

Small-Scale Fisheries and the Development of Related, Particularly Economic Research in Southeast Asia*

HARIAN LAMPE

1. INTRODUCTION

Southeast Asia with its maze of islands, bays, gulfs, peninsulas and shallow shelves, can be expected to have human populations with strong links to the sea (see contribution in COWAN and WOLTERS, 1976). Thus, the islands of what is now Indonesia and the neighboring stretches of mainland were launching pads for sea-based westward migrations along the Indian Ocean coast, to Madagascar eastward across Polynesia, all the way to Hawaiï and the Easter Islands and northeast up to Japan. The ancient Southeast Asians did not only sail, however, they also fished, and this is illustrated in elaborate traditional gears and records of ancient fishing lore (OCHOTORENA, 1981). These fishing activities were regulated through an elaborate set of rules, enforced by the fisherfolk communities themselves. Remnants of these traditional management schemes were documented by JOHANNES (1981) for a small group of Polynesian islands, and RUDDLE and JOHANNES (1985) for the Pacific and Asia, including Southeast Asia proper.

Although at least one sociological/anthropological classic has been based on the study of Southeast Asian fisherfolks communities (FIRTH, 1966), what little management of small-scale fisheries developed from the 1950s to the late 1980s was almost exclusively based on advice derived from biological, resource-oriented studies (see contributions in IPFC 1987). One result of this is that the managers (mostly government officials) ended up knowing little of the economic aspects of small-scale fisheries and virtually nothing of the sociological/anthropological aspects of life of the fisherfolks affected by their decisions.

Moreover, the resource-oriented disciplines were themselves also guided by imported paradigms, appropriate to the colder climes where they were formulated, but which were, as it now turns out, often misleading when applied to Southeast Asian fisheries resources (PAULY, 1987 ; LONGHURST and PAULY, 1987).

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2. PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF SOUTHEAST ASIAN NEARSHORE HABITATS AND RESOURCES

Southeast Asia has the world's most diverse marine vertebrate and invertebrate fauna as well as an extremely specious flora. Most Southeast Asian coasts were originally lined with a mangrove belt especially wide in estuarine areas, but also occurring along many stretches of coast, bordered by coral reefs.

The climate is warm and humid throughout the year, with seasons defined by the southwest and northwest monsoon. This reversal of the directions of the winds induces strong environmental cycles affecting small-scale fisheries, e.g. via the reversal of the currents sweeping through the Java Sea (SOEGLARTO and BIROWO, 1975). The different monsoons lead to different levels of biological productivity (PAULY *et al.*, 1984) and of recruitment to major stocks, or to season-specific accessibility of certain fishing grounds (e.g., along the Pacific coast of the Philippines) most of which become unfishable during the northeast monsoon (e.g. contributions in PAULY and MINES, 1982).

Thus, benign as the climate may appear, the seasonal fluctuations of the Southeast Asian environments have forced fisherfolks to cope with environmental variability.

Some important adaptations include:

- Shifting from fishing to land-based activities (mainly in agriculture) when the catch per effort of preferred species declines (MUNRO, 1979);
- shifting between gears such as to catch different fishes (e.g., ESPORLAS, 1982);
- Developing methods of fish processing which could accommodate large quantities of seasonally occurring fishes, e.g. drying, and especially the manufacturing of «fish sauces» (e.g. «noc-mam» in Vietnam, «nam pla» in Thailand or «patis» in the Philippines (see RUDDLE, 1986).

The first of these adaptations is particularly relevant because (a) it is a self-regulatory method that uses opportunity cost as key variable, and (b) landlessness among fisherfolks now keeps them fishing even when stocks are low, thus preventing these from recuperating (this is analogous to the slash-and-burn farmers who stay longer and longer at any given spot, and/or return sooner to a spot that had already been cultivated).

An extremely important aspect of the marine fisheries resources of Southeast Asia is that (1) the biomass concentration usually occurs nearshore, and (2) the constituent species often have life cycles involving brackishwater or freshwater stages (PAULY, 1988b).

This applies particularly to valuable penaeid shrimps (PAULY and NEAL 1985) but also to a large number of finfish whose early juvenile use estuaries as nursery grounds, and/or whose adults might penetrate deep into rivers or even into freshwater lakes (HERRE, 1959 ; PAULY, 1982b).

