

## SOCIAL CONSEQUENCES OF EXCESS FISHING EFFORT

by

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### ABSTRACT

Levels of fishing effort are defined as being excessive where they result in depletion of commercially valuable stocks and so threaten sustainable harvests. In many parts of Southeast Asia, this threat has been realized by the rapid expansion of commercial fisheries and the consequent increase in fishing effort. Southeast Asian fisheries are described as having a dualistic structure with distinct small-scale and large-scale subsectors.

Competition and conflict between these subsectors is widespread and exacerbates the negative social consequences of excessive fishing effort. These include dissipation of resource rents, gear conflicts leading to broader social conflict, increased use of destructive fishing techniques, changes in the food supply and distribution channels (with disproportionate negative effects on rural populations), and increased concentration of economic power within the fisheries sector. Further, excessive fishing effort reduces incomes and standards of living for the majority of fishermen and undermines community-based distributive and resource management mechanisms.

The fundamental problems of fisheries management are inherently political, entailing issues of resource allocation and distributive equity. These problems are complicated by the role of fisheries as a social safety valve for the landless and the unemployed. As such, fisheries management cannot be divorced from broader problems of Southeast Asian nations and are only solvable within this larger context.

### I. Introduction

#### 1.1 Context of the problem

Rapid adoption of new production technologies in a context of resource scarcity describes the common setting for this discussion. Over the past two decades, marine fisheries in many tropical developing countries have experienced a technological transformation of major proportions. This "blue revolution" has been especially significant in Southeast Asia, a region with a long maritime tradition, a large number of fishermen, and a high degree of dependence on fish for dietary protein. More recently, fisheries products have gained increased importance as a source of foreign exchange. Indeed, the integration of Southeast Asia's fisheries into world commodity markets is the driving force behind the "blue revolution" and is largely responsible for massive increases in levels of fishing effort throughout the Region.

The capital-intensive nature of most new fishing technologies also has led to increasing concentration of production capacity in the hands of relatively few individuals. As a result, throughout Southeast Asia there has been (1) a *de facto* reallocation of scarce resources favoring those who control the most powerful technologies and (2) the creation of a dualistic industry structure characterized by important differences in technology, capitalization, and basic orientation to the fishing enterprise itself. These differences are of fundamental importance to understanding both the causes and the social consequences of excessive fishing effort.

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### *1.2 Excess fishing effort*

Given the state of our knowledge regarding population dynamics of tropical multi-species fisheries, and the common absence of data on existing levels of fishing effort, we cannot with precision establish at what point levels of fishing effort become excessive. As fishing effort increases, there may be differential impacts on the resource, with the result that certain species may decline in abundance while others may increase (Pauly 1979). Under these circumstances, increasing levels of fishing effort beyond some mythical point identified as maximum sustainable yield (MSY) does not automatically result in declining catch but may instead result in a changing species composition which may (or may not) have a higher economic value.

Recognizing these limits to our knowledge, it is generally accepted that levels of fishing effort can increase to the point where most or all commercially valuable species suffer population declines. I would define this resource depletion as the point where levels of fishing effort have become excessive. Levels of fishing effort which exceed some estimate of MSY are not by definition "excessive" unless they result in resource depletion.

## **2. Dual structure of fishing industry within Southeast Asia**

For purposes of this discussion, Southeast Asia's fishing industry will be divided into the small-scale and large-scale subsectors. Each country in the Region has its own system of classification, usually based on the type or size of boat employed. In my view, physical dimensions are not the most important distinguishing characteristic separating these two subsectors. More important are the fundamental differences in values and goals that distinguish these two classes of fishermen.

### *2.1 Large-scale subsector*

The large-scale subsector is a broad category dominated by individual entrepreneurs who own wooden-hulled trawlers and purse-seiners which generally displace less than 50 GT and are powered by diesel inboard engines of 100-200 h.p. I also would include within this subsector private corporations and state enterprises which operate boats that generally are far larger and more powerful. This latter category, however, is relatively inconsequential in terms of fleet size, employment, or fishing effort compared to the much larger group of entrepreneurs who own one or perhaps a few boats of the type described above.

These Southeast Asian entrepreneurs share common goals of profitability and capital accumulation. We have no trouble recognizing the economic rationality of their behavior or predicting the impact of their operations on marine resources under open access conditions. Following the scenario proposed by Hardin (1968) in his classic "Tragedy of the Commons," we can expect to find entrepreneurs attempting to maximize individual gain. The collective result of these individual actions often is to increase fishing effort beyond levels necessary to achieve maximum sustainable yields (MSY). When this occurs, my defining criterion for excess fishing effort is met.

### *2.2 Small-scale subsector*

Prior to the 1960s, the fisheries of Southeast Asia were almost exclusively small-scale in nature and were oriented to supplying local domestic markets. Since that time, commercial fisheries have grown in importance. Nonetheless, small-scale fishermen still account for roughly 90% of those directly employed and harvest the bulk of all fish consumed in Southeast Asia.

