

COMMON PROPERTY IN THE MEKONG

Issues of Sustainability and Subsistence

EDITED BY

MAHFUZUDDIN AHMED

PHILIP HIRSCH

SH
207
SR76
#26
c.1



CLARM
THE WORLD BIRD CENTER



SH
207
SR #6
26
C-1

COMMON PROPERTY IN THE MEKONG: Issues of Sustainability and Subsistence

EDITED BY
MAHFUZUDDIN AHMED
PHILIP HIRSCH

2000



0000015121

**Common Property in the Mekong:
Issues of Sustainability and Subsistence**

Edited by
M. Ahmed
P. Hirsch

2000

Printed in Manila, Philippines.

Published jointly by the International Center for Living Aquatic Resources Management (ICLARM) - The World Fish Center, P.O. Box 500, GPO, 10670 Penang, Malaysia, and the Australian Mekong Resource Centre, Department of Geography, University of Sydney, Sydney, Australia, through the financial assistance of the Swedish International Development Cooperation Agency to the Policy Research and Impact Assessment Program, ICLARM.

Ahmed, M. and P. Hirsch, Editors. 2000. Common property in the Mekong: issues of sustainability and subsistence. ICLARM Stud. Rev. 26, 67 p.

Cover: a collage of pictures from the Savannaket region in Lao PDR.
Photography: Albert Salamanca.

Managing Editor: Marie Sol Sadorra-Colocado
Copyeditor: Rita Kapadia
Assistant Copyeditor: Sheila V. Siar
Cover Designer: Alan Siegrifid Esquillon
Layout Designer: Mayanne A. Wenceslao

ISBN 971-802-008-X
ISSN 0115-4389

ICLARM Contribution No. 1564

ICLARM-The World Fish Center is one of the 16 international research centers of the Consultative Group on International Agricultural Research (CGIAR) that has initiated the public awareness campaign, Future Harvest.



The opinions expressed in this publication are those of the author(s) and do not necessarily represent those of the publishers.

CONTENTS

Foreword		iv
Preface		v
Introduction		
MAHFUZUDDIN AHMED	<i>Conflict, Competition and Cooperation in the Mekong</i>	3
PHILIP HIRSCH	<i>Commons: Feeding People and Protecting Natural Resources</i>	
Overview		
JOAKIM ÖJENDAL	<i>Some Implications of the Mekong River Commission</i>	11
ELIN TORELL	<i>Agreement</i>	
PHILIP HIRSCH	<i>Managing the Mekong Commons – Local, National and Regional</i>	19
	<i>Issues</i>	
MAGNUS TORELL	<i>Institutional and Legal Perspectives on the Management</i>	27
	<i>of Aquatic Resources in the Mekong River Basin</i>	
Case Studies		
NICOLAAS VAN ZALINGE	<i>Where There is Water, There is Fish? Cambodian</i>	37
NAO THUOK	<i>Fisheries Issues in a Mekong River Basin Perspective</i>	
TOUCH SEANG TANA		
DEAP LOEUNG		
PETER DEGEN	<i>Historical, Cultural and Legal Perspectives on the Fishing Lot</i>	49
NAO THUOK	<i>System in Cambodia</i>	
KHAMLAPHANVILAY	<i>Pilot Schemes for Community-level Forest Management in</i>	61
	<i>Lao PDR: A Case Study of the Nam Ngum Watershed</i>	

FOREWORD

Living aquatic resources, predominantly fish and other aquatic animals, contribute substantially to food security and livelihood in the countries of the Mekong River basin. The wetlands habitats that support the renewal and abundance of fish and other aquatic life also provide many other important environmental services. However, maintaining the contribution of the wetlands to human food supply and their continued ecological integrity is becoming more and more difficult. Increasing human population and growing competitive uses for land and water resources, often advanced from different sectoral viewpoints, are crowding out previous practices and opportunities. A comprehensive approach to management of the wetlands of the region provides great challenges since the river, its tributaries and floodplains cut across several national boundaries; the biological resources themselves are complex (with more than a thousand species of fish plus other aquatic organisms, forests, ricefields, mangroves, etc.); and people representing different sectors, disciplines and goals have to contribute to the solutions.

Against this background, it was most appropriate that a panel representing some of the key stakeholders in the development of the region considered the conflicts, competition and cooperation in the Mekong "commons." The emphasis in the report is on "common property", the bounty it represents and the identification of the strains and stresses in managing these common resources in the future for the good of all. ICLARM has an interest in these issues in general, and in the Mekong region in particular, as the process of development, conservation and equitable use of aquatic resources are interdependent. We are grateful to all our partners in the development of this book, especially the Australian Mekong Resource Centre and the Swedish International Development Agency (Sida). We believe that the book will be of value to all the national and international agencies concerned with the development of the Mekong River region. Cooperation between these agencies with the interest and capacity to respond to the issues raised in the book is the key to maintaining the sustainability of the aquatic resources of the Mekong region, and protecting and improving the livelihood of the people who depend upon them.

Meryl J. Williams
Director General
International Center for Living
Aquatic Resources Management -
The World Fish Center

PREFACE

The Mekong, the world's twelfth largest river, is the target for major development interventions, such as hydropower generation and large-scale water diversion, that will no doubt alter its diverse ecosystem and have significant consequences for its inhabitants. After several decades of national, regional and international conflicts in the region, attention is now being focused on harnessing the resources of the Mekong basin through development interventions. Regional and international agreements, such as the Mekong River Commission established in 1995, have already laid the basis for some of the major development efforts in the riparian countries. It is understood that changes in the river basin are inevitable. Only the form they take and when they occur can be managed. The mighty Mekong, which has shaped the pattern of settlement over several hundred years by creating a vast natural resource base and providing the primary basis of livelihood for the people, will have its own shape changed.

With many development agendas on the table, the future of the resources and the people of the basin are at a crossroads. An informed basis for development decisions is vital, as it will determine if and how the local, national and regional impact of development should be viewed. This volume contains the papers presented in a panel session on *Conflicts, Competition and Cooperation in the Mekong Commons: Feeding People and Protecting Natural Resources*, during the Seventh Conference of the International Association for the Study of Common Property entitled Crossing Boundaries held on 10-14 June 1998 at the University of British Columbia, Vancouver, Canada. It provides an analysis of the common property perspective of the basin's natural resources and raises the issues of subsistence and sustainability stemming from development interventions.

The editors would like to thank the Swedish International Development Cooperation Agency for their financial support in publishing this report. In addition, they would like to thank Peter R. Gardiner, Deputy-Director General of ICLARM, for the substantive contributions, and Mylene Lorica and Bing V. Santos of ICLARM for providing technical assistance.

The Editors

INTRODUCTION

Conflict, Competition and Cooperation in the Mekong Commons: Feeding People and Protecting Natural Resources*

Mahfuzuddin Ahmed¹ and Philip Hirsch²

¹ International Center for Living Aquatic Resources Management - The World Fish Center, P.O. Box 500, GPO, 10670 Penang, Malaysia

² Australian Mekong Resource Centre, Department of Geography, Sydney University, NSW 2006, Australia

AHMED, M. and P. HIRSCH. 2000. Conflict, competition and cooperation in the Mekong commons: feeding people and protecting natural resources, p. 3-7. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

Introduction

The Mekong River basin covers nearly 800 000 km² and is home to more than 65 million people. The waters of the Mekong have shaped the pattern of human settlement in the region and created a vast natural resource base that has historically provided the primary basis of rural livelihood. Regarded as one of the earth's most diverse and productive ecosystems, the Mekong basin also provides a common cultural heritage for the people who have lived in the basin for centuries. The basin now covers parts of the territory of Burma, Cambodia, Lao PDR, Thailand, Vietnam and the Yunnan Province of China (Fig. 1). The political division of the basin has, over many decades, given rise to different perspectives on its economic, social and environmental significance. The differences have increased with the different levels of economic development, geopolitical history and geographic location of the countries and the relative importance of the river basin in each country.

While there have been differences over the use of the Mekong basin's resources, there is also a long history of attempts to create a common vision. Since the establishment of the Mekong Committee in the 1950s, the economic potential of the Mekong River has been assessed in terms of hydropower development, water diversion and irrigation, logging, navigation, fisheries and tourism. Recent initiatives under the Asian Development Bank's Greater Mekong Subregion program and under other bilateral and multilateral schemes have targeted the Mekong for large-scale infrastructure development. It has been suggested that the water in the Mekong and its tributaries can be used to generate 285 400 GWh of electrical energy annually (MRC 1997) and that the rivers have the potential to

irrigate several million hectares of agricultural land. Such large-scale development is put forward as the key to prosperity and to enhancing food security for the inhabitants of the basin.

However, if these gains are looked at in relation to households and communities dependent on the basin's natural resources, the net gain appears less attractive or, at best, uncertain for the majority of the poor and disadvantaged people in the basin. The costs of the Mekong development agenda are manifest at the local level, where the livelihood and environmental impact of infrastructure development are felt most immediately. The current challenge for sustainable development of the basin is to reconcile local interests, common to the majority of the basin's farmers and fishers, with the broader development vision.

The Mekong Commons

The prospect of large-scale development is predicated on the exploitation of the Mekong basin as a shared resource. Geopolitical tensions that previously precluded a shared developmental vision have eased. The 1995 Agreement for the Sustainable Development of the Mekong River Basin, which is the basis for the Mekong River Commission (MRC), is based on the joint use of water and other resources of the basin by the six riparian countries. The Mekong basin commons are regarded as a hitherto unexploited resource to be harnessed for economic development.

There is another level at which the Mekong commons are affected by the rapid development of the basin's resources. Local common property is both directly and indirectly impacted by infrastructure development, the growth of commercial production, new property relations and a myriad of other changes affecting the region. The fact that the water, fishery, land and forest resources are common property leads to their appropriation and exploitation without due concern

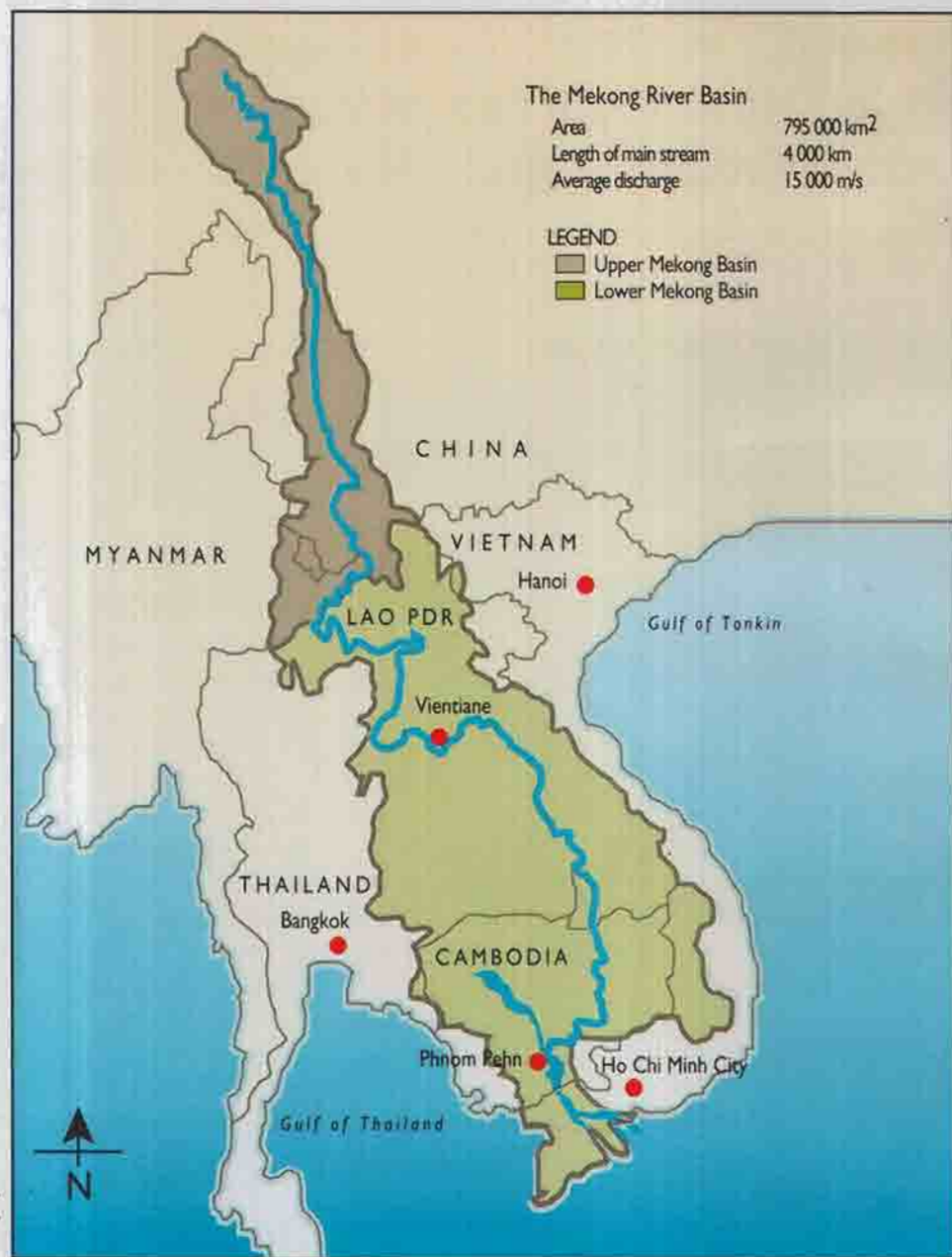


Fig. 1. The six riparian countries of the Mekong River basin. Source: MRC 1997.

for their value in supporting the livelihood of local people. The role of common property has often been neglected in the assessment of the benefits and costs of development schemes, and their resource value has been systematically underestimated. There is an urgent need both for documentation of the physical and institutional forms of common property in the basin, and for an analytical approach to the management of the commons as they face various threats.

While the MRC agreement is based on the interests of the participating countries, the 65 million farmers and fishers living in the Mekong basin have certain common interests irrespective of nationality. Their livelihood is strongly dependent on the natural resources and ecological wealth created by the Mekong River. Strong linkages and interdependencies between private and common property resources have long been recognized as integral to their livelihood (Shams and Ahmed 2000). For instance, while most farmers in

Cambodia do not have title to the land they till, their right to live and operate on that land is generally recognized. At the same time, they also fish, hunt, collect, gather and harvest goods and services from the common land, water and forests. Moreover, technologies used in private agriculture interact heavily with the environment, a "common" or public good, for supply of inputs and production of outputs (Ahmed and Shams 1998).

Agriculture and the rural sector have been the main basis for development in all the riparian countries of this region, despite the differences in their colonial history, political economy and geopolitical affiliation in the post-colonial period. The level of economic development achieved by these countries has shown wide variation over the last several decades. By 1995 the contribution of agriculture to GDP in Thailand and China (Yunan Province) had declined to 10% and 18%, respectively, whereas it is still the single largest contributor to GDP in Myanmar (62%) and Lao PDR (55%).

However, agriculture continues to employ the majority of the population in Thailand, and the recent economic downturn has reinforced the significance of the rural resource base as a safety net for the poorer sections of society.

Fisheries are another important use of the basin's rivers and wetlands that are home to many aquatic resources. Fish is an important staple in the diet of local people in all these countries. In Cambodia, some recent findings suggest that per capita consumption of fresh and processed fish is nearly 75 kg per annum for the communities living in and around the waterways, rivers, lakes and floodlands (Ahmed et al. 1999). Total fish production for inland capture fisheries in the riparian countries is estimated at up to one million tons per year although estimates vary between sources (MRC 1992; Jensen 1996; Van Zalinge et al., this vol.). Aquatic resources, thus, play a major role in the Mekong basin. Aquatic supplies come from various types of interrelated environments, i.e., permanent water (river, lake, etc.), permanent and seasonal backswamps, flooded forests, grasslands, receding waters, inundated ricefields and seasonally flooded crop fields. This common property and its ability to supply a large amount of aquatic products are being neglected in the ongoing development debate on the Mekong region. Current knowledge of the economic and nutritional value of aquatic products such as fish (capture and culture), wildlife, plants and vegetables is still inadequate to estimate the "true" value of the aquatic resources of the "commons" in the Mekong basin.

Besides the direct benefits from the products and services, many of the indirect benefits and functions also have an economic value that is significant locally and also for the population as a whole. For instance, groundwater recharge and fertile soil deposits through floods maintain the fertility and productivity of the land. These benefits and functions of the ecosystem are not often considered in development that interferes with natural cycles of floods.

Conflict or Cooperation in the Commons?

The notion of "commons" implies shared interests based on a degree of common vision. The commons have also been associated with discord, most notably in Hardin's (1968) metaphor of commons as a tragedy for the natural resource base. In this volume, we attempt to show the significance of the commons for the well-being of most people who make their livelihood from the Mekong River basin. We also discuss how undermining of the commons through poor analysis and neglect can threaten this. The Mekong commons are a source of well-being based on the cooperative use of resources, but are also a site of actual and impending conflict.

Like many other river basins around the world, the floodplains of the Mekong River and its major tributaries have also attracted and supported a large human population relative to the lightly settled hinterland. The basin's natural resources, fertile land and water provide an abundant livelihood for subsistence in a mainly peasant society. The delta in southeastern Cambodia and Vietnam has a particularly high population density. At the national level, the basin is significant for all the lower riparian countries. In Cambodia and Lao PDR, about 85% of the national territory of each country lies within the basin, so that it is the dominant resource system for these two largely agrarian states. In Vietnam, the delta only forms 10% of the national area but produces about half of its rice crop, vital both for food security and for Vietnam's status as the world's third largest rice exporter. For Thailand, the basin is part of the country's poorest regions in the northeast.