This concentration along a thin coastal belt of both biomasses and migratory processes makes Southeast Asian marine stocks extremely susceptible to pollution, and to overexploitation by large numbers of fisherfolks using simple crafts which may have a limited range, or weirs which block migratory pathways (PAULY and CHUA, 1988).

The following is an account of the development of fisheries economics in Southeast Asia, based on the author's experience and subjective opinions, tempered somewhat by a preliminary analysis on the literature on fisheries economics in the Region.

3. GROWTH OF ECONOMICS AND RELATED SOCIAL SCIENCE RESEARCH ON SOUTHEAST ASIAN SMALL-SCALE FISHERIES

Fisheries development programs in Southeast Asia were generally premised upon economic and social objectives. Almost all development programs sought to produce more low-cost protein for the people, particularly the poor, improve the incomes of fishermen, increase employment, increase exports and generally contribute to the economic development of the country. Yet, for a very long time, little consideration was given to the economics of the systems that were being tampered with and their links to other parts of the economic system. The repeated failure of development projects to live up to optimistic expectations forced some changes upon the politicians, technocrats and biologists who had been at the forefront of fisheries development policy and program formulation. Economic advice and counsel was sought in the preparation of development plans and sometime in their evaluation. This planted the seeds of interest that have been slowly growing into a community of fisheries economists which today includes over one hundred practitioners.

It has always been convenient to explain away the results of bad economic planning, program design and execution as the consequence of having neglected the overpowering social and cultural constraints on development. This may be convenient, but not often true. Failure to assess correctly economic and biological realities has been chiefly responsible for most development and management failures.

The region has some of the greatest concentrations of people in the world and economies which were, until recently, almost entirely agriculturally based. Population growth has continued to be very rapid (2-3% per year) and places extraordinary demands upon agriculture to produce sufficient food. Agriculture has met the challenge quite effectively in most of the countries. Fish output has also increased substantially as private and public initiatives have introduced new manpower, technologies and capital into the fisheries systems.

With all of the advances in agriculture and increasing industrial development there have come serious economic dislocations. The most obvious disruption has been the extraordinary growth of cities with rural migrants seeking opportunities when agriculture can no longer absorb them. A less obvious change has been the entry of many workers with few skills and little or no capital into the fishing sector. The result has been a great increase in the numbers of small-scale fishermen.

The consequence of these economic changes is that many of the coastal resources are overexploited. There is, however, nothing really new in the phenomenon of small-scale fishermen overfishing coastal resources. What is new is the extent to which coastal resources have been placed in peril. In an earlier age there were pockets of overfishing in the neighborhoods of many villages. Increased mobility and range of the small-scale fishermen have allowed them to fish in places once protected by distances too great to bridge.

The links between overfishing of coastal resources and poverty among fishermen are now obvious, as is fishing as an occupation of last resort (SMITH, 1979; NEAL, 1982; PAULY, 1988a). However, it is not clear that all small-scale fishermen in Southeast Asia are worse off than their predecessors of two or three decades ago.

When individual productivity has declined, prices have often increased. Economic opportunity has attracted capital into the fisheries of the region and the common property condition of the resource has resulted in overfishing. Thus, one does not need poverty to explain resource depletion in fisheries, although it certainly exacerbates the problem. The low labor costs associated with poverty increase the capital share in returns and induce investment in labour intensive technologies, not all of which are small scale (PANAYOTOU and JETANAVANICH, 1987).

Nevertheless, one cannot be sanguine about the income level of fishermen and their families; in some countries such as the Philippines real income levels of fishermen have declined. Also, the very low productivity of many fisheries has induced dependence on a variety of destructive fishing methods designed to capture what meagre resources remain available (GALVEZ and SADORRA, 1988; RUBEC, 1988).

It has been easy to underestimate the power of the marketplace in generating fishing pressure. As most economies in the region have grown and incomes increased, the demand for fish and other protein foods has increased. The upward pressure on prices will continue to induce entry into fishing and fish resources will be subjected to more pressure.

