

Developing a Regional Shellfish Hatchery for The Wider Caribbean: Assessing Its Feasibility and Sustainability

Desarrollo de un Criadero de Moluscos Regional para el Caribe: Evaluar su Viabilidad y Sostenibilidad

Développement d'une Ecloserie de Mollusques Régionale pour la Région des Caraïbes: Une Evaluation de sa Faisabilité et Durabilité

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EXTENDED ABSTRACT

It is widely recognized that the development of aquaculture in the Wider Caribbean region is inhibited, in part, by the lack of technical expertise, infrastructure, capital investment, and human resources. Furthermore, seed supply for native species relies, for the most part, on natural collection, subject to natural population abundance with wide yearly variations. This situation has led to the current trend of culturing more readily available exotic species, but with a potentially undesirable impact on the natural environment. The centralizing of resources available in the region into a shared facility has been recommended by several expert meetings over the past 20 years.

The concept of development of a Caribbean Regional Shellfish Hatchery was first assessed through a questionnaire distributed to 33 countries throughout the region in August 2009. Responses were received from 21 countries (63%); 14 countries (66.7%) expressed a definite interest in the concept, while five (23.8%) were uncertain and requested further information. In response to the widespread interest throughout the region, the Food and Agriculture Organization of the United Nations (FAO) hosted a 4-day workshop, October 18 - 21, 2010, in Kingston, Jamaica — *A Regional Shellfish Hatchery for the Wider Caribbean - Assessing its Potential and Feasibility* (Lovatelli and Sarkis 2011). The workshop addressed the need for pooling of resources among Caribbean countries to ensure the development of sustainable aquaculture in the Region. It was proposed that a Regional Shellfish Hatchery would:

- i) Favor the development of aquaculture by centralizing specific efforts and resources,
- ii) Support a team skilled in the culture (and research) of native/endemic species,
- iii) Enable the distribution of certified commercial seed to interested aquaculture enterprises or for stock enhancement activities, and
- iv) Provide technical support for farming grow-out operations

Working Groups comprised of aquaculture experts and representatives from ten participating Caribbean governments identified several important issues that need to be considered for the development of a regional hatchery facility and established the following recommendations:

- i) Select culture candidates from target species identified, prioritizing them on the basis of culture know-how, market value, market demand, and availability of broodstock. Shellfish species (molluscs, echinoderm, and crustaceans) were prioritized due to their potential in terms of known culture techniques, simple grow-out technology, and relatively low impact on the surrounding environment.
- ii) Establish operation protocols in consideration of population level genetics, and prevention of pathogen and disease proliferation during transfer or shipment of living aquatic organisms,
- iii) Base site selection on specific criteria – infrastructure, occurrence of target species, ease of access, technical support, and
- iv) Develop a 5-year business plan for the facility and its operations with a defined break-even point and a timeline for financial sustainability.

Recommendation 1

Identify candidate species for culture, prioritizing targets based on available culture technology, market demand, and availability of broodstock.

The primary criteria for success of the Regional Hatchery will be to demonstrate the ability to culture native shellfish species with sufficient production to meet existing and potential market demand. The Working Group recommended that

mangrove oysters (*Crassostrea rhizophorae*) and lion's paw scallop (*Nodipecten nodosus*) as the first candidates for culture, based on culture know-how, with an assessment of potential market volume prior to production. Once production protocols and market value and demand have been established, culture efforts will begin for the other targeted species: pearl oyster (*Pinctada imbricata*), West Indian top shell (*Cittarium pica*), sea egg (*Tripneustes ventricosus*), and sea cucumber (*Isostichopus badionotus*). Culture techniques for growout to market for these species will require a research phase, although congenics from other regions, notably Asia, are currently in commercial production. These species also may be cultured for fisheries stock enhancement efforts. In addition, limited market demand information is available for several countries in the region; marketing studies in the partner countries will be needed to ensure sufficient demand for financial sustainability and to enable the development of a comprehensive business plan. Any technological constraints to the commercial production of these species also will need to be identified and incorporated into the research and development strategy of the Regional Hatchery.