The situation of northeastern Thailand is symptomatic of the more general concern that development in the basin has lagged behind other areas and the gains from economic development in the basin have not been concomitant with the resources it has provided for the overall economic development of the region. The loss of biological and ecological wealth, such as the forest cover, fish stocks, species diversity and wildlife of the basin (MRC 1997), has been felt mainly by those traditionally dependent on these resources, while the fruits of economic growth have been reaped elsewhere. This is evident from the widening income gap between the northeastern and central parts of Thailand, and the relatively poor social and economic conditions of the people living in some pockets of the Mekong delta as compared to the other parts of the country (MRC 1997).

Changing perspectives towards development also influence policies that affect the basin's natural resources. With a trend toward the development of market economies that measures human welfare only in terms of marketed services and production of manufactured goods, natural goods and services will systematically receive inadequate weight in policy decisions that concern the use, appropriation and alteration of natural resources (Costanza 1997). A certain perception of the national interest has often overridden livelihood concerns in policy perspectives towards the resources and environment in the basin (Hirsch 1996).

Economic development, combined with a high rate of population growth and high dependency ratios, has led to an ever-growing set of demands on water, land, forests and fisheries of the basin. Competition for these limited resources from a growing number of users and other claimants is exacerbated by competitive and incompatible use of resources by new types of activities. For example, increasing the number of subsistence fishers on particular stretches of the river is accompanied by market development that places new demands on limited stocks, while environmental threats to

the same stocks arise with upstream hydropower and water diversion projects. Therefore, we find pressures within the local commons as well as pressures on these commons from outside.

A reevaluation of the true value of the common property resources will help to set proper priorities in the planning process, including the need for fair and just compensation to people whose access to and use of common property resources might be threatened by development plans. There is solid evidence to show that a much larger aquatic production is available from these resources than reported in official statistics (Deap et al. 1998; Ahmed et al. 1999; Guttman 1999). Use of market price and marketed quantities as the sole criterion for valuing the resources and their products results in the undervaluing of aquatic resources relative to other uses of the river and its floodplains. The subsistence and dietary importance of fish is ignored when the focus is on the commercial value of large-scale development plans. For instance, the large value attached to hydropower projects in Lao PDR is the result of the high projected demand for electricity for the industrial sector in Thailand.

The single-sector development orientation is the result of a lack of public participation in policy development and decisionmaking. Only through bringing the public into the dialogue will it be possible to capture intersectoral and nonmarket values in common property resources management. Incompatibilities between local, national and regional priorities have also resulted in the undervaluing of many uses and services of the basin's natural resources. Political pressures and donor influence have resulted in overlapping jurisdictions over the resources. There is often a lack of coordination between agencies, and donor's priorities do not always match the priorities of national and local agencies.

Subsistence, Sustainability and Development

Against the backdrop of the conflicts described above, the vast majority of the basin's inhabitants who are still subsistence farmers and fishers are now threatened by intensive agriculture, logging and hydropower development. The hypothesis that irrigation and other forms of agricultural intensification are vital to increased food supply, in view of fast declining area of unused arable land and rapid increase in population, is gaining credence amongst development planners and policymakers. However, the impact of this on environmental integrity, the production and supply of wetland and aquatic goods and services, the gender division of labor, property rights, food security and equity are not well understood.

Central to the issues of subsistence and sustainability in the commons in the Mekong basin is the utilization of the waters of the Mekong, the single most important common resource (MRC 1998). Development decisions often

simplify the issue in terms of: (i) the potential conflicts arising from water scarcity on the mainstream river in the dry season; and (ii) the need to manage high river flows during the wet season. The question of how to protect other users and the ecosystem from the effects of water utilization is treated only as peripheral. Most of the ongoing efforts are centered around reaching an agreement among the riparian countries on abiding by a set of rules for the use of water, covering both quality and quantity. These rules do not necessarily conform to the needs and aspirations of the majority of the inhabitants of the basin nor do they take into account the multiple effects on the environment in a wide range of cultural, social, economic and ecological settings.

Another key element in incorporating the commons into development debates in the basin is the very basis by which agreements are being worked out among the riparian countries at the regional level and the definition of what is deemed as acceptable action by individual countries. Each country has the opportunity to exercise sovereign power and independence, provided it keeps the impact of development decisions and actions within the bounds of change acceptable to the others. This may be seen as a satisfactory arrangement by the governments in dealing with commons. However, given the cultural, ethnic and socioeconomic diversity and the political and economic strengths and weaknesses of the various groups within each country, it is naive to assume that local commons will be protected by national level decisions once national and regional issues are dealt with fairly and justly. In view of the paucity of data, lack of communication, limited and imperfect mechanisms for dialogue and consultation over the commons within the existing political framework, the shared development agenda at the regional level has the consequence of decreasing the influence of weaker groups in the decision-making process.

With growing material aspirations, population pressure and increasing requirement of food and other basic necessities, the basin is faced with the twin challenges of feeding its people and protecting its natural resources. It is critical to identify the technological, policy and institutional options that can meet these challenges. This requires: (i) the use of a multisectoral and interagency strategy for development and management; (ii) management of resources through an ecosystem (e.g., wetlands) approach rather than through production maximization; (iii) integration of intersectoral policies and institutional governance of the resources; (iv) recognition of local rights over the common resources and involvement of communities and stakeholders in the basin's development; and (v) use of environmental and ecological approaches to economic indicators, such as natural resource accounting rather than conventional economic growth. All of these require a proper understanding and valuation of the role of the commons at different levels.

The articles that follow focus on conflicts, competition and cooperation over shared water and aquatic re-

sources, and on problems and possibilities of optimizing the benefits from the natural resources in the wetlands at the regional and local levels. Particular emphasis is given to the legal and institutional policies governing common property and natural resources such as water, flooded forests and fisheries. The regional focus is on the lower Mekong basin. In the local context, the implications of a market-oriented approach to establishment of resource access and use rights are examined. The role of community-based approaches and integration of common and private property based resource management are assessed.

The book has two parts. The first part consists of three overview papers. The first of these considers the role and limitations of the Mekong River Agreement. The second paper looks at the significance of the issues at the local, national and regional levels. The third looks at the institutional and legal perspectives on the management of the basin's resources.

The second part consists of three case studies. Two of these studies relate to Cambodian fisheries. The first study outlines the ecological and social problems in the management of this highly important common property resource, and suggests that assumptions of plenty are no longer valid. The implication is that new means of defining access rights by rural Cambodians are a prerequisite to protecting both the resource itself and the livelihood of those who depend on it. The second study cautions that the fishing lot system, inequitable as it may seem, has its roots in the structure of rural Cambodian society and, hence, should be adapted rather than dispensed with in favor of simplistic community-based management approaches. The third study analyzes a pilot scheme on community management of watershed resources in Lao PDR.

This collection does not seek to be comprehensive in its coverage of the issues concerning the commons. It focuses selectively on certain aspects of common property to highlight specific dilemmas surrounding shared resources in the context of rapid development. A fuller treatment would require a much larger compendium, given the diversity of the basin and the complexity of shared

resource issues. However, the problem is so urgent that any discussion of the issues is warranted – if only to stimulate further debates on the development options facing the basin, its constituent economies, cultures and ecosystems.

References

- Ahmed, M. and N. Shams. 1998. Ecological input-costs in agricultural production in Northwest Kampuchea. *J. Sustain. Agric.* 12 (4): 5-23.
- Ahmed, M., H. Navy, L. Vuthy and R.A.V. Santos. 1999. Fish consumption pattern in major freshwater fisheries provinces of Cambodia. *Naga, ICLARM Q.* 22(2):27-31.
- Costanza, R. 1997. The ecological, economic and social importance of coastal and marine systems, p. 237-252. *In With rivers to the sea - interaction of land activities, freshwater and enclosed coastal seas. Proceedings of the Stockholm Water Symposium/ EMECS, Stockholm, 10-15 August 1997.*
- Deap, L., S. Ly and N.P. Van Zalinge, Compilers and Editors. 1998. Catch statistics of Cambodian freshwater fisheries 1994-1997. Project for the Management of the Freshwater Fisheries of Cambodia, Phase I. MRC/ DoF/ Danida. Phnom Penh, Cambodia.
- Guttman, H. 1999. Ricefield fisheries—a resource for Cambodia. *Naga, ICLARM Q.* 22(2):11-15.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162 (3859): 1243-1248.
- Hirsch, P. 1996. Competition, conflict and cooperation in the Mekong River Basin: towards a new framework for security, p. 57-63. *In B. Stensholt(ed.) Development dilemmas in the Mekong Sub-region, Workshop Proceedings. Monash Asia Institute, Development Studies Center and Center of Southeast Asian Studies, Monash University, National Thai Studies Center, Australian University and National Center for Vietnamese Studies.* 277 p.
- Jensen, J.G. 1996. 1,000,000 tonnes of fish from the Mekong. Catch and culture. Vol. 2, No. 1. Mekong River Commission, Bangkok, Thailand.
- MRC. 1992. Fisheries in the Lower Mekong Basin. Annex 4 and 5. Interim Mekong Committee, Bangkok, Thailand.
- MRC. 1997. Mekong River Basin diagnostic study. Final report. Mekong River Commission, Bangkok, Thailand.
- MRC. 1998. Water utilization program preparation project. Final Report. Mekong River Commission. 35 p. Annexes.
- Shams, N. and M. Ahmed. 2000. Private and common property linkages in lowland forest-fishery-farming systems for North Cambodia. *J. Sustain. Agric.* 15 (4): 59-87.

OVERVIEW

Some Implications of the Mekong River Commission Agreement

Joakim Öjendal¹ and Elin Torell²

¹ University of Gothenburg, Padrigu, Brogatan 4, S-413 01 Gothenburg, Sweden

² Coastal Resources Center, University of Rhode Island, South Ferry Road, Narragansett, RI 02882, USA

ÖJENDAL, J. and E. TORELL. 2000. Some implications of the Mekong River Commission agreement, p. 11-18. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

This paper discusses the risk of serious damage resulting from the development and exploitation of natural resources in international watersheds. Specifically, it focuses on the lower Mekong River basin where water is an indispensable and valuable asset. It scrutinizes the risk of ecological damage and the absence of public participation in the development planning process. It assesses the implications of the 1995 Mekong River Commission Agreement for the two core countries in the lower Mekong River basin, Lao PDR and Cambodia.

Introduction

In the early 1990s, increasing attention was given globally to the implications of the potential scarcity of natural resources – especially water – for sensitive ecological systems. Intractable conflict situations were apparently emerging and “water wars” were predicted (Starr 1991). However, there were some misconceptions on how tensions and rivalry on water would be expressed. Wars over water resources are rare in the modern world. International conflicts are usually negotiated and agreements are often reached. These agreements tend to focus on broad approaches and lack operational details for resource utilization. This solution is not necessarily more acceptable. Potential international conflicts are then transformed into regional and local socioeconomic conflicts threatening the local resource base. Local communities shoulder the burden of social and ecological change. These communities are often voiceless and have little capacity for adapting to the changing circumstances. The consequences are even more serious in societies with no tradition of grassroots participation and few channels for the affected people to air their views and interests. Aid agencies and corporate entities supporting and participating in the development process usually interact with relevant national agencies. They have few local contacts and little knowledge of social and on the local issues. There is a need to identify which resources are important for the local communities, which ones are tradable or expandable and which ones are not, and how this should be controlled. While these are general considerations, every watershed has specific character-

istics to be considered in development planning (McCully 1996).

The lower Mekong River basin (LMRB), a relatively ecologically intact area, is facing large-scale changes in the name of development over the next decade. It is a sensitive entity in several aspects. The basin has a complex ecological system and major changes could upset the balance. The social system, historically one of the most conflict ridden in the world, is also delicate and facing changes. Primary production could be forced to give way to production in the modern sectors. As a resource base, the river basin is a cornerstone for all four LMRB countries. As a regional concern, it is one of the single most important foreign policy questions.

The Mekong River Commission (MRC) Agreement of 1995 addresses several problem areas in a general way, but its contradictions may continue to disturb implementation of development in the basin. The agreement presupposes that national authorities will develop its general statements into laws, policies and guidelines. The agreement has been a catalyst for a renewed interest in and increased pace of modern development in the region. The capacity of the MRC in safeguarding the resource base is limited. The authority vested in it by the different participating countries varies, and the position its executive agency, the MRC Secretariat, has vis-à-vis other agencies in the region is unclear. The relation between various states and the MRC are perhaps not unclear, but not as solid and direct as one could hope for. The MRC (and its secretariat) has no authority in influencing the regional activities in the management of the shared resources as this is vested at the national level. The National Mekong Committees do not have any significant role in the management of the resources

within their national jurisdictions. There is thus a possibility that the conflict resolution achieved at one level will result in conflicts and unsustainable resource utilization at a more local level of authority.

There are many plans for hydropower and large-scale irrigation projects. There are several problems associated with them. A common feature for many of these is that the scale and the design of the projects are out of tune with the level of development in these countries, with the administrative and technical capacity, and with the national budgets. Grassroots interests are not taken into consideration and there is no provision for public participation. A major change of the resource base, on which the people in the basin are heavily dependent, without the adequate administrative capacity and without consulting the local people is a dangerous undertaking. The MRC Agreement that was meant, *inter alia*, to protect the ecosystem and the resource base could well threaten the ecosystem and, as a consequence, the livelihood of people living there. While the scale of this threat cannot be assessed in this paper, we address the two most urgent questions on the impact of the development of the Mekong River basin. These relate to *ecological sustainability* and its relation to survival, and the degree of *public participation* in the development process. Put more precisely:

- What are the overarching threats to the regional resource base?
- What are the possibilities for increasing the role of the local communities to share responsibility for the utilization of the water resources of the lower Mekong basin?

In this context, we will also try to assess policy changes that the MRC Agreement has triggered in the two "core countries" of the LMRB and ask:

- What are the consequences of the MRC Agreement for Lao PDR and Cambodia?

The paper is based on a number of interviews with decisionmakers and 'experts' in the region and on a number of empirical studies on community organization carried out in rural Cambodia. In addition, it draws on a large number of secondary sources, ranging from national White Papers on the development of the Mekong basin to reports from a number of development institutions in the region. Finally, it draws on the findings of the authors' previous report for the Swedish aid agency, Sida (Öjendal and Torell 1997).

The paper discusses some theoretical perspectives on watershed (ecosystem) management, the impacts of human intervention and a brief background of the Mekong issue. It then addresses the three questions and draws some tentative conclusions on the risks and possibilities of the MRC Agreement at the national and local levels.

Perspectives on Change in Sensitive Human Ecosystems

Ecological systems are sensitive. They are constantly evolving and in a situation of instability and change they adapt to new conditions in order to regain stability. Some changes are natural, for example, seasonal changes and individual plant and biogeochemical changes, while others are caused or accelerated by human interaction with the ecosystem. The outcome of anthropogenically driven environmental change is often a less valuable ecosystem in terms of the quantity and quality of the resources. The social and economic outcome of environmental change is dependent on variables such as population density, wealth, technology, the speed of change, the management response, and the ability to import resources to replace losses (Johnston and Olsen 1998).

Ecosystem management is often based on the premise that economic development inevitably competes with ecosystem preservation (a win-lose situation). Resources are valued from the perspective of how much income they can generate for those who utilize them. The noncommercial value of the resources is seldom considered. In many areas of the world, both developing and developed, managers often believe that they cannot afford to be conservationists. Management of watersheds is often shortsighted, focusing on individual interventions (e.g., hydropower, logging) and not taking their long-term ecosystem impact into account. This leads to management cycles that are short and out of synchronization with longer-term ecosystem cycles. Holling (1995) notes that "... each proceeds at its own pace and in its own space, and this creates extraordinary conflicts when there are extreme mismatches among the scales at which ecosystems, institutions, and societies function".

This quote needs to be considered seriously in the future development of the LMRB, which is facing growing internal and external pressures for development. There is risk of a mismatch between the *ecosystem* and its human management as solid *institutions* managing this process are in short supply, the *involvement of local people* in the process is inadequate and outside actors routinely have *too little knowledge* about the societies and ecosystems in which they are intervening.

Public participation, as part of a functioning democratic decisionmaking process, is one of two pillars in *adaptive management*. Public participation ensures that learning will be maximized. Political conflict can provide ways to recognize errors, complementing and reinforcing the self-conscious learning of adaptive management (Lee 1993). The second pillar in adaptive management is reliable knowledge gained from experience. In order to attain reliable knowledge, baseline indicators have to be established through qualitative studies carried out prior to any intervention. A barrier to sustainable management is that decisionmakers are often reluctant to question policies and their relevance and, therefore, are not likely to transfer learning over time.

Current Status

The Mekong is one of the great rivers of the world. From its origin in the Tibetan Himalayas, the 4 200 km long river's watershed stretches over China, Myanmar, Thailand, Lao PDR, Cambodia and Vietnam. The geographical features vary widely, from rugged mountains and upland plateaus to low flat deltaic areas. The river is the source of capture fisheries and water for agriculture and aquaculture. For example, the Mekong delta in Vietnam generates close to 45% of Vietnam's total food production in rice equivalent, though it covers only 12% of the land area and holds 22.6% of the population (Öjendal and Torell 1997). Eighty-five percent of Cambodia lies within the LMRB, so the Mekong River and the Tonle Sap Lake are of great importance to the population. The countries of the Mekong River basin (MRB) are rich in natural resources, although, there is a lack of documented information on them. The region is heavily dependent on the natural resource base and the area is relatively abundant in forest, water, fish and mineral resources. Most of the population (about 84%) is rural and as such depends on these resources for their livelihood (MRCS 1996a). At the same time, the natural resources are important for the nations as a means of generating foreign currency through export, as a source of raw materials and food, and for handicraft industries. The natural resources are being degraded in some areas, mainly because of the increasing population pressure combined with their exploitation for economic development.

The Mekong region has a high rate of economic growth, though the countries are at different levels of development. Despite recent financial difficulties, Thailand is close to achieving the status of a Newly Industrial Country (NIC), while Cambodia, Lao PDR, and Vietnam are less developed as defined by per capita GDP (Table 1). Lao PDR, Cambodia and Vietnam are all in a phase of transition from centrally planned economies to market-oriented economies.