3.1. The changing substance and focus of economic research in the region

Since those days thirty and more years ago when economic analyses and inputs were first felt necessary by the community development, the substance of economic research and evaluations has shifted from an emphasis on the costs and earnings potential of fishing and collateral enterprises, to marketing, to measures of development benefits and finally to the management of the fisheries resources. The transitions have not been simple and are far from complete. Research in all of these fields continues today.

Most of the economic research in the region has directly or indirectly been concerned with small-scale fisheries. Much marketing research had its roots in suspicions of market manipulation which depressed prices to small-scale fishermen and raised prices to consumers. The costs and return research was largely dedicated to demonstrating that the fishermen were indeed poor if not poorer than most others in society. Production economics studies have often been designed to determine whether or not there are economies of size in fishing. The objective of many studies has been to demonstrate that many small-scale units are economically efficient. Also there has been a predisposition on the part of economists to justify the labour intensive small-scale fisheries systems. Under current wage conditions in the region this is not difficult to do.

The conflicts that have arisen between larger fishing units like trawlers and large purse seiners and the near shore small-scale operations has also been a matter of considerable concern economically, socially, politically and biologically. Efforts to obstruct the operations of large trawlers and to create productive habitats for fish to be exploited by the small-scale fishermen have also attracted attention (e.g., PRAMOKCHUTIMA and VADHANAKUL, 1987). Very little current research in fisheries economics strays far from a concern with the small-scale fishery. However, whether or not the research itself contributes to an understanding of these complex issues is not so clear.

3.2. The development of fisheries economics as a profession in Southeast Asia

The growing demand for economics input into development program formulation and project design has required a considerable growth of the profession. University courses on various aspects of fisheries economics have now begun to proliferate throughout the region and both graduate and undergraduate programs in fisheries economics are evolving. Substantial numbers of academics and civil servants have sought advanced education in Europe and North America. The contribution of these national, regional and overseas programs to the development of the profession has been considerable. Indeed, in the process, fisheries economics has advanced from what can be fairly called «fisheries accounting» to much more sophisticated analyses using modern analytic tools. This transformation is far from complete and merits in dealing with modern small-scale fisheries issues still need evaluation.

Today almost all Southeast Asian governments have a section, division or group that is responsible for fisheries economics work. These organizational entities are often found in planning departments but sometimes in other groups as well. Some research establishments also include economists as part of the professional staff.

The education of fisheries economists and the courses provided for most fisheries students in the subject reflect the growing academic conviction that the courses and programs are a valuable asset to the community and the students who enroll in them. However, the region may eventually have a superabundance of unemployable professionals.

Overall, the contributions of fisheries economics as a profession to the development and management of fisheries resources have hardly been glorious. Neither has the impact on the development of small-scale fisheries been significant. Some of the reasons lie within the discipline as it has matured in academies and others lie in the peculiar perception that the fisheries community has of fisheries economics.

Very little interest in any aspect of fisheries economics was observable in the region until the 1960s, demonstrated by the paucity of literature dealing with the subject. The Food and Agriculture Organization of the United Nations (FAO) sponsored its first international meeting on fisheries economics in 1962 in Ottawa, Canada, and the participants were able to convene in a small meeting room.

The late 1960s and early 1970s saw a significant increase in interest in the problems of small-scale fisheries development in the region. Indonesia had a particular interest in its coastal fisheries and some agencies, such as FAO and the US Agency for International Development (USAID), began to provide systematic and important inputs into the economics of Indonesian fisheries development.

The first significant effort to provide specialized training in fisheries economics to professionals in the region was that by USAID in Indonesia, in 1974, which provided the Directorate General of Fisheries six fellowships for MS-level studies in fisheries economics at US universities, as a part of a much larger and broader development support project.

In the Philippines, the then Philippine Council for Agricultural Research (PCAR), recognizing the importance of fish farming and fisheries, also began to support fisheries research with studies of small-scale fisheries and of the milkfish (*Chanos chanos*) industry. Various other agencies under the Department of Agriculture also became interested in fisheries and sponsored a number of studies in the early 1970s, a substantial number of them in fish marketing.

