

and impacted by the important management practices implemented during the on-going culture. In future also there is every possibility that the state and central governments and the courts will take a serious view of aquaculture, if it violates sound management principles, induces user conflicts and affects other user groups, the rights of consumers and other sections of the society. On the other hand, unsound management practices drastically decrease the economic efficiency of the carp culture in several ways and ultimately may result in serious losses, which, in turn, may force the farmers to abandon the culture. To ensure further sustainability of this un-paralleled carp culture system in Asia, for decades to come, it is time that a thorough and urgent review of the entire carp culture system in the state is undertaken, problems identified, and remedial measures implemented.

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## The business approach to operating national broodstock centres: An innovative strategy for developing the freshwater aquaculture seed industry in Viet Nam

Roehlano M. Briones, Tran Thi Huyen Trang, Nguyen Cong Dan, Nguyen Huu Ninh, Pham Van Khanh, Nguyen Hien Thi, Don Griffiths and Trinh Quoc Trong.

The freshwater fish seed industry in Viet Nam supports a dynamic freshwater aquaculture sector, which has made significant contributions to incomes and food security. Freshwater aquaculture production has been growing rapidly since the late 1980s, with output value reaching US\$ 585 million in 2001 (FAO, 2004). The Ministry of Fisheries (MOFI) of Viet Nam projects production to grow by 11.4% annually from 1999 to 2010 (MOFI, 1999). Likewise, seed demand is projected to grow annually by 4.9% from 2005 to 2010 (MOFI, 2003).

Recently however, deterioration in seed quality has been cited as a major constraint to the growth of downstream freshwater aquaculture. This has been attributed to poor broodstock quality and poor management practices. In

response, the Government of Viet Nam has recently approved the establishment of three National Broodstock Centres (NBCs) under MOFI, to maintain and upgrade seed quality nationwide.

Establishment of the NBCs occurs within the context of doi moi (reform or renewal) policy, which mandates market-oriented reforms. Hence, while the government subsidized the construction of broodstock centre facilities, it delegated responsibility to finance operating or running costs to the NBCs themselves, essentially as self-sustaining businesses. The adoption of a business strategy for broodstock centres is an important institutional

innovation that could possibly be a model for seed industry development in other countries.

Implementation of the new strategy soon made clear the need for sound business planning to support operations and financing. Hence the MOFI, with support of the Danish Agency for International Development, undertook a capacity-building initiative for the NBCs based on a systematic assessment of business conditions and participatory business planning. This paper presents the framework, method, and outcomes of this initiative.

## Background and rationale

In Viet Nam, the majority of seed supply is obtained from hatcheries, which are either government-owned or private companies. The industry has witnessed the deterioration of genetic quality in several cultured fish species, a trend that has become evident since the late 1970s (Thien, Dan, and Tuan, 2001). This has been attributed to a decentralized system in which genetic quality of broodstock was the responsibility of individual hatcheries.

The creation of the NBCs represents a shift to a centralized "pyramid system" for genetic improvement (Figure 1), which is widely practiced in animal breeding (Notter, 2004). At the apex are the national centres, who are the main custodians of the breeding nuclei. In the middle are the multiplier hatcheries, which in turn disseminate the improved breeds to commercial farmers.

The NBCs are under the auspices of the Research Institutes for Aquaculture (RIA 1, RIA 2 and RIA 3 covering the Northern, Southern, and Central regions respectively). At the time of writing, NBC 1 has a mandate for operations in the Northern region, while NBC 2 which is under construction has a mandate for the Southern region (funds have been approved for NBC 3 for the Central region, but construction has yet to commence). NBC 1 is located in Hai Duong, Phu Tao province, while NBC 2 is in Cai Be, Tien Giang province. NBC 1 was originally a provincial hatchery, while NBC 2 was the Research Centre for Aquaculture of RIA 2. At both Centres, the MOFI made sizable investments (up to US\$2,000,000) to construct modern facilities for research and broodstock development.

In creating the NBCs, several institutional options were open to the government. The first option is state-planning, in which supply decisions are centralized at the level of a planning authority, which also provides the resources (funds, facilities, and personnel) for the delivery of goods and services. The second option is profit-oriented supply, which became prominent in the hatchery industry after the doi moi (reform or renewal) policy. The third option is mission-oriented supply. This denotes production by a non-profit business entity that is organized for a social purpose. Resources are

mobilized through cost-recovery (i.e. sale of products and services), donor contributions, partnerships with the private sector, and other such financial measures.

Problems with state-planning supply throughout the economy led to the dismantling of many types of state subsidies under the doi moi (reform or renewal) program. The NBCs were classified under the umbrella of enterprises to be run without a budget allocation from the government. However, it may not be feasible to operate the broodstock centres entirely as for-profit enterprises and expect them to deliver on their seed quality mission; after all, the hatchery sector (which runs on a for-profit basis) has also failed to improve genetic quality and promote seed production technologies. This leaves the third option, that of operating the NBCs as mission-oriented businesses (though under government ownership). In this way, the NBCs can focus on providing quality R & D products, while compelled to mobilize their resources and recover its running costs.