In spite of international and institutional cooperation on the river basin since 1957, the Mekong River watershed is basically untouched by modernization. There is only one mainstream dam in the upper section and none in the lower Mekong. The river is not extensively used for irrigation or for transport of goods. However, the people living in the river basin use its resources extensively for primary production. The Mekong Committee was set up in 1957 with the mandate to coordinate the development around the Mekong River. Due to the many political conflicts in these countries, the Committee could not pursue its mandate and the Mekong region did not have any large-scale development plans. The Committee was reformed in 1995 as the Mekong River Commission to include all four of the LMRB countries. This was a new start for cooperation in the development of the region.

The MRB Agreement provides an opportunity for

Table 1. Some economic indicators for Thailand, Lao PDR, Cambodia and Vietnam.

Country	GDP real growth 1994 (%)	GDP per capita 1993 (US\$)	Inflation 1994 (%)	Foreign debt 1994 (US\$m)
Thailand	85	1 950	5.0	40 900
Lao PDR	82	280	6.8	2 080
Cambodia	40	250	26.1	472
Vietnam	88	240 (1994)	14.4	19 600

Sources: Statistical yearbook 1995 and Asia Pacific Review 1996.

cooperation among the four countries to pursue common development projects. All four countries have launched growth plans that will result in a sharply increasing demand for electricity and a greater requirement of water for agriculture and aquaculture. Rapid population growth and industrialization place a strain on natural resources. The potential economic value of the natural resources of the basin, whether for irrigation, hydropower, transportation or fishing, is gigantic. The costs and benefits, the risks and potentials are very high. Economic, political, social and environmental interests must be carefully balanced in realizing the potential. The pace of change must be acceptable to the population.

Threats to the Resource Base

The general environmental condition of the MRB is quite good, especially in Lao PDR and Cambodia. However, there are indications of potential problems such as loss of forests, soil erosion, changes in water quality, possibly water quantity, and overfishing. Threats to ecosystem health stem from both general and particular uses. Nonsustainable management of resources, often triggered by population growth and exploitation aiming at fast economic returns, leads to general overuse of resources. Apart from these general threats, the MRB faces a number of specific threats, mainly in the form of plans for large-scale hydropower development and irrigation schemes. These activities usually involve international investments that are not familiar with local conditions.

The total population in the MRB, including the sections of Myanmar and the Yunnan province that are situated within the Mekong watershed, was estimated at 65.7 million in 1995 (MRCS 1996a). The population growth is estimated to be around 2% per annum. In Cambodia and Lao PDR, the pressure on land is not yet as severe as in the Mekong delta and northeastern Thailand. However, the two countries have high population growth rates (2.6% per annum for Lao PDR and 2.8% per annum for Cambodia), so the situation is likely to change. In Lao PDR about 50% of the population is below 15 years of age and is expected to double over the next 25 years

Table 2. The energy situation in the Mekong River basin.

Region	Hydropower potential GWh/year	Power demand 1993 (GW)	Estimated power demand 2020 (GW)	Electricity demand 1993 (TWh)	Estimated electricity 2020 (TWh)	% of households supplied with electricity
Yunnan	71 500	20	112	129	723	19
Myanmar	500	05	25	33	145	7
Thailand	26 100	98	61.8	61.6	411.3	72
Lao PDR	102 300	0.05	03	03	1.8	13
Cambodia	36 300	0.09	08	06	4.9	4
Vietnam	10 000	20	112	124	930	10

Source: MRCS 1996a.

(Öjendal and Torell 1997). This will significantly increase the pressure on natural resources like land and water.

Since the MRB is rich in natural resources such as water, forests, minerals and biodiversity, development strategies will be based on these resources. Unlike the development of the industrialized world, where resource exploitation leading to ecosystem changes took place over a long period of time, the environmental changes in the MRB are likely to occur rapidly if not managed properly. It is unlikely that the Mekong region will have the opportunity to substitute lost resources with imported goods from less developed countries as the western world does. Hence, it is crucial to use an adaptive resource management strategy that is able to detect problems before the ecosystem is harmed beyond recovery. If local communities are involved in development projects it may be possible to find solutions before serious damage occurs.

Large-scale development projects are putting pressure on forest and water resources through logging and hydropower operations. Lao PDR, which has one of the highest ratios of forest cover to total land area in Asia, has experienced a significant decline of forest resources over the last two decades. It is estimated that only about 10% of the remaining forests are commercially valuable (Öjendal and Torell 1997). Cambodia is also experiencing an alarming rate of deforestation. In the early 1990s, illegal logging operations led the forests to be cut at a pace that is three to five times higher than the sustainable rate (Öjendal and Torell 1997). The forest exploitation is an example of resource exploitation driven by individual economic interests instead of a more sustainable development plan supporting the long-term benefit of the ecosystem and the population as a whole.

There is a substantial hydropower capacity in the MRB, although less than 5% is developed. Some dream of Lao PDR becoming a future Kuwait of Indochina, with its many tributaries winding down the hills of the Annamite Chain and the northern highlands and the largest potential for hydropower generation in the LMRB (Table 2). There are many interests, with Thailand in the frontline, that wish to see a large expansion of hydropower in Lao PDR. The economic benefits of hydropower development have to be weighed against potential environmental destruction, lost economic opportunities and

international economic dependency. Hydropower development inevitably leads to local changes in the environment and competes with other economic sectors, such as fisheries, agriculture and tourism, for available resources.

Although there are environmental and social risks attached to hydropower, it is receiving serious attention in the region. There is strong national and regional pressure for the production of electricity. It is a sector, like mining, that attracts foreign direct investments. The full environmental and social costs relating to the development of hydropower should be incorporated in the project cost. If the "polluter pays" principle is adopted, the users of electricity should pay the true value of the resources used. Unfortunately, the users of the resources usually have financial power and political support, while the local people, the environment, and future generations are not organized and unable to exercise political influence. In most projects only the direct costs are considered. In some cases, e.g., the Nam Theun-Hinboun project in Lao PDR, an environmental protection agreement has been negotiated. In this case one million US dollars of the project's budget were allocated for this purpose. This is a minor sum compared to the total cost of US\$280 million (Öjendal and Torell 1997). If the true costs, including the depletion of biodiversity, fish resources, loss of social and cultural values, and decreased access to agricultural land, are imposed on the projects, they may turn out to be relatively poor investments compared to alternative development possibilities.

Another potential threat to both water quality and quantity in the lower Mekong and its tributaries are upstream activities. China has many plans for the use of the waters of the Mekong and is currently constructing a series of dams on the main stream. A large-scale irrigation of the Korat Plateau will also be environmentally destructive for downstream areas. It will result in decreased water flow downstream and lower water quality because of pesticides and acidity, while higher salinity would result if saltwater intrusion increased in the delta. Thailand also has plans for transbasin diversions in the northern part of the country. The two areas most likely to suffer from decreased water quality and quantity are the Tonle Sap Lake in Cambodia and the Mekong delta in Vietnam. The Tonle Sap Lake, covering up to

10 000 square km during the peak wet season, provides one of the most productive fisheries in the world. The lake is extremely rich in plant and animal biodiversity. At the same time its hydrological features, with seasonal changes in the water flow, act as a natural flood regulator downstream. In Cambodia, over 80% of the daily protein intake comes from fish, of which over 60% are caught in the Tonle Sap (Öjendal and Torell 1997). Upstream activities pose a serious threat to the lake and, in a worst-case scenario, the lake area may decrease or even disappear. In this scenario, the depletion of fish and forest resources will have serious implications on the livelihood and food security of the people dependent on them and lead to severe repercussions throughout the MRB.

One reason underlying the regional focus on large-scale hydropower and irrigation projects is that there is an undervaluation of "free" resources such as fish, fuelwood, frogs, snakes and other species caught as a secondary product to rice cultivation. Many of these products never reach the market and their importance is often neglected when estimating benefits and costs of large operations. Subsistence farming, fishing and hunting supports the majority of the population. The scale and design of many development projects are out of tune with the level of development and the capacity of the region. If development proceeds without taking the value of the existing activities into account, and if strategies are not adapted to suit the local circumstances, there is a risk that the development will lead to rapid ecosystem changes which will alter the availability of, for example, fish, fuelwood and arable land. In this scenario, development will most likely benefit only a small proportion of the population and leave the rest worse off.

In summary, the MRB in general and Lao PDR and Cambodia in particular, are presently at a point where they have the possibility of choosing the path they will take for their development and for the management of their natural resources. As of now, most of the threats to the ecosystem stem from general factors. But there are potential threats from development activities. There is a risk that major hydropower development and large-scale water diversions will have a devastating effect on the MRB ecosystem. Therefore, it is essential to involve the various interest groups at the international, regional and local levels, and to thoroughly discuss and study the long term costs and benefits of specific projects. Alternative development paths should also be considered.

Increasing the Role of Local Communities

Large-scale ecological changes are of concern in themselves. If they occur without preparation or consultation with local communities, they are a recipe for disaster. In the words of Hill (1995):

"Failure to include human values in planning and implementation of development projects has resulted in the continuing loss of biodiversity and increased social conflict."

To achieve genuine public participation in the development of the Mekong region may be difficult for several reasons. The development agenda has overlooked public participation and in all four countries there is a wide gap between the modern and the traditional sectors. Modern projects tend not to take cognizance of traditional production and local needs. There is no tradition of grassroots participation in national policymaking. There are no established systems for the local administration to communicate with the local people and vice-versa. The workplan of the MRC is not a result of a participatory process. International or transnational cooperation tends to distance decision-making from the grassroots. Finally, lack of appreciation and knowledge of the livelihood of the local communities and the underestimation of the value of local production will seriously undermine the future existence of the traditional sectors.

Though participation is poor, there is an increasing awareness of the need for involving the local communities – at least in the rhetorical organizational objectives as stated by the MRC's Chief Executive:

"To plan for the sustainable and rational utilization, protection, conservation and management of water resources based on community needs and priorities within the framework of national economic development policy.

To design, implement and evaluate projects and programs that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people, local communities in water management policy-making and decision-making." (Matoba 1995)

One of the largest donors to the MRC states in an internal document that:

"Valuable local experience and knowledge will be lost in the planning process by not involving local participation in the process of priority-setting and decisionmaking with respect to the future development of the Mekong River Basin. It may further lead to situations of dissatisfaction and social unrest, and may hamper/delay or in worst case even block the needed socioeconomic development of the area."

It continues:

"Public participation in the planning and decision making processes should be ensured so that people affected by planned developments have the opportunity to express their interests and see that they are taken seriously. This process will help ensure understanding and acceptance of decisions, and a feeling of shared responsibility."

The Policy and Planning Division of the MRC Secretariat writes in a project proposal, as a part of a direct attempt to address the public participation deficit, that:

"Therefore it is strongly felt that pre-empting these conflict situations should be one of the prerequisites for sustainable development and this can perhaps be accomplished by means of public participation in the various and important stages of planning and developments." (MRCS 1996b)

Finally, an example can be quoted from the UNESCO project on the protection of the Tonle Sap:

"Government agencies must delegate some degree of local control to communities. Decision making bodies that plan and implement policies on natural resources management must have sufficient representation of local people . . . A willingness to negotiate settlements with communities must be displayed at an early stage." (UNESCO 1996)

However, these are ambitions and plans. Which reality do they address?

In Cambodia, probably the most difficult country of the four in which to put these visions into practice, an interesting development is going on in terms of strengthening local participation. Traditionally there has been a very low level of public participation in or political resistance to change. Cambodian culture is hierarchical with few built-in mechanisms for people's participation, at least in terms of people standing up to authority in a constructive way. The experiences of the last decades have reinforced the top-down, centralist approach to development (Ovesen et al. 1996). Recently a number of initiatives on involving local communities have been launched. These changes have been initiated by the development community, either through the work of NGOs or through official development assistance projects such as the Cambodia Area Rehabilitation and Regeneration Project Phase 2 (CARERE2). They have been accepted by the central Cambodian administration and enthusiastically supported at and below the provincial level. The idea with CARERE2

is that the local communities analyze their own situation and plan on how to improve it. Villagers as well as the local administration are involved in the process. While this CARERE2 experiment is limited to five (out of 21) provinces, similar initiatives are being pursued in other parts of the country and the idea of Village Development Committees (VDCs) is slowly taking root. The Ministry of Rural Development is now a staunch supporter of the idea and plans to make it nationwide. A limiting factor is the lack of communication between various levels of the administration, and the lack of economic, knowledge, and technical resources and skills. Economic liberalization and administrative reforms have reduced and impoverished local administrations, which makes collective action much more difficult. Local leadership and management has not been able to effectively organize local communities due to a lack of trust.

In Lao PDR, the situation is less plagued by social inertia and lack of self-organization. Local communities are probably quite capable of managing their own resource use. Major construction projects at the village level provide a clear example of how the community organizes sustained cooperation for the benefit of all. Schools, pagodas and irrigation dams are common examples where the community mobilizes large amounts of labor, material and sometimes money (Ireson 1996). There is no tradition of local organizations opposing the State. In addition, the State has had very little presence in local villages in remote communities and has little knowledge about them.

In both Cambodia and Lao PDR, therefore, it will require much more than launching a project on public participation or writing objectives in project documents to ensure genuine and effective consideration of local issues.

Actions and Reactions to the 1995 MRC Agreement

To what extent has the MRC Agreement affected the situation?

Both Lao PDR and Cambodia have two overarching contradictions. First, they are both highly dependent on the existing resource base of the lower Mekong region and its sustainable use. On the other hand, they are dependent on utilizing it and changing it in order to accommodate population growth, national economic growth and development imperatives. Second, they do not have much political weight in international fora, but they need to be involved in the international cooperation on Mekong issues. Lao PDR is aware of the need to balance the benefits of development of the river and the possible economic and political damage this could have on downstream countries. For this, regional communication and cooperation is of the utmost importance. Consequently, Lao PDR has welcomed the MRC

Agreement and has been working seriously in order to fulfill its undertakings. The MRC Agreement dictates what Lao PDR *can do*, but not what it *cannot do*.

Domestically, the Agreement has few implications for Lao PDR. Currently, there are no plans for any diversion of the Mekong River nor for any mainstream dams. Several hydropower projects are, however, planned on the tributaries (Öjendal and Torell 1997). These would have been planned even without the Agreement. They have been criticized for lack of sustainability and lack of public participation. However, this criticism has little to do with the Agreement. The Agreement states that "On tributaries of the Mekong River, including Tonle Sap, intra-basin uses and inter-basin diversions shall be subject to notification to the joint committee" (Agreement 1995, Art. 5), but gives no concrete limitation as to what can be done with domestic tributaries to the mainstream. The Agreement protects against "substantial damage" (Article 8) and tries to safeguard "...the environment, natural resources, aquatic life and conditions and ecological balance of the Mekong River Basin from pollution or other harmful effects resulting from any development plans and uses of water and related resources in the basin." (Article 3). Neither of these clauses protects against construction on tributaries.

In the international context, the Agreement has given Lao PDR a clearer frame of what it can do, without really impeding any of its existing plans. Domestically, the importance of the Agreement will depend on the type of projects implemented in the future.

Cambodia is a downstream country, receiving problems instead of creating them. It is less concerned about the damage it causes and more about the damage caused by others. The Agreement serves as a means for Cambodia to protect itself against possible harmful effects of change in the Mekong water regime. The protection of Tonle Sap has a special clause (Article 6) in the Agreement and the mechanism for prevention of harmful effects downstream is certainly better than the Cambodian government could have accomplished bilaterally. Cambodia has consequently reacted very positively to the conclusion of the Agreement and there is a widespread consensus in all formal bodies in Cambodia that the Agreement is good for their country. There is a growing concern about the Basin Development Planning (BDP) process as Cambodia is negotiating from a position of weakness – downstream location and high dependency.

Within Cambodia the agreement has become very prominent. In the absence of a Water Law or even a National Water Policy, the Agreement has become a major policy document. When the national policy document and laws are worked out, they will have to be adapted to the Agreement. A number of consultancy reports commissioned by the MRC have also become major policy documents in themselves, rather than policy tools, dictating approaches and developments.

To sum up, the MRC Agreement has given Cambodia a certain protection from upstream activities and clarified its international position. Domestically, it has become a key instrument in establishing a national water policy. At the local level it has so far meant little.

Conclusions

Water wars are not likely in mainland Southeast Asia. However, social and economic difficulties at a local level are likely to appear if the development and utilization of the resources of the MRB do not take them into consideration. The conclusions of this paper are:

- In societies based heavily on primary production the inherent value of the ecosystem must be recognized and development must be founded on win-win solutions that balance the need for sustainable ecosystems and economic development.
- For development to be synchronized with ecosystem changes, development of the MRB must focus on the ecosystem, must integrate the interests of different user-groups and coordinate the regional and international actors and programs.
- Local ownership of the development process is crucial for good results. Therefore, the development process should not be donor driven. The MRB countries should, in their local and regional development efforts, present solutions to issues such as ecological sustainability and public participation to which the donors could then react.
- The MRC Agreement should not be seen as a fixed and final blueprint for future development but as a tool and a framework for the planning and management of future development. As such, it gives the countries a common platform from which they can proceed, adapting development to local as well as regional conditions and demands.
- It is important not only to focus the development process on national and regional issues, but to acknowledge local needs and interests. For management to be in synchronization at all levels, regional and national development processes should be linked to local management initiatives. It is important to spur community-based management efforts. Local developments will provide lessons of significant importance to the national and regional development process.

To achieve the above, it is necessary to establish communication between the four (or even better, six) states in the basin aiming to build mutual trust between the major stakeholders. In the current context of economic development and of resource exploitation in the basin, a high-level political commitment to obviate the risks between private and public exploitation, and regional and national authorities needs to be established. The MRC Agreement is a necessary, but far from a sufficient, policy document.

Planning and management should not stop here, it starts here. The BDP must be a flexible instrument that can adjust to coming changes.

