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FISHERIES CO-MANAGEMENT : An Institutional Innovation Towards Sustainable Fisheries Industry

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U P U T R A M A L A Y S I A

FISHERIES CO-MANAGEMENT: AN INSTITUTIONAL INNOVATION TOWARDS SUSTAINABLE FISHERIES INDUSTRY

ABSTRACT

The changes that have occurred in the fishery sector during the past two decades call for a reappraisal of the relevance of conventional fishery development and management strategies. Principal debates on fishery management policies arise from the natural tension between three differing fishery worldviews or paradigms, namely the conservation, rationalization and social/community paradigms. Several strategies have been adopted worldwide to address the problems of fisheries resource use conflicts and overexploitations, but the outcomes were mixed. Many studies have pointed out that lack of participation of stakeholders/resource users in planning and decision making as the major factor. The fishery co-management as an alternative to centralized command and control fisheries management is often suggested as a solution to the problem. This paper proposes the concept and structure of a fisheries co-management arrangement, and identifies factors affecting the selection of this alternative management institution. Fisheries co-management starts with the premise that stakeholder involvement in the planning and management of natural resources will improve resource conditions and welfare of the society. From the policy perspective, there is a need to empirically evaluate the efficiency and net benefits of co-management institutions against those fisheries that are centrally managed.

INTRODUCTION

The old proverb "Give a man a fish and you feed him for a day, teach him how to fish and you feed him for a life time" no longer holds. As human populations increase and natural fisheries resources diminish, knowing how to fish is not enough for today's fishermen and their families; the overall welfare of the society who are dependent on the fisheries and the sustainability of the resources are critical issues that need to be addressed by the policy makers.

Global-scale changes in the supply, demand, value, management and uses of fishery resources could threaten progress towards sustainable food security in many parts of the world. The United Nation Food and Agriculture Organization estimates have shown that the global fish production has levelled off during the 1990's after reaching its peak in 1989 (Figures 1 & 2). The total world fish production in 1999 was estimated at 125.2 million tonnes, 78 percent of which came from marine capture fisheries (FAO, 2002). The levelling off of total catch follows the general trend of the most of the world's fishing areas, which have apparently reached their maximum potential for capture fisheries production, with the majority of the stocks being fully exploited. It is therefore very unlikely that substantial increases in total catch will be obtained. The combined effects of increasing population

growth and stabilization of fish supplies has led to a decline in the per capita supply for human consumption, while prices continued to rise due to a widening gap between supply and demand.

Figure 1: World capture fisheries and aquaculture production

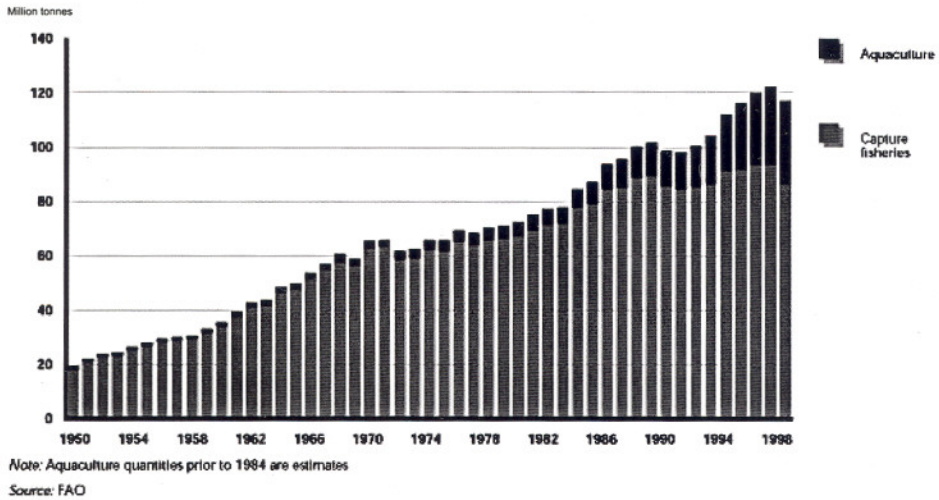
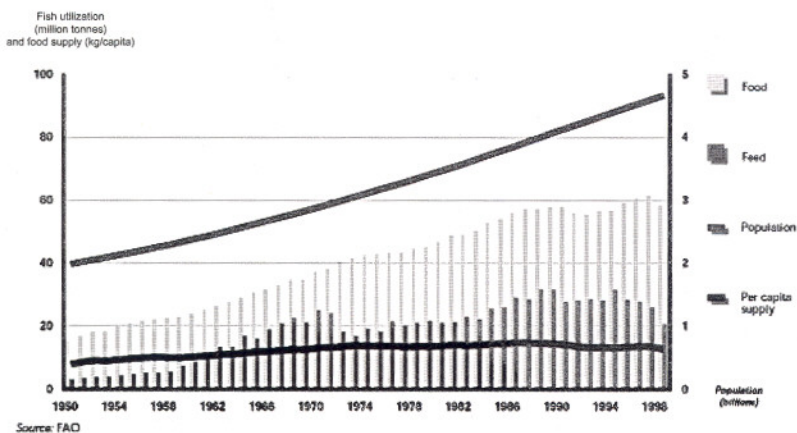


