Bangus Fry Resource Assessment in the Philippines

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2001

Published by ICARML - The World Fish Center
P O Box 500, GPO
10670 Penang, Malaysia.


Perpustakaan Negara Malaysia. Cataloguing in Publication Data

Bangus fry resource assessment in the Philippines/M.Ahmed ...[et al.].
Bibliography: p. 33
ISBN 983-2346-03-7
2. Fish - culture - Philippines. I. M. Ahmed.
639.37509599

ISBN 983-2346-03-7
ICLARM Contribution No. 1602

Printed by Delimax (M) Sdn Bhd, Penang, Malaysia
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Bangus or Milkfish is the Philippine ‘national fish’. It is widely cultured and is generally favored by the Filipinos. The culture is traditionally based on fry collected from the wild. In the light of the growing demand for fry by the bangus industry and the implications of the decline of natural fry resources, the Philippines Bureau of Fisheries and Aquatic Resources (BFAR), the Philippine Council for Aquatic and Marine Research and Development (PCAMRD), the Southeast Asian Fisheries Development Center (SEAFDEC) and ICLARM – The World Fish Center embarked on an investigation of the conditions prevailing in the milkfish fry sector.

From 1996-1998 the staff of BFAR, SEAFDEC and ICLARM made a conscientious effort to understand not only the state of the natural fry resources in relation to the growing demand for fry by the bangus industry, but also the implications for the socioeconomic conditions of the poor people who rely, for their livelihood, on fry collection and sale.

We are confident that the findings of the Bangus Fry Resource Assessment project by the researchers from all institutions will benefit both the bangus aquaculture industry in general, and the bangus fry industry in particular, not to mention the poor people in the coastal areas of the country who rely on fry gathering for their source of income.

The project was made possible by the funding from PCAMRD and BFAR, which allowed ICLARM staff to work side by side with the SEAFDEC and BFAR staff. The collaboration between ICLARM and the other agencies serves as a successful example of partnership between national, regional, and international agencies concerned with optimizing the sustainable utilization of aquatic resources for the benefit of the poorer people in a developing country. We look forward to tapping more opportunities to work collectively on developing and managing a sustainable bangus industry in the Philippines and improving the well-being of those who depend on this resource for their livelihoods.

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During a tripartite meeting held in October 1995 involving ICLARM Director General, Dr. Meryl Williams; SEAFDEC-AQD Chief, Dr. Efren Ed. Flores; and Mr. Rolando Edra representing the Executive Director of PCAMRD, Dr. Rafael Guerrero, concern was raised about the scarcity of milkfish (bangus, *Chanos chanos*) fry, the increasing demand for fry and the resulting increase in the price in the Philippines. Though research agencies and private sector interests are working on the establishment of hatcheries to develop additional sources of supply, it was considered necessary to assess the availability of natural fry and the impact of a decline in the availability and other related developments on the coastal people who are dependent on the gathering and trading of milkfish fry on a small scale.

It was suggested by PCAMRD that a study be made of the *sabalo* (adult milkfish broodstock) fishery to assess the condition of the fry resources. However, it was not considered feasible to collect data on the *sabalo* population as fishing of broodstock is banned. The best alternative was to make an assessment of the natural fry industry itself. This led to the project on the Bangus Fry Resource Assessment.

In December 1995 PCAMRD and BFAR committed funds for the project. ICLARM and SEAFDEC committed staff time and travel funds for a collaborative study. Five sites were selected for the study, one each in Regions I (Currimao, Ilocos Norte), IV (Palawan), VI (Antique), VII (Bohol), and XI (General Santos City) of the Philippines.

Project field activities officially started in mid-March 1996. Data collection took twelve months and was completed in mid-May 1997. The designated regional field coordinators of BFAR assisted at the five study sites. The ICLARM, BFAR and SEAFDEC staff were responsible for the monitoring and supervision of all field sites during the field data gathering.

A project workshop was held in February 1997. The workshop was attended by the regional coordinators from the five Regions and project staff from BFAR, SEAFDEC, and ICLARM. The role of the regional coordinators was reviewed during the workshop. An assessment was made of the possibility of gathering time-series data on catch and effort for fry production from the major producing regions in addition to a survey on fry trading and gathering activities in the field sites. A preliminary attempt was made to identify coastal environmental parameters and human development factors affecting the productivity of spawning/nursery grounds in the project sites. The baseline information already collected was reviewed. The regional coordinators were requested to gather additional information to support this data.

Although most of the primary data collection was completed within the planned twelve-month period, the transmission of the data from the field and verification and analysis were delayed. This was due to the change of project staff assigned by ICLARM. The former Director of BFAR, Dr. Arsenio Camacho, made an additional allocation of funds for the collection of data for production and input used from different types of milkfish production systems in order to estimate the fry requirements of the milkfish aquaculture industry. This final round of data collection strengthened the analysis of this report.