References

- Asia Pacific Review. 1996. Basic statistics about the socioeconomic situation in Lao PDR. Far Eastern Economic Review, Hong Kong.
- Hill, S.A. 1995. Integrating human values and cultural diversity into sustainable development in a watershed ecosystem. Paper presented to the Mekong International Technical Workshops for Sustainable Development through Cooperation, 28 November-2 December 1995. Washington, D.C., USA.
- Holling, C.S. 1995. What barriers? What bridges? In L.H. Gunderson, C.S. Holling and S.S. Light (eds.) Barriers and bridges to the renewal of ecosystems and institutions. Columbia University Press, New York, USA.
- Ireson, W. R. 1996. Invisible walls: village identity and the maintenance of cooperation in Lao PDR. *J. South. Asian Stud.* 27(2):219-244.
- Johnston, R. and S. Olsen. 1998. Towards a typology of coastal management contexts: a comparative analysis of long-term coastal ecosystem change. *Coast. Manage. Rep.* 2203. Coastal Resources Center, University of Rhode Island, USA.
- Lee, K. N. 1993. Compass and gyroscope: integrating science and politics for the environment. Island Press, Washington D.C., USA.
- Matoba, Y. 1995. Note on the collaborative roles of the Mekong River Commission (MRC) in relation to the other subregional initiatives. MRCS, Bangkok, Thailand.
- McCully, P. 1996. Silenced rivers—the ecology and politics of large dams. ZED Books, London, UK.
- MRC Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin. 1995. The Kingdom of Cambodia, Lao People's Democratic Republic, The Kingdom of Thailand and Socialist Republic of Vietnam.
- MRCS (Mekong River Commission Secretariat). 1996a. Mekong River Basin diagnostic study, final draft. International Environment Management Co. Ltd. and Global Environment Consultants.
- MRCS (Mekong River Commission Secretariat). 1996b. Terms of reference: preparation of the Mekong Basin Development Plan (Phase II). MRCS, Bangkok, Thailand.
- Öjendal, J. and E. Torell. 1997. The mighty Mekong mystery. *Publ. Water Resour.* 8. Department for Natural Resources and the Environment.
- Overson, J., I.B. Trankell and J. Öjendal 1996. When every household is an island. Social organization and power structures in rural Cambodia. *Uppsala Res. Rep. Cult. Anthropol.* N15. Uppsala, Sweden.
- Starr, J. 1991. Water Wars. *Foreign Policy* 82 (Spring):17-36.
- Statistical yearbook 1995-1996. 1995. Socialist Republic of Vietnam, General Statistical Office. Hanoi, Vietnam.
- UNESCO (United Nations Educational, Scientific and Cultural Organization). 1996. Strategy and action plan for the protection of the Tonle Sap watershed. Phnom Penh, Cambodia.

Managing the Mekong Commons – Local, National and Regional Issues

Philip Hirsch

Department of Geography, Sydney University, Sydney, Australia

HIRSCH, P. 2000. Managing the Mekong commons—local, national and regional issues, p. 19-25. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

This paper investigates common resource tenure and management issues in the Mekong basin. Tenure is particularly fluid in this region due to rapid political and economic change and an accelerated infrastructure and resource development agenda. The paper looks at tenure questions with regard to resources managed in common at several levels—regional, national and local—within a number of resource sectors, including water, forests, fisheries, and land.

At the regional level, issues of common management between riparian States are discussed with reference to water and fisheries. At the national level, a comparison is made between these countries with regard to co-management of forest resources. At the local level, the paper discusses management issues within Lao PDR, drawing on case studies of local experience in tenure and management of fisheries and forests.

Introduction

This paper seeks to cross a number of boundaries. To begin with, the regional context raises issues of transboundary management of aquatic and terrestrial resources. Furthermore, within a complex and highly interdependent macroecosystem such as the Mekong basin, boundaries between narrowly conceived resource sectors need to be broken down. There is also a scale boundary to be transcended, as local, national, regional and global commons are significant in the Mekong basin. To this end, the paper takes discussion beyond local common property concerns. Scaling up from the local level brings in national issues of property rights and natural resource management in the context of political and economic change in the transitional economies of Indochina. Regional cooperation also raises issues of resources held and managed in common by several countries.

The paper attempts to address common property issues in a relational rather than a hierarchical way. Local common property issues are not looked at as just a subset of common property questions in the national or regional context. The relationship between the problems of sharing of resources among countries, on the one hand, and among local users, on the other hand, is examined. The paper asserts the need to avoid prioritizing the international dimension of resource sharing above local issues, while also pointing out the limitations of overly localized approaches to managing common resources.

Shared Resources in the Mekong Basin

The Mekong basin covers 795 000 km² in six countries—China, Myanmar, Lao PDR, Thailand, Cambodia and Vietnam. The basin's land, water, forest and fish resources are the basis of the livelihood of approximately 65 million people. These resources are shared at several levels.

Resources are shared due to the transnational character of the basin. Water used by an upstream country, for example, may be lost to a downstream country on a temporary, seasonal or permanent basis. For example, river levels in northern Lao PDR were unusually low for several months while the Manwan Dam in China was filling in 1995. Plans for large-scale water diversions such as the Khong-Chi-Mul scheme in northeastern Thailand have significant implications for seasonal water availability in the Mekong delta in Vietnam. Smaller diversions would take water out of the basin altogether. Fig. 1 shows some of the proposed intra and interbasin water transfers in the Mekong region. Most of these have a transboundary dimension. Even within the individual countries, transboundary issues between provinces reflect the shared nature of the resource. For example, lower delta provinces in Vietnam are concerned about irrigation developments in the upper delta that will affect freshwater availability, saline intrusion and acid sulphate leaching into lower delta waterways.

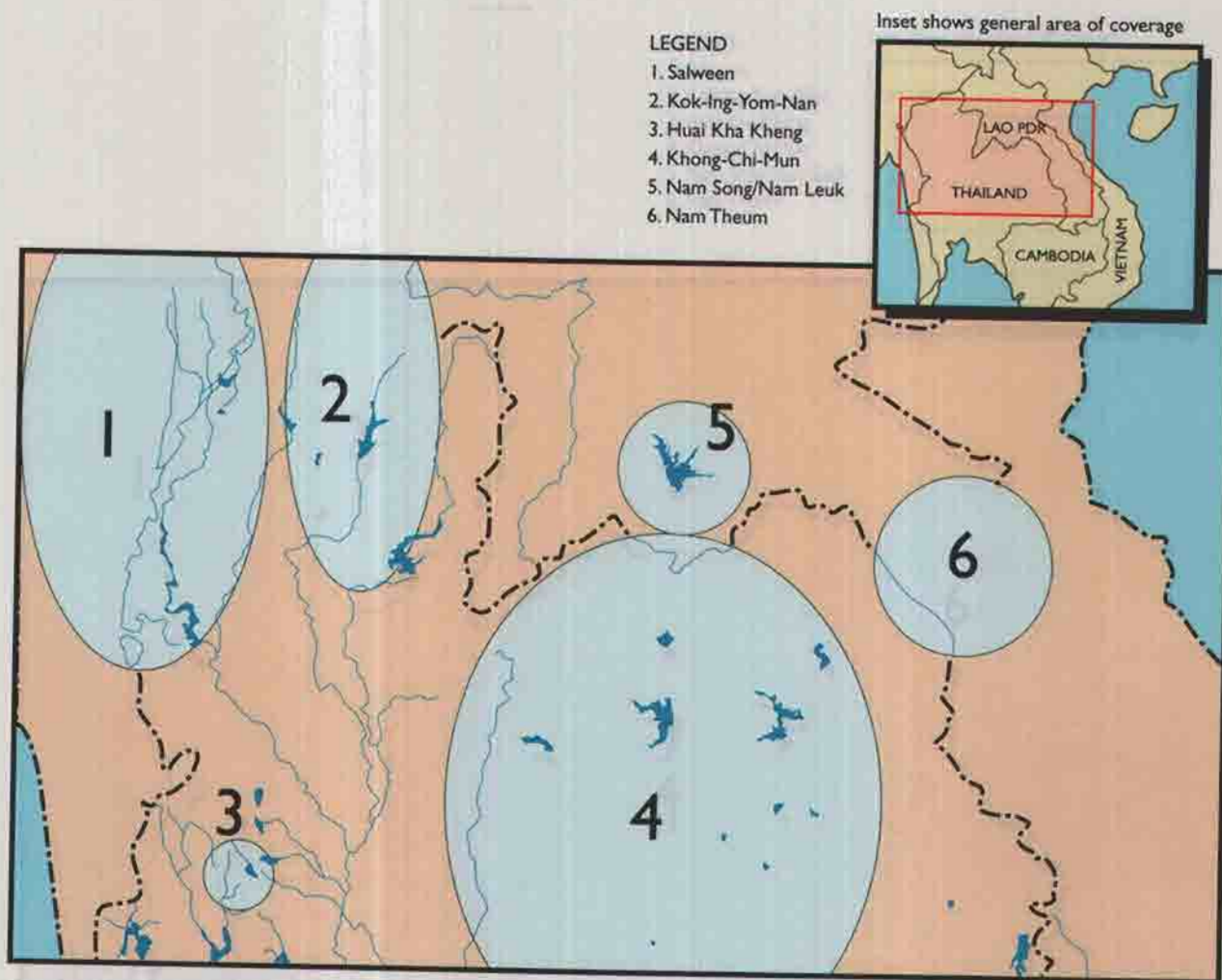


Fig. 1. Some proposed diversions in the Mekong region.

While water has been the main subject of international agreements in recognition of the transboundary nature of this common resource (Ojendal and Torell, this vol.), other resources are also mobile and hence shared. Migratory fish constitute a significant proportion of the more than 1 200 species of ichthyofauna that make the Mekong the third most biodiverse river system in the world. Fishers in southern Lao PDR, for example, share their resource with fishers living on the shores of Cambodia's Tonle Sap (Great Lake), so that management of key species (for example the endangered *Probarbus jullieni*) only makes sense within a transboundary framework. Moreover, such management requires attention to factors other than the number of fish taken out in different places. If spawning habitats are destroyed by clearing of flooded forests in one country, or if migration routes are blocked by a dam in another, fish are lost to fishers elsewhere in the system. Managing such a shared resource requires a holistic approach that transcend both national and resource sector boundaries.

Resources in the Mekong basin are also shared through trade. Rapid development of trade in the Mekong region has greatly increased the crossborder

flows of resource-based commodities. Much of the hydropower development agenda of the Mekong basin is predicated on international electricity sales, from Lao PDR to Thailand, from southern China to Thailand, from Cambodia to Thailand and Vietnam, and possibly from Lao PDR to Vietnam. Trade in forest products has greatly increased after a logging ban was imposed in Thailand in 1989. Despite a ban on export of aquatic fauna from Lao PDR, there is a significant trade in fish to serve the Thai market, placing further pressure on an increasingly stressed resource.

Resources are shared at a local level through a range of traditional and new arrangements for collective management. Communal irrigation schemes share certain common characteristics in parts of all the six Mekong countries. Similarly, customary management of forests and forestlands is increasingly recognized in a range of different forest management systems. Local wetlands and some river courses have been subject to communal fisheries management.

Finally, Mekong resources are shared in the widest sense in that the biodiversity of some parts of the basin is sufficient to characterize them as global common property embodied in the notion of "World Heri-

tage". This global value implies also a global interest and responsibility for the direct opportunity costs of conservation.

Political and Economic Changes Affecting Common Property Arrangements

The Mekong region is undergoing a process of political and economic development with significant implications for property rights, administrative structures and governance of local and national commons. Some of these are discussed below.

Resource development agenda

Development of mainland Southeast Asia is closely associated with a major agenda of infrastructure and natural resource development in areas where physical isolation and geopolitical conflict have until recently precluded large-scale projects. Numerous mining, forestry and hydroelectric schemes in the Mekong basin have attracted interest from international investors and multilateral development banks. Large projects place significant demands on the local resource base and they usually have implications – notably downstream impacts – for resource users further afield. This immediately raises the question of whose resource is being developed, by whom, under whose authority and control, and in consultation with whom. In areas where customary rights have taken precedence in allocating resources between and within local communities, and where competition and conflict over the resource base have previously not been an issue, the resource development agenda can immediately raise questions of national versus local common property rights.

Privatization of resource and infrastructure development

Over the past decade, the transition economies of Indochina have carried out reform of economic mechanisms and property rights regimes. The move from a command economy to a market economy has been associated with privatization at various levels. In the common property area, the most obvious part of the privatization agenda is the move from collective to household agricultural production through the decollectivization process. However, there are also significant implications on a broader scale. In the Mekong basin, there is a move towards privatization of large-scale infrastructure projects that would earlier have been built with public financing. New schemes are now more typically financed under a variant of the build-own-operate-transfer (BOOT) model. This involves negotiated agreements between major international consortia and governments that effectively provide a lease on a natural resource for an extended period, during which revenues are shared between the return on equity for the

corporate investor and royalty for the host government. Appropriation of resources from local communities is at best compensated through a combination of cash and resettlement arrangements. The mechanisms for taking into account local common property are still poorly developed in the context of such programs.

For example, the standard procedure for a hydroelectric project in Lao PDR is for an international consortium of investors to negotiate a memorandum of understanding (MOU) with the national government that gives the investor first call on leasing the river, land and forest area in question. If the project is taken further, an environmental assessment then addresses the on-site impact on the land and forest area to be flooded, the hydrological implications for downstream flows in the river being dammed and, in the case of a diversion, the receiving system, the impact on fisheries due to impoundment and barrier effects, etc. Rarely will such an assessment take into account the range of customary and legal property rights regimes governing access to and control over such resources as part of an integrated social and environmental assessment process. There is systemic alienation of local property rights due to corporate and state usurpation.

Policy reform

There is wide-ranging policy reform in the field of natural resource management. This is partly associated with a range of forestry, fisheries, watershed and land titling projects. More generally, the policy reform agenda is related to a restructuring of local, provincial and national roles in decisionmaking and resource allocation.

In both Lao PDR and Vietnam, there are opposing trends in the centralization and decentralization of authority over natural resources. For example, on the one hand, provincial autonomy in forest exploitation and management has been reduced with the rationalization of national forestry programs under central government control through a line-ministry approach. On the other, both countries have taken significant steps in the partial devolution of forestland management to the local level through programs at the household level in Vietnam and at the village level in Lao PDR. This contrasts with Thailand, where the issue of community rights over forestry land has been bogged down in a long-standing community forestry bill, whose genesis is closely associated with local challenges to state and corporate interests and community claims of rights to manage.

In each country, different departments and ministries take different approaches. In Lao PDR, the Department of Forestry has established a local forest management policy through a series of regulations, decrees and laws that are handed down through provincial and district governments. In principle, some of these regulations allow for community input based on existing customary management practice. In fact, the degree of participatory implementation has been quite erratic (Phanvilay, this vol.). The Department of Livestock and Fisheries, on the other hand,

currently takes a cautious and hands-off approach to regulation and management of local fisheries.

The environment of policy reform offers a number of opportunities for developing co-management arrangements. Co-management of forests and fisheries involves development of a *modus operandi* for joint community and State management, but also involve regional issues. Just as there are limits to the effectiveness and equity of State control over the local resource base, so there are limitations to community management of natural resources that are shared at a wider level.

International common property in the Mekong basin

The most important international common resource in the Mekong basin is water. While it is possible to calculate the contribution of each riparian country to the total water availability in the basin, use of water in one country has direct implications for water available to downstream countries. The 1995 Agreement for the Sustainable Development of the Mekong River Basin that underlies the Mekong River Commission (MRC) is largely concerned with water sharing. The absence of China and Myanmar from the MRC limits the efficacy of the Agreement. Furthermore, the implications of upstream water development go well beyond downstream water availability. The integrated nature of a river basin ecosystem means that terrestrial resources are also affected. For example, upstream impoundments have implications for salinity intrusion in the delta area, with potential impacts on land resources. Similarly, terrestrial resource exploitation, such as clearance of about half the basin's forest cover over the past generation, has major – but poorly studied – impacts on aquatic environments.

While water is international common property both through the physical characteristic of the resource (it flows across borders) and through its international trade value (notably through cross-border hydropower sales), fish are international common property primarily due to their biophysical (migratory) characteristics. However, they remain a primary subsistence resource, comprising an estimated 40 to 80% of the animal protein consumed by local people (Mekong Secretariat 1992). Fisheries are also the least understood natural resource in the Mekong basin. Though taxonomy is the best documented aspect of Mekong fisheries, there are a large number of species yet to be identified. Meanwhile, the migration, spawning and stock patterns of individual species are only partially known and are the subject of large assessment projects in the four lower riparian states. There is also very limited understanding of customary fishery management practices and structures, and of how these are changing and adapting in the context of new pressures and opportunities.

National common property in the Mekong basin

In Lao PDR and Vietnam, state property is still often characterized as the "property of the people". This sense

of natural resources belonging to the people has a superficial democratic aspect, but it can also imply that customary tenure involving locally delimited common property will not be acknowledged. The move from command to market economy structures involves a revamped system of property rights, with associated tensions between the State and the local communities as the "national common property" is either privatized or placed under the jurisdiction of State agencies. However, a considerable scope still exists for delimiting and distinguishing between State and community ownership and management rights and responsibilities. Such delimitation is particularly significant in forestry and fisheries. This marks a significant difference between these countries and Thailand, as the latter has legislated a much more rigid distinction between State and private tenure. Some of the rigidity are, however, starting to erode as Thailand moves to implement the 1997 Constitution that provides significant involvement and participation by local people in the planning and management of natural resources (Thailand 1997; Torell, this vol.).

The local Mekong commons

Local commons continue to play a significant role in the lives of the farming and fishing communities in the Mekong basin. Timber for house construction, non-timber forest products, stream watersheds and forests are subject to well-documented customary rules, regulations, prohibitions and sanctions in northern Thailand, the central highlands of Vietnam, southern Yunnan province and much of rural Lao PDR. *Muang faai* (weir and distribution channel) irrigation schemes also involve local management of a resource held in common by a defined set of users. Grazing land is also usually held in common though rarely recognized by formal titling schemes.