Most small-scale fishermen are restricted to operating in coastal waters near their home community by the size of their boats and the design of their fishing gear. Although the productive capacity of individual small-scale fishing units is quite limited, the large number of units involved frequently results in high levels of fishing effort.

Unlike the case of commercial fishermen, high levels of fishing effort within the small-scale subsector are not attributable to a combination of mechanized fishing power and profit-seeking behavior, but rather to the sheer numbers of individuals seeking a living from the sea. Moreover, their numbers continue to grow because of both natural population increase and the entry of landless agricultural workers and others seeking a means of earning a

living. The open access nature of fishery resources and the low capital requirements necessary to invest in a simple small-scale fishing unit present few barriers to the entry of additional small-scale fishermen (Bailey 1982).

Small-scale fishermen are no less rational economically than their commercial counterparts, but what constitutes rational behavior among this group has to be understood in the context for their particular socio-economic circumstances. Traditional fishing technologies are inextricably linked to the values of local fishing communities and these in turn shape a wide range of social and economic relationships. Profitability and capital accumulation are only two goals among many. Careful examination of sharing systems clearly shows that non-economic factors often shape the social relations of production among small-scale fishermen (Aminah and Widjayanti 1980; Bailey 1983; Villafuerte and Bailey 1982).

Broader social values often mitigate the harsher aspects of purely economic factors by assuring access to locally available resources (e.g. fish) and by promoting redistributive mechanisms based on generalized or other forms of reciprocal relationships supported by tradition and community social sanctions (Bailey 1983; Collier *et al.* 1979). This finding is important because it indicates that small-scale fishermen have the ability to restrain themselves from maximizing personal gain at the expense of the collective good. This social consciousness provides a basis of resource management, a point we shall return to below.

### *2.3 Competition between small-scale and large-scale fishermen*

Competition between small and large-scale fishermen is of two-kinds: competition over finite marine resource; and competition over scarce development resources.

#### *2.3.1 Competition over marine resources*

Competition between fishermen for a finite resource may be likened to a zero-sum game, where technological advantages enjoyed by a few translate into declining shares of the total harvest by all others. As small-scale producers with limited capital resources, the majority of fishermen in Southeast Asia lack the means to remain competitive with those who adopt more powerful production technologies.

Direct competition occurs when both types of fishermen exploit the same fishing grounds and/or the same species of fish. The fishery of San Miguel Bay in the Philippines illustrates the impact of commercial fisheries development on the small-scale subsector. In this area, ownership of the fleet of 95 trawlers was vested in 25 out of 3,500 families directly involved in the fishery (Bailey 1982), yet the catch was nearly equally divided between trawlers and small-scale fishermen (Pauly 1982). Moreover, there was clear species-by-species competition between these two groups of fishermen.

Situations such as this are common in Southeast Asia because most important fishery resources are concentrated in coastal waters. Most small-scale fishermen are restricted to these waters by their simple fishing technologies. Trawlers in particular are attracted into coastal waters by the relative abundance of high-valued shrimp. In the process of trawling for shrimp, large quantities of other organisms also are captured, including a high proportion of sexually immature individuals of commercially valuable fish and shrimp (Azhar 1980). Despite eroding catch-per-unit-effort ratios, excessive levels of fishing effort continue to be applied due to the high prices paid for shrimp on the world market. This, in turn, has led to serious declines in catches and incomes among large numbers of small-scale fishermen (Bailey 1982, 1985, 1987; Panayotou 1980; Smith 1979).

#### *2.3.2 Competition for development resources*

Governments throughout Southeast Asia have actively supported development of large-scale fisheries through gear trials, exploratory fishing surveys, extension of technical advice and training, construction of ports and related infrastructure, and provision of subsidized loans. Bilateral and multilateral development assistance agencies have provided technical and financial support for these programs. Between 1978 and 1984, more than US\$590 million in external assistance was provided to the governments of Thailand, Indonesia, Malaysia, and the Philippines (FAO, 1984). Comparatively few international resources have been devoted to development of the small-scale subsector (Asian Development Bank 1980; FAO, 1984; Sfeir-Younis and Donaldson 1982).

### **3. Negative social consequences of over-exploitation**

This section examines the negative social consequences of excessive fishing effort.

#### *3.1 Resource depletion and threats to sustainable harvests*

Most important fisheries within Southeast Asia are being exploited at or near the level where there exists a clear threat of resource depletion. For societies as heavily dependent on fisheries resources for nutritional and economic well-being as those of Southeast Asia, this doubtlessly is the most serious negative social consequence of excessive fishing effort. In broad terms, excessive fishing effort represents a misallocation of human and capital resources resulting in (1) a diminution of economic returns to these two factors of production, (2) declining harvests because of resource depletion, and (3) consequent losses in income, employment opportunities, and supply of fisheries products to domestic and international markets affecting both the fishing industry and society as a whole. These negative social consequences will be addressed in more detail below.

