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Introduction

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In this volume we examine changes in marine resource use by coastal inhabitants in Southeast Asia and the southwestern Pacific. We provide fundamental and comparative information that is needed for development programs and for understanding contemporary ecology and culture of people who live by fishing [AKIMICHI 1995b].

Coastal inhabitants in Southeast Asia and the southwestern Pacific have faced many difficulties in coping with rapidly changing environmental hazards and socio-economic collapse [SOYSA *et al.* 1982]. In particular, where small-scale fisheries are practiced, grave changes are occurring as a result of the infiltration of the cash economy [AKIMICHI 1992], the offshore activities of foreign fishing vessels [PEARSON 1977], and the abrupt emergence of middlemen in the village economy, and tourism [BAINES 1980]. The inhabitants of coastal areas have suffered from inequity and poverty more than those living in urban or rural areas.

To overcome crises and inequalities, several procedures have been implemented by the national and international polity-makers. Unfortunately, despite good intentions made so far, some of these activities and programs have been problematic. One reason for this is a general ignorance of community-based practices in marine resource use.

Village fisheries and local fishermen have been a relatively minor field of study for fisheries economists and policy-makers. However, during the last decade anthropologists have been more aware of the need to understand small-scale fishermen's views, activities and ideologies. Several important points have arisen from studies on women's roles in fisheries development [PADMA and SLATTER 1982], informal resource management measures by local fishermen [AKIMICHI 1984], the diversity of sea tenure rules of local fishermen [JOHANNES 1978; RUDDLE and AKIMICHI 1984; RUDDLE and JOHANNES 1985; CORDELL 1989; RUDDLE and AKIMICHI 1989, NIETSCHMANN 1989], ownership of fishing grounds as clan property [CARRIER 1980] and as sacred places and for ancestor worship [DAVIS 1984], and the changing perception of local fishermen towards exclusive rights, due to the rising demand for certain kinds of resources [BAINES 1985].

Economists and pragmatists may find it hard to see the significance of conserving good fishing grounds for the descendents of a small group. It may seem troublesome to examine informal and puzzling agreements on sea tenure and their transformation through time [CARRIER and CARRIER 1985]. Nevertheless,

these cultural realities are important for policy-makers and consultants working in the field of resource management and conservation.

In brief, without understanding customary practices, cognition and ethics regarding nature and natural resources, development programs are likely to be inappropriate or unworkable.

Aligning sustainable resource management with development goals has become crucial for policy-makers and local inhabitants [BAILEY and ZERNER 1992; RUDDLE 1994]. Countries seeking development have witnessed the importance of this alignment. However, the problems and solutions are not always the same in different countries. For instance, Indonesia [POLUNIN 1985; BAILEY *et al.* 1987; POLLNAC *et al.* 1992], Malaysia [FURTADO *et al.* 1982], Papua New Guinea [MORAUTA *et al.* 1982] and the Solomon Islands [BAINES 1985] have both particular and common problems. Furthermore, even within the country there are regional and cultural diversities of marine resource use.

Territorial behaviors of small-scale fishermen, and the associated formal and informal institutions [ACHESON 1975; CHRISTY 1982; AKIMICHI 1984] have been studied in relation to the use of common-pool and/or privatized resources [McCAY and ACHESON 1987; OSTROM 1990]. Conflicts over the use of common-pool resources, or those that are claimed as "owned" by particular group [CARRIER 1987], are widespread and incessant in the world today. It is not easy to resolve conflicts in which ecological, socio-economic, and ethnic factors are involved [MATSUDA and KANEDA 1984; JOMO 1991; REID 1992; FOX 1992].

Indigenous resource management measures are known in many communities in the Asia-Pacific region [JOHANNES 1978; RUDDLE and AKIMICHI 1984; RUDDLE and JOHANNES 1985; AKIMICHI 1986]. It remains a question whether or not measures derived from one society can be applied to another. Where community-based practices are prevalent, local government and local courts can be effective in resource management and conflict avoidance [AKIMICHI 1995a].

Most small-scale fisheries are community-based and often represent a proportion of the national fisheries sector in terms of fishermen's populations and number of fishing vessels of less than 5 gross tons. Also, there is a marked diversity of fishing method and species exploited. This is certainly true for tropical fisheries in Southeast Asia and the southwestern Pacific.

Other merits of studying village fisheries are related to the application of indigenous knowledge and practices within modern resource management programs [JOHANNES 1982; MORAUTA *et al.* 1982].

For marine biologists working for academic and applied purposes, information about the ecology and behavior of marine species is vital. Such knowledge often overlaps the lores held by local fishermen.

Although social scientists are unfamiliar with marine biology, biological data collection can be useful for resource management. This *etic* approach has been challenged by ethnobiological research [CONKLIN 1954; BULMER 1967, ANDERSON

1972; HUNN 1977, AKIMICHI 1978]. In this research, biological and cultural/linguistic information are both elicited from the people's knowledge system and activities [AKIMICHI 1990]. This *emic* approach should be integrated with *etic* approach into a holistic study of resource management.