Figure 2: World fish utilization and supply, excluding China



Source: FAO (2002)

Despite the intense fishing pressure and a decline in productivity, the fishery sector still plays important role in providing food, income and employment in many countries of the world. Approximately 1 billion people worldwide rely on fish as a major source of their food, income and/or livelihood. In Asia alone, about 150 million people are economically dependent on fishing and its related activities although marine fishing accounts for only about one percent of the total worldwide economy (Nik Mustapha and Kuperan, 1998). Although fish catch in many developing countries is declining, their per capita fish consumption remains relatively high. In Malaysia, for example, per capita fish consumption was estimated at almost 40 kg. in 1990 (Nik Mustapha, 1994) and exhibited strong habit persistence for fish among her population (Nik Mustapha, 1997). In Indonesia, fish is considered a necessity good and contributes more than two-thirds of the population protein intake (Nik Mustapha *et. al*, 1994). As far as food security is concerned, it is important that fish is always accessible to all and its supplies be continuously maintained at least at its current level to meet daily requirement for food of the general population. This can be achieved, among others, through proper and sound management of fisheries resources worldwide.

■ CHALLENGES IN FISHERIES GOVERNANCE

The changing world order has upset the way many economic activities are organized and scarce natural resources are managed. There are in fact fears that a new form of colonization will emerge with globalization. In the fishery sector, the exploitation of the resources and the market for fishery products are increasingly operating in the international domain. Although globalization represents new and better opportunities for stakeholders in the fishery it also requires substantial financial and organizational resources to realize these opportunities or even to secure future access to fisheries resources. These financial and organizational requirements are very costly and can rarely be met by fishing communities in developing countries. The opportunities that exist in globalization are likely to turn poor fishermen into exclusion, whereby fishing communities loose control over and access to fisheries resources in their own environment, while the bigger share of benefits are accrued to other users. Such users may come from the rich fishing nations where their distant-water fishing fleet out-compete the coastal fishermen in developing countries, and in some instances, may entirely displace local fishermen.

Another aspect of globalization is the development of international agreements and conventions on standards for environmental and fisheries management, which focus mainly in the aquatic ecosystems rather than on local communities. Market driven arrangements such as green- and eco-labelling or certifications of fisheries products also tend to focus on ecosystem rather than people. The objective of such arrangement although beneficial to fishing communities in the long run it may not address their immediate concerns such as meeting daily requirements for food and income.

Fisheries are also under severe pressure from other uses of the coastal and fresh-water requirement such as infrastructure and industrial development, irrigation and flood control,

hydropower development, aquaculture and environmental changes. Such uses are often exclusive to fisheries by competing for space or by changing the environment in ways that lead to reduced productivity of fisheries resources. At the same time the development in the coastal environment attracts population from inland areas leading to further pressure on coastal space and resources. Fisheries depend on natural stocks with limited growth capacity in the aquatic ecosystem. Increased exploitation leads to overexploitation, reduced production per fisherman and eventually to conflicts between fishermen concerning access to resources and markets, and gear conflicts.