Fisheries management is less well documented so that policy is sometimes predicated on the notion of fish as an open access resource. Nevertheless, closed or wetland fisheries in the Mekong basin have established rules for community management. Management of more open waterways also recognizes the local common property nature of this resource through prohibitions on the use of certain types of destructive fishing equipment such as explosives, poisons and fine-meshed nets. More complex and controversial is the establishment of local conservation zones in the Mekong mainstream to protect a resource that is largely supra-local in its nature. In some cases, these zones have been established in the name of community management by decree from above.

Local commons in the countries of the Mekong basin remained relatively uncontroversial, despite their ambiguous tenure status under the law, until other claims were placed on the resource. The rapid pace of infrastructure and resource development is now making numerous such claims. In the case of private property, appropriation of the local resource base in the name of wider development is usually dealt with by compensation in cash or kind. In the case of common property, however, compensation and

mitigation methodologies are very poorly developed even where the impact on local forests, small irrigation facilities, grazing land or fisheries is quite direct. Where such impacts are less direct, particularly where there are spatially distant and cross-jurisdictional issues, common property becomes yet more vulnerable to externalities from large development projects. Local commons thus become part of national and international issues of resource sharing. In the Mekong basin, it is only in Thailand that institutions of civil society are sufficiently developed to allow for collective claims by those dispossessed of common property, enabling local issues to be heard at the national and sometimes international level.

A Case Study of Common Property in the Mekong Basin: Champassak Fisheries

The fisheries of southern Lao PDR are among the most diverse and important in the Mekong basin. This is reflected in the biodiversity, particularly around the Khone Falls area that serves as both biogeographic divide for Mekong ichthyofauna and as an important site for migration studies. It is also reflected in the diversity of aquatic ecosystems. The Mekong mainstream, tributaries,

backswamps, streams, inundated ricefields and aquaculture ponds all present different biological niches and management challenges at different levels.

The district of Sanasomboun in Champassak province (Fig. 2) borders a stretch of the Mekong River. It contains the lower 50 km of the Sedone River before its confluence with the Mekong at Pakse. Its 85 villages contain a number of backswamps seasonally linked to the Sedone tributary. The streams provide different types of fishing opportunities in the wet and dry seasons. The ricefields are also a source of fish and other aquatic organisms. The property regimes are described briefly for each of these aquaecosystems.

Ricefield fisheries are normally household-based and are, therefore, seen as private or individual property. However, the vulnerability of ricefield fisheries to pesticides and other environmental influences associated with intensification of cropping systems means that there is a potential need for cooperative arrangements to deal with local externality issues. Moreover, in most villages, frogs and the toads are common property as they can be caught in the neighbors' ricefields. However, there are sanctions on people coming from outside the local area to collect such organisms and on excessive marketing of amphibians.



Fig. 2. Sanasomboun district, Lao PDR.

Smaller streams are subject to seasonal tenure rules. During the wet season, fish are caught by local villagers along the length of the stream course, using a variety of *ton* traps. As the streams dry out (beginning in February or March), barrier traps are set up to hold fish back in deeper pools that become isolated from one another. Each pool is held in common by several households belonging to a descent group (*takun*), and specific rules govern when fish are caught, how they are to be divided, and who can be invited to fish in the pool. By April, only eels survive deep in the mud and these are also the common property of the descent group.

Floodplain swamps are associated with a range of tenure rules based on community arrangements. In two of the villages with backswamps seasonally linked to the Sedone River, these arrangements focus around the annual tradition of *phaa paa* (dividing the fish) – a collective fishing-out of the catfish, snakehead and smaller fish. The fish that are caught have spawned from mature fish that enter the swamp early during the wet season as water spills over from the Sedone River. Rules vary from one swamp to another. In Khamyaad village, the Bungkhaa backswamp is open to fishers from surrounding villages on the day of the *phaa paa*. However, smaller pools dug out around the edge of the swamp are household property. Both the open nature of the *phaa paa* here, and the seemingly private aspect of individual enclosures, are based on rules set by a clearly defined village level management system and are associated with propitiation of resident spirits. There are similarities between this system and that governing a backswamp at Solonoi further downstream. However, the fishing out of this swamp is strictly limited to residents of the one village, with no individual enclosures permitted. Recent changes in the Khamyaad and Solonoi management systems have resulted from the release of fingerlings. More specific access rules have been established, and a certain portion of the extra catch has been set aside to supplement community funds.

The Sedone tributary is not subject to exclusionary practices as are the smaller fishery environments. However, prohibitions on destructive practices, such as the use of seine nets, fine mesh nets, poisons or explosives, are governed by community sanction. At present, there are no comprehensive mechanisms for state enforcement of sanctions or regulations. The Sedone tributary in Sanasomboun contains Lao PDR's earliest hydropower project, the Selabam Dam. While this 3 MW scheme is very small (compared with the many larger schemes slated for most of the country's major tributaries), has a limited headpond and has a parallel natural stepped fall that allows for some fish migration, there are indications that fish composition above and below the dam is quite different. This is likely to be much more significant with the larger power schemes. Moreover, these larger schemes also involve new reservoir fisheries, though with poorly defined

tenure.

The Mekong fisheries in Sanasomboun and elsewhere are not subject to local common property rules as the fish are highly migratory. In 1993, villages along the Mekong were instructed by some local authorities to set up fishing conservation zones. In the island village of Don Kho, for example, a 50 m strip on the eastern side of the island was declared a nominal no-fishing area. A deep pool conservation zone south of the island at Vern Khong was established as part of a project to establish *wang paa* (fish palaces) elsewhere in southern Lao PDR. This project is administered by the Department of Forestry through its Wildlife and Fisheries Division. The Department of Livestock and Fisheries (DLF) is less enthusiastic about such zones, seeing them as based on little scientific evidence of their conservation values. The notion put forward by DLF can also be a sign of different viewpoints on institutional roles. Some local people describe the ban on fishing at Vern Khong as "cutting off their hands and feet" as it covers important fishing grounds and have ceased to respect the ban. There is a strong awareness of the international nature of the resource and local fishers on the Mekong in southern Lao PDR see little point in refraining from using a resource that is being utilized across the border in Cambodia. Elsewhere in southern Lao PDR, there is more support for no-fishing zones. The international dimension is also apparent in the increase in extraction of key species for sale across the border to Thailand.

Different fisheries within a single localized area of the Mekong thus involve sharing and joint management arrangements at a number of levels. Similarly, these fisheries are subject to pressure involving both endogenous and exogenous influences. Overfishing is due both to endogenous factors such as population growth and adoption of new technologies, notably gillnets. Exogenous influences such as domestic and international markets also play a role. Environmental impacts on the fishery range from localized problems associated with pesticide use to large-scale modifications due to hydropower and other development elsewhere. Dealing with these influences requires attention to the level at which they are manifest.

Conclusion

When we speak of common resources, it is often assumed that it is mainly at the local level. This paper has raised issues of common property at other levels. The international resource sharing inherent in the development of hydropower and other infrastructure development requires institutional means for international management of the basin and it requires attention to the common property arrangements that already exist at other levels.

The ambiguity and indeterminate nature of resource tenure with respect to many resources that form the basis for subsistence of the people in the Mekong basin is exacerbated by the rapid pace of political and economic change. Without close attention to common property arrangements at all levels, the competition and conflict among the many stakeholders in the region's land, forest, fish and water resources can only be expected to intensify.

References

- Mekong Secretariat. 1992. Mekong work programme: ongoing and proposed. Committee for Coordination of Investigations of the Lower Mekong Basin (interim). Bangkok, Thailand. 146 p.
- Thailand. 1997. The Constitution of the Kingdom of Thailand. B.E. 2540. Bangkok, Thailand.

Institutional and Legal Perspectives on the Management of Aquatic Resources in the Mekong River Basin*

Magnus Torell

International Center for Living Aquatic Resources Management - The World Fish Center, P.O. Box 500, GPO, 10670 Penang, Malaysia

TORELL, M. 2000. Institutional and legal perspectives on the management of aquatic resources in the Mekong River Basin, p. 27-33. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

The Mekong River basin is rich in aquatic resources that are critical to the livelihoods of the poor inhabitants of the region. Unfortunately, these resources are grossly undervalued and the existing legal and institutional structures are not adequate to protect and manage them in a sustainable manner. The legal structures are fragmented and the institutional responsibilities are often conflicting. There are no mechanisms for existing traditional systems and customary laws to be incorporated into the legal and institutional structures that are being developed. The problem is exacerbated by the fact that these structures are being developed with the assistance of external aid agencies and experts who are not aware of traditional systems and practices in these countries and tend to superimpose their own systems in an environment with totally different requirements. The fact that the real value of these resources for the local communities is not recognized or documented means that the assessment of the costs and benefits of development projects may be flawed.

Introduction

Throughout the Mekong River basin, fish and other aquatic products (such as frogs, eels, snails, crabs, etc.) found in "commons" like wetlands and floodplains are central to the livelihoods of the rural poor with limited ownership of productive land. These areas are being threatened by encroachment, overexploitation, destructive practices, pollution and environmental degradation, both man-made and natural. Governments, NGOs, scientists and others recognize the need to stop the degradation of the catchments, wetlands and other waterbodies and their resources and to ensure that these are utilized in an equitable and sustainable manner. However, policy responses have been generally weak and uncoordinated. National government jurisdiction and authority over natural resources tends to be fragmented and governments lack the capacity to monitor resource use or to enforce regulations.

A major problem that hinders sustainable use of natural resources is the lack of ability, willingness, and/or functioning systems to address the many different

factors that need to be considered in designing viable options for resources management. In the Mekong River basin, there are no clear legal, policy or institutional frameworks for safeguarding the natural resource base and protecting the interests of the poorer communities in terms of access rights and equity. The valuation or assessment of "common property resources" is very important for policy planning. In spite of their importance in the local (and national) economy, these resources are usually undervalued, which makes them very vulnerable to encroachment and degradation by those not dependent on them.

In this paper "wetlands" refer to the whole range of wet areas, seasonal or permanent, listed in Annex 1 and include near-coastal areas, lakes and rivers, ricefields and man-made ponds, i.e., all wet areas of the region.

"Wild wetlands resources" refer to all noncultured animals and plants that are used for human consumption or production such as fish, snails, frogs, eels, snakes, crabs, etc. In this context, the value of these resources in terms of their tourism potential should also be considered among their uses.

Background

As a background, a description of geographical, political, ecological, cultural, and socioeconomic factors is important for planning of natural resources management systems. Extensive overviews can be found in Hirsch and Cheong (1996), MRC/UNEP-EAP (May 1997 and June 1997), and Öjendal and Torell (1997), so these are not considered in this paper.

Lack of information and understanding

A review of existing literature on the geographical, economic, and sociological aspects of the region indicates that there is a lack of information on key natural resources (such as fish) and their value to the local population. There is also a lack of understanding of the local, national and regional importance of these resources. The legal structures and administrative responsibilities for planning and management of natural resources are not well defined. The roles and responsibilities of central and local authorities as well as the rights and responsibilities of local communities and other users, are not very clear.

In principle the "Agreement on the Cooperation for the Sustainable Development of the Mekong River" is intended to be a region-wide wetlands program covering all the water areas (seasonal as well as nonseasonal) of the basin (MRC 1997). However, there is a tendency to view all wetlands projects as "environmental" projects rather than for the integrative, productive use of the natural resources by several sectors. This can, in turn, lead to additional complications in approach.

Valuation of resources

Wetlands are central and basic to the whole region, its development, its people and the cultures that have emerged in the region. As expressed by King Ramkamhaeng around the year 1300 (during the Sukhothai period of present Thailand): "there are fishes in the water and in the rice fields". It is worth remembering that the fields referred to are wetlands, which have a lot of aquatic products besides rice and fish. The expression is also an indication of the importance and expected availability of fish as a central source of food.

Wetland resources have not been very well recorded in official statistics probably due to the abundance and relatively free access to freshwater aquatic products. Household surveys are being conducted to make an assessment of the amount and value of the consumption of these products. Such surveys are being done within the framework of Mekong River Commission's (MRC) Fisheries Programme and Asian Institute of Technology's Aqua Outreach Programme (see Gregory et al. 1997 and Ahmed et al. 1998, for examples). There has been no real assessment of the value and the potential for development of tourism in the region. Nor has any attempt been made to estimate

the loss resulting from deterioration of the environment resulting from other development projects (Öjendal and Torell 1997).

The undervaluation of natural resources and the external costs of development projects has major implications for planning and policy as these do not reflect the true economic benefits and costs of various options. This tends to favor urban-based needs and/or options related to intensive agriculture schemes. While this is not an argument against urban development schemes per se, it is an indication of the need to assess all options and opportunities based on adequate information on all tradeoffs.

Environmental impact assessments

The countries of the region are in different stages of the development of laws and schemes with regard to environmental impact assessment (EIA). The real value of wild wetlands products should be used for EIAs. If not, these resources will be more vulnerable to encroachment by competing users and the economic (and subsistence) value of these resources to the rural poor could be reduced and their means of livelihood lost.

Legal and Institutional Development

The history of legal and institutional development is quite different in the four member countries of MRC. Only Thailand has had a long unbroken history of development of legal and institutional structures from the Sukhothai period (1238-1378) up to the 1997 constitution. The development in the other countries has been more fragmented. In Cambodia, this is exemplified by:

- up to 1870s - pre-colonial systems based on traditional Khmer laws and institutions prevailed;
- 1870s to 1954 - French systems were progressively superimposed;
- 1954 to 1975 - a dual system of French and traditional laws was maintained;
- 1975 to 1979 - the Khmer Rouge scrapped all laws and legal institutions;
- 1979 to 1991 - the State of Cambodia established a system of revolutionary people's courts;
- 1992 to 1993 - the United Nations Transitional Authority in Cambodia (UNTAC) period; and
- 1993 to present - 21 September 1993, the constitution of the Kingdom of Cambodia was promulgated (Cambodian Working Group Team 1998).

This provides a background to the struggle to develop and establish functional legal and institutional systems and to understand the traditional systems that affect peoples' willingness to follow rules and regulations. Cambodia is very much in the middle of this struggle.

Lao PDR and Vietnam have also had radical shifts in legal and institutional development.

Throughout the Mekong River basin there are no well-developed systems for local management of commons and wild wetland resources (Chircop and Torell 1997; Jerndal 1997; The Nation 1997). Access rights and ownership systems are not clearly defined. In Vietnam, it is still not possible to own land privately or collectively (Chircop and Torell 1997). User rights are based on long-term leases. There are no guarantees for continuous or long-term user rights for wild wetlands resources and there is a risk of encroachment by outside development projects

In the absence of formal systems for allocation of rights to exploit and manage the wild wetland resources, existing practices like sharing of user rights and management are based on customary laws and practices that are unwritten. Therefore, the successful implementation of locally based management schemes and the sustained and improved well-being of local communities will depend on the extent to which traditional practices and customary laws and rights are integrated into the mainstream legal, institutional and policy structures.

Constitutional basis for local management and customary law

Cambodia

In principle, the necessary elements are present in the constitution of Cambodia. The constitution states that "All persons, individually or collectively, shall have the right to ownership" (Cambodia 1993, Article 44). The Article goes on to specify that only Khmer entities and citizens shall have the right to own land. "Commons" (in a broad definition) are considered as "state property" and their use and management are to be determined by law (Cambodia 1993, Article 58). There is no direct reference to customary practices.

Lao PDR

The Lao constitution provides, in principle, a sufficient base for local management and customary law. For instance, Article 8 states that "All ethnic groups have the right to protect, preserve and promote the fine customs and cultures of their own tribes and of the nation" and Article 14 states that "collective and individual ownership" is recognized (Lao PDR 1994). There are, however, a number of provisions that could imply reduced rights for local communities. For example, the use of customary law such as "the rights (of the people) are exercised and ensured by the Lao People's Democratic Party" (Lao PDR 1994, Article 3) and Chapter VII could form the basis for the implementation of top-down management and lines of command. Constitutional support of local management and customary laws are dependent on laws and regulations that are actually established.

Thailand

The launching of the Eighth National Economic and Social Development Plan (1997-2001) and the promulga-

tion of a new constitution in 1997 have brought about some radical changes in the fundamental basis for decentralized and local management. The Eighth Plan (NESDB 1996) has focused whole sections on "popular governance" (Part VII) and "popular participation in natural resources management" (Part VI, Chapter 3). References are also made to the "incorporation of local wisdom".

The constitution also contains several provisions on the right of people and community, such as in Chapter III, Section 46: "... traditional community shall have the right to conserve and restore their custom. Local intellect, arts or good culture of their community and the nation and participate in the management, maintenance, preservation and exploitation of natural resources and the environment in a balanced fashion and persistently as provided by law" (Thailand 1997). Furthermore, Section 48 states that "property right is protected" while another new element is Chapter IX contains provisions related to "local government" including a "duty to conserve local arts, custom, intellect or good culture" (Thailand 1997, Section 289).

Vietnam

It is possible to find constitutional support for local management and customary laws but, as in the case of Lao PDR, these are dependent on suitable laws and regulations. Examples of provisions that support the development of customary practices are Article 5 which states the right to "promote fine customs, habits, traditions and culture", and Article 121 which stipulates that "the deputy of the People's Council represents the will and aspirations of the local people" and he is also supposed to "answer their requests and proposals" (Vietnam 1992).

Of the four, the Thai constitution has the most clear and far-reaching commitment to locally-based management and support for traditional systems.

External distortion and institutional development

The constitutional basis for local management and acceptance of customary laws depends on specific laws, regulations and institutions.