#### *3.2 Dissipation of resource rents*

Excessive levels of fishing effort leading to resource depletion result in a net economic loss to society as costs of exploitation increase to the points where all economic rents from the resource are dissipated. As the economic consequences of excess fishing effort are being addressed by Dr. Aguero, I will not discuss this matter in detail.

#### *3.3 Gear conflict*

Competition for a dwindling resource base has led to serious gear conflict, especially between small-scale fishermen and trawlers. Trawlers not only compete effectively against small-scale fishermen, but because of their active mode of operation, they frequently damage or destroy more passive small-scale gear. This is a particular problem at night, a time favored by trawler operators as it is then that shrimp are most active and easily caught. As an added incentive, trawlers operating illegally in coastal waters are less likely to be apprehended at night.

Fishermen in Malaysia claim that the introduction of trawlers led to the elimination of demersal trap fisheries off Kelantan and Trengganu (personal interviews). During each of the six months I was resident in a Malaysian small-scale fishing community, at least one drifting gill net (marked by hurricane lamps at both ends) was seriously damaged by a trawler illegally operating at night in inshore waters. Panayotou (1980:44) notes in the case of Thailand:

Small-scale fishermen using traditional fishing methods must either abandon those types of gear that are susceptible to destruction by trawlers or change fishing grounds, a choice that can be ill afforded by fishermen with limited fishing range and meagre funds.

Destruction of small-scale gear by commercial trawlers has also been reported in the Philippines (Bailey 1982; Smith 1979), Malaysia (Bailey 1983; Gibbons 1976; Smith 1979), and Indonesia (Sardjono 1980).

Damage or destruction of small-scale fishing gear caused by trawlers results in serious economic losses and is a continuous threat to the life and livelihood of many small-scale fishermen. On the west coast of Malaysia, there have been numerous instances of trawlers having rammed small-scale boats, resulting in the loss of life (Smith 1979). This in turn has contributed to broader problems of social unrest addressed in the following section.

#### *3.4 Social conflict*

Conflict between competing users is an almost inevitable result under conditions of excessive fishing effort. Conflict within the fisheries sector of Southeast Asia is widespread and verging on the endemic. Although there is evidence of tensions among small-scale fishermen (Hadikoesworo 1977), the primary axis of conflict is between small-scale and large-scale fishermen, the latter most notable represented by trawler operators. The resulting violence has led to widespread loss of life and destruction of property (Bailey 1984; 1987; Smith 1979).

In the Southeast Asian context, tensions within the fisheries sector are particularly volatile because

technological advantages are not only a matter of economic class (i.e., small-scale *versus* large-scale fishermen) but are also frequently related to ethnic divisions within the region. The possibility that tensions within the fisheries sector might erupt into widespread social unrest must be considered where commercially-oriented ethnic Chinese entrepreneurs operate in direct competition with non-Chinese small-scale fishermen.

It is natural for fisheries administrators to consider violent conflict in negative terms and to strive to eliminate the causes of unrest. The best example of this is Indonesia's decision in 1980 to ban all trawler operation in waters off the islands of Java, Sumatra, and Bali, and the extension of this ban throughout most territorial waters in 1983. This action was taken, in part, to protect important demersal fisheries resources from depletion, and to promote small-scale fisheries development. However, there is little doubt that the government was forced to take this drastic action to eliminate the cause of escalating violence (Bailey 1987). Although we all may deplore the loss of life and property, our antipathy to violence should not blind us to the positive role of conflict in promoting social change.

### ***3.5 Increased use of destructive fishing techniques***

Where excessive levels of fishing effort lead to resource depletion, fishermen are forced to adopt increasingly fine meshed nets, poisons, or other destructive fishing methods which meet their short-term needs at the expense of long-term interests in resource sustainability. This response to resource depletion is most likely to occur among small-scale fishermen who have no alternative employment opportunities. Under these conditions, which are common throughout the region, fishermen have no economic alternative to exploiting undersized or juvenile recruits before they have reached optimum economic value or reproduced.

### ***3.6 Impacts on food supply and distribution channels***

Throughout Southeast Asian societies, fish provides the single most important source of high quality animal protein, and the only affordable source for the poor. Demand for fisheries products within the Region is increasing due both to natural population growth rates and to increasing per capita demand by urban and middle-class consumers, who have benefited most from national economic development.

As levels of fishing effort increase to the point where resources begin to be depleted, fish becomes an increasingly valuable commodity in domestic markets. As prices rise, the ability of the poorest strata within society to purchase fish is diminished, with the predictable result being increased protein malnutrition.