In Malaysia, a surge of interest in fisheries was fostered in the early 1970s by the establishment of the then Malaysian Fisheries Development Authority. Academics also became interested and began to contribute to the literature on conditions in the small-scale fisheries sector with a focus on the east coast of Peninsular Malaysia where economic development had been slow to take place. Early works by Jahara Yahaya, Eng Tan Chen and George R. Elliston helped promote interest in the field.

Thailand, which enjoyed a particularly strong expansion of fisheries with the introduction of bottom trawling in the 1960s, paid relatively little attention to the development of small-scale fisheries although some of the profits of the National Fish Marketing Organization (FMO) were earmarked for use to support the construction of facilities for small-scale fishermen. Research on small-scale fisheries did not develop until somewhat later, at Kasetsart University in Bangkok.

The Agricultural Development Council (ADC) evinced an early interest in the fishing community and fisheries development. WILLIAM COLLIER, while an ADC associate at the Institut Pertanian Bogor, gave support to studies of coastal communities in Indonesia. This activity initiated an interest that resulted in an ADC review, during 1974 of the social science requirements of fisheries research and development in the region. A seminar in Singapore was convened by ADC to discuss the findings of the review. Representatives from Sri Lanka, India, Indonesia, Malaysia, Thailand, the Philippines and Singapore attended. The report concluded, among other things, that the region could use about one-hundred professionals with doctorates and perhaps double that number of MS degree holders to support the educational and research needs attendant upon the development and management programs that were in place and planned. The report also concluded that many of the necessary professionals would come from agricultural economics, which has proven to be the case.

The Hawaii-based East-West Center (EWC), through the efforts of Brian Lockwood, made the next and most significant contribution to the development of fisheries economics in the region. In 1976 the EWC convened a meeting in Honolulu with the objective of developing a set of research proposals for each of the countries represented:

Malaysia, Philippines, Indonesia and Thailand (LOCKWOOD and RUDDLE 1977). These proposals were then incorporated into a proposal which was subsequently funded by the International Development Research Center (IDRC) in Canada.

This effort by EWC and the response by IDRC might well be thought of as the genesis of a regional fisheries economics research program.

Among the Southeast Asian institutions, the Faculty of Economics and Management of the Universiti Pertanian Malaysia (UPM) is among the first to have shown an interest in fisheries economics. Opportunities for graduate education in fisheries economics had been opened to the staff and a modest research activity had been initiated in the field. This was reinforced by an institutional linkage with the University of Rhode Island (URI) under the US Sea-Grant Program in 1976. This linkage also included the Universiti Malaya and the Universiti Sains Malaysia and the association involved both economics and marine biology. On balance, the biological links were more effective.

However, following the almost three-year UPM-URI association, the new resident ADC associate in the Faculty of Economics and Management, BRIAN LOCKWOOD, devoted considerable efforts to the development of the fisheries economics program. This proved to be an extremely fruitful arrangement that built upon his earlier efforts at EWC and the early interest of ADC in fisheries economics matters. It also was the foundation for the major institutional contributor to the field, the Asian Fisheries Social Science Research Network (AFSSRN) established in 1983 (see below).

In the early 1970s, the Center for Policy Development Studies (CPDS) of Universiti Sains Malaysia (USM) began work on social sciences and fisheries. The Center sponsored a number of research projects, one of which provided the first methodologically serious look at the issue of the economic component fisheries management in the region. The resulting paper (MUNRO and CHEE, 1978) was an agonizingly long time in gestation, mainly due to the resistance of the Government of Malaysia to its publication.

Unfortunately the early interest and leadership of the CPDS did not persist.

The establishment of ICLARM in the Philippines introduced the first major institutional commitment to fisheries management and economics in the region in providing a position for one, and later two economists as part of its professional staff. The ICLARM economics effort led by IAN SMITH was initially concentrated on the Philippines, which manifested itself in a number of studies on the economics and related aspects of small-scale fisheries and aquaculture of that country (e.g. SMITH *et al.*, 1980; CHONG *et al.*, 1982). Particularly interesting here is San Miguel Bay, a major fishing ground which was subjected to a multidisciplinary study, the results of which (PAULY and MINES, 1982; SMITH and MINES, 1982; BAILEY, 1982a,b; SMITH *et al.*, 1983) are being used for guidance throughout the region and beyond (e.g. SPOEHR, 1984).

