

Economics of aquaculture feeding practices in selected Asian countries



Cover photos:

Left top to bottom: Bag feeding method practised in carp farms in Andhra Pradesh, India (courtesy of J.K. Jena). Sea trawlers' bycatch consisting of unwanted small fish, shrimp and squids, mixed with rice bran and minced into a paste to be fed to African catfish raised in earthen ponds in Phuket, Thailand (courtesy of Wing-Keong Ng). Industrially manufactured pelleted feed for sutchi catfish, Bangladesh (courtesy of Nesar Ahmed).

Right: Sun-drying of farm-made aquafeed in Bangladesh (courtesy of Mohammad R. Hasan).

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Preparation of this document

Improved feed management strategy including the use of optimal combinations of fertilizers, feed ingredients and manufactured feeds has been advocated to be a prioritized area of study for small-scale aquaculture to lower feed cost and to optimize production of aquatic species during different stages of their life cycles. Increased understanding on the economics and cost-benefit analysis of these practices is one of important pre-requisites for development of an improved feed management strategy. With this objective in view, the Aquaculture Management and Conservation Service (FIMA) of the FAO commissioned the implementation of six (6) case studies in selected countries in Asia (Bangladesh, China, India, The Philippines, Thailand and Viet Nam) to have a clear understanding on these practices as a part FIMA's regular work programme on "Study and analysis of feed and nutrients (including fertilizers) for sustainable aquaculture development" under the programme entity "Monitoring, Management and Conservation of Resources for Aquaculture Development". In addition, and as part of the FIMA work programme, a targeted training workshop on "Data processing and analysis on the economic and bioeconomic assessments of aquaculture feeding systems" was organized in Bangkok, Thailand, 25– 27 April 2006 to review and analyze critical issues related to the conduct of appropriate economic assessments of aquaculture feeding systems. The workshop was jointly organized by FIMA of FAO and the Network of Aquaculture Centres in Asia-Pacific (NACA).

Six country case study reports from Asia and a regional synthesis prepared based on six country case studies are included in this document. The manuscripts contained in this technical paper were reviewed and technically edited by Mohammad R. Hasan. English editing was done by Mr. Richard Banks and Tim Huntington of Poseidon. For consistency and conformity, scientific and English common names of fish species were used from FishBase (<http://www.fishbase.org/home.htm>). Most of the photographs in the manuscripts were provided by the authors. Where this is not the case, due acknowledgements are made to the contributor(s).

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Abstract

This technical paper provides an analysis of the economic implications of, and the reasons for, adopting various feeding practices for different fish species and aquaculture systems in Asia. It comprises of six selected country case study reports from Asia (Bangladesh, China, India, the Philippines, Thailand and Viet Nam) and an overall synthesis ending with conclusions and recommendations.

Field survey for the case studies was carried out between 15 October 2005 and 14 February 2006 and three hundred and forty Asian fish farmers were interviewed about their fish feeding practices. In India and China selected farmers were engaged in carp polyculture, in Bangladesh and Viet Nam they raised sutchi catfish (*Pangasianodon hypophthalmus*) and pangasiid catfish (*Pangasianodon hypophthalmus* and *Pangasius bocourti*) respectively, in Thailand hybrid catfish (*Clarias gariepinus* x *C. macrocephalus*). In the Philippines those undertaking polyculture of giant freshwater prawn and milkfish participated. Prior to the random selection of farmers each national group of farmers had been stratified according to three broad categories of feeding practices. These were (i) use of industrially produced pelleted feed (intensive farmers), (ii) use of industrial and farm-made feed mixes (semi-intensive), and (iii) use of on-farm feeds consisting of a mixture of locally available feed ingredients (traditional/extensive). The 340 respondents represent these three feeding categories in about equal proportions, and include 60 farmers by country with the exception of India in which 40 farmers were interviewed.

After completion of the field survey and the preliminary analyses, the researchers involved in the case studies met to agree on methods and an outline for country reports. After agreeing on the methodology and outline of the country reports, the authors of the case studies, for each feeding strategy and farming system, analyzed demographic factors (including age and marital status, education and ownership structure), physical characteristics (average number of ponds and average pond size), and other input features (stocking strategies, feeding practices, types of feed, frequency and intensity of feeding and labour utilization).

The case studies also identified the principal input costs, assessed the economic rates of return (gross and net margins), returns to labour, land and capital, gross and net total factor productivity, break-even prices and production and returns on capital for each feeding strategy. Problem areas were identified for the different farming systems. A statistical analysis using either regression analysis or the Cobb Douglas production function established the existence, or non-existence, for each feeding strategy of the relationships between aquaculture production and or profit as the dependent variable and a number of independent factors.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BCR	Benefit Cost Ratio
BFAR	Bureau of Fisheries and Aquatic Resources, the Philippines
CNY	Chinese Yuan
Danida	Danish International Development Assistance
DAP	Di-Ammonium Phosphate
FC	Fixed Cost
FCR	Food Conversion Ratio
MAEP	Mymensingh Aquaculture Extension Project, Bangladesh
MOFI	Ministry of Fisheries, Viet Nam
MP	Muriate of Potash
MRD	Mekong River Delta
NGO	Non-Governmental Organization
PCMARD	Philippine Council for Marine and Aquaculture Research and Development
PRA	Participatory Rural Appraisal
SFP	Stochastic Frontier Production
SRS	Stratified Random Sampling
TC	Total Cost
TE	Technical Efficiency
TSP	Triple Super Phosphate
US\$	United States Dollar
VC	Variable Cost
VND	Vietnamese Dong