The growth of large-scale fisheries has led to a major shift in the centre of fishing activities from small coastal communities to urban fishing ports equipped to handle larger boats. The relative affluence of urban compared to rural populations has increased the importance of urban markets as centers of demand for fisheries products. The expansion of large-scale fisheries not only has contributed significantly to excessive levels of fishing effort, but also has increased the importance of urban fishing ports as centers of supply for fisheries products. Urban consumers, in particular, have benefited from this development. Rural consumers, however, have been adversely affected wherever an increasing proportion of the catch is landed at urban ports, because from there distribution patterns tend towards other urban markets rather than to rural areas.

### ***3.7 Changes in the social relations of production***

Large-scale fishermen enjoy a number of important advantages which contribute to their increasing importance within the fisheries sector. The greater productivity of large-scale compared to small-scale fishing units provides an important advantage in competing for a dwindling resource base. Direct and indirect subsidies give this technical edge an economic dimension of apparent efficiency, allowing commercial fishermen to compete for a dwindling resource on advantageous terms with small-scale fishermen (Smith and Mines 1982).

This combination of technological and economic advantage has resulted in the concentration of fishing power in the hands of relatively few individuals. With the concentration of fishing power has come a concentration of economic power. Labor is in relatively abundant supply compared to capital, and owners of capital-intensive fishing units are able to dictate the terms of employment (Villafuerte and Bailey 1982).

The examination of sharing systems provides valuable insights into social and economic relationships within the fisheries sector. The manner in which the proceeds from the sale of the catch are distributed among owners and non-owning crewmen reflects the respective value place on capital and labour as factors of production. In small-scale fisheries, it is common to find owners taking an active role in fishing. Analysis of sharing systems reveals that clear distinctions are drawn between capital, labor, and management, but as factors of production among small-scale fishermen, these frequently are combined in the role of owner-operator. Within the small-scale subsector, sharing systems frequently are based on more than economic calculation (Aminah and Widjayanti 1980; Bailey *in press*; Villafuerte and Bailey 1982).

Large-scale fisheries enterprises are operated quite differently. Owners provide capital and on-shore management, paying particular attention to marketing, but leave management of actual fishing operations to a hired captain (Bailey 1983; Villafuerte and Bailey 1982). This captain is responsible for hiring and firing of the crew, who have little contact with the owner. Thus, the roles of investor, manager, and worker are clearly differentiated. The result is a separation between owners and crewmen along lines of economic class interests. The separation of ownership, management, and labour serves to lessen owners' social obligations, a buffer which owners are careful to maintain (Villafuerte and Bailey 1982).

An example will illustrate this general trend. Raymond Firth, a British anthropologist, studied a Malay fishing community named Perupuk during the late 1930s and conducted a restudy in 1963 (Firth 1966). During the time between the two studies, motors and nylon netting had been introduced to Perupuk, greatly increasing available fishing power but also increasing investment costs. The result was a concentration in the ownership of productive assets, though boats and nets still were owned by local residents and sharing systems still reflected the influence of non-economic social relationships.

When I visited Perupuk in 1976, I found a vastly changed situation. Most fishermen from that community no longer owned their own boats and nets but rather worked as crewmen on relatively large purse-seiners based at Kuala Besut, a port about 20 miles away. The fishermen from Perupuk had shifted from the status of owner-operators to workers operating on a share basis.

In short, what we have in the case of the fishermen of Perupuk is a shift from a peasant mode of production in the 1930s to domestic commodity production in the 1960s, to an advanced form of free-market capitalism during the 1970s. During this process the fishermen of Perupuk experienced a shift in class status from owner-operator (or at least a crewman who could reasonably expect to become an owner) to that of worker whose sole productive asset is physical labor.

### *3.8 Impacts on community organization*

This transformation of Perupuk's economy had a significant impact on the community by reducing the capacity of residents to organize for social, economic, or political purposes. Throughout the year, a large proportion of all able-bodied men were absent from Perupuk during three weeks of each month. Only during the brightest phases of the moon did the men return (during that time lights could not effectively be used while purse-seining at night). The regular absence of a large number of people not only affected the capacity to mobilize community energies for development, it also negatively affected small businesses and sundry shops within the community, which experienced reduced patronage. This had the effect of reducing alternative employment opportunities within the community and increasing dependence of the community on fishing as the primary source of income. This dependence was further increased by the prolonged absence of many men who might otherwise have been engaged in other local economic activities in addition to fishing (see Bailey [ 1983 ] for a discussion of part-time farming and other secondary economic activities among fishermen in a nearby community).

Most Southeast Asian fishermen have not yet experienced these processes of specialization and proletarianization, yet almost all have experienced fundamental changes affecting social and economic relationships within their community. The effect of excessive fishing effort on landings and incomes of small-scale fishermen is beginning

to impose a new set of values with profound implications for individual fishermen and their communities. The combination of pressure on the resource base and competition in the marketplace has negatively affected the standards of living of many small-scale fishermen. These pressures have forced many to emphasize narrow self-interest and a neo-classical form of economic rationality as a means of survival, resulting in the abandonment of social welfare mechanisms at the community level.

