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**RESOURCE DEPENDENCY AND COMMUNITY STABILITY IN  
COASTAL FISHING COMMUNITIES OF SOUTHEAST ASIA**

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# RESOURCE DEPENDENCY AND COMMUNITY STABILITY IN COASTAL FISHING COMMUNITIES OF SOUTHEAST ASIA

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## Introduction

The term 'resource dependency' has come into common usage to denote conditions under which particular communities or regions are heavily reliant on one type of economic activity (e.g., farming, mining, fishing, or logging). Interest in resource dependent communities is a well established tradition among social scientists. Particular attention has been paid to the connection between community stability and the status of natural resource systems in North America (e.g., Field and Burch 1991; Flora et al. 1992; Lee, Field and Burch 1990; O'Leary and Lee 1982; Weber and Howell 1982). In the U.S., for example, social and economic problems associated with timber dependency recently have been accorded nationwide attention due to structural changes affecting forest-based industries of the Pacific Northwest. These changes underscore what social scientists long have known: dependency creates vulnerability, especially in the context of physical isolation and the absence of alternative employment prospects that characterize many if not most timber dependent communities.

The argument advanced in this paper is that similar analyses of problems associated with resource dependency can and should be applied to coastal fishing communities of the Third World. Examining these communities in the context of resource dependency draws our attention to the connection between sustainable resource use and community stability. However, because conditions are different, we should expect that the dynamics between resource base and conditions in human communities also will differ. One purpose of this paper is to expand application of resource dependency as a conceptual framework beyond the limited geographical bounds of the current literature. By so doing we hope not only to shed new light on the concept but also to better illuminate the human dimensions of small-scale fisheries in Southeast Asia.

In this paper, we briefly outline current conditions regarding technologies, resources and development policies affecting coastal fisheries in Southeast Asia. We then address factors that have caused continued rapid growth in numbers of small-scale fishers in the region. This is followed by a discussion of occupational diversity within the households and communities of coastal Southeast Asia.

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## Contemporary Conditions

The nations of Southeast Asia probably have the strongest maritime traditions and the greatest reliance upon marine fisheries of any region within the Third World (Emmerson 1980a). For centuries the region has served as an important cross-roads of material and intellectual commerce (Hall 1970, Reid 1988). Indonesia and the Philippines, two large archipelagic nations, have combined populations of approximately 250 million and a total coastline of over 100,000 km. Millions of people in Southeast Asia are employed directly in marine capture fisheries, and additional millions find employment in such support services as boat building, fish processing, marketing and distribution, and input supply. Current employment figures are not available, but by the end of the 1970s Smith (1979:8) estimated that there were over 3.5 million small-scale fishers operating in Southeast Asia. In Indonesia, one of the few countries in the region which reports numbers of fishers, has experienced a 77% increase in numbers of fishers between 1979 and 1989. Most countries in the region will probably did not experience such a high rate of increase, but it is likely that by the early 1990s there were 5 million fishers trying to make a living from Southeast Asia's sea. The vast majority of those who are directly involved in fishing are residents of small communities scattered along the coastlines of the region. Marine fisheries in the region provide the majority of all animal protein for domestic consumers within most nations of Southeast Asia (Kent 1987). Marine fisheries, and in recent years coastal aquaculture of shrimp, are beginning to play an increasing role in exports to Japan, Europe and North America (Bailey 1988; Floyd 1985).

The marine fisheries of Southeast Asia are best described as multi-species and multi-gear. Most fishers in the region utilize simple small-scale technologies of limited productivity. In Indonesia, for example, more than half of the fishing fleet is non-motorized, and the most common type of gear in use is the simple handline (DGF 1990). Other small-scale fishers use motorized boats and employ various gill nets, seines or traps. Each country in the region uses different criteria for distinguishing between small-scale and other fisheries. As a general statement for the region as a whole, small-scale operators account for well over two-thirds of all fishers and account for more than half of total marine landings.

