Economic Studies of Small-Scale Fishers: A Comparison of Methodologies

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Abstract

This paper discusses economic field data collection and analysis methodologies developed for a production and marketing study of a small-scale fishery in Matalom, Leyte, Philippines. The field data collection methodology is built around the use of a record keeping system. The economic analysis method makes use of budgeting techniques for the production study; and descriptive, organizational, and price efficiency techniques for the marketing study. These methods are then compared to economic data collection and analysis methods used by researchers in three other projects on small-scale fisheries in the Philippines, Costa Rica and India.

Introduction

Increasingly, more attention and resources are being directed by governments and international development institutions toward the problems of small-scale fishers. The problem of low standard of living and, more specifically, low income levels among small-scale fishers is an issue of increasing concern (Smith 1979). Research can shed considerable light on these problems by providing information on the sources and causes of low standard of living, by identifying and clarifying behavioral characteristics of fishers and fishing communities, and by providing and defining alternative development and management solutions to decisionmakers. Analytical research is directly linked and is complementary to fishery development and management efforts.

It has become apparent that there is a shortage of research-based information available to decisionmakers to evaluate alternative policies and assess their impacts. This is especially true for economic information on fisheries and fishers. In most developing countries, much of the economic research has taken the form of generalized community socioeconomic studies which are primarily descriptive in nature. While these studies have provided decisionmakers with a great deal more information than previously existed, their usefulness is limited. To provide more useful information to decisionmakers will require analytical research on such areas as costs and returns of fishing gear, economic efficiency of production technology, performance and efficiency of the fish marketing system, and political and institutional constraints. The linkages between biological, technological, economic, social and institutional factors must be identified and examined.

It has been pointed out that economic information on small-scale fisheries and fishers is an untapped source of useful and cost-effective information which can provide predictions about the status of the fishery very close to those of more expensive exploratory fishing expeditions (Lampe 1980; Smith and Mines 1982).

These detailed analytical studies of small-scale fisheries are still few and far between and as such there is not a great deal of practical experience available to draw upon when planning and conducting such research. An analytical framework and methodology are required if the results of research are to be useful to decisionmakers (Smith 1979).

This paper discusses an economic data collection and analysis methodology developed for a study of the production and marketing system of a small-scale fishery in Matalom, Leyte, Philippines. This methodology and the conclusion drawn from its use are compared with methodologies used by researchers in economic studies of small-scale fisheries in the Philippines, Costa Rica and India.

The Economics of Production and Marketing
in a Small-Scale Fishery: Matalom, Leyte, Philippines

There are many misconceptions and unanswered questions related to small-scale fishers and fishing communities in the Philippines and in other developing countries. Among these are questions concerning the behavior of fishers, especially when a

fishery is overfished; the profitability of fishing using various fishing gear types; and the alleged imperfections in the marketing system, such as those resulting from the *suki* or credit/marketing relationship between fishers and fish traders in the Philippines. The goal of the research conducted by the author in Matalom, Leyte, was to examine these questions through an economic analysis of production of the major fishing gear types used in the fishery, a costs and earnings study, and through an analysis of the performance and pricing efficiency of the fresh fish marketing system (Pomeroy 1989). The study was not multidisciplinary; no biological data were collected. The study focused, due to personnel and financial limitations, on economic and social factors. No historical data on the fishery or fishers existed. Census data on number of fishers provided the only secondary data and their reliability was highly questionable.

The field data collection was built around a fisher and fish trader record keeping system. This approach was preferred to interview or observation techniques for collecting data on the fishing and marketing activity because of the difficulties in monitoring any sample of fishers or fish traders using the other methods.

Using the record keeping method, cooperators were selected based on their willingness to participate in the program. It was felt that the collection of highly reliable data from purposively selected cooperators is better than the collection of poor data from a randomly selected group using interview or observation methods.

The study had four phases of data collection: general site assessment, household census, fishers costs and returns record keeping, and fish traders record keeping and marketing survey. The first phase of the study involved a general assessment of the physical setting of the coastal barangays, the community leaders, the fishers and their families, the community structure, and the fishing and marketing activity. The initial step was to meet and discuss the project with municipal and barangay government leaders. This was done not only for reasons of protocol, but also to gain an introduction to the fishers. Credibility can be quickly established if local leaders, whether government, business or fishers, understand the purpose of the work and its implications for them and the community.