Recommendation 2

Establish operation protocols in consideration of population-level genetics, and prevention of pathogen and disease proliferation during shipment of living aquatic organisms

In order to ensure that genetic biodiversity is maintained throughout the region and diseases and parasites are not accidentally introduced through live shipments, operational protocols must be established and strictly adhered to. The authorizing body of the Regional Hatchery and its responsibilities should be clearly established and in compliance with host-country legislation and other regional and international regulations related to the trade of cultured aquatic organisms. Some specific actions that will be required include:

- i) Conduct a population-level genetic study to establish distinctive stocks throughout each species distribution in the Caribbean,
- ii) Evaluate the *health of the stock*,
- iii) Carefully evaluate the collection site for broodstock,
- iv) Establish detailed shipping protocols in compliance with existing international criteria. The Regional Hatchery will be responsible for providing disease-free seed, shipped under optimal conditions, and with all the export documentation required, and
- v) Design broodstock quarantine facilities and develop biosecurity protocols.

Recommendation 3

Careful thought should be given to the selection of a site for a regional hatchery facility, as it is critical to the success of aquaculture development in the region. Site selection must be based on specific criteria.

Identifying the location of a regional shellfish hatchery should take into consideration environmental, technical, and political characteristics. These would include:

- i) Occurrence of targeted species,
- ii) Environmental health — water quality, occurrence of disease and pathogens, environmental toxins (e.g. harmful algal blooms),
- iii) Oceanographic conditions, protection from storm events, and other natural disasters,
- iv) Adequate infrastructure,
- v) Transportation access for both local and international shipments,
- vi) Access to technical expertise (staff and consultants), and
- vii) Host country contributions and support commitments

Although several countries in the region can meet these criteria, the level of commitment expressed by the potential host-countries will likely be the prominent consideration. Nonetheless, the capital investment and transfer of knowledge that will be essential for the development of the Regional Hatchery will require assistance from several Caribbean countries, as well as regional and international organizations.

Recommendation 4

The Regional Hatchery will be a business, and development of a 5-year business plan, with a well-defined breakeven point and time at which it becomes financially self-sustainable and viable, is critical.

The financial sustainability of the Regional Hatchery will depend on successfully fulfilling the action items outlined in the previous recommendations:

- i) Location of the site should facilitate the shipment of broodstock, seed, equipment, and supplies,
- ii) Production should focus on target species with well-established culture techniques and a favorable market niche and profitability,
- iii) Commercial production and research and development should be a balanced effort, and
- iv) Host-government support, at the ministerial level, and financial contributions from participating countries for on-going research will be critical to success.

A 5-year plan consisting of the following phases was recommended from the participants of the workshop:

- i) *Inception* — Actions required, promotion, proposals for funding, securing government support,
- ii) *Infrastructure* — Facility design and construction, permit approvals, consultation and equipment purchase,
- iii) *Engagement of stakeholders and securing staff and broodstock* — Partner with countries for broodstock collection and shipment, conduct genetic assessment, recruit and train core hatchery staff.

- iv) *Pilot production* — Larval and post-larval production, establish seed transport protocols, growout methodology for interested countries, and explore potential markets.
- v) *Providing training production* — Technical services and training to private sector for growout, market product, and increase hatchery production.
- vi) *Full production* — Hatchery expansion and increased production; training for growout, shipment, and sale; define and confirm future (post-project) legal status of the hatchery. Develop a 5-year business plan with defined break-even point and timeline for financial sustainability.

Recommendation 5

Promote the Regional Hatchery concept through dissemination of information, targeting senior civil servants and politicians.

A steering committee should be established to promote the concept and disseminate information to interested parties. A planning strategy that outlines actions required to achieve implementation should be promulgated and distributed to governments throughout the Wider Caribbean. A regional technical cooperation project (TCP) drafted by the interested governments would serve as an initial document to promote the establishment of a regional hatchery.

LITERATURE CITED

- Lovatelli, A. and S. Sarkis. 2011. A regional shellfish hatchery for the Wider Caribbean: Assessing its feasibility and sustainability. FAO Regional Technical Workshop. 18 - 21 October 2010, Kingston, Jamaica. *FAO Fisheries and Aquaculture Proceedings No. 19*. FAO. Rome, Italy. 246 pp.
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