The implications of this change are illustrated by a case study from the north coast of Java. Collier *et al.* (1979) documented what happened when the combination of resource depletion and the need to increase cash incomes to meet mounting obligations transformed traditional distributive values. Fishermen who had allowed orphans and other poor community members to take a few fish for their own consumption gradually disallowed this practice. Where previously fishermen were content to market their catch through local petty traders who served nearby rural communities, the need to maximize earnings led to a shift to big buyers supplying urban markets where prices were higher. As a result, local residents lost an important source of gainful employment, and agricultural communities in the immediate hinterland found it increasingly difficult to obtain and afford the fish which provided their main source of animal protein.

### *3.9 Impacts on income, standards of living, and employment*

To appraise the impact of excessive fishing effort on income, standards of living, and employment, we need to determine whether the fishing effort in question is coming from the small-scale or large-scale subsectors.

#### *3.9.1 If large-scale subsector largely responsible for excess effort*

Where the large-scale subsector contributes significantly to excessive levels of fishing effort, this tends to have a depressing impact on incomes, standards of living, and employment opportunities within the sector as a whole. Two studies conducted along the north coast of Java indicate that competition between trawlers and small-scale fishermen led to declining incomes among the latter group and a subsequent withdrawal from fishing among those no longer able to earn an adequate livelihood (Collier *et al.* 1979; Mubyarto *et al.* 1984). Joenoes *et al.* (1979) and Naamin (1983) report parallel developments in the Cilacap area of Java's south coast. Landings and incomes among small-scale fishermen along the Malacca Straits also are reported by Darus (1983) and Unar (1972) to have declined as a result of competition with trawlers. There is little doubt that demersal resources in each of these three areas were subject to excessive fishing effort and that trawlers contributed substantially to this problem (*Dwiponggo in press*).

Despite general agreement in the literature on this matter direct measurement of these impacts is difficult to achieve. However, there is evidence from Indonesia which tells us what happens to incomes and employment opportunities when excessive fishing effort suddenly is reduced. Joenoes *et al.* (1979) reported that a government act which reduced trawler operations in the Cilacap area resulted in increased employment opportunities; among the beneficiaries were small-scale fishermen who had withdrawn from the fishery because they were unable to earn a living in competition with trawlers. Indonesia's 1980 trawler ban provided dramatic evidence of the effect of a sudden reduction in levels of fishing effort. The number of fishermen operating off Java's north coast increased by nearly 10% (to over 290,000), while along the Malacca Straits numbers of fishermen increased by 21% (Directorate General of Fisheries 1982, 1984). Naamin (1983) reported that average household incomes increased by 30% among small-scale fishermen on the north and south coasts of Java as a result of the trawler ban. No comparable data are available from the Malacca Straits.

#### *3.9.2 If small-scale subsector largely responsible for excess effort*

Although the rapid expansion of the large-scale subsector in Southeast Asia is largely responsible for major increases in fishing effort over the past two decades, small-scale fishermen are becoming increasingly capable of exploiting fisheries resources to the point of depletion. This is true both because of the sheer numbers of people involved and also because many small-scale fishermen have adopted increasingly effective production technologies. These new technologies generally involve greater use of purchased inputs (e.g., fuel). As a result, small-scale fishermen have become increasingly enmeshed in the cash economy and must be concerned with meeting operational and investment costs. These concerns exert a strong influence towards increasing fishing effort as a means of maximizing income.

The negative social consequences of excessive fishing effort caused by small-scale fishermen are less serious than if caused by the large-scale subsector because, on balance, these may be mitigated by positive social gains, in particular the generation of additional employment opportunities.

Because marine fisheries generally are considered an open access resource they serve as a social safety valve, a resource of last resort for society's landless and unemployed. Resource managers may consider this a hopeless situation, recognizing their inability to control entry and consequently levels of fishing effort. Yet I think it important to realize that problems posed by continued influx of new entrants reflect broader problems within society. The fisheries sector is unable to absorb all surplus labour in the economies of Southeast Asia, but from the perspective of society as a whole there are positive social welfare benefits involved in permitting continued entry of small-scale fishermen. Just as the fisheries sector may be unable to solve society's problems, so too the problems of fisheries management cannot be solved without reference to broader developments within society as a whole.

Allowing continued entry of small-scale fishermen may be socially responsible as a means of generating employment opportunities achieved at the cost of small incremental increases in fishing effort. However, continued open access and free entry to commercial fisheries is another matter entirely given significantly greater fishing power and the comparatively capital-rather than labour-intensive nature of the technologies employed.