The challenges for fisheries governance are indeed daunting, and requires immediate reappraisals of existing policies. Globalization and competing uses of the aquatic environment leave fisheries communities in a very delicate situation where they are in danger of losing access to and control over their resource base while at the same time the same resource base may be dwindling due to environmental changes and overexploitation. To prevent further depletion of fisheries resources improved and innovative fisheries management approach is needed. Many current management arrangements have failed to coordinate and restrain the many users of fisheries resources. They have not kept pace with the technological ability to exploit the resource or with the driving incentives to exploit economic returns, population growth, food and employment. Management systems have focused on fisheries development and resource management but have failed to address the issues of economic efficiency, equity and user conflict.

By and large, fisheries management can be casted into three differing fisheries world views or paradigms namely the conservation, rationalization and social/ community paradigm (Kuperan and Nik Mustapha, 1993). The principal debates on fisheries management policy arises from the natural tensions between the three differing paradigms. In the last decade approaches for management and governance of fisheries resources have undergone a significant transition. There has been a shift from traditional production and stock- and species-based management towards conservation and ecosystem-based management. The overriding objectives of "modern" fisheries management are very much related to the sustainability of the resource.

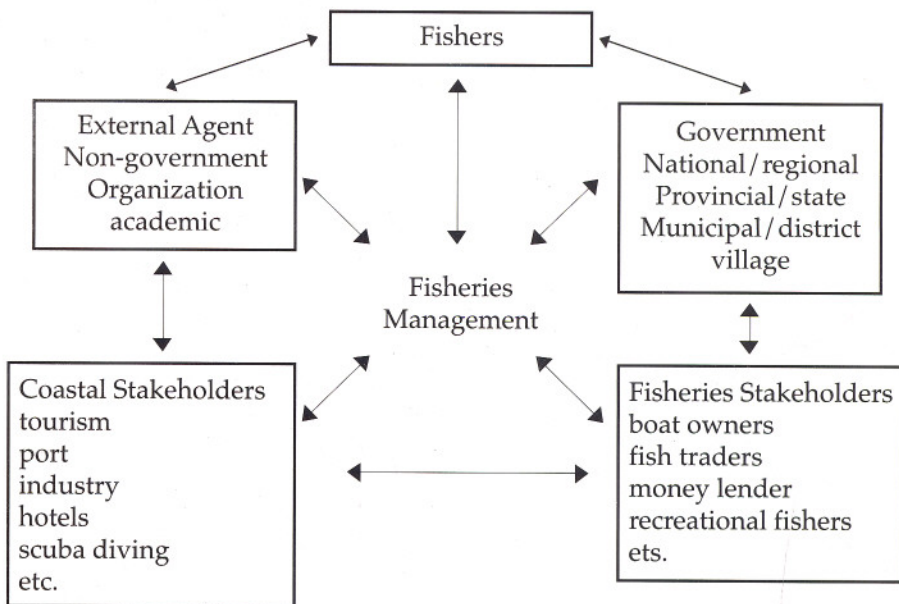
However, the current centralized, top-down approach based on formal biological sciences to fisheries management fails to address the core concerns for fishing communities, is insensitive to local conditions, lack of backing from fishing communities and is even inefficient in achieving its own objective. It is increasingly recognized that resources can be better managed when fishermen and other stakeholders are directly involved in management of the resources. The primary concern of fisheries management should then address the relationship between fisheries resources to human welfare and the conservation of the resources for use by future generation. The main focus of fisheries management should be people, not fish per se. Therefore, the basic challenge to future fisheries governance and policy interventions, is to empower fishing communities in addressing the complex problems and fragile relationships that exist in the fishery industry, if they are to bring about lasting solutions, through fisheries co-management approach.

FISHERIES CO-MANAGEMENT

As mentioned earlier, one of the main reasons for the lack of success of the top-down approach of modern fisheries management is that it has left the fishing communities completely out of the decision-making process and build-up barriers between the fisheries administrators and fishing communities. As a result, the stakeholders are increasingly questioning the legitimacy and the efficiency of the system. The fisheries co-management approach is purported to improve dialogue between stakeholders, efficiency, equity and sustainable resource use, and as such it has been widely recognized as a promising option for reform of fisheries governance institution in most fishing nations.

Fisheries co-management can broadly be defined as the sharing of responsibility and authority between the government and the community of local resource users (fishers), external agents (NGOs, academic and research institutions, and other fisheries) and coastal resource stakeholders (boat owners, fish traders, money lenders, tourism establishment, etc.) to manage a fishery (Pomeroy and Williams, 1994; Sen and Nielsen, 1996; Nik Mustapha *et. al*, 1998b). It can also be viewed as a set of institutional and organizational arrangements (rights and rules), which define the cooperation among the fishery administrators and relevant fishing communities. This partnership is illustrated in Figure 3.