### Poorest of the poor?

Fishers and their families in Southeast Asia are widely regarded to be among the poorest of the poor. Short-term visitors to coastal fishing communities are likely to be struck by the ramshackle appearance of most homes and the common absence of basic social services in many isolated villages. Such visitors may listen to stock assessment experts who tell them that the resource base is limited and in many cases already overexploited. They will learn that each year more people put to sea with more boats and more gear, dividing the available harvest into ever smaller portions. Given strong visual evidence of poverty and realizing that declining productivity per unit effort offers little hope for reversing this condition, it is not surprising that many observers consider the plight of the fisher to be desperate.

There is substantial evidence to support these initial observations, but in this paper we argue that this view is inaccurate. Let us first examine the evidence in support of the proposition that fishers are the poorest of the poor.

In many parts of Southeast Asia, fish stocks are under heavy pressure (Marr 1976,1982; Pauly 1979). Many of the region's most important fishing grounds (e.g., the Gulf of Thailand) have been depleted due in large part to the introduction of new fishing technologies, notably the trawl (Boonynbol and Pramokchutima 1984). Over the past three decades, landings have increased ten-fold in the region due to the introduction of new technologies and the increasing demand of both domestic consumers and international markets. This growth in fishing effort applied to a finite resource has led to competition and conflict. Competition between trawlers and small-scale gear in Southeast Asia has been well-documented. In Indonesia, intense conflict between trawler operators and small-scale fishers led to widespread violence and the 1980 ban on trawlers (Bailey 1988). In San Miguel Bay, Philippines, similar violence has broken out during the last several years over the operation of trawlers in conflict with small-scale gear (W. Sunderlin, ICLARM, pers. com., August 1993). Conflict between trawlers and small-scale gear have been noted elsewhere in Southeast Asia as well (e.g., Marr 1982; Panayotou 1982; Smith 1979). Similar problems exist where purse seiners or other relatively powerful gear compete with small-scale operators for a finite resource.

Governments in the region, supported by international development agencies, have made substantial efforts to improve the lives of small-scale fishers through programs designed to improve productivity, marketing and distribution. Credit programs have been established to motorize and improve vessel seaworthiness so that, equipped with appropriate gear, they can operate further offshore and thus utilize stocks that are less heavily exploited than those found in inshore waters where most fishing effort currently is concentrated. In practice, such programs of technological innovation have not had the hoped for effect for two related reasons. First, tropical fisheries resources tend to be concentrated in coastal areas due to higher primary productivity in these nutrient rich waters. Although fishing pressure in offshore waters is less intense, the stocks are smaller and more widely scattered. As a consequence, those fishers who are able to invest in more powerful fishing technologies, or who are the beneficiaries of government loan programs, often find it advantageous to continue operating in coastal waters where their new technologies give them an important advantage over small-scale fishers using less effective gear.

Small-scale fishers also have contributed significantly to increasing pressure on fish stocks. In most countries of the region, the ranks of small-scale fishers continue to grow as does the size of the fishing fleet. Faced with dwindling stocks, many small-scale fishers have begun using increasingly fine meshed nets, putting further pressure on the resource (Pauly 1979). Elsewhere fishers have used poisons and explosives in coral reef fisheries. In many parts of the region, the capacity of marine stocks to sustain this increased pressure has been undermined by destruction and pollution of key coastal habitats which serve as nursery grounds for commercially important species. Chemical pollution from urban, industrial and agricultural sources and sedimentation due to erosion along watersheds have reduced the productivity of

estuaries, seagrass beds and coral reefs. Mangrove forests have been cleared and converted into shrimp ponds. Offshore oil exploration and pollution from shipping that passes through the region also affect marine stocks and their ability to sustain high rates of fishing mortality.

Despite these problems, the ranks of small-scale fishers in Southeast Asia continue to grow. The academic literature on resource dependent communities would lead one to expect a decline in numbers of fishers as stocks declined and as capital replaced labor in the fishing effort equation. Certainly we would expect this to be the case if indeed fishers were the 'poorest of the poor.' Such does not appear to have been the case, however, and in the following section we will attempt to explain why.