Fisheries policy must be concerned with resource sustainability, but biologists are beginning to realize that the response of marine populations to excessive levels of resource exploitation is variable. In some cases, the result may be a catastrophic collapse, as in the case of the California sardine and the Peruvian anchoveta fisheries (Glantz and Thompson 1981). Tropical multi-species fisheries may not respond in this fashion, and it is likely that excessive levels of fishing effort are more likely to result in shifts in population composition rather than an absolute decline in the biomass (Pauly 1979). Under these conditions, it *may* be possible to allow high levels of fishing effort if the primary goal of fisheries policy is to increase employment opportunities.

### *3.10 Resource allocation and distributive justice*

Fisheries development efforts which focus exclusively on production-oriented technologies raise serious ethical problems associated with distributive justice (Bailey et al. 1986). The capital-intensive nature of purse seiners, trawlers, and other highly effective modern fishing technologies precludes all but the wealthy few from benefiting from this form of development. By promoting the use of highly productive technologies without simultaneously strengthening institutional capacities to manage and allocate finite resources among competing users, national and international development agencies are contributing to structural problems and policy distortions which result in excessive levels of fishing effort and negatively affect the catches, incomes, and standards of living of the majority of those employed in the fisheries sector.

## **4. Community resources for resource management**

There is a need to increase our knowledge of community organization among fishermen to better appreciate the potential role of local communities in resource management. It is generally (though by no means correctly) assumed that fisheries policies, including those pertaining to resource allocation, always are made at the national level. In many cases, the effective capacity of government agencies to regulate what goes on in widely scattered fishing grounds is almost non-existent. Under these conditions, devolution of major resource management and allocation decisions to the local level may be more effective than central government efforts. This is the essence of a "common property" resource system (as distinct from an open-access system), wherein members of a community control and allocate access to the resource (Ciriacy-Wantrop and Bishop 1975).

Mobilizing fishermen to manage local resources is not the only solution to problems of resource management and is not always a viable option (e.g., when community structures and traditional management mechanisms are disintegrating). Nonetheless, it is difficult to visualize achieving lasting success in resources management without the active involvement of those who will be most affected.

It may be relatively easy to achieve a consensus of opinion among members of a fishing community regarding the need to exclude outsiders from local fishing grounds (Bailey 1984). Where large-scale trawlers and purse-seiners are present, the desire to restrict these highly capitalized competitors frequently is strong and will provide a strong motivation for organized action where this is encouraged (or at least permitted) by the government.

It may be more difficult to enlist the active support of local residents in resource management when they must control their own fishing activities. The case of Sumilon Island in the Philippines provides an example of both the difficulties faced in mobilizing community cooperation and the favorable effect of local management in an area which had been subject to excessive fishing effort. Researchers at a local university worked with local fishermen over a three year period, convincing them that by setting aside a portion of the reef to serve as an undisturbed breeding and nursery ground they would experience an increase in sustainable harvests (White 1984). After much debate the experiment began and quickly proved successful. Indeed, the experiment was so successful in increasing resource availability that the reef attracted the attention of powerful outsiders, who threatened the life of the local community's watchman assigned to monitor fishing activities in the sanctuary (Maclean 1986). A year later an underwater survey identified evidence of damage to the coral by explosives and muro-ami fishermen, and a dramatic decrease in the population of groupers and other important species. However, the usefulness of sanctuaries did not go unnoticed in three neighboring municipalities, which established reserves actively controlled by local residents (Maclean 1986; see also Flores and Silvestre pp. 481-493, this volume).

Few efforts of this type have been attempted in the fisheries sector of Southeast Asia, but a successful model (the "learning process" approach) for agency/community collaboration has been found effective in mobilizing public involvement in managing and allocating irrigation water, a scarce resource (Bagadion and F. Korten 1986; D. Korten 1980; F. Korten 1982).

## 5. Conclusion

The fundamental goal of fisheries policy is to ensure resource sustainability, but to reach this goal decision-makers in Southeast Asia must concern themselves with more than trying to control levels of fishing effort. The real problems of fisheries management are inherently political and entail issues of resource allocation and distributional equity.

Fisheries development efforts make little sense unless they are socially beneficial and are designed to be sustainable over time. Resource scarcity and the social disruption caused by rapid technological innovation in the fisheries sector within most Southeast Asian nations make it necessary to integrate and balance fisheries development programs with management policies that address fundamental issues of resource sustainability and allocation between competing users.

Excessive fishing effort doubtless has social costs which are to be avoided. In broad terms, these include threats to the sustainability of harvests, the dissipation of resource rents, and reduced incomes and standards of living among the majority of those employed within this sector. Nonetheless, we must recognize that the fisheries sector does not exist in isolation from the rest of society. Many fisheries management problems reflect broader problems of resource availability and unemployment within Southeast Asian societies and are only soluble within this larger context.