The AFSSRN grew out of the efforts of Ian Smith and of Brian Lockwood and was coordinated by the latter as an ICLARM project. The latter, initially with the EWC, continued with ADC at UPM with the support of the International Development Research Center (IDRC). The Ford Foundation later provided critical support to ICLARM for the management of the Network for two years.

The AFSSRN presently consists of a network of ten research teams at universities and government agencies (Tab. 1). Each of the institutions has made a commitment to the development of social science research and education relating to fisheries. The Network, administered by ICLARM and financially supported by IDRC (and previously the Ford Foundation), assists the member institutions in developing effective research programs and in professional development.

Research in three main areas has been initiated by the Network: marine fisheries management; coastal (brackish-water) aquaculture management; and farming systems. The research is conducted by teams of biologists and economists with sociologists and anthropologists as appropriate.

The Network provides short courses for its members and other interested participants. The recent emphasis of these courses has been on research methods, particularly more advanced methods of analysis.

Table 1 - Member institutions of the Asian Fisheries Social Science Research Network (AFSSRN)

Institution	Country	Team leader
Universitas Diponegoro (UNDIP)	Indonesia	Drs Wiratno
Research Coordinating Center for Fisheries (RCCF)	Indonesia	Drs Budiharjo
Kelompok Penelitian Agroekosistem (KEPAS)	Indonesia	Dr Md. Husein Sawit
Universiti Pertanian Malaysia (UPM)	Malaysia	Dr Md. Ariff Hussein
Kasetsart University (KU)	Thailand	Dr Ruangrai Tokrisna
Department of Fisheries (DOF)	Thailand	Pongpat Boonchuwong
Prince of Songkhla University (PSU)	Thailand	Somsak Baromthanarat
University of the Philippines in the Visayas (UPV)	Philippines	Rodel Subade
University of the Philippines at Los Baños (UPLB)	Philippines	Danilo Evangelista
Aquaculture Department (AQD-SEAFDEC)	Philippines	Renato Agbayani

Table 1 - Member institutions of the Asian Fisheries Social Science Research Network (AFSSRN)

Years	Number of references	Years	Number of references
1. 1920-24	1	8. 1955-59	3
2. 1925-29	0	9. 1960-64	0
3. 1930-34	1	10. 1965-69	4
4. 1935-39	0	11. 1970-74	25
5. 1940-44	0	12. 1975-79	138
6. 1945-49	0	13. 1980-84	124
7. 1950-54	2	14. 1985-89	27

4. THE FOCUS OF SOUTHEAST ASIAN FISHERIES ECONOMICS AND METHODS

There has always been considerable confusion on the part of non-economists about the role of economists. More problematic than the confusion of non-economists has been the apparent confusion among economists themselves about what they ought to be doing. These collective confusions have been well illustrated by fisheries experiences in the region.

The development of fisheries economics in the region can be monitored in the literature. This can be done only imperfectly however, because of language problems. The principal loss is probably that of papers written in the Thai language.

A search of the literature revealed a 1921 pamphlet on the economics of the Straits Settlement fisheries (MAXWELL, 1921) as the earliest publication dealing explicitly with the economics of the fishing industry in the region. For the next twenty-five years, the literature reveals no particular interest in the economic conditions in the fisheries of the region (Tab. 2). The silence was broken by FIRTH's 1946 classic book (FIRTH, 2nd ed., 1966) on Malay fishermen which stands as a landmark of detailed and careful description relating to the small-scale fisheries of the time. Another book in the Firth tradition is that of SZANTON (1972), which is also anecdotally rich and descriptively detailed. Both of these contributions have attracted considerable attention and were, for many, an introduction to the social, cultural and economic conditions of the small-scale fisheries of the region.

Many papers presented earlier at various symposia and workshops were reports on fragments of research and not necessarily reports of completed projects, while the reports in recent years tend to present results of completed research projects.