Coastal inhabitants in Southeast Asia and the southwestern Pacific have exploited aquatic life both for subsistence and commercial purposes over hundreds of years. The fishing techniques used have allowed the harvest of a variety of marine and freshwater life and have permitted survival of the coastal people in diverse marine environments [ANELL 1955; REINMAN 1967, SUBANI and BARUS 1988/89].

These include many cartilaginous and bony fish species, common in tropical waters of the Indo-Pacific [CARNSONSON 1977; MASUDA *et al.* 1980] and some 105 families of freshwater fish in Southeast Asia, and 310 species in the case of the Kapuas river of Kalimantan [KOTTELAT *et al.* 1993] and 330 species in New Guinea Island [MUNRO 1967; ALLEN 1991]. For the gastropods and bivalves, it is known that there are some 1500 and 1000 species. Other than these, crustaceans and echinoderms such as sea-urchin and sea-cucumber are known as abundant in terms of species diversity. Five species of sea turtles are recorded from the area [SOEGLARTO and POLUNIN 1982]. Such marine mammals as dolphins, whales and dugongs are also found extensively in these warm waters.

Marine organisms have provided food, materials for tools and utensils, weapons, ornaments, money, medicine, and toys. The use of marine resources has become vitally important as a source of income for small-scale fishermen. The economic value of particular marine resources has spread quickly without prior arrangements, but often results from ideas brought in from the outside world directly to the community. It has brought about changes of the villagers' daily activity patterns (Suda, in this volume) and has led territorial conflict over the use of economically important resources [BAINES 1985]. Eventually, the process may often lead to resource depletion.

For instance, marine resources such as sea-cucumber, shark fin and trochus shell have been exploited extensively in tropical waters for export to China. Even the jellyfish, sea-horse (*Hippocampus*), pipefish (Syngnathidae) are eagerly sought for by local fishermen to obtain small amounts of money. These petty commodities [McCAY 1981] are used mainly as foodstuff in the Chinese cuisine. Sometimes, these are also regarded as medicine for health, nourishment, vitality, longevity, and even as an aphrodisiacs.

Shellfish are used for either food and medicine as in the case of the giant clam (Tridacnidae spp.), or ornaments (*Trochus*, *Turbo*, *Pinctada*, *Spondylus*, *Chama*). Shells are also valued as traditional money and ornamental materials in many societies particularly in the Pacific [QUIGGIN 1979].

During recent decades, live grouper (Epinephelidae) and Maori wrasse (*Cheilinus undulatus*) have been exported to Singapore and Hong Kong by Chinese cargo ship. As these reef-dwelling fish are captured by line or trapping in

Indonesian waters, they are nursed for a while in a fish-pen and then collected by a mother-ship for export [AKIMICHI 1995b]. The business started during the 1970s and it is now expanding, despite a ban on the export of Maori wrasse by the Indonesian government. Sessile animals such as giant clams, green snails, and trochus are now being depleted due to overfishing [MUNRO 1993; NASH 1993; YAMAGUCHI 1993].

Thus, use of marine resource and the associated socio-economic relations does not reflect of an *a priori* coastal environments between man and the environments, but suggests a need for the study of the changes over time.

In this book, coastal foragers are defined rather loosely as those who live by exploiting marine and brackish water resources. Exceptionally, the Orang Asli in Peninsular Malaysia are also included although these people forage freshwater resources (see Kuchikura, in this volume). As Kuchikura states in his paper, even the contemporary hunter-gatherers in the Malay Peninsula have survived by producing commercial goods while the Orang Laut who inhabit the river mouth of Johor River [SOPHER 1977] have depended on commercial sales of fish to Singapore [GOTO 1994 per. com.].

Henceforth, coastal foragers in this volume include not only hunter-gatherers in Malay Peninsula (see Kuchikura) but also the sea-oriented Bajo fishermen in eastern Indonesia (see Akimichi and Supriadi), subsistence-oriented farmer-fishermen of the Sangihe Islands of eastern Indonesia (see Mantjoro and Akimichi), the Kiwai Papuans as sago-eater and sea-mammal hunters in the Western Province of Papua New Guinea (see Tawa, and Suda), expert fishermen living on artificial islets in Malaita Island of the Solomon islands [AKIMICHI 1978] (see Takekawa, and Goto), Chinese commercial fishermen in the Malacca Strait region (see Tawa) and the Malay commercial fishermen in the Johor River (see Goto).

Major aquatic resources discussed in these reports include benthic animals (sea-cucumber, trochus, Tridacna, mother-of-pearl shell), crustaceans (lobster, prawn, and crab) fin-fish (freshwater catfish, mackerel scad, fusilier, grouper, sharks, and pomfret), reptiles (freshwater and marine turtle), and sea-mammals (dolphin and dugong).

The volume covers a diverse range of fishing communities. The problems encountered by these respective populations provide insights into the use of marine resources in the rapidly changing socio-economic environments of Southeast Asia and the southwestern Pacific.

In this book, papers are arranged geographically, in the following order; Solomon Islands (A. Goto and D. Takekawa), Papua New Guinea (M. Tawa and K. Suda), Indonesia (T. Akimichi, D. A. Supriadi and E. Mantjoro), and Malaysia (Y. Kuchikura, A. Goto and M. Tawa).

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