## 6. References

- AMINAN and A. WIDJAYANTI. Peranan wanita dalam kehidupan sosial ekonomi masyarakat nelayan di daerah 1980. nelagan Muncar, Banyuwangi-Jawa Timur [ The Role of women in socioeconomic life in the fishing society of Muncar, Banyuwangi-East Java ]. Jember: Universitas Negeri Jember, 156 pp.
- ASIAN DEVELOPMENT BANK, Bank operations in the fisheries sector. Bank Staff Working Paper. Manila : 1980 Asian Development Bank.

- AZHAR, T., Some preliminary notes on the by-catch of prawn trawlers off the west coast of Peninsular 1980 Malaysia. pp. 64-69. Report of the Workshop on the Biology and Resources of Penaeid Shrimps in the South China Sea Area-Part 1. SCS/GEN/80/26. Manila: South China Sea Fisheries Development and Coordinating Programme.
- BAGADION, B.U. and F.F. KORTEN, Developing irrigators' organizations: a learning process approach. pp. 1986 52-90, In: M.M. CERNEA (ed.), Putting People First; Sociological Variables in Rural Development. New York: Oxford University Press. Published for the World Bank.
- BAILEY, C., Small-Scale Fisheries of San Miguel Bay, Philippines: Occupational and Geographic Mobility. 1982 ICLARM Technical Reports No. 10. Manila: International Center for Living Aquatic Resources Management, Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University, 56 pp.
- BAILEY, C., The Sociology of Production in Rural Malay Society. New York and Kuala Lumpur: Oxford 1983 University Press, 226 pp.
- BAILEY, C., Managing an open access resource: the case of coastal fisheries. pp. 97-103, In: D.C. KORTEN 1984 and R. KLAUSS (eds.), People-Centered Development: Contributions Toward Theory and Planning Frameworks. West Hartford, Conn.: Kumarian Press.
- BAILEY, C., The blue revolution: the impact of technological innovation on Third World fisheries. *The Rural 1985 Sociologist* 5(4):259-66.
- BAILEY, C., Government protection of traditional resource use rights: the case of Indonesian fisheries. pp. 1987 292-308. In: C.C. KORTEN (ed.), Community Management: Asian Experience and Perspectives. Hartford, Conn.: Kumarian Press.
- BAILEY, C., *In press*. Socioeconomic factors affecting small-scale fisheries development. In: C. Bailey, A. Dwiponggo, and F. Marahudin, Indonesian Marine Capture Fisheries. ICLARM Studies and Reviews. Jakarta and Manila: Directorate General of Fisheries, and the Marine Fisheries Research Institute, Department of Agriculture; and the International Center for Living Aquatic Resources Management.
- BAILEY, C., D., CYCON, and M. MORRIS, Fisheries development in the Third World: the role of international 1986 agencies. *World Development* 14(10), pp. 1269-1275.
- CIRICAY-WANTRUP S.V. and R.C. BISHOP. "Common property" as a concept in natural resources policy. 1975 *Natural Resources Journal* 15:713-727.
- COLLIER, W.L., H. HADIKOESWORO, and M. MALINGREAU, Economic development and shared poverty 1979 among Javanese sea fishermen. pp. 218-236, In: A. LIBRERO and W.L. COLLIER (eds.), Economics of aquaculture, sea-fishing and coastal resource use in Asia. Los Banos, Philippines: Agricultural Development Council and the Philippine Council for Agriculture and Resources Research.
- DARUS, B., Pengaruh penghapusan trawl di Sumatera Utara [ Effect of the trawl ban in North Sumatra ] 1983 pp. 231-240, In: Prosiding Workshop Social Ekonomi Perikanan Indonesia, Cisarua, 2-4 November 1982. Jakarta: Center for Fisheries Research and Development, Department of Agriculture.
- DIRECTORATE GENERAL of FISHERIES. Fisheries Statistics of Indonesia, 1980. Jakarta: Directorate 1982 General of Fisheries, Department of Agriculture.
- DIRECTORATE GENERAL of FISHERIES. Fisheries Statistics of Indonesia, 1982. Jakarta: Directorate 1984 General of Fisheries, Department of Agriculture.
- DWIPOONGGO, A., *In press*. Indonesia's marine fisheries resources. In: C. BAILEY, A. DWIPONGGO, and F. MARAHUDIN, Indonesian Marine Capture Fisheries. ICLARM Studies and Reviews. Jakarta and Manila: Directorate General of Fisheries and the Marine Fisheries Research Institute, Department of Agriculture; and the International Center for Living Aquatic Resources Management.