### Push and Pull Factors

Populations of fishing communities and numbers of fishers generally have increased at a pace greater than the rate of natural population increase, suggesting an overall pattern of immigration and recruitment from other sectors of the economy. In Indonesia, for example, numbers of fishers have increased 2.6 times more rapidly than did the national rate of population growth during the 1980s (Table). Logic suggests that that this movement of population reflects the existence of relatively worse conditions in other sectors. Few studies have been conducted on this matter, but those which are available suggest that new migrants to fishing communities often come from the ranks of landless agricultural laborers (Bailey 1982, Mubyarto et al. 1984). Technological changes associated with the Green Revolution have tended to reduce the demand for labor among the landless, who face a limited set of options (Hart et al. 1989). One option is to migrate to the capital city or other urban growth center and enter the ranks of unskilled laborers, clearly a direction chosen by large numbers of people (Pryor 1979). A second option is to move into the hills and forests, an option often involving shifting cultivation in marginal lands. A third option is to move to the coast and cast one's lot with fishers of the sea.

The sea offers many attractions compared to the other two options. With few exceptions, fishing grounds in Southeast Asia are open access resources with few if any restrictions on entry for able-bodied men.<sup>2</sup> Typically a new recruit will work as a crewmember, learning his new craft. At some point, he may decide to invest in a small boat and become an independent fisher. There generally is an active trade in used boats and gear, making such investments affordable (Bailey 1983). Similarly, there often are fish buyers willing to loan money to a fisher willing to sell the catch to them on an exclusive basis (Emmerson 1980b).

Material conditions in coastal fishing communities often compare unfavorably with those found in agricultural communities. One explanation for this is that fishing households are more

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<sup>2</sup> Women rarely fish from boats, though they are active in gleaning in the intertidal zone, and often dominate fish processing, marketing and distribution in coastal fishing communities. We will return to these points in the next section.

likely to invest available cash resources into maintaining and improving boats, engines and nets, which are constantly in need of repair. Unlike agricultural land, fishing assets depreciate in value; boats, engines and nets wear out and have to be replaced. Even when there are no such immediate demands, a fishing household may decide to purchase another section of net rather than improve their living quarters, choosing to invest in a productive asset rather than consume available cash in that manner.

Increasing pressure on the resource base will reduce the productivity of individual fishers, but the multispecies nature of most Southeast Asian fisheries means that the threat of collapse is small. Tropical multispecies fisheries are fundamentally different from single species temperate water fisheries in this regard. Increasing fishing pressure in a multispecies fishery will lead to shifts in species composition favoring smaller more short-lived species. Larger and more highly valued species generally give way to less valuable species and an increased proportion of the catch classified as "trash fish" destined for use as animal feed. In volume terms, harvests may not decline in spite of the application of surplus fishing effort. The economic value of the harvest may decline or not, depending on market demand. The point here is not to promote exploitation of a fishery beyond its maximum sustainable yield. If we are going to explain the continued migration into coastal fisheries despite the existence of what experts would regard as overfishing, however, this basic resilience of tropical multispecies fisheries is a factor that needs to be understood.

None of this is meant to suggest that the life of a fisher is easy. The work is hard and sometimes dangerous; rewards often are uncertain and generally are small. But, compared to the life of a landless agricultural laborer, who has no reasonable expectation of ever being able to afford the purchase price of a plot of land, and whose labor is in decreasing demand, the prospects of a fisher may appear reasonably bright. The new recruit to a coastal fishery initially may be no better off than he was as an agricultural laborer, but his prospects for upward mobility are considerably greater. The same can be said for other members of the household as well, as will become clear in the following section.