Thailand has had the opportunity to develop its legal system and institutional structure over a long period of time. In comparison, the other three countries are struggling to get a workable legal system in place. The development of the legal system is often based on outside support – both financial and technical. This has led to the establishment of an *ad hoc* legal and institutional structure. A lack of coordination of internal support has led to the development of different sectors along different "cultures" based on the systems of the donor country. A low rate of adoption at the grassroots level is to be expected as the "law establishment process" is usually given too little time and a ready made "law" is presented to the country for adoption (at the national government level). The proposed laws might be well constructed but may not be based on national or local needs. This will result in the development of institutions that are not in tune with national traditions.

Such patchwork laws usually result in conflicting provisions with regard to different sectors or levels of authority.

A related problem is that development agencies have considered problems based on whether law is rooted in a US type tradition and or a French (mainland Europe) tradition. Following advice given by US and European experts on various programs for development, we suggest it is preferable to search for a local traditional base on which to build a legal and institutional framework.

Frequently the implementation of projects and programs is in the hands of the wrong institutions. Most wetlands are either lakes, rivers, ponds, floodplains, etc. (fishing areas) or ricefields (agriculture and fishing areas). However, most wetlands management programs are operated by ministries or departments of the environment. In Cambodia, for example, the law states clearly that all wet or flooded areas are fishing areas and fall under the authority of the Department of Fisheries. However, the present wetlands programs such as the MRC Inventory and Management of Cambodian Wetlands are under the Ministry of Environment (however, coordination with other departments such as the Department of Fisheries is anticipated in the project document). The donors' ignorance of existing legal systems adds to the confusion in the roles and responsibilities of national and local institutions and communities.

Regional Agreements and International Commitments

The four countries of the Mekong River basin have signed a number of regional agreements and international conventions. The central one on the Mekong River is the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin signed by Cambodia, Lao PDR, Thailand and Vietnam on 5 April 1995. The Agreement allows for the entry of China and Myanmar into the MRC. Presently they are invited as observers to the meeting of the Council and the Joint-Committees. Other important regional and international commitments are to the Greater Mekong Sub-region Initiative, membership in the Association of Southeast Asian Nations, the Biodiversity Convention, the Ramsar Convention on Wetlands of International Importance especially as Water-fowl Habitats, the United Nations Educational, Scientific and Cultural Organization Convention on Cultural and Natural Heritage, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. All of these contain provisions and objectives for sustainable use of resources with special attention to the poorer groups of society, indigenous people and other marginalized social units. It remains to be seen how these will translate into plans for local development.

Conclusions

Countries in the Mekong region should be encouraged to strive for more coherent legal and institutional structures based on local and national customs and traditions for resource management, ownership, user rights, local decisionmaking, etc.

For effective planning and management of wetlands it is necessary to put them back under the central line ministries and seek coordination and integration between sectors, central and local authorities, and user and user groups.

There is an urgent need to ensure that the implications of the gross undervaluation of natural resources be made clear to development planners so that the real value of these resources can be reflected in EIAs and development schemes in the Mekong region.

References

- Ahmed, M., H. Navy, L. Vuthy and M. Tiongco. 1998. Socioeconomic assessment of freshwater capture fisheries of Cambodia: report of a household survey. Mekong River Commission, Phnom Penh, Cambodia. 185 p.
- Cambodia. 1993. The Constitution of the Kingdom of Cambodia. Phnom Penh. (Unofficial translation).
- Cambodian Working Group Team. 1998. Draft synthesis report on management of fisheries, coastal resources and the coastal environment in Cambodia: institutional, legal and policy perspectives. Wetlands International, Phnom Penh, Cambodia.
- Chircop, A. and M. Torell. 1997. The legal framework for fisheries co-management in Vietnam. Report prepared for the VCOPII Project, Halifax. (Unpublished).
- Gregory, R., H. Guttman and Thearith. 1997. Poor in all but fish: A study of the collection of rice field food from three villages in Svay Theap District, Svay Rieng Province. Work. Pap. 4. AIT Aqua Outreach (Cambodia), Phnom Penh, Cambodia.
- Hirsch, P. and G. Cheong. 1996. Natural resource management in the Mekong River Basin: perspectives for Australian development cooperation. Final overview report to AusAID. University of Sydney, Australia.
- Jernedal, R. 1997. Modernization without development? Implementing market economy in Laos. University of Gothenburg, Göteborg, Sweden.
- Lao PDR. 1994. The Constitution of the Lao People's Democratic Republic, Vientiane, Lao PDR.
- MRC (Mekong River Commission). 1997. Inventory and management of wetlands in the Lower Mekong Basin: draft project document. Environment Unit, Mekong River Commission Secretariat, Bangkok, Thailand.
- MRC/UNEP-EAP (May). 1997. Mekong River Basin diagnostic study: final report. Mekong River Commission, Bangkok, Thailand.
- MRC/UNEP-EAP (June). 1997. Greater Mekong Sub-Region: state of the environment report. Mekong River Commission, Bangkok, Thailand.
- NESDB. 1996. The Eighth National Economic and Social Development Plan (1997-2001). NESDB, Bangkok, Thailand.
- Öjendal, K. and E. Torell. 1997. The mighty Mekong mystery. Publ. Wat. Resour. 8. Department for Natural Resources and the Environment, Sida, Stockholm, Sweden.

Thailand. 1997. The Constitution of the Kingdom of Thailand. B.E. 2540. Bangkok, Thailand.
 The Nation. 1997. The battle for our forest resources. October 7: A5. Bangkok, Thailand.

Vietnam. 1992. The Constitution of the Socialist Republic of Vietnam. Hanoi, Vietnam.

Annex I. Wetlands classification system of the lower Mekong basin.

Classification	Types	Subtypes			
Saltwater	A. Marine/Coastal	1. Subtidal	Nonvegetated Natural subtidal bare marine Subtidal mariculture Vegetated/coral Subtidal marine coral Subtidal marine seagrass Subtidal marine seaweed Natural subtidal marine seaweed Subtidal marine seaweed farm		
		2. Intertidal	Nonvegetated Natural Intertidal coastal beach Intertidal coastal mudflat Intertidal coastal cliff Intertidal coastal salt flat Artificial Intertidal coastal salt works Intertidal coastal aquaculture Vegetated/coral Intertidal marine coral Intertidal marine seaweed Natural intertidal seaweed Intertidal marine seaweed farm Trees/shrubs Coastal mangrove swamps Coastal mangrove plantation Forbs/coastal salt marsh		
		3. Nontidal	Nonvegetated Nontidal mariculture		
		B. Estuarine	1. Subtidal	Nonvegetated Natural subtidal bar estuarine Subtidal estuarine aquaculture Vegetated/coral Subtidal estuarine coral Subtidal estuarine seagrass Subtidal estuarine seaweed Natural subtidal estuarine seaweed Subtidal estuarine seaweed farm	
				2. Intertidal	Nonvegetated Natural Intertidal estuarine beach Intertidal estuarine cliff Intertidal estuarine salt flat Artificial Intertidal estuarine salt works Intertidal estuarine aquaculture Vegetated/coral Intertidal estuarine coral

Annex I, continued

Classification	Types	Subtypes
		Intertidal estuarine seagrass Intertidal estuarine seaweed Natural intertidal estuarine seaweed Intertidal estuarine seaweed farm Trees/shrubs Estuarine mangrove swamp Estuarine mangrove plantation Forbs/estuarine salt marsh
	3. Nontidal	Nonvegetated Nontidal estuarine aquaculture
<hr/>		
C. Coastal lagoon		
<hr/>		
D. Inland salt lake		
<hr/>		
Freshwater		
A. Riverine	1. River	Perennial river Pool in perennial river Channel in perennial river Natural channel in perennial river Perennial canal With perennial rapid With perennial waterfall Seasonal river Pool in seasonal river Channel in seasonal river Natural channel in seasonal river Seasonal canal With seasonal rapid With seasonal waterfall
	2. Riverine banks/ beaches/bars	
	3. Riverine floodplain	Floodplain grassland Natural floodplain grassland Human-made floodplain grassland Floodplain wet rice Other floodplain crops Floodplain trees/shrubs Natural seasonally flooded trees/shrubs Human-made seasonally flooded crops/ orchards Seasonal floodplain lake Seasonal floodplain pond Seasonal back swamp/marsh Natural seasonal back swamp/marsh Human-made seasonal back swamp/ marsh Wet rice in seasonal back swamp/marsh
B. Lacustrine	1. Lake > 8 ha	Permanent lake Natural permanent freshwater lake Human-made permanent reservoir Seasonal lake Natural seasonal freshwater lake Human-made freshwater lake
	2. Pond < 8 ha	Permanent pond Natural permanent freshwater pond Human-made freshwater pond Freshwater aquaculture pond

Annex I, continued

Classification	Types	Subtypes
		Sewage treatment pond Farm pond Cooling pond Borrow pit, excavated pond Others Seasonal pond Natural seasonal freshwater pond Human-made seasonal pond
C. Palustrine	<ol style="list-style-type: none"> 1. Permanent palustrine 2. Permanently flooded grassland 3. Permanent freshwater marsh, with trees/shrubs 4. Seasonal palustrine 5. Seasonally flooded grassland 6. Natural seasonally flooded grassland 7. Human-made seasonally flooded grassland 8. Human-made seasonally flooded plantation 9. Seasonally freshwater marsh, with sedges 10. Seasonally freshwater swamp, with seasonally freshwater swamp, with trees/shrubs 11. Natural seasonally flooded swamp 12. Human-made seasonally flooded plantation 	

Source: MRC Environment Programme 1997.

CASE STUDIES

Where There is Water, There is Fish?

Cambodian Fisheries Issues in a Mekong River Basin Perspective

Nicolaas van Zalinge¹, Nao Thuok², Touch Seang Tana² and Deap Loeng²

¹ Mekong River Commission Project, Phnom Penh, Cambodia

² Department of Fisheries, Phnom Penh, Cambodia

VAN ZALINGE, N., T. NAO, S.T. TOUCH and L. DEAP. 2000. Where there is water, there is fish? Cambodian fisheries issues in a Mekong River basin perspective, p. 37-48. In M. Ahmed and P. Hirsch (eds.) Common property in the Mekong: issues of sustainability and subsistence. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

The Cambodian proverb "where there is water, there is fish" is still true for the fisheries of Cambodia and of the entire lower Mekong basin, both in terms of food security and as a major industry providing employment and income for millions. However, potential threats are posed by the increasing fishing effort, environmental degradation and infrastructure development. This paper examines the main fisheries sectors and their contribution to the national economy. It also examines the state of exploitation of fish stocks, the reasons for their decline and how further deterioration can be stopped. Safeguarding the present situation requires: (i) greater awareness at the decisionmaking level, in government and international organizations, of the significance of fish for food security and employment; (ii) a functional platform for dialogue and cooperation between the riparian countries in order to be able to deal with the upcoming water and fisheries management issues in a timely way; (iii) an improved and enlarged capacity for research and management; and (iv) a strengthened role of the fishing lots in habitat protection by improving legislation, setting up of lot management bodies and increasing environmental awareness of the stakeholders.

Introduction

Cambodian freshwater capture fisheries probably contribute more to national food security and the economy than such fisheries do in any other country in the world. The Khmer saying *me-an tuk, me-an trey* meaning, "where there is water, there is fish" reflects this situation. Despite this, the government and international organizations have shown a remarkable lack of interest in the state of capture fisheries that are threatened by the impacts of the ongoing development of the Mekong River watershed, as well as internal mismanagement. This may have been due to misleading records and the complexity of the issues at stake.

The paper attempts to address this information shortage by providing an overview of the problems facing Cambodian freshwater capture fisheries. First it briefly describes the main fishery sectors and their contribution to the national economy in terms of food security and employment. Then it examines the state of exploitation of some of the fish stocks and the perceived causes of their decline stemming from external (upstream) and internal (national) sources. Finally, ways are identified to contain further deterioration.

Although the lower Mekong River basin is still relatively untouched in Cambodia and the Lao PDR, regional development is accelerating causing pollution, erosion through deforestation, and increased water usage for urban and industrial water needs, irrigation schemes and hydropower generation. The cumulative effects of these demands on the fish resources of the Mekong are not easily quantifiable but are likely to be serious.

In Cambodia and Lao PDR, these processes are still in their early stages, whereas development projects in Vietnam and Thailand are much more advanced. Cambodia, Lao PDR, Thailand, and Vietnam signed a treaty in April 1995 for the purpose of reaching a water utilization agreement through cooperation in the Mekong River Commission. China and Myanmar also share the Mekong waters but have so far declined to join. The contribution of each country to the average river flow (MRC 1998) is as follows: China 16%, Myanmar 2%, Lao PDR 35%, Thailand 17%, Cambodia 19% and Vietnam 11%.

In Cambodia, the improved political situation, returning refugees and a reduction in military personnel are swelling the number of fishers and increasing

the need for farmland. Wetland habitats essential for sustaining the present level of fish production are being converted to ricefields. The pressure on the fish resources in the open access sector of fisheries is growing and conflicts with the privatized (limited access) sector are intensifying. These are the main management challenges facing the Department of Fisheries in Cambodia. In order to gain sufficient government and international donor support it is critical to highlight and publicize the large contribution that fisheries make to national food security and the economy.

Fisheries in Cambodia and the Lower Mekong River Basin

Floodplain productivity and biodiversity

Wild fish proliferate in the wetland ecosystem that is created by the annual flooding of the Mekong River during the southwest monsoon (June-October). In Cambodia, the Tonle Sap River flowing from the Great Lake to Phnom Penh reverses its direction due to a faster rise in Mekong water levels. This results in an expansion of the Great Lake by four to six times (Fig. 1). In a similar, though less dramatic way, thousands of square kilometers of floodplain forests and shrub lands are temporarily submerged along the Mekong River and its tributaries, thereby making abundant food resources accessible and providing shelter for numerous fish species.

The degree of floodplain inundation depends on the level of the Mekong floods. Relationships between water levels, lake surface extent and flood duration are given by Carbonnel and Guiscafré (1963) and Tes (1998) for the Great Lake Tonle Sap. Fish productivity is positively related to the extent of the lake surface and the duration of the flooding.

When the floods recede, the direction of the Tonle Sap River flow changes again. Water levels on the submerged lands start dropping, signaling to most fish species that it is time to migrate to deeper water in the lake or tributaries (lateral migration). Many species will then undertake longer (longitudinal) migrations from the lake or tributary to the Mekong River, probably moving upstream as well as downstream. The large and medium-scale fisheries are geared to intercept these migrations. Longitudinal migrants constitute about 63% of the total catch taken by these fisheries in the Tonle Sap area.

Many fish species with longitudinal migrations begin to spawn in the Mekong River at the beginning of the rainy season (May-July), when the first flood waters are coming in and water levels start rising. Other species migrate back from the Mekong up the tributaries and into the floodplain for spawning. Important spawning areas are located in Kratie, Stung Treng and Ratanakiri provinces. A large numbers of fish eggs and

fry are carried by the currents and swept into the floodplain areas that are inundated.

These fish migrations seem to be largely confined to the Mekong and its tributaries below the geological fault line at the Khone Falls in the Khong district of southern Lao PDR. on the border with Cambodia, although the extensive rapids and falls (10-15 m) allow for the upstream passage of most species. Data on relative abundance are available for most species (Duankum et al. 1996a, b; Baird 1998). However, quantitative information is lacking, although Baird et al. (1998) infer from interviews that some 4 000 t are caught in Khong district annually (mostly above the falls). A large proportion of this consists of species that have migrated up from Cambodia. The existence of a *dai* fishery in the Vietnamese part of the Mekong suggests that there is also a dry season (November-March) movement downstream out of the Cambodian floodplains. More data on catches and species composition are needed.

Due to geological processes, several river systems joined to form the Mekong River. This brought together fish faunas that had evolved in different parts (Rainboth 1996). At present some 1 200 fish species are known to exist in the river system. The 500 species found in Cambodia are described in Rainboth (1996). This study will be expanded to cover the entire fish fauna of lower Mekong basin. A number of new species have already been discovered. While many of these species have little direct commercial value, most are utilized in subsistence (family and ricefield) fisheries.

The important commercial species are often broadly categorized (MRCS 1992) as: (i) black fish - species able to survive in swamps and plains all year round with limited lateral migrations. These are mostly carnivorous and detritus feeders. This group includes Channidae (snakeheads), Clariidae, Bagridae (*Mystus* sp.) and Anabantidae; and (ii) white fish - most species showing strong lateral and longitudinal migrations. This group includes many cyprinids, various *Pangasius* sp., Siluridae and Notopteridae. Also included is the group of small, short-lived cyprinids, among which Trey Riel (*Henicorhynchus* sp.) is the most common. Life cycle research needs to be done on these species, including habitat preferences. It should elucidate the role of floods, forests and other wetland areas.

Fisheries in Cambodia

Type of fisheries

The large and medium-scale fisheries require fishing licenses, which are estimated to add about US\$2 million annually to government revenue (Nao and Ly 1997). Family and ricefield fisheries are unlicensed. The large-scale fisheries have limited access, whereas the other fisheries have open access.

Fishing lots (loh nesaat). Fishing lots are concessions auctioned by the Cambodian Government to the high-

est bidder for exclusive exploitation over a two-year period. It is one of the government's main instruments for extracting a resource rent from fisheries. At present the lot system is found only in Cambodia though in the past it also existed in Thailand (Leelapatra, pers. comm). At present, there are 164 lots comprising lake (Fig. 2), riverine (Fig. 3) and river beach lots and covering an area of 852 900 ha. In addition, there are 89 *dai* (bagnet) fishing lots and 15 fish sanctuaries. Lots are allowed to operate under the general fishery law and with specific (burden book) regulations between October and June. The catch range and breakdown by (main) species are given in Tables 1 and 2.

Table 1. Annual inland water catch in Cambodia from 1994 to 1997.

Type of fishery	Annual catch range (t)
Large-scale fisheries	
Fishing lots ¹	25 000-75 000
Dois (bagnets) ²	14 000-16 000
Medium-scale fisheries ³	85 000-100 000
Family fisheries ³	115 000-140 000
Ricefield fisheries ⁴	50 000-100 000
Total	289 000-431 000

Sources: Ahmed et al. 1998; Deap et al. 1998.