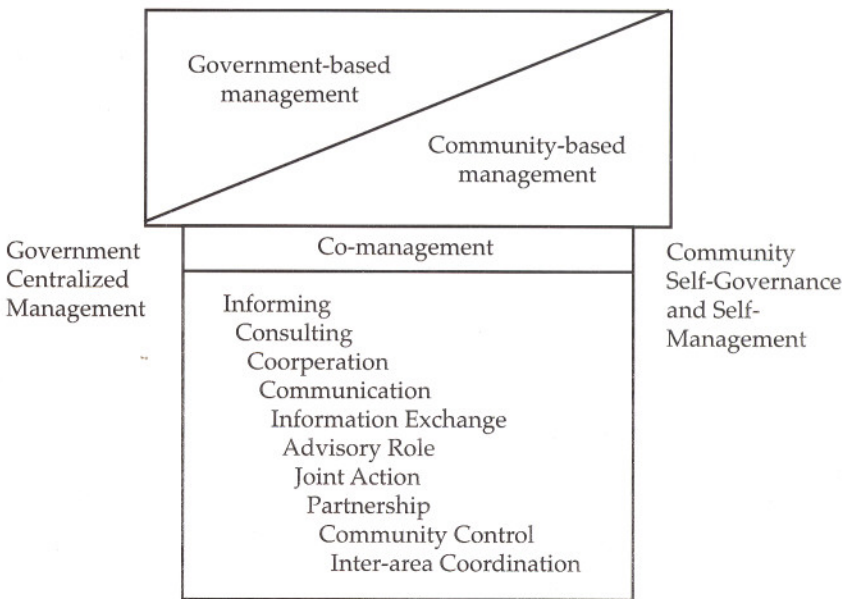
Figure 3: Fisheries Co-Management



Source: Pomeroy (2001)

Co-management covers various partnership arrangement and degrees of power sharing using the capacities and interests of the local fishing community, complimented by the ability of the state to provide enabling legislation, enforcement and other assistance (Berkes, 1994). There is a hierarchy of co-management arrangements from those in which the fishermen are merely consulted by the government before regulations are introduced, to those in which fishers design, implement, and enforce laws and regulations with advice and assistance from the Government (Figure 4). The amount of responsibility and authority that the state and various local levels have will differ and depend upon country-specific and site-specific conditions, and will ultimately be a political decision (Nik Mustapha *et. al*, 1998b).

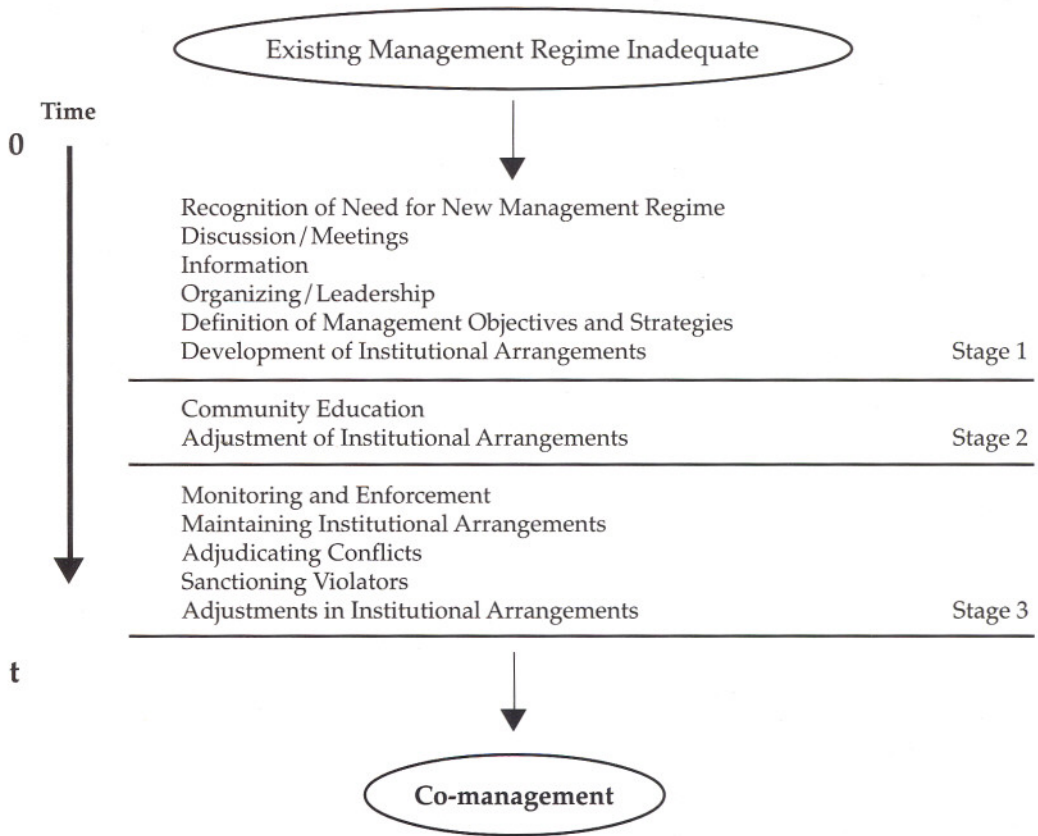
Figure 4: A Hierarchy of Co-Management Arrangement (after Berkes, 1994)