### Occupational Diversity

The tropical coastal zone is one of the world's most productive and diverse ecosystems. Mangrove forests, seagrass beds, coral reefs and estuaries all contain enormous biological diversity (Macintosh 1982; Turner 1985; White 1987). These systems provide employment for men, women and children. In addition to fishing, men may engage in charcoal production, the cutting of wood for lumber or firewood, the collection of material for making thatch roofs or subsistence-oriented hunting and trapping (Bailey 1983). Indeed, it probably is fair to say that many if not most fishers also are employed in other activities. Statistics on this phenomenon are not available on a regional basis, but in Indonesia roughly half of all fishers are reported to be employed on a part-time basis in other activities. Primary data from field research in Malaysia and the Philippines suggests similar patterns of occupational diversity (Bailey 1982, 1983).

Fishing itself is a diverse occupation. Most fisheries of Southeast Asia are both multispecies and multigear in nature. Many species also have a distinct seasonal characteristic. The seasonal availability of one species gives way to that of another, either in one locale or another. Like their prey, fishers are mobile and often follow stocks over great distances (Spoehr 1980). In other cases, fishers switch gears on a seasonal basis, harvesting various pelagic or demersal species depending on their availability. This variability in species, gear and season is a key factor in understanding fishing as an occupation that sustains households and communities. Fishers exploit not only local ecosystems but also more distant ones, and only rarely rely on one gear or species.

There are exceptions to this flexible adaptation to variable resource availability. Trawlers, purse-seiners, and long-liners targeting large tuna are specialized craft, though they may harvest multiple species. Even more specialized are boats used for harvesting skipjack tuna using pole-and-line techniques. Fishers who operate non-motorized boats in coral reefs and estuaries are not likely to be as geographically mobile as those whose boats are motorized, but they are likely to exploit a broad mix of species in these highly productive areas.

Diversity also characterizes the economic opportunities available to other members of fishing communities. Women may be involved in collecting a wide range of material from tidal flats, mangrove forests or coral reefs for household consumption or for sale. Local materials including grasses and sedges may be harvested and manufactured into mats, baskets and other woven household articles. The most common occupations for women in fishing communities, however, have to do with processing, marketing and distribution of fish (Gulati 1984; Illo and Polo 1990; Szanton 1972; Upton and Susilowati 1992). Children often are close at hand and actively involved in many of these activities (Yater 1982). Involvement of household members in these activities serves to keep a substantial portion of the value added from these activities within the community if not the household of the fisher.

The net result of these diverse employment opportunities is that fishing communities are best understood as dependent not on a single resource but on a whole ecosystem. This expanded resource base is the key to stability for households and communities in Southeast Asia's coastal zone. Multiple resource bases and with differing seasonal availabilities provides a hedge against misfortune or unexpectedly low productivity in any one activity. The resulting stability in household income (both in case and kind) makes life in a fishing community relatively attractive for landless agricultural laborers whose employment prospects are more seasonal in nature, with periods of intense activity followed by long periods of underemployment.

#### Resource Dependency and Attraction of the Sea

Fishing communities in Southeast Asia are resource dependent but for the most part are not vulnerable to the kinds of threats to community stability often associated with that concept. Tropical fisheries resources are highly resilient to increasing fishing pressure. The multispecies and multigear nature of most Southeast Asian fisheries give these communities a diverse rather

than a specialized resource base. Individual communities may be vulnerable to threats posed by toxic contamination that would affect the productivity of local ecosystems, but the majority of coastal fishing communities are not.

Diversity in household income sources means that coastal communities of Southeast Asia themselves tend to have broad based economies which offer a range of employment opportunities to men, women and children. Household economies in most coastal fishing communities in Southeast Asia have based on a wide range of income sources that are widely distributed both temporally and spatially. Rather than being specialized and therefore vulnerable to a sudden change, fishing households are well situated to adapt to changing circumstances.