Time was then spent with the fishers and fish traders to allow them to get to know the investigators and the purpose of the

research. This was felt to be the most critical time of the study and essential to its success. Almost two months was spent in this activity. This period allowed the investigators to gain support from all sectors of the community.

The second phase of the research involved a general household census in the ten coastal barangays. The household census was used to identify the actual number of fishers and fishing households in each barangay. The census also provided baseline information on the fishing activity, marketing practices and problems.

Phase three of the research involved the keeping of daily fishing activity records by 28 fishers/cooperators for six major fishing gear types over a ten-month period. The record keeping form had 28 variables including time fishing, gear used, area fished, costs, species of fish caught, amount caught, amount sold, amount for own use, and price received.

The primary method of economic analysis used was budgeting techniques. The cost structure, sharing system and profitability of each fishing gear type was analyzed. For each cooperator and for each boat/gear combination, capital investment costs, fixed costs (depreciation of the asset and license fee), operating costs, and opportunity cost of labor and capital were calculated. The opportunity costs of labor and capital, often overlooked in the analysis of costs, are imputed costs; they are the returns that these factors of production could earn if they were used in an alternative activity (Ovenden 1961; Panayotou 1985).

Profitability was analyzed in two ways. First, as returns to owner and hired crew (costs minus gross returns). Second, the return to owner's labor, management, capital and risk was compared to the respective opportunity cost of labor and capital to determine the existence of pure profits (resource rents). The presence or absence of pure profit is an indication that open-access equilibrium of an open-access fishery has or has not been reached. The result can provide direction for management and development of the fishery (Smith and Mines 1982; Panayotou 1985).

Phase four of the study was the fish trader record keeping and market survey. The objective of this phase was to collect data that could be used to examine the *suki* relationship, that is, the nature of competition and pricing behavior at the primary buyer and producer level. The marketing firm (fish trader) was selected for analysis.

The fresh fish marketing system was analyzed using three different, but complementary, market analysis methodologies. These were descriptive, organizational, and price efficiency methods. The perfectly competitive model was used as a standard of comparison. Work by Wharton (1962) served as a theoretical basis for the analysis.

In developing countries, conditions do not always allow studies of the marketing system to be dealt with neatly. Since so little is usually known about the marketing systems and operations in most developing countries, the first need is to describe market participants, market channels and market arrangements.

To build on this description of the marketing system and to provide systematic analysis of the market, a model was used from this field of industrial organization which traces a causal flow between market structure, conduct and performance (Bain 1968). This methodology is a standard tool for industry analysis in the United States and the United Kingdom. Theory tells us that the market structure (the environment) determines market conduct (the behavior of economic agents within the environment) and thereby sets the level of market performance (how close the industry comes to meeting the norm or standard of reference of social welfare) (Caves 1982). If we can uncover reliable links between elements of structure, conduct and performance, we have a powerful tool for economic analysis. Causation may run both ways, however, and the relationship may also be dynamic. These issues may limit the predictive and analytical value of this approach and must be considered when interpreting the results of the analysis (Needham 1978; Scherer 1980).

Analysis of market structure at the primary buyer level made use of economic characteristics such as primary buyer concentration, economies of scale and barriers to entry. Within this environment of market structure, the relationship between structure and conduct of the middlemen was examined through an analysis of their price setting policies. By analyzing fish traders net returns and market margins and their cost components at the primary buyer level, the impact of structural and behavioral characteristics on market performance was examined.

To allay certain criticisms of the industrial organization approach, the performance dimensions were modified and expanded by use of price efficiency criteria. The extent of market integration

and spatial price differentials, although simplifications of reality, can be useful in spotting distortions in pricing performance (Farruk 1968; Bressler and King 1970; Lele 1971; Harris 1979). With this methodology, the pricing system plays a central role in the analysis, allowing for a determination of where the marketing system departs from the perfectly competitive model and the reasons for the departure.

Comparison of Methodologies

Several research studies have been conducted on small-scale fisheries and the role research can play in designing fisheries management and development programs. Three of these studies are of interest because they were multidisciplinary in nature, they were designed to provide information for fisheries management policy, and for the data collection and analytical methods used.