¹ Range reflects uncertainty in actual catch levels.

² Range shows approximate minimum and maximum values in 1994-1998.

³ Based on socioeconomic survey data extrapolated to entire country.

⁴ Approximately 1.8 million ha x likely range of fish yields: 25-62 kg ha⁻¹.

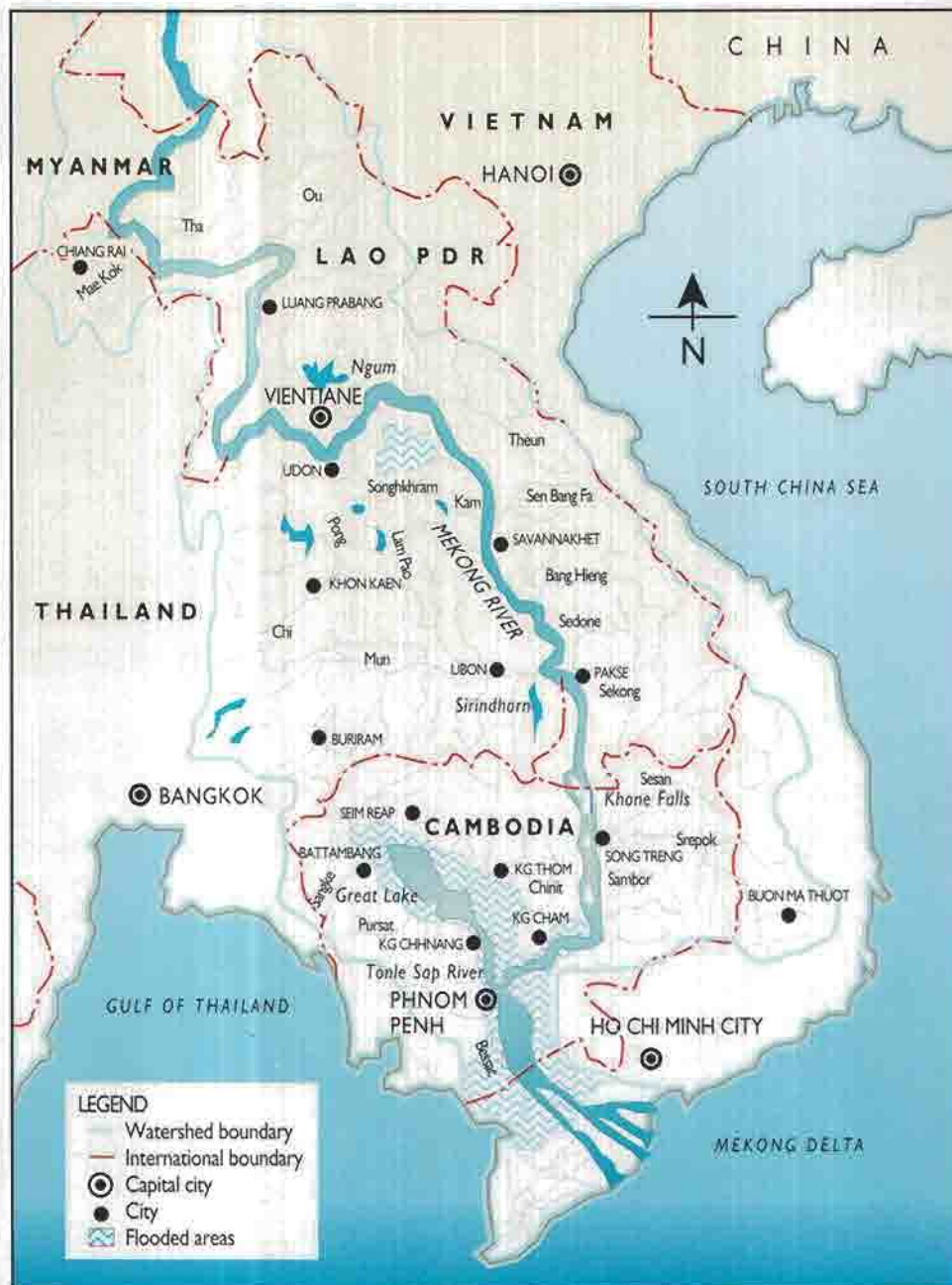


Fig. 1. The six riparian states in the Mekong River basin.

The lots surrounding the Great Lake are very large (the largest is 508 km²), encompassing vast tracks of floodplain covered with short tree/shrub land vegetation (80%) (Fig. 4), able to withstand long periods of inundation and long dry spells of relentless heat, a gallery forest (<10%) along the lakeshore and waterways, as well as aquatic herbaceous vegetation (McDonald et al. 1997). Many of the plant species are endemic to the Mekong River catchment.

Dai lots. A *dai* is a kind of bagnet or stationary trawl positioned in the river to capture fish migrating downstream (Fig. 5). Lieng et al. (1995) have given an account of this fishery in the Tonle Sap River. The legal structure is like that for a fishing lot but, instead of a piece of land and water, a particular anchoring location in the river is auctioned. *Dai* lots tend to be much cheaper on average than the other lots. Most of the auctionable *dai* locations are in the Tonle

Sap River, where 68 operated from October through March during 1997-1999. When the floods recede, fish move from the submerged lands toward the rivers and lakes and eventually to the Mekong. In a short period of six to one day before full moon, there is a peak in migratory activity. More than half of the season's catch is taken in January (Fig. 6). The bulk of the catch consists of the current year's crop of small white fish species (Table 2) that are used for making fish paste (*prahoc*), fish sauce, oil, and salted and dried fish.

In the now illegal *dai* fishery for *Pangasianodon hypophthalmus* fry, much smaller specialized nets are used. In 1998, more than 650 *dai* were in operation. Billions of fry of many species are caught in the Mekong from May to August. Only *Pangasianodon* fry is kept alive to be sold to cage culture enterprises, mainly in Vietnam.

Fig. 2. Lake fishing lot in Kampong Thom province. The long bamboo fence channels the fish migrating out of the flooded forest (on the left) into the central capture room. The arrow-shaped traps on the outside of the fence are sublet by the lot holder. Operational from January to May.



Fig. 3. The barrage across a branch of the Tonle Sap River near Kampong Chhnang town is part of a fishing lot concession. Three openings admit migrating fish through a passageway made of netting into the fish pens. The other opening is navigable for small craft. Fishery regulations do not permit the blocking of all river branches. Operational from November to May.





Fig. 4. Battambang province. Typical flood forest habitat of short tree and shrub species able to withstand inundation for three to six months.

Table 2. Species composition and value of the catch by type of fishery, Cambodia 1995-1996.

Species name	Type of fishery (%)			% of total catch	Total value	Type of fish
	Lot	Dai	Middle			
1. <i>Henicorhynchus</i> sp.	11	40	20	21	9	Cyprinid
2. <i>Channa micropeltes</i>	16	-	8	9	19	Snakehead
3. <i>Cydocheilichthys enoplos</i>	8	1	13	9	8	Cyprinid
4. <i>Dangila</i> sp.	5	6	7	6	2	Cyprinid
5. <i>Osteochilus</i> sp.	2	10	2	4	2	Cyprinid
6. <i>Cirrhinus microlepis</i>	5	3	2	3	4	Cyprinid
7. <i>Pangasius</i> sp.	8	0	1	3	3	Catfish
8. <i>Barbodes gonionotus</i>	3	0	4	3	2	Cyprinid
9. <i>Paralabuca typus</i>	1	11	0	3	1	Cyprinid
10. <i>Channa striata</i>	5	-	1	2	6	Snakehead
Weight (%) of 10 species	64	70	59	63	56	
% share in total catch	33	23	44	100		
% share of total value	41	15	44	100		
No. of species recorded	75	44	62			

Source: Deap et al. 1998.

¹ Family and ricefield fisheries have not been included due to insufficient data.

Medium-scale fishing (open-access). In Cambodia, medium-scale is legal under license only. It is permitted to use a variety of gears of dimensions that exceed those allowed under family fishing rights. It is an open-access fishery, although excluded from operating in fishing lots. Medium-scale and family fishing and ricefield fisheries are also widespread in Lao PDR, Thailand and Vietnam.

Due to practical limitations, only about 40 gear types and mesh sizes are being monitored regularly in Cambodia, although several more are being used. The 10 gears most commonly used are shown in Table 3. In the late 1980s, monofilament gillnets came into use and have become very popular, leading to an increase in fishing effort.

Table 3. Top 10 gears used in medium-scale fisheries in Cambodia, 1995-1996.

Type of gear	% share in total catch	Khmer name
1. Gillnets (all mesh sizes)	52	Mang
2. Encircling seine net	16	Uon hum
3. Arrow-shaped trap	6	Lop nor
4. Small river trawl	3	Neam
5. Encircling gillnet	3	Mang hum
6. Hooks and lines	3	Santouch
7. Single bamboo trap	3	Lap
8. Beach seine	2	Uon
9. Castnet	2	Samnanh
10. Brush park ¹	2	Samrah
Total	92	

Source: Deap et al. 1998.

¹ Probably grossly underreported, as the fishing method is presently illegal.



Fig. 5. Row of eight dai fishing lots in the Tonle Sap River.



Fig. 6. Typical dai fishery catch during the January peak period, when 300-500 kg of mainly small cyprinids are taken every 15 minutes for 24 hours over four to five days.

Family fishing and ricefield fisheries (open-access). Family fishing is estimated to produce at least 115 000 tons annually (Ahmed et al. 1998). It has open-access and does not require a license, but gears are subject to certain restrictions on size and use. Access to fishing lots is limited to the closed season (June-September).

Data on ricefield fisheries are scarce. Fedoruk and Leelapatra (1992) reported a minimum figure of 25 kg ha⁻¹ from northeast Thailand, while Gregory (1997) found 62 kg ha⁻¹ in Svay Rieng, a Cambodian province outside the Mekong basin. Wet season rain-fed, lowland and deep-water, rice ecosystems covered about 1.8 million ha in Cambodia in 1994-1995 (Nesbitt 1997). Fish yield per hectare varies with the elevation of the field, its distance from a permanent waterbody or wetland, and the degree of pesticide use. At the onset of the floods, fish migrate from such refuge to land that is being submerged. When contours reappear above the waters, farmers start fishing and guarding their paddies. Surplus yields are sold and provide significant supplemental income considerably in some cases (Gregory and Guttman 1997).

Employment

In Cambodia fishing related employment is significant. The household survey of the fishing dependent communes carried out in 1995-1996 (Fig. 7) in eight provinces with a total population of 2.4 million people, or 453 000 households (government figures), showed that 10.5% of the households have fishing (9.3%) or a fishing related activity (1.2%) as the primary occupation, while another 34.1% were engaged on a part-time basis (Ahmed et al. 1998). Thus, in these provinces, more than 1 million people were either fully or partly dependent on fisheries for their income. Only about 4% of households involved in fishing are engaged one way or another in large-scale fish-



Fig. 7. The *dai* catch of small cyprinids is sold fresh to middle-persons who resell it to fish processors waiting on the riverbank.

ing, while 9% carry out medium-scale fishing and 87% have family fishing activities (Ahmed et al. 1998). In addition, most rice farmers fish in their fields.

Catch levels and fish stocks

Brief history

Since the Great Lake in Cambodia was formed some 5 000–6 000 years ago (Carbonnel 1963), it has abounded with fish. The rise of the Khmer Angkor Empire may, to a large extent, have been possible due to the availability of these rich fish resources and well-developed rice irrigation schemes. The abundance of fish pictured on the reliefs of the Bayon and Angkor Wat temples and the proximity of the temple complex to the Great Lake in Siem Reap province are testimony to this. The combination of rice and fish is still the staple food for the great majority of Cambodians. Until recently, Khmer-speaking rice farmers in northeastern Thailand (Buriram) used to trek to the Great Lake during the fishing season to trade fish for rice. This still happens within the Cambodian national boundaries.

The French colonizers, recognizing the richness of the fish resources, modeled the taxation system on the traditional royal fund raising practice of issuing fishery leases and introduced the first fishery laws in the country (Petillot 1911). Petillot reported that in 1910 about 50 000 t were exported in the form of dried, salted and live fish, as well

as fish oil and paste. In the 1920s and 1930s, exporting dried fish to Java was a big business. Chevey and Le Poulain (1940) reported that an average of 25 000 t was shipped annually from Cambodia mainly via Singapore by Chinese traders. Given a fresh to dried fish ratio of 3 to 1 (Chhouk 1996), this corresponds to 75 000 t of fresh fish. Chevey and Le Poulain (1940) estimated total fish production to be 120 000 t·year⁻¹. The trade does not exist anymore, although similar quantities are being exported to Thailand and Vietnam, mostly in fresh and dried/smoked form or as fish paste/sauce.

Although the richness of the Cambodian fish resources was recognized in the past, it was never quantified well. There have been a number of useful descriptions by Chevey and Le Poulain (1940), Bardach (1959), Fily and d'Aubenton (1966) and Lagler (1976). However, statistics on the fish catch and its value are very poor and time series do not exist.

Catch levels and species composition

The Department of Fisheries in Cambodia generates fishery statistics based on planned figures. The catch range in the period 1981–1995 was given as 51 000–75 000 t. In order to get a more realistic idea of the size of the fishery, the MRC/DoF/Danida Project for the Management of the Freshwater Capture Fisheries of Cambodia has set up a catch assessment system based on stratified random sampling of the catch (by species, gear and district) and frame survey information on fishing gears utilized in the large and medium-scale fisheries (Stamatopoulos 1995; Van Zalinge and Touch 1996a; Deap et al. 1998). In addition, socioeconomic household surveys carried out in 1994–1995 provide catch estimates of the medium-scale and family fisheries (Ahmed et al. 1998). Their data for the annual inland water catch from 1994 to 1997 (Table 2) are much more realistic and, though they exceed all previous estimates, are still considered to be underestimates.

With an annual production of 300 000–400 000 t, Cambodia's freshwater capture fisheries ranked fourth in the world in 1996 (FAO 1999). The monetary value of the catch at landing sites ranges from US\$ 100 to 200 million and increases through the marketing chain to between US\$ 250 to 500 million. The top 10 species composition and catch value of the fishing lot, *dai* and medium-scale fisheries are shown in Table 3.

Recognizing that official production data are generally unreliable, other estimates for the inland capture fisheries in the Mekong watershed of the Lao PDR, Thailand and Vietnam are presented in Table 4. For instance, the official figure for Thailand's Mekong basin freshwater catches in 1989 was 51 000 t, whereas the results of a survey carried out in the same year indicated that 303 000 t of "wild" freshwater fish were consumed (MRC 1992). Total estimated fish production already approaches 1 million t annually and might be much larger if better data become available. The contribution from fish culture, which is thought to be small (<10%), especially in Cambodia, is not

Table 4. Estimated capture fisheries production in the lower Mekong basin.

Countries	Annual catch range (t)
Cambodia ¹	289 000-431 000
Lao PDR ²	27 000
Thailand ²	303 000
Vietnam ²	190 000
Total	809 000-951 000

Sources: ¹Ahmed et al. 1998; Deap et al. 1998. ²MRC 1992; Jensen 1996.

included. The 50 million people living in the lower Mekong basin, with an average per capita income of US\$ 150-200 per year, are the main consumers of the fish (Jensen 1996).

Fish stocks

It is a common belief that fish were much more abundant in the 1950s and 1960s than at present. Nevertheless, estimates of total fish output are higher now than at any time in the past. Improved data collection is certainly part of the explanation. There has also been an increase in effort (more fishers and more effective monofilament gillnets). Medium-scale and family fishers complain about decreasing catch-per-unit effort. Medium-scale and family fishery production has more than tripled since the 1960s. Destructive fishing practices and the steady loss of flood forests have had a negative effect on the overall sustainability of the fisheries. On the other hand, large-scale fishery production appears to have been stable (Fily and d'Áubenton 1965; Van Zalinge and Touch 1996b; Van Zalinge 1997a).

The lack of reliable statistics makes it impossible to estimate sustainable catch levels. Catch-effort relationships showing likely exploitation scenarios for large, medium and small migratory fish species in the Tonle Sap Great Lake and river fisheries are shown in Fig. 8.

Catches of large migratory fish species, such as *Pangasianodon gigas* (giant Mekong catfish) and *Catlocarpio siamensis* (giant Mekong barb), have dwindled to very small numbers. Large fish tend to reproduce at a relatively late age and big size. Most are caught on their extensive migratory travels before they have a chance to reproduce. The catch of medium-sized migratory species, such as *Cirrhinus microlepis*, *Boesemania microlepis*, *Probarbus jullieni* and *Tenuulosa thibaudeaui*, is also reduced though still considerable. The Mekong herring, *Tenuulosa thibaudeaui*, has become rare, probably because of the introduction of monofilament gillnets in the late 1980s. Small migratory species such as *Henicorhynchus* sp. (small cyprinids, Trey Riel) are still very abundant and form a large part of the catch (Table 3). Small fish species reproduce at an early age, often within the first year of their life. Fast reproduction ensures that they can withstand more pressure from fishing than large species. *Channa* sp. (snakeheads, Trey Chhdaur and oth-

ers), although large fish (Fig. 9) are still the most important component of the lot catches (see Table 3). This is largely due to their less extensive migrations that are limited to lateral movements between the floodplain and the lake.