The obvious economic problems encountered by the kind of development proposed by teams of fishing technologists, biologists and engineers suggested to the more perceptive that perhaps some facets of the fisheries system had been ignored in planning. Sometimes fish was produced and could not be sold; fishermen scoffed at the government debt collectors, pleading greater poverty than before; fish prices did not fall; exports did not rise; and gross national product did not increase. The cry went out for fish marketing specialists (sometimes underemployed fish merchants), fish production economists (often unemployed tuna boat captains or agricultural production economists or gear specialists with some rudiments of accounting), macro-economists (almost any available non-agricultural economist), processing economists (redundant fish processing plant managers), etc. There were almost as many economists who knew nothing about fish as there were biologists and technologists who knew nothing about economics at work in fisheries development. The penalty was paid by the thousands of small-scale fishermen and their families who were the object of investigations.

Economists were often attached to fisheries project planning teams to generate the background information in the form of those statistics which donors felt essential to forming a judgment on the importance of various projects. The economist was asked to get data on fish production and values, exports and imports, per capita income, gross national product and other numbers felt to be useful. Some but not all of this was relevant to the projects and much of it was presented in a way that over-emphasized its importance. Thus, economists became essential to the requirement that fisheries be shown to be important in the country. The statistics which only the economists/statisticians seemed comfortable collecting and evaluating became an essential part of all proposals.

Once economists joined the project development process, additional tasks were found for them. When the engineers had trouble calculating the costs of their designs, the economist came to help. When the fishing technologists found their accounting a bit constraining, the economist/accountant was asked to help. Thus, the accounting role of the economist became central to the thinking of others about economists. The economist/accountant soon became responsible for all the cost and earnings calculations of projects.

A serious problem in many fisheries projects was the lack of any understanding of the market processes. The economist was called upon as merchant to design the ways in which fish might be sold at some advantage to the fishermen. It is interesting to note that there was often a special position on the teams for a marketing economist as distinct from the statistician and accounting types. It should be observed that some of the so-called marketing economists were not economists of any kind, but businessmen with some experience in selling fish.

The economist, because of the variety of roles in a team, became something of an integrator of the various parts of the development project and in this role also became that of an author and editor.

As international donors began to press governments to provide better economic evaluations of the projects to be financed, most governments expanded their planning section and placed some economists within it.

Most government agencies perceived fisheries economists in the roles indicated above. However once they were established in government they often acquired a new role, that of budget planner.

Academic economists have the opportunity and often the educational background to perform as «field economists». However, the universities tended to follow the lead of government agencies in developing their research programs. These had grown in response to what was perceived to be in the national interest and what could contribute to the formulation of public policy. Put differently: the academic community had not yet matured to the point where it could exercise a critical judgment on what research is essential to the formulation of policy. However, as more and more qualified professionals enter the various faculties, one can expect a somewhat more independent point of view, coupled with better conceived and better designed research programs. The process is well underway and is particularly important to research related to effective small-scale fisheries management strategies.

The obvious failures of many projects to achieve their objectives in time have an impact on even the most obtuse planner, bankers or developers. In fact, there have been cases where careful research clearly anticipated failure of development projects that were nevertheless implemented. The research referred to here was an «in house» activity of the development agency and of course was never published. There are also cases of government agencies that have funded research but refused to permit the publication of the results because they contradicted their proclamations. Some economists have done some solid research which could have helped avoid failure but which has been ignored.

It should also be recognized that donor agencies which finance small-scale and other fisheries development schemes have multiple objectives. When short-run considerations dominate, sustainable economic and social development may not be one of them.

It is a bit discouraging at times to note that most small-scale fisheries development policy is pursued with little or no attention to its economic consequences. However, as economists develop an understanding of fisheries matters and are increasingly capable of addressing management policy, their advice is being sought. To date the contribution of economists to pressing management policy issues has not always been very sound because the research base upon which to give such advice is still small.

As economists entered the fisheries field through the development «gate», they began to produce a varied literature that reflected, to some extent, those matters about which the development community was most concerned. Table 3 gives some idea of the topics that have dominated the field during the past twenty years.

One notable feature of the information in Table 3 is the relative importance of aquaculture-related papers compared with that on small-scale fisheries. This bias reflects the fact that most economists working on fisheries problems have their educational roots in agriculture. However, some of the papers on marketing or development could deal with small-scale fisheries issues without specifically mentioning the fact. Almost all Indonesian papers, for example, whether they mention it or not, deal with small-scale fisheries, either directly or indirectly. Also, it is relatively easy to transfer research methods from an agricultural commodity to fish production and many researchers have done this. One must also note the substantial number of marketing papers: fish offer another commodity market for the application of agricultural marketing research methods.