This is not to suggest that fishing community residents have open ended opportunities to improve their material standards of living or have higher incomes on average than residents of farming communities. The argument made here is life in a fishing community may be relatively attractive for rural landless agricultural laborers, of whom there are many millions in Southeast Asia. For this social strata, opportunities for upward mobility are relatively open and relatively few restrictions to access exist.

The concept of resource dependency often is employed in relation to communities which are engaged in production of commodities for a global market, such as timber or coal. Economic conditions in these communities are strongly influenced by world market prices for these commodities, that is to say on forces far beyond the control of local residents and producers. To some extent, the same can be said of communities that are dependent on the production of agricultural commodities. World prices for grains vary from year to year based on supply and demand factors beyond the ability of individual farmers or farm communities to control. The introduction of new agricultural technologies has greatly increased production for key grains as well as for poultry and other livestock, and further gains can be achieved if demand is sufficiently strong to justify the use of inputs that will give higher yields. Increasing productivity in agriculture does not necessarily lead to higher incomes for producers, and the opposite may be the case for the majority of producers.

The situation in fisheries, however, is somewhat different. In the case of marine fisheries, there is little that can be done to expand production. Increasing production from aquaculture will have some effect on meeting growing demand, but much of the production at this point is oriented toward particular market segments (e.g., shrimp for international trade, high-valued fish for wealthy domestic consumers). There is little immediate prospect that the supply-demand equation in marine fisheries will go through the kinds of gyrations that affect other resource dependent communities.<sup>3</sup>

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<sup>3</sup> Communities made of up rubber and oil palm producers are good examples of resource dependent communities in Southeast Asia due to the influence of global economic forces on their local economies.



## Implications for Theory and Policy

Resource dependency takes many forms. Under some conditions, the economic base of a community is linked to global commodity markets that determine income and employment opportunities for local residents. Particularly if such communities are physically isolated and lack access to alternative opportunities, the absence of a diversified economic base can lead to social and demographic instability. The general case of Southeast Asian fishing communities presented here suggests that this need not be the fate of even isolated resource dependent communities. A key distinguishing characteristic that differentiates the such communities from most resource dependent communities in North America is their relative insulation from global market forces. A second key characteristic is the diversity of economic opportunities present in the highly productive coastal zone of tropical Southeast Asia. Most fishing communities in Southeast Asia retain some element of insularity with regard to national and international markets, in part because their products are oriented towards local and regional markets, and in part because of their occupational diversity.

Fisheries development policy in the region has been oriented against these characteristics, which provide a basic stability to the residents of coastal fishing communities. Development programs that promote investment in more capital intensive fishing technologies introduce new vulnerabilities to fluctuating fuel prices, suppliers of spare parts. To pay for these new technologies, it becomes increasingly important to become involved in more lucrative markets, preferably for high-value species like tuna and shrimp. These international markets are fickle and introduce new vulnerabilities into the life of a fishing community.<sup>4</sup> To do so may indeed be in the best interests of some members of a community, or even for the community as a whole, but this will not always be the case. The introduction of more productive fishing technologies may put increasing pressure on the resource both because of greater fishing power of the new technology and because the owner will have to obtain sufficient return on the investment to pay for it. If the new technology gives the owner a competitive edge over other fishers in the area, they are likely to suffer the consequences of a declining resource base. Because the owner will have sunk substantial capital into the new fishing unit, the owner may have to sell farm land or other assets which may then resulting in greater specialization and reliance on fishing for income.

An irony of fisheries development in Southeast Asia is that governments are actively exploring limited entry policy options at the same time as they are promoting technological innovations that will increase resource dependence. The diversity of economic activities found

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<sup>4</sup> Tuna prices have dropped in the last several years due to consumer concern over dolphin kills associated with the operation of purse-seines. Shrimp prices have reached a plateau and are unlikely to continue their upward trend due to increasing supply from pond producers; indeed, prices may decline.

in many Southeast Asian coastal fishing communities provides a significant degree of economic and social stability. Many current development programs threaten this stability by promoting increased specialization and vulnerability to both resource and market fluctuations.

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