The first of these studies was conducted in Central America with a focus on the Gulf of Nicoya in Costa Rica, by the University of Rhode Island (URI) (Sutinen and Pollnac 1981). A second study was conducted in San Miguel Bay in the Philippines by the Institute of Fisheries Development and Research of the University of the Philippines in the Visayas in cooperation with the International Center for Living Aquatic Resources Management (ICLARM) (Smith and Mines 1982). A third study was conducted in the fisheries of Kerala in India by the Programme for Community Organisation (PCO) and the Bay of Bengal Programme in cooperation with the FAO/UNDP regional project for small-scale fisheries development in South Asia (Kurien and Willmann 1982). Although not discussed, several other studies have focused primarily on economic aspects of small-scale fisheries (e.g., Panayotou 1985). A comparison of the economic data collection and economic analysis methods used in each of the four studies is presented in Table 1. Each study contained an element of costs and earnings and marketing efficiency. (While an analysis of the market was not reported in the PCO study, it was documented in other publications of the Bay of Bengal Programme). In all the studies, research objectives were well defined. Differing objectives of each study dictated the data collection and analysis method used. Record keeping or self-enumeration techniques were found to be preferable to interview or observation techniques.

Table 1. Comparison of economic data collected and economic analysis methods of four economic studies of small-scale fisheries.

	URI[1]	ICLARM[2]	PCO[3]	Matalom[4]
Data collection method	Record keeping	Record keeping	Observation	Record keeping
Data collected				
A. Household census	Subset of households	Single visit, all households	Single visit, all households	Single visit, all households
B. Ex-vessel prices	Daily, 5 months	2-3 x weeks, 1 year	Daily, 1 year	Daily, 10 months
C. Cost and earnings of major gears	Daily, 6 months	Daily, 1 year	Daily, 1 year	Daily, 10 months
D. Catch and effort	6 months	Daily, 1 year	Daily, 1 year	Daily, 10 months
E. Wholesale and retail prices	Daily	2-3 x weeks, 1 year	No	2-3 x weeks
F. Fish trader, costs and earnings	Interview for 5 months	Single interview	Low emphasis*	Daily, 10 months
G. Fish trader purchases and sales	Daily purchasing receipts for 5 months	Single interview	No	Daily, 10 months
Analysis method				
Cost and returns	Not reported	High emphasis	High emphasis	High emphasis
Opportunity cost	Not reported	High emphasis	No	High emphasis
Production and revenue function	High emphasis	Low emphasis	Low emphasis	Low emphasis
Resource rents	No	High emphasis	No	Low emphasis
Productivity of fishing gears	Low emphasis	Low emphasis	High emphasis	High emphasis
Market structure conduct and performance	High emphasis	Low emphasis	Low emphasis*	High emphasis
Price efficiency	Low emphasis	Low emphasis	No	High emphasis
Economies of scale	High emphasis	High emphasis	No	Low emphasis

[1]URI - Sutinen and Pollnac (1981)
[2]ICLARM - Smith and Mines (1982)
[3]PCO - Kurien and Willmann (1982)
[4]Matalom - Pomeroy (1989)
*Description of fish flows and market structure only.

While the methods of field data collection were similar, each study utilized a slightly different analytical methodology. The URI study emphasized the estimation of key production parameters (using production and revenue functions) for the capture sector to explain differences in yield. No costs and earnings for the major gear types were reported. The study of the marketing system emphasized an analysis of the structure, conduct and performance (including the extent to which economies of scale are utilized) of the wholesale marketing sector in Costa Rica.

The ICLARM study in San Miguel Bay focused on analysis of costs and returns for each major fishing gear to determine the returns to capital and labor for each gear type. The study examined the economic efficiency and distribution of benefits from the fishery as a whole. The opportunity cost for each gear type was computed in order to examine the existence of pure profits (resource rents above costs) for each fishing gear in the fishery. The market study concentrated upon spatial and form price analysis for the major processed and fresh fish.

The PCO study in Kerala emphasized the analysis of costs and earnings. Factor productivities, cost-effectiveness, and profitability variations between different fishing gear types, fishing centers and seasonal variations were analyzed. The market structure at the landing sites was described to determine how ex-vessel prices were determined and, in turn, the effect on gross earnings.