The "best practice" for a new enterprise is to begin with a useful business plan or feasibility study (Hishamunda and Manning, 2002). The business plan expresses the strategy for achieving the mission while maintaining financial sustainability. The business plan is therefore useful for internal purposes;

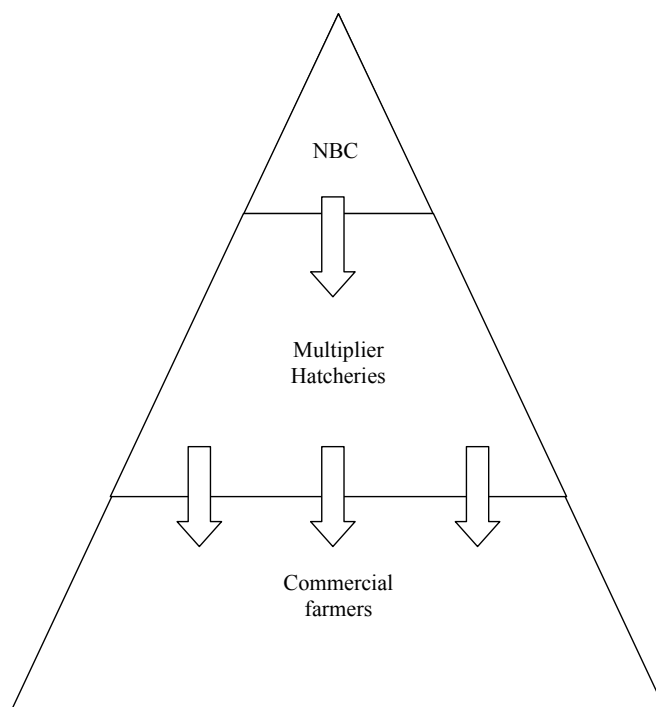
it is also essential material for potential contributors and supporters of the NBC mission.

In preparation for business planning, information on the demand side and the supply side of the business was systematically gathered. This was followed by training for business plan formulation. Information on demand for NBC products and services was collected by a rapid rural appraisal of hatcheries in the North and South regions. Information on the supply side was undertaken through a multi-dimensional business assessment (covering human and physical resources as well as business systems). After assessment and training, a participatory planning exercise was conducted by the NBCs to draft the business plans.

## Results from demand assessment

The rapid appraisal was conducted by a small-scale purposive survey of hatcheries in North and South regions (nine each, totaling 18 respondents). Findings of the survey include the following: First, seed production is a profitable business. On a per unit (broodstock or area) basis, private hatcheries tend to be more profitable than state-run hatcheries. In the short to medium term, most of the hatcheries project a favorable market outlook for

Figure 1. Pyramid system for breeding improvement.



their business. Hence, at the enterprise level, owners and managers share the same favourable market outlook of the government and other industry observers.

Second, all hatcheries replace broodstock largely by reproducing their own stocks. To a lesser extent, hatcheries obtain broodstock from grow-out farmers. Least important is obtaining broodstock from other hatcheries. Private hatcheries are more dependent on self-replacement. This suggests a potential for genetic deterioration, particularly for private hatcheries. Broodstock is replaced gradually, due to the long reproductive life of most of the species cultured, especially the Chinese and Indian carps and *Pangasius* catfish species.

Third, hatchery demand for mature broodstock is large. However, translated into equivalent seed to be on-grown as broodstock, the market demand is small relative to the production capacity of a typical hatchery, let alone a broodstock centre. This results from a combination of reproductive age, length of reproductive life, and fecundity of broodstock fish. Hence revenues from sale of seed may be small relative to the costs of maintaining genetically-managed and genetically-improved broodstock.

Fourth, quality broodstock is the most preferred product from the NBCs. Hatcheries also welcome training and technology transfer on techniques for disease control, as well as spawning and rearing of non-traditional species. On-farm trials, seed certification, and other types of training, while helpful, are not as desirable to hatchery owners/operators.

## Evaluation of business capacity

Several problems were highlighted on the NBC supply side:

- Both NBC 1 and NBC 2 suffer from a shortage of human resources for research and extension.
- Because of their unfamiliarity with the business model for delivering research products and services, both NBCs suffer from inadequate business systems (related to organization, planning, and financial accounting).

- Both NBCs also need to build their network with other hatcheries to set up a formal multiplier system for improved seed.
- The status of the NBC as a research centre as well as a business enterprise creates confusion about the NBC purpose and action program.

On the positive side, the NBCs enjoy the advantage of long experience and informal relationships with hatcheries and other stakeholders in their respective regions, as well as strong support from their respective RIAs. They already share in the prestige earned by the RIAs from the successful dissemination of improved strains of common carp and tilapia. Both also benefit from an energetic management and cooperative staff, who are highly motivated by their elevated organizational functions and mandate. While some confusion remains on implementation details, management and staff in the NBCs fully embrace the business model for their organization.

