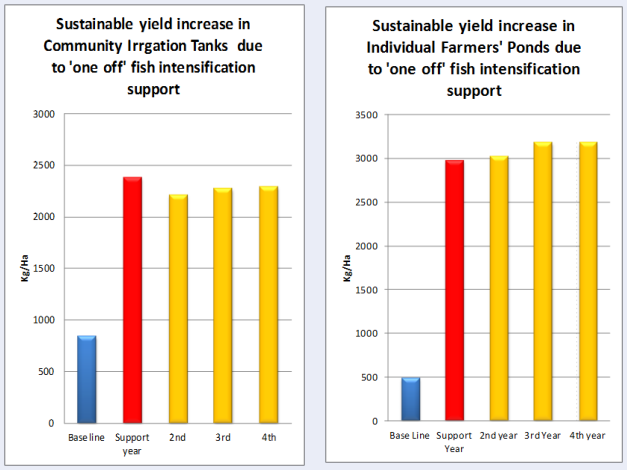
The project used community procurement, based on preapproved district inputs costs. The process was verified by the social audit committee of the community groups and based on the community operation manual. A random sample of subprojects was also subjected to physical asset verification visits.

Lesson 5: Measure the results.

The project's third-party M&E (monitoring and evaluation) consultants have measured yields both in the support year and in subsequent years (see Figure 1). This measuring of results has proven the sustainability of the improved yields and found the following:

- 87 percent of beneficiaries continued with improved production techniques.
- There are significant spillover effects as nearby farmers also take up the technology.
- Each beneficiary in the Fishery Ponds component will have benefited by some Rs 5,560 ($123) per year.
- Each beneficiary of the Tanks component will have benefited by Rs 2,080 ($46) per year.
- Of the 43,770 beneficiaries, 41 percent are landless, 42 percent are marginal farmers, and the rest are small farmers.
- 13 percent of all the beneficiaries are women.

Figure 1: Sustainable Yield Increases in Tanks and Ponds



Source: AACP reports by third-party M&E consultants.

[4]Rs = Indian rupees.

Fish farmers are able to apply their new knowledge directly to their own work.

Photo Credit: Grahame Dixie

Conclusion

This approach has proved very popular, bringing a radical change to the fish farming in Assam. Altogether, the project has covered a water area of about 2,500 hectares of individual farmers' ponds, each one about 0.1 hectare. In total, 26,468 farmers have benefited from 1,832 CIGs. The community tank program covers 461 hectares and 456 tanks and works with a total of 16,311 landless, small, and marginal fish farmers.

Beneficiaries are now aware of maintaining specific stocking densities. They understand the importance of maintaining an optimum water pH through the application of lime (CaO) and the necessity of using quality fingerlings. As a result, the farmers have increased their fish productivity by 200 to 500 percent.

What is proving to be even more impressive is that these changes in production technology now appear firmly embedded into the way these fish farmers operate. The reason is believed to be twofold:

- Beneficiaries have clearly taken onboard that this is a one-off opportunity to make a super profit, and they have saved some of this money for their working capital in subsequent seasons.

- Farmers are not just observing an experiment or a field pilot; they are directly engaging with the positive impact of the technology.