The most striking difference between the four projects was that each had different primary objectives. These objectives were important because they served as a framework for planning the data requirements, data collection methods and analysis methods for each project. A second major difference between the four projects was that the URI, ICLARM and PCO projects were multidisciplinary in nature, while the Matalom project was not. This multidisciplinary approach provided a much broader wealth of information for fisheries management purposes.

Although each of the four projects differed in their primary objectives, their conclusions regarding data collection and analysis methodologies were very similar. A variety of economic methods are available for analysis of small-scale fisheries depending upon the objectives of the study. Economic analysis of the capture fishery sector can involve direct computation of net profits to the fishers to more complicated econometric analysis of production efficiency.

Economic analysis of the market sector has evolved from descriptive analysis to more systematic analysis utilizing the structure-conduct-performance framework. This framework has been used in several studies of small-scale fisheries and, with certain limitations, has proven to be an effective method. Price efficiency analysis can be a useful complementary method to this framework. The key to successful analysis, however, remains having good data.

Conclusions

This paper has presented some of the methodologies used in four studies of small-scale fisheries in the Philippines, Costa Rica and India. In terms of conclusions regarding usefulness of certain methodologies for information acquisition and policy development, there were more similarities than differences in the four projects. Some of these similarities are: record keeping is the preferred method of data collection; highly sophisticated models and methods are not necessary initially to meet information needs about the fishery; and clear manageable objectives are needed to plan and implement the project. Above all, as noted by Smith and Mines (1982), is that "research on small-scale fisheries be multidisciplinary, or better still interdisciplinary in nature, so that data is truly shared among research teams." As each project has shown, economic information of fisheries and fishers is highly useful and cost-effective and can be extremely valuable for fisheries management policy.

References

Bain, J.S. 1968. Industrial organization, 2nd edition. John Wiley and Sons, New York.

Bressler, R.G. and R.A. King. 1970. Markets prices and interregional trade. John Wiley and Sons, New York.

Caves, R. 1982. American industry: structure, conduct, performance. 5th edition. Prentice Hall, Englewood Cliffs, New Jersey.

Farruk, M.O. 1968. Structure and performance of the rice marketing system in east Pakistan. Cornell University IAD Bulletin 23. Ithaca, New York.

Harriss, B. 1979. There is method in my madness: or is it vice-versa? Measuring agricultural market performance. Food Res. Inst. Stud. 17(2):197-218.

Kurien, J. and R. Willmann. 1982. Economics of artisanal and mechanized fisheries in Kerala: a study on costs and earnings of fishing units. Working Paper No. 34. FAO/UNDP Bay of Bengal Programme. Madras, India.

Lampe, H. 1980. Conceptual considerations for fisheries management programs. Report prepared for the Fishery Industry Development Council, Ministry of Natural Resources, Manila.

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Lele, U.J. 1971. Food grain marketing in India: private performance and public policy. Cornell University Press, Ithaca, New York.

Needham, D. 1978. The economics of industrial structure, conduct and performance. St. Martin's Press, New York.

Ovenden, A.E. 1961. Costs and earnings investigations of primary fishing enterprises: a study of concepts and definitions. FAO Fish. Stud. 10. 72 p.

Panayotou, T. (ed.) 1985. Small-scale fisheries in Asia: socioeconomic analysis and policy. IDRC-299. International Development Research Centre, Ottawa.

Pomeroy, R.S. 1989. Economics of production and marketing in a small-scale fishery: Matalom, Leyte, Philippines. Cornell University. Ph.D. dissertation. 365 p.

Scherer, F.M. 1980. Industrial market structure and economic performance, 2nd edition. Rand McNally College Publishing Co., Chicago.

Smith, I.R. 1979. A research framework for traditional fisheries. ICLARM Stud. Rev. 2. 40 p.

Smith, I.R. and A.N. Mines. 1982. Small-scale fisheries of San Miguel Bay, Philippines: economics of production and marketing. ICLARM Tech. Rep. 8. 143 p.

Sutinen, J.G. and R.B. Pollnac (eds.). 1981. Small-scale fisheries in Central America: acquiring information for decision making. International Center for Marine Resource Development, University of Rhode Island.

Wharton, C.R. 1962. Marketing, merchandising and moneylending: a note on middleman monopsony in Malaysia. Malayan Econ. Rev. 7(2):24-44.