Many colleagues from ICLARM, SEAFDEC and BFAR took part in the planning and execution of field data gathering for the project. Their invaluable contributions are as gratefully acknowledged below. Three former staff of the project namely Ms. Annabelle Trinidad, Mr. John Marie Gacutan and Ms. Marites Tiongco provided substantial technical inputs to the project. The conception of the project as well as its implementation would not have been possible without the support of Mr. Dennis Araullo and Dr. Arsenio Camacho, former Directors of BFAR; and Mr. Malcolm Sarmiento Jr, current Director of BFAR; Dr. Rafael D. Guerrero, Executive Director of PCAMRD; Dr. Efren Ed Flores (former Chief) and Dr. Rolando Platon, current Chief of SEAFDEC-AQD; Dr. Meryl J. Williams (Director General) and Dr. Peter Gardiner (Deputy Director General) of ICLARM. The team would also like to acknowledge the assistance of the following individuals who have, in one way
or another, been part of this project: Mrs. Simeona Aypa, Mr. Nemencio Arevalo, Mr. Francisco Santos and Mr. Isidro Velayo, Jr., all from BFAR; Mr. Jose Razon, Jr. and Ms. Rosalie Joven, both from SEAFDEC; Mr. Len Garces, Mr. Maximin O. Luna and Ms. Florabelle Gagalac of ICLARM; and the following regional coordinators for field coordination: Dr. Julita Ungson, MMSU, Batac, Ilocos Norte; Ms. Tutu Almonte, Office of the City Agriculturist, Puerto Princesa, Palawan; Ms. Mary Lou Estomata (deceased), DA-LGU, Antique; Mr. Jose Belga, DA-PAFCO, Bohol and Mr. George Campeon, DA-General Santos City.

The Authors
EXECUTIVE SUMMARY

During 1996-1998, BFAR, SEAFDEC, PCAMRD, and ICLARM collaborated in a project entitled Bangus Fry Resource Assessment in the Philippines to investigate the scarcity of milkfish fry in the Philippines and to explain the reasons for this. Specifically the project aimed to:

- monitor fry production in selected sites in the Philippines for a period of one year;
- assess the current demand for milkfish fry; and
- provide on-the-job training on data collection and recommend a system for continuous collection of data on fry production.

Sites were selected in five important fry producing regions of the country for the investigation of fry gathering activities over a twelve-month period during 1996-97. The sites were:

(i) Currimao, Ilocos Norte;
(ii) Puerto Princesa, Palawan;
(iii) Dauis, Guindulman, Jagna, Loay, and Tagbilaran in Bohol;
(iv) Pandan, Antique; and
(v) Kiamba, Sarangani.

A total of 194 fry gatherers were selected for interview based on the criterion of having at least 5 years experience in fry gathering. In addition, 13 fry traders and 44 milkfish producers were interviewed. BFAR's and SEAFDEC's own records and observations by their staff during field visits were used to supplement the data and analysis. Structured interviews, using a questionnaire, were conducted on all three groups (i.e., fry gatherers, fry traders and milkfish producers) covered by the study.

Survey results show a strong perception among the fry gatherers that milkfish fry production from natural stocks is declining. The reasons given for the decline are: pollution, loss or degradation of coastal habitats, overexploitation of fishery resources and a decline in the sabalo population. Ninety-five percent of the fry gatherers believe that the primary reason for the decrease in fry production is the decline in the sabalo population. Data generated by the study based on a one-year catch monitoring record show a declining trend in catch during both peak and lean months when compared to the historic data for the same site.

On the other hand, there are indications of a growing demand for fry in recent years. This is attributable to two factors. The first is a shift from traditional or extensive culture systems to semi-intensive and intensive or high-density culture systems. The second is the shift from prawn farming to milkfish farming. This shift is due to the collapse of the prawn farming industry. Because of the lack of reliable data on the size of land and water area under milkfish aquaculture and the rate of stocking, a preliminary estimate of the total demand for milkfish fry was made from a survey on production technology and stocking rates of milkfish producers. The estimate indicates a current annual demand for milkfish fry of 1.65 billion nationally. It is not possible to make a more definite estimate of fry scarcity or the level of deficit in supply because of incomplete information on alternative sources of supply such as imports. A definite conclusion is that fry availability from the wild is highly seasonal and its abundance fluctuates over time and space. The natural supply is unable to cope with the year round demand for fry for grow-out operations, even though the producers use various mechanisms (e.g., stunting the fry in nurseries or staggering the production cycle) to even out the gaps in the supply of fry.

This points to a need to develop a framework for monitoring natural fry resources and to develop a greater local participation over the management of fry gathering activities.
Hatcheries are seen as an increasingly important source of supply of fry for milkfish aquaculture. While the supply from the wild is decreasing, hatcheries are improving their technology for fry and fingerling production. This could mean competition for fry gatherers. Most milkfish producers place a higher value on wild-caught fry relative to hatchery-bred, so there is still a good market for the fry from the wild. However, this may change once the hatchery industry gets well established.

To ensure a stable and sustainable supply of fry to meet the growing demand of the milkfish industry it is necessary to develop: sources of fry supply, including hatcheries; a greater acceptability of hatchery produced fry by fish farmers; a reliable and efficient fry distribution system; and information on price and quality.

Based on the findings of this study and from the National Bangus Forum 99 (held in Mactan City, Cebu on 14 June 1999), the following recommendations are made for follow-up research and extension activities that will further help sustain the milkfish fry industry, including fry gathering and fry trading:

- Monitor fry gathering activities in the selected sites for a clearer understanding of production trends and management impacts;
- Devise a simple system for monitoring and data gathering;
- Understand and analyze the role of middlepersons and the private sector in the production and distribution of hatchery produced fry;
- Develop institutional mechanisms for the implementation and enforcement of fishery rules and regulations relating to catching sabalo, destructive fishing, fry gathering and fry smuggling; and
- Provide information campaigns, and financial and moral support for enforcement of regulations, to complement institutional devolution (e.g., community-based management) and legal enforcement of rules and regulations.