- FOOD and AGRICULTURE ORGANIZATION (FAO). A survey of external assistance to the fisheries sector in developing countries, 1979-1983. Prepared by Helga Jösueit. FAO Fisheries Circular No. 755, Revision 1. Rome: FAO, 53 pp.
- FIRTH, R., Malay Fishermen; Their Peasant Economy. Hamden, Conn.: Archon Press, 398 pp. 1966
- FLORES, E. and G. SILVESTRE pp. 481-493 , this volume. "Community based coral reef fishery resource management in the Philippines: the Balicasag Island experience. IPFC/87/Symp./V/Inf. 12.
- GIBBONS, D.S., Public policy towards fisheries development in Peninsular Malaysia. *Kajian Ekonomi Malaysia* 1976 XIII (1-2):89-121.
- GLANTZ, M.H. and J.D. THOMPSON (eds.). Resources Management and Environmental Uncertainty -- Lessons from Coastal Upwelling Fisheries. New York: J. Wiley and Sons, 491 pp. 1981
- HADIKOESWORO, H., Exploitation of the estuaries in the Kendal area (north coast of Java) by artisanal fishermen. *Marine Research in Indonesia* 19:95-100. 1977
- HARDIN, G. The tragedy of the commons. *Science* 162:1243-48. 1968
- JOENOES, G.R., T.D. WIRUTALLINGGA, B. HENDRARTO and T. SUSILAWATI, Pengaruh pengurangan jumlah kapal trawl (pukat harimau) terhadap kehidupan nelayan dan produksi ikan di daerah Kabupaten Cilacap[ Effect of reduced numbers of trawlers (tiger nets) on fishermens' livelihood and fisheries production in the area of Cilacap Regency ] . Semarang, Central Java: Marine Fisheries Research Institute and Universitas Diponegoro, 75 pp. 1979
- KORTEN, D.K., Community organization and rural development: a learning process approach. *Public Administration Review* 40:480-511. 1980
- KORTEN, F.F., Building national capacity to develop water users' associations: experience from the Philippines. 1982 World Bank Staff Working Paper no. 528. Washington, D.C.: World Bank, 69 pp.
- MACLEAN, J. End of a marine reserve: Sumilon revisited. NAGA, The ICLARM Quarterly 9(1):13. 1986
- MUBYARTO, L., SOETRISNO, and M. DOVE. Nelayan dan Kemiskinan; Studi Ekonomi Antropologi di Dua Desa Pantai [ Fishermen and Poverty; an Economic Anthropological Study of Two Coastal Communities ] . Jakarta: CV. Rajawali, 195 pp. 1984
- NAAMIN, N. Masalah-masalah yang dihadapi dalam pelaksanaan KEPES 39/1980 tentang penghapusan penggunaan jaring trawl [ Problems faced in implementing presidential Decree 39/1980 regarding elimination of trawl gear ] . pp. 209-230, In: Prosiding Workshop Social Ekonomi Perikanan Indonesia, Cisarua, 2-4 November 1982. Jakarta: Center for Fisheries Research and Development, Department of Agriculture. 1983
- PANAYOTOU, T., Economic conditions and prospects of small-scale fishermen in Thailand. *Marine Policy* 1980 4(2):142-146.
- PAULY, D., Theory and management of tropical multispecies stocks: a review, with emphasis on the Southeast Asian fisheries. ICLARM Studies and Reviews 1. Manila: International Center for Living Aquatic Resources Management, 35 pp. 1979
- PAULY, D. History and status of the San Miguel Bay fisheries. pp. 95-124, In: D. Pauly and A.N. Mines (eds.), Small-scale fisheries of San Miguel Bay, Philippines: biology and stock assessment. ICLARM Technical Reports No. 7. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. 1982
- SARDJONO, I., Trawlers banned in Indonesia. *ICLARM Newsletter* 3(4) : 3. 1980

- SFIER-YOUNIS, A. and G. DONALDSON, Fishery sector policy paper. Washington, D.C.: World Bank, 1982 79 pp.
- SMITH, I.R., A research framework for traditional fisheries. ICLARM Studies and Reviews No., 2. Manila: 1979 International Center for Living Aquatic Resources Management, 40 pp.
- SMITH, I.R. and A.N. MINES, Implications for equity and management. pp. 130-143, In: I.R. Smith 1982 and A.N. Mines (eds.), Small-scale fisheries of San Miguel Bay, Philippines: economics of production and marketing. ICLARM Technical Reports No. 8. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University.
- UNAR, M., Review of the Indonesian shrimp fishery and its present development. *Laporan Penelitian Perikanan Laut* 1:1-26. 1972
- VILLAFUERTE, E.D. and C. BAILEY. Systems of sharing and patterns of ownership. pp. 25-41, In: C. Bailey (ed.), Small-Scale Fisheries of SanMiguel Bay, Philippines: Social Aspects of Production and Marketing. ICLARM Technical Reports No. 9. Manila: International Center for Living Aquatic Resources Management; Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas; and the United Nations University. 1982
- WHITE, A., Effects of protective management on coral reefs in the Philippines. *ICLARM Newsletter* 1984 7(4):9-11.