The ease with which the research methods of agriculture can be transferred to some aspects of fisheries has seriously hindered the development of the part of fisheries economics that addresses the serious bio-economic questions of fisheries management. Indeed, few of the professionals currently conducting research in Southeast Asia are adequately educated to deal with these problems.

Much of the early work and some of the current work is largely descriptive of some aspect of the fisheries system. These descriptive studies were part of the process to understand fisheries and to identify researchable questions.

Numbers often played a major role in these descriptive studies and were either drawn from secondary sources or from surveys. Table 3 underestimates the frequency with which surveys were conducted (because only the frequency with which the word «survey» appeared in the titles of papers is reflected); little analysis of the figures was made, whether formal or informal. Statistical analyses of any kind were rare. It is safe to say that more than half the items in the list we presented in the bibliography can be classified as descriptive rather than analytic.

More recent efforts in the field have sought to apply production and profit function analyses to farm operations. The production function analyses are often applied in circumstances in which they are not suitable but do represent an effort to more than summarize operations in tabular form.

Most of the market research has been descriptive and much has been conducted with an obvious bias: the researcher begins with the premise that the «middleman» is responsible for the poverty of fisherfolks and concludes that the premise is correct. Also, perceived or real marketing problems have inspired considerable support for cooperative development in many countries of the region. Despite their widespread failure to perform under the socioeconomic condition prevailing in Southeast Asia, many economists still recommend cooperatives as a cure-all solution.

Table 3 - Occurrence of key term in the titles of a selected list of Southeast Asian fisheries economics papers 1921-1987 (based on same list as in Table 2)

Key term(s) in title	Number of occurrences	Per cent total
	References (a)	
Economics	94	26
Socio-economics	40	11
Small-scale/Artisan	31	9
Management	25	7
Cost	25	7
Markets and marketing (b)	49	14
Development	47	13
Aquaculture / Culture farm	69	19
Survey	31	7

(a) Per cents total are more than 100 because more than one of the chosen words may appear in a reference title.

(c) 36.3 % of the marketing papers were presented and/or produced in the Philippines.

5. PROFESSIONAL DEVELOPMENT AND EDUCATION OF SOUTHEAST ASIAN FISHERIES ECONOMISTS

The literature shows a substantial professional foundation in the region. Table 4 shows that most of the authors are indigenous to the region and also shows that most authors addressed fisheries questions only once.

A substantial number of the papers have been presented in symposia, seminars and workshops. The frequency of meetings related to fisheries economics may have declined, however, and the literature now is more likely to be fed by reports emerging from the normal completion of research projects rather than conference papers. What has

**Table 4 - Number of author of selected references
on Southeast Asian fisheries economics 1921-1987 (same basis as other tables)**

Number of titles	Number of authors	Regional authors
1	185	165
2	31	25
3	9	6
4	5	3
5	1	0
6	1	1
7	1	0
8	1	1
9	2	0
Total authors	236	201

happened is that the earliest phases of professional fisheries economics development in the region are over. Meetings and conferences, which played an essential role in generating interest and in plotting courses for activities may no longer be important. As it became increasingly clear that fisheries economics matters require a knowledge of theory and practice well beyond that of agriculture or marketing, for example, the field has been left to a number of professionals who have dedicated themselves to the study of fisheries economics. This is a fairly new generation, not yet very experienced, but increasingly well educated in the field and increasingly capable of conducting useful research.

However, there is a division in the house. The extraordinary emphasis on aquaculture by many countries in the region, given the promise of export development, has attracted substantial resources to aquaculture economics. Table 4 indicates that aquaculture has dominated fisheries economics research. On the other hand, there has been considerable diffidence in approaching small-scale fisheries management issues by economists living in and/or interested in the region. The work of ICLARM stands out as a notable exception.