As shown in Figure 4, co-management can be regarded as a middle course between pure state property and pure communal property regimes, and is considered to represent a more democratic governance system because it implies increased involvement of users and delegation of decisions to be taken as close to the users as possible. At the same time, co-management may involve the recognition and legitimization of traditional or customary local-level management systems. The integration of fishers' local knowledge and practices into contemporary management systems will make co-management more economical in terms of administration and enforcement costs than centralized systems. The incorporation of local level and indigenous knowledge into fisheries is also likely to minimize adverse social and environmental impacts of management and lead to more socially and environmentally sustainable systems.

However, fishers' ability to organize for collective action has a number of prerequisites, essentially involving the question of local institutional arrangements. Not all local groups of fishers have appropriate local institutional arrangements. In such cases, any co-management initiative will start with institution building. The establishment and successful operation of fisheries co-management can be a complex, long-term and costly process. This process of moving towards and establishing a co-management system is shown in Figure 5.

Figure 5: Process of Moving Towards Co-Management



Source: Nik Mustapha *et. al.* (1998b)

The three stages of establishing co-management system can be described as: (1) devising and creating the institutions and obtaining information for decision making; (2) implementing the decisions through dissemination of information and explanation of how the community-based system will work; and (3) maintaining, monitoring and ensuring compliance with institutional rules and adjusting rules as conditions in the fishery change. The cost of individuals to participate in co-management (time and money) may outweigh the expected benefits. Community organizing, for example, can take from three to five years before a self-sufficient organization is in place, on the basis of cases in the Philippines (Carlos and Pomeroy , 1996) and five to ten years on the basis of a case in St. Lucia, West Indies (Smith and Berkes, 1993).

The delegation of significant responsibility and authority to manage the fisheries may be one of the most difficult tasks in establishing co-management systems. While the governments may be willing to call for more user participation, they must also establish commensurate rights and authorities and devolve some of their own powers. Government resource managers are often reluctant to share their authority or part of it. Many managers fear a loss of political power or infringement on their professional and scientific turf. Fishers too will need to take some of the responsibilities of convincing managers of their ability to undertake local-level resource management. In all cases of co-management, the ultimate authority is held by the government.

EMPIRICAL EVIDENCE

Fisheries co-management which is built around the theory of collective action, became a popular buzzword among fishery managers in the early 1990's. Despite the progress made on the theoretical and conceptual developments of fisheries co-management in the last decade or so, there is a paucity of literature on the economic analysis of this alternative management approach. With the exception of limited case studies from Asia, where customary and traditional management values and practices are in existence for a long time, the fisheries co-management approach has merely been rhetoric in many international fora but has not been fully well-researched on the ground.