## Formulation of business plans

The business plan training guided the NBC management teams in understanding basic business plan concepts. The business plans consist of ten key elements:

1. Mission statement.
2. Market analysis.
3. Internal analysis of strengths and weaknesses.
4. Problem and goal identification.
5. Priority setting.
6. Objective setting.
7. Program formulation.
8. Organizational structure.
9. Organizational development plan.
10. Financial plan.

Rather than have professional consultants write the business plans, the NBCs wrote their own plans in a participatory approach facilitated by a regional and a national consultant. The two NBCs completed their business

plans in early 2005. The following contain some salient points from the business plans:

The mission statements of the NBCs are:

- **North:** "Ensure timely production and provision of freshwater aquatic seed of high quality and culture techniques to the hatcheries in the North region".
- **South:** "(1) to conduct research on genetic conservation, seed production, and grow-out of various freshwater species (2) to produce high quality freshwater fish seed for hatcheries in the South region."

Both NBCs assess their market environment as highly favourable, consistent with the findings of the demand assessment. Meanwhile, the internal assessment of both NBCs reflects the problems raised in the business assessment. NBC programs and organizational structure are geared towards addressing these concerns. Both NBCs break down their overall mission into goals, tailored to address specific problem areas in the freshwater seed industry, namely:

1. Produce and disseminate genetically improved broodstock;
2. Maintain and disseminate broodstock of high genetic quality;
3. Preserve genetic diversity of indigenous fish species; and
4. Develop and transfer technologies to local hatcheries and fish farmers, with respect to fish reproduction, fish culture, and disease control.

The financial plans presented detailed projections and spending and revenue generation, covering the period 2005-2009. The summary financial projections for the first year of operation of NBC 1 and NBC 2 are respectively presented in Tables 1 and 2. The effort to maintain and disseminate broodstock of high genetic quality requires large annual outlays (ranging from about 70 to almost 90 thousand dollars). However projected cost recovery through sale of seed and other by-products is only around 40 to 50 thousand dollars. This is consistent with earlier findings based on the demand assessment. The resulting deficit is the external funding requirement.

In addition, other efforts to improve seed quality for the industry (including technology transfer and technology development activities) are also costly, further increasing the deficit. The external funding requirement for the first year ranges from 110 to 170 thousand dollars. To the extent that other institutions are willing to support the seed quality mission of the NBCs, the shortfall can be funded by donor contributions. Funds may be sourced from ODA, private foundations, aquaculture industry associations, local governments, and competitive research grants from the national government. The NBCs may also be supported by the RIAs and MOFI to gain access to development funds. As with other nonprofits, the business plans become an indispensable tool for resource mobilization of the NBCs.

## Concluding remarks

This paper describes a business model for upgrading quality in the freshwater fish seed industry. The model was recently adopted by the NBCs of Viet Nam. In this model, the broodstock centre functions as a centre for research, development, and genetic preservation of the seed industry. It is nonetheless a publicly-owned, non-profit enterprise responsible for its own financial viability.

We demonstrate that the preparation of business strategies can be the product of participatory planning undertaken by the management and staff teams of the broodstock centres. Such planning is conditional on an objective assessment of internal problems, market environment in the seed industry, and prior capacity-building. The resulting plans point to a diversified set of resource mobilization efforts, including cost recovery by sale of seed, donor contributions, and grants from various public funding sources (both national and local).

The business model demonstrates a workable strategy to both address seed industry development, while reducing recurring cost burdens on the public sector. Based on the experience of the NBCs, we propose this model as a framework for the development of the freshwater fish seed industry in other developing countries.

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**Table 1: Summary financial projections for NBC 1, first year of operations.**

Items	Amount (millions VND)
<b>Expenses</b>	
Genetic programs and broodstock dissemination	1,070
Development of new hatchery and culture technologies	1,390
Training and technology transfer activities	100
Others	80
Total expenses	2,640
<b>Revenues</b>	
Sale of seed for broodstock	400
Sale of seed for commercial grow-out	250
Earnings from developing new technologies	200
Total revenues	850
Total deficit (-savings)	1,790
Note: US\$1.00 VND 16,000. Source: National Broodstock Centre of Northern Viet Nam.	

**Table 2: Summary financial projections for NBC 2, first year of operations.**

Items	Amount (million VND)
<b>Expenses</b>	
Genetic programs	1,424
Development of new hatchery and culture technologies	1,020
Training and technology transfer activities	636
Others	134
Total expenses	3,279
<b>Revenues</b>	
Sale of seed (total)	601
Total revenues	601
Total deficit (-savings)	2,678
Note: US\$1.00 VND 16,000. Source: National Broodstock Centre of Southern Viet Nam.	