This interest in aquaculture is reflected in the theses of graduate students. Data for theses are easier to obtain from farmers than from fishermen. Most students and teachers have a better understanding of farm production processes than they do of fishing. And, of critical importance, most economics students have almost no understanding of biological processes. Hence, it is very problematic for them to appreciate the complex systems within which fisherfolks operate and to conduct effective research in the field. It will require some time to alter the balance of economics effort in the field of fisheries in the region to reflect the overwhelming importance of capture fisheries and to begin to address the critical problems of their management.

Few government researchers have doctorates, only one within the AFSSRN. Most of the rest have Masters degrees although a substantial number are first (Baccalaureate) degree holders.

Many universities in the region have developed programs of research and education in fisheries. Universiti Pertanian Malaysia (UPM) initiated a program of fisheries research about fifteen years ago and provided staff, with a department of resource economics to carry it out. Now UPM has an English language Masters program in fisheries economics which serves the entire region.

There are eight Universities in the region which conduct regular research on fisheries economics matters in the region (Table 1). Other universities have staff members that may, from time to time and as resources permit, conduct research projects related to economics of fisheries.

In many universities there exists a certain dichotomy in the organization of fisheries economics research. Fisheries economists may reside in economics faculties or departments and in fisheries faculties or departments. This jurisdictional issue has not yet become a problem. The principal objection to this separation is that economists in fisheries faculties and departments may not be subject to quite the same professional standards as their counterparts in economics faculties. However, having economists housed in fisheries faculties may also improve the collaboration among fisheries scientists that is essential to the conduct of management-oriented fisheries research.

Fisheries economics education in the region may be expanding beyond needs. Fisheries economics research essentially requires education at the doctoral level. MS degree holders can, of course, perform a number of research tasks but usually not the more sophisticated analyses required to address resource management questions. Baccalaureate degree holders can provide technical assistance in research but generally are very ill equipped to plan and conduct research.

Currently, the region has no doctoral program in fisheries economics although Universiti Pertanian Malaysia plans to initiate one soon. There is, as has been indicated earlier, a masters program in fisheries economics at UPM and a second in resource economics (including fisheries) is beginning at Kasetsart University, Bangkok. A number of Universities have had masters students who have written theses on fisheries economics subjects without providing specialized fisheries economics courses.

An undergraduate program in fisheries economics has been in place at the Institut Pertanian Bogor, Faculty of Fisheries and Aquaculture, in Indonesia, for a number of years. The graduates of the course normally find their way into government service, frequently as extension workers. Another undergraduate program is planned by Universitas Diponegoro in Semarang, Java, and another has been considered by UPM in Malaysia. There is a serious question as to whether or not undergraduate general fisheries economics programs are useful. These programs are, by their very nature, almost terminal. Participants touch upon a number of aspects of fisheries and economics but are ill prepared to continue their education in any field.

6. CONCLUSIONS: SMALL-SCALE FISHERIES AND FISHERIES ECONOMICS IN SOUTHEAST ASIA

Without engaging in a protracted discussion of what constitutes management, and fisheries management in particular, it is safe to say that most deliberations on the subject still focus on the resource and are governed by political consideration. Economists have not yet developed the research base necessary to permit them to speak with some authority on the short and long-term economic consequences of management. This research base cannot be effectively developed without a substantial enhancement of professional skills in the region. Improvements are taking place at a rapid rate. Many professionals still shun the mathematics and statistics necessary to an appreciation of both economic and biological theory and practice.

Because there are so many fishermen in the region and because they are generally poor, there has been a propensity to look upon their plight as a social rather than economic problem. This perception has eroded the willingness of politicians and management officials to look seriously at the economic implications of their actions. This, unfortunately, has led many economists to move away from the hard analysis that is necessary to address many of the difficult questions towards a more appealing kind of research that appears under the rubric «socio-economics». This, sadly, is not economics at all but an amalgam of analyses often without cohesive thread or strong discipline.

As fisheries economics professionals mature and begin to address the serious problems of managing the resources upon which the small-scale fisherfolks and indeed the nations themselves depend, they will join other professionals in fisheries science to make a lasting contribution the region. This process has, happily, begun.

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⁽¹⁾ This list includes all items cited in the text, plus other references relevant to the social aspects, especially the economics of small-scale fisheries in Southeast Asia. All references in Indonesian stem from BAILEY et al. (1987). This list presents the major part of the references used for tables 2-4.

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