One of the purported advantages of co-management over centralized management is that it will reduce transaction costs - the cost of gaining information about the resource, reaching agreements and coordinating with others in the group with respect to the use of the resource, and enforcing agreements that have been reached (Nik Mustapha, Kuperan and Pomeroy, 1998). It was hypothesized that co-management approach is associated with high program design costs as effective participation is time-consuming and expensive. However, co-management is likely to lead to lower implementation, monitoring and enforcement costs as acceptance of the regime is greater (Hanna, 1995).

In a study in San Salvador Island, Philippines, it was found that the cost in stages I and II of fisheries co-management – stages of recognizing a resource problem, holding discussions, developing a management strategy, initiating a new management regime, community education and adjustment of institutional arrangements – are higher for the co-management system compared to the centralized management system. The costs, however, decrease or

stabilize in the third stage when the major activities are monitoring, enforcement and conflict management. This costs in stage III for the co-management system (1.2 million pesos)¹ are found to be lower than for the centralized management system (2.83 million pesos) (Kuperan, *et. al.*, 1999).

In a similar study conducted in Bangladesh, Jahan *et. al* (2000) demonstrated that there was a significant difference in total costs of fisheries management and resource rents obtained in the co-management and centralized management institutions as shown in Table 1.

Table 1: Costs Incurred (TK/ha/year) and Resource Rents (TK/ha) in Different Stages for Establishing Co-Management and Centralized Management Institution

	Transaction Costs		Resource Rents	
	Co-Management	Centralized Management	Co-Management	Centralized Management
Stage I	10314 ²	10040	2737	1508
Stage II	14769	4188	14586	6357
Stage III	3814	4707	20861	7825

They found that the costs in stages one and two were higher for co-management than in centralized management lakes. At the initial stage, more money was spent for developing the co-management institution, than the centralized management institution, as all the agencies and the government staff spent a considerable amount of time in community development. At this stage, fishers also spent a lot of costs in training and organization formation. However, the costs were lower in the third stage for co-management when monitoring, enforcement and conflict resolution became important. In addition, the results of the study showed that co-management system in Oxbow Lake has resulted in higher rents, compared to government managed lakes and the net return in co-managed lakes was much higher than the centralized managed lakes at third stage.

These findings appear to be consistent with the views of Hanna (1995) and Nik Mustapha *et. al* (1998a) that the downstream or implementation costs are likely to be lower for a co-management system. This is because the cost of monitoring and enforcement is likely to be lower as community members are likely to comply with rules and regulations developed by the community as a whole as apposed to regulations imposed by an external regulatory authority.

¹US\$1 = Php 26.00 in 1996

²US\$1 = 46 TK (2000)

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Another argument that supports the fisheries co-management is that it improves overall welfare of the society and sustainability of the resource. Jahan *et. al* (2001) carried out another study to evaluate the welfare impacts of fisheries co-management at Oxbow Lakes in Bangladesh. This co-management program was designed in 1988 and was completed in July 1997. Using the time-series data from 1991 to 1998, the welfare change before and after the implementation of co-management program was computed. It was found that the change in the consumer surplus was 487 percent while the increase in producers' surplus was 56 percent after the implementation of co-management system. This could be because the consumers were paying lower prices to fishers during the post co-management period due to substantial increase in fish production. In general, the society as a whole enjoys a significant welfare gain (84% of the total net social welfare) after the co-management program commenced in this area. From this study, it was concluded that the implementation of co-management system at Oxbow Lakes was successful in enhancing the fish production as well as the welfare of the society. At the same time the findings support earlier assertion that fishermen, if given the opportunity to organize themselves and participate in decision-making process, managed to develop the capacity and motivated to innovate with regards to management and technological matters to improve their livelihood.

Although these case studies may not be representative to success stories of fisheries co-management programs worldwide, they have nevertheless, provide positive indications that substantial economic benefits can be gained by stakeholders through this new regime. As co-management may not be suitable for every fishing communities, the challenge ahead lies in fine-tuning the approach to suit different local and site-specific conditions in many countries. A lot more research is required to determine the robustness of the system before fisheries co-management can be accepted as an alternative policy tool in fisheries management.

PROSPECTS OF FISHERIES CO-MANAGEMENT IN SOUTH-EAST ASIAN FISHERIES

It is now almost universally accepted that many of the coastal regions of South-east Asia have been overfished. The governments of these countries (Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand, Burma, Papua New Guinea) are working to attain sustainable improvements in the socio-economic conditions of small-scale fishing communities. They see the need to maximize the net economic or net social benefit from the fishery. They are also grappling with the issues of allocating the country's limited marine fisheries between small-scale fishing communities and industrial fisheries so as to minimize the conflict between the two. Most government see the need for well-managed fishery with reduced internal conflict as a basis for alleviating poverty among fishermen and at the same time increasing society' overall return from the fishery. In most of the countries in South-east Asia with the exception of Papua New Guinea, the number of active fishermen far exceeds that which is required under a socially optimum management of the fishery. Fishery management therefore entails the creation of other outlets for fishermen such as the creation of employment opportunities in aquaculture, processing, mining, tourism, etc. To handle these issues, greater central control of the fisheries is seen

in most of South-east Asia. Traditional sea tenure systems in South-east Asia have been largely replaced by centralized government control often originating from the colonial experiences of each country with little or no opportunity for fishermen or fishermen's organization to participate in the planning and management process of the fishery.

The market economy is well developed in most of South-east Asia and fishing communities are well integrated into the market economy. In the case of Malaysia, a political system based on a concept of a federation of 13 states provides centralized power to the federal government to manage the fishery. This, coupled with an almost free market system has also removed any form of customary marine tenure that would attract serious support from fishing communities. The cursory evidence on fishing communities in Malaysia and a well established centralized fisheries management system does point to a limited scope for co-management of fisheries in Malaysia.

What has happened in most South-east Asia with the exception of Papua New Guinea and some parts of the Philippines is a transformation from traditional sea systems to centralized state-controlled resource management regime. The question now is: is there a prospect for co-management in the fisheries of South-east Asia? The answer is perhaps, yes or no depending on which country we are considering. The transfer of power to local communities to manage fishery resources may not be an attractive proposition to many governments in South-east Asia. In Malaysia, for example, the co-management idea is unlikely to be politically feasible and the political and legal framework in the country strongly favours central control of resource management. Similarly, the implementation of co-management for resource management will not be without difficulty in countries such as Thailand and Brunei where the trend is for centralized control of resources.

The Philippines and Indonesia, on the other hand, may have better prospects for co-management as these countries are geographically dispersed and are made up of many islands. Localized marine tenure systems that make both ecological and cultural sense to different fishing communities could be marshalled for improved management of fisheries resources. There are greater prospects for using customary marine tenure as found in the Pacific Island within a co-management framework for managing the coastal fisheries in the Philippines and Indonesia. In Indonesia, however, the tendency for a strong central government may impede the prospects for co-management (Kuperan and Nik Mustapha, 1994).

The ranking of the prospects for co-management approach for managing coastal fisheries in South-east Asian countries is shown in Table 2. It is interesting to note that, except for Burma (Myanmar), those countries that have exhibited high economic growth rates and have good records of government success in managing the overall economy are ranked as having low prospects for co-management. This is to be expected as communities where government has failed (such as the Philippines) are less likely to believe that centralized government-based approaches to managing the fisheries will be successful. The good prospects for co-management in the Philippines are largely due to the changed political climate in the country, as there is a move to delegate more responsibilities to local governments and non-governmental agencies are actively involved in community development.

Table 2: Prospects for the Adoption of the Co-Management Approach for Coastal Fisheries Management in South-east Asia

Country	Rank		
	High	Average	Low
Brunei			x
Burma (Myanmar)			x
Indonesia		x	
Malaysia			x
Papua New Guinea		x	
Philippines	x		
Singapore			x
Thailand		x	

Source: Kuperan and Nik Mustapha (1994)

CONCLUSION

Fisheries co-management as an alternative to centralized command and control fisheries management is often suggested as a solution to the problems of fisheries resource use conflicts and overexploitation. The strategies of co-management not only respond to management crises, they also offer the promise of increased democratization, and empowerment and development of regional and local communities. Although the process of establishing fisheries co-management can be time-consuming and costly, international experiences have indicated that this new resource management regime will bring about improved efficiency, equity and sustainability of resource use. Despite the limited number of research work to determine the feasibility of fisheries co-management system, the future of fisheries management worldwide lies in this new and innovative institutional development. By combining modern, scientific and local knowledge, and active participation from stakeholders in managing resources, fisheries co-management promises to bring better and sustainable fishery industry for the benefit of mankind.

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