Fish consumption and food security

Statistics in Table 4 indicate that 16-19 kg of freshwater fish per capita per year are available. This is low compared with 21 kg in northeastern Thailand, 30 kg in the Mekong delta in Vietnam (MRC 1992) and 27-38 kg in Cambodia (based on estimates in Table 2). Household sample surveys carried out during 1995-1996 in the fishing districts of eight Cambodian provinces around the Great Lake and the Mekong floodplains with a population of 4.2 million (out of the 11 million people living in Cambodia) suggest that average consumption of fresh and processed fish is at least 67 kg/capita⁻¹.year⁻¹ (Ahmed et al. 1998). Based on this, it is estimated that total fish consump-

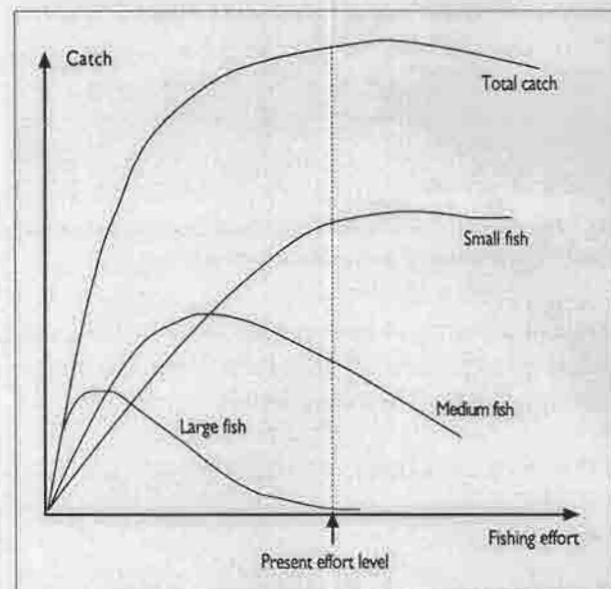


Fig. 8. Hypothetical state of exploitation of stocks of large, medium and small migratory fish species in Cambodia.



Fig. 9. Snakeheads (*Channa micropeltes*) in a fishing lot capture room.

tion in these eight fishing districts alone is more than 280 000 t (Table 2). Average nationwide consumption will be somewhat lower.

Fish and rice are the main elements of food security in Cambodia, although fish was not recognized as such by the government and by FAO (MAFF 1996; 1999), as only government planning figures were used (i.e., 5-7.5 kg·capita⁻¹·year⁻¹ of freshwater fish). A possible consequence of this lack of awareness is that the government will neglect the protection and management of the fish resources within the country and will fail to give national fisheries the appropriate importance in regional discussions on water management.

Discussion

There are factors threatening the sustainability of inland capture fisheries from both outside and inside the country.

Water management

Since the 1950s, thousands of large and small multi-purpose dams with reservoirs and often extensive irrigation schemes have been built in the Mekong watershed. This has led to the fragmentation of aquatic habitats and the blocking-off of fish spawning areas. The cumulative effects that these water management schemes have on river flow levels result in additional negative impacts. The filling up of reservoirs tends to delay and reduce peak floods, while increasing dry season river flows. In the 1980s and 1990s the wet season flow was about 15% lower than normal (MRCS hydrological database). Climatic changes were ruled out as an explanation for this (IMC 1992). Reduced peak floods result in less inundation of the floodplains.

Fish yield appears to change from year to year. It is likely that these changes are largely related to variations in the hydrological conditions of the river. The extent of the flooding (area and duration) is thought to be positively related to fish productivity (Dennis 1987; NEDECO 1988; ESCAP 1990) because of the spawning and nursery functions of the floodplain and the access that fish have to food. On average, higher water levels in the 1950s and 1960s will have meant a greater abundance of fish than at present. This is a widely held view in Cambodia. A delay in the timing of peak flooding may cause it to be out of phase with natural occurring cycles of reproduction, especially for highly migratory fish species whose eggs and fry depend on the first floods of the wet season for transport to the floodplains. Mainstream dams, especially in Cambodia and Lao PDR, block these vital migratory pathways.

MRC (1998) used a rough model to predict future flow changes due to potential implementation of water use schemes. It estimates that the river flow at Phnom Penh may be further reduced by as much as 15% in the wet season, resulting in a 20% lower flow towards the Great Lake.

This would translate into a loss of 20% of regularly submerged land, comprising about 240 000 ha of the 1.2 million ha presently flooded around the Great Lake (CNMC 1998). The model estimates that losses will be greater for wetlands in Lao PDR and northeastern Cambodia.

There is an urgent need for improved hydrological modeling of the cumulative effects of water management to predict flood levels and extent and duration of the inundation at various river locations. These models need to be linked to habitat distribution in the wetlands and their fish productivity. The botanical and (fish) faunal diversity of floodplains needs to be inventoried and fish productivity by habitat type determined.

Fishery management

Fishery management is a balancing act between the requirements for biologically sustainable resource use, economically optimal exploitation patterns and their social acceptability. The main internal threats are the open access nature of the medium-scale and family fisheries, their conflict with the fishing lot system and the destruction of floodplain habitats for rice production and other uses.

In Cambodia, the fishing lot system has been in place for at least 100 years. Large lots are operated through subletting parts to fishers from neighboring communes (Degen and Nao 1998; Gum 1998). Even though concession holders fully exploit the fish resources in their lots, they generally have a longer term interest. Catches seem to have been stable. Lot operators tend to provide a degree of protection by keeping poachers out and preventing large-scale destruction of the flood forest.

Open-access in fisheries usually leads to overfishing, especially in times of economic depression. Traditionally, fishing rights that govern fisheries along the Mekong and its tributaries in Lao PDR and northeast Cambodia (Stung Treng, Ratanakiri) provided some form of protection to local nonmigratory stocks. In places where these traditions were reinforced with outside help, fish stocks often recovered in a surprisingly short time (Baird, pers. comm.). If resources are to be maintained for feeding a growing population, such traditional rights should be firmly anchored in an effective fishery law that strengthens community involvement in fisheries management.

The large increase in fishing effort observed in the open-access medium-scale and family fisheries may have been caused by the improved security and access to the lake, and possibly by an influx of internally displaced persons and refugees (380 000 returned in the early nineties), some of whom have settled in the lake and river areas (Fig. 10), where there is little alternative employment. It is easy to take up fishing as the required capital investment is low and a license is cheap or not required. Due to the increase in the number of fishers, the catch per fisher has declined. Fishers living near fishing lots illegally exploit the richer resources of these lots. This has given rise to conflicts. Fishing lot operators feel they need to employ



Fig. 10. Chhnuc. One of the floating villages of the Great Lake. These villages only exist during the dry season as the lake is too rough and too deep in the wet season.



Fig. 11. Flood forest is gradually being converted into ricefields in Kampong Chhang province.

armed guards to keep poachers and firewood cutters at bay.

The Government of Cambodia does not have the capacity to control fishing practices and access to the fisheries, except through privatization of these tasks, as is done through the fishing lot system. Solutions may be found through a greater involvement of fishing communities in the management and operation of the lots in combination with a redefinition and an expansion of the fishing lot boundaries to include more floodplain habitat. For each major lot, a consultative body of stakeholders should be set up to work out the ways and means to implement this. Raising environmental awareness among the concerned parties will have to be an important part of this exercise. Community participation in lot management is not simple and there is some doubt about the existence of adequate social structures for the successful implementation of such management arrangements in the targeted communities (Ovesen et al. 1996; Degen and Nao 1998). The process of learning, experimentation and capacity-building is long.

A major function of fishing lots is habitat protection. In areas outside the lots, woodcutting, burning, and conversion into ricefields (Fig. 11) and other croplands are rapidly reducing floodplain habitats on public land. Often such lands are then claimed as private property. Expansion of the fishing lot system in the Great Lake/Tonle Sap River region may, under proper conditions, be one of the options to safeguard Cambodia's flood forest and fish resources. Every year, the floods reach a level of 8 m or more (above sea level) submerging an area of more than 700 000 ha of which less than 10% is under cultivation in the dry season (CNMC 1998). The fishing lots currently occupy only 56% or 390 000 ha and could be substantially expanded without interfering with agriculture. However, the effectiveness of the fishing lots in habitat and fish stock conservation needs to be improved through legal means and capacity building (Van Zalinge 1997b).

UNESCO and the Ministry of Environment have proposed to set up a Tonle Sap biosphere reserve that would include the Angkor temple complex, the Great Lake and surrounding wetlands. If the core areas are limited to those parts of the fishing lots where important bird colonies (painted stork, spot-billed pelican, greater and lesser adjutant) are found and fishing is allowed outside these core areas, there need not be a major conflict of interests. In fact, the protection provided by the lots will be highly beneficial in maintaining the reserve. Fishery management objectives in the Tonle Sap area of Cambodia are not incompatible with conservation objectives as put forward under the biosphere reserve proposal (UNESCO 1996). Floodplain conservation through greater community participation and limiting open access are priorities for both.

Conclusion

The paper notes that fisheries are still of great importance for Cambodia and indeed for the entire lower Mekong basin in terms of food security and as an industry providing employment and income for millions. In view of (potential) threats posed by increasing fishing effort, environmental degradation and infrastructure developments, safeguarding the present situation requires:

- greater public awareness, especially at the decision-making level in government and international organizations, on the significance of fish for food security as well as of the present and potential role of fisheries in the economic development of the country and of the region;
- a functional platform for dialogue and cooperation between the riparian countries to be able to timely deal with the upcoming fisheries management issues in a timely fashion;
- an improved and enlarged capacity for research and management. Databases should contain information on the size and economic value of the fisheries, the possible impact of water management schemes, and their biological aspects (life cycles, migrations and habitats); and
- a strengthened role of the fishing lots in habitat protection by improving legislation, setting up of lot management bodies and increasing environmental awareness of the stakeholders.

The Mekong River Agreement signed by Cambodia, Lao PDR, Thailand and Vietnam in April 1995 provides the framework. An overall management concept (Basin Development Plan and Water Utilization Program) has been developed and relevant actions are proposed including setting up of a sub-committee for fisheries under the MRC Joint Committee of member nations.

It is time to act: as the river dominates the lives of so many, they also share her fate.

References

Ahmed, M., N. Hap, V. Ly and M. Tiongco. 1998. Socioeconomic assessment of freshwater capture fisheries of Cambodia. A report on a household survey. MRC/DoF/Danida Project for the Management of the Freshwater Capture Fisheries of Cambodia. Mekong River Commission, Phnom Penh, Cambodia. 186 p.

Baird, I.G. 1998. Preliminary fishery stock assessment results from Ban Hang Khone, Khong District, Champasak Province, Southern Lao PDR. Department of Forestry, Champasak Province, Environmental Protection and Community Development in the Siphandone Wetland Project. 112 p.

Baird, I.G., I. Vixay, P. Bounpheng and K. Phongsavath. 1998. A rapid fishery survey in Khong District, Champasak Province, Southern Lao PDR. Department of Forestry, Champasak Province, Environmental Protection and Community Development in the Siphandone Wetland Project. 31 p.

Bardach, J. 1959. Report on fisheries in Cambodia. USOM/Cambodia, Phnom Penh, Cambodia. 80 p.

Carbonne, J.P. et J. Guiscafré. 1963. Grand Lac du Cambodge: Sedimentologie et Hydrologie, 1962-63. Muséum National D'Histoire Naturelle de Paris. 401 p.

Chevey, P. et F. Le Poulain. 1940. La pêche dans les eaux douces du Cambodge. Travaux de L'institut Océanographique de l'Indochine. 5e Mémoire, Gouvernement Générale de l'Indochine. Saigon. 241 p.

Chhouk, B. 1996. The socio-technological assessment of the utilization of low-value fish in Cambodia. Asian Institute of Technology, Bangkok, Thailand. 96 p. (M.S. thesis).

CNMC. 1998. Main report. Natural resources based development strategy for the Tonle Sap area. A CNMC/NEDECO/MRC/UNDP project report. 110 p.

Deap, L., S. Ly and N.P. Van Zalinge, Editors. 1998. Catch statistics of the Cambodian freshwater fisheries. MRC/DoF/Danida Project for the Management of the Freshwater Capture Fisheries of Cambodia. Mekong River Commission, Phnom Penh, Cambodia. 186 p.

Degen, P. and T. Nao. 1998. Inland fishery management in Cambodia: is the concept of community-based management appropriate for fishing lots? Contribution to the Mekong Panel at the Seventh Common Property Conference of the International Association for the Study of Common Property, 10-14 June 1998, Vancouver, Canada.

Dennis, J. 1987. In D.A. Ablin and M. Hood (eds.) The Cambodian agony. M.E. Sharp Inc., New York, USA.

Dennis, J.V. 1990. Kampuchea's ecology and resource base: natural limitations on food production strategies, p. 213-242. In D.A. Ablin and M. Hood. The Cambodian agony. M.E. Sharp Inc., New York, USA.

Duankum, S., S. Chaloune, V. Khamdeng, S. Bounlium and T.J. Warren. 1996a. The main dry-season fish migrations of the Mekong mainstream at Hat Village, Muang Khong District; Hee Village, Muang Mouan District and Hatsalao Village, Pakse, Lao PDR. Department of Livestock and Fisheries. Indigenous Fishery Development Project. Fish. Ecol. Tech. Rep. 3, 131 p.

Duankum, S., S. Chaloune, V. Khamdeng, S. Bounlium and T.J. Warren. 1996b. The main wet-season fish migrations through Hoo Som Yai, a steep gradient channel at the great fault line on the Mekong River, Champasak Province, Lao PDR. Department of Livestock and Fisheries. Indigenous Fishery Development Project. Fish. Ecol. Tech. Rep. 4, 115 p.

ESCAP. 1990. Environmental impact assessment. Guidelines for water resources development. Environ. Dev. Ser. (ST/ESCAP/786). UN, Bangkok, Thailand.

FAO. 1999. Review of the state of world fishery resources: inland fisheries. FAO Fish. Circ. 942, 54 p.

Fedoruk, A. and W. Leelapatra. 1992. Ricefield fisheries in Thailand, p. 91-104. In C.R. de la Cruz, C. Lightfoot, B.A. Costa-Pierce, V.R. Carangal and M.P. Bimbao (eds.) Rice-fish research and development in Asia. ICLARM Conf. Proc. 24, 457 p.

Fily, M. and F. d'Aubenton. 1965. Cambodia. Report on fisheries technology in the Great Lake and the Tonle Sap, 1962-63. National Museum of Natural History, Paris, France. 509 p.

Gregory, R. 1997. Rice fisheries handbook. Cambodia-IRRI-Australia Project. Phnom Penh, Cambodia. 38 p.

Gregory, R. and H. Guttman. 1997. Poor in all but fish. A study of the collection of ricefield foods from three villages in Svay Theap District, Cambodia. AIT Aquaculture Outreach, Draft Work. Pap. 4, 27 p.

Gum, W. 1998. Natural resource management in the Tonle Sap biosphere reserve in Battambang province. Consultancy Report for the European Commission Support Program to the Environmental Sector in Cambodia (SPEC). 52 p.

- IMC (Interior Mekong Committee). 1992. Mekong River water balance study, Phase 3 report. Prepared for IMC by the Institute of Hydrology, Wallingford, Oxon, UK.
- Jensen, J.G. 1996. 1 000 000 tonnes of fish from the Mekong? *Mekong Fish Catch Cult.* 2 (1).
- Lagler, K.F. 1976. Fisheries and integrated Mekong River Basin development. Terminal Report of the Mekong Basin-wide Fisheries Studies. Committee for Coordination of Investigations of the Lower Mekong Basin. Exec. Vol. 367 p.
- Lieng, S., C. Yim and N.P. Van Zalinge. 1995. Freshwater fisheries of Cambodia: the bagnet (*dai*) fishery in the Tonle Sap River. *Asian Fish. Sci.* 8:255-262.
- MAFF. 1996. Food security in Cambodia. A country position paper. World Food Summit, November 1996, Rome, Italy. Ministry of Agriculture, Forestry and Fisheries.
- MAFF. 1999. Agriculture development plans: long, medium and short term, 1999-2010.
- McDonald, A.J., B. Pech, V. Phauk and B. Leev. 1997. Plant communities of the Tonle Sap flood plain. Contribution to the nomination of the Tonle Sap as Biosphere Reserve for UNESCO's "Man in the Biosphere Program". Phnom Penh, Cambodia. 90 p.
- MRCS (Mekong River Commission Secretariat). 1992. Fisheries in the Lower Mekong Basin. Annexes 4 and 5. Interim Mekong Committee, Bangkok, Thailand.
- MRCS (Mekong River Commission Secretariat). 1998. Conceptual framework report. Water Utilization Program. Prepared by SMEC and funded by Global Environmental Facility.
- Nao, T. and S. Ly. 1997. Review of the fisheries and aquaculture sectors in Cambodia. Prepared for the Project: CMB/95/003, Natural Resources Based Development Strategy for the Tonle Sap Area. Phnom Penh, Cambodia. 64 p.
- NEDECO, Electrowatt Engineering Services Ltd. and Asian Engineering Consultants Corp., Ltd. 1988. Perspective for Mekong development: indicative plan for the development of land, water and related resources of the Lower Mekong Basin. Work. Doc. Vol. 1c. Fisheries and Fisheries Projects. Mekong Committee, Bangkok, Thailand.
- Nesbitt, H.J., Editor. 1997. Rice production in Cambodia. International Rice Research Institute, Manila, Philippines. 112 p.
- Ovesen, J., I. Trankell and J. Öjendal. 1996. When every household is an island. Social organization and power structures in rural Cambodia. *Uppsala Res. Rep. Cult. Anthropol.* 5, 99 p.
- Petillot, L. 1911. La pêche et les poissons, une richesse du Cambodge. Librairie Maritime et Coloniale, Paris, France. 169 p.
- Rainboth, W.J. 1996. Fishes of the Cambodian Mekong. FAO species identification sheets for fishery purposes. Food and Agriculture Organization, Rome. 265 p.
- Stamatopoulos, C. 1995. Statistical monitoring of the freshwater capture fisheries in Cambodia. FAO Mission report. Phnom Penh, Cambodia. 6 p.
- Tes, S. 1998. Hydrological studies of the Tonle Sap Great Lake area. MRC/UNDP Project for Natural Resources-based Development Strategy for the Tonle Sap Area, Cambodia. Final report. Vol. 2, Part B, Sectorial Studies. 53 p.
- UNESCO. 1996. Strategy and action plan for the protection of the Tonle Sap. Technical Coordination Unit for the Tonle Sap (TCU). Ministry of Environment, Phnom Penh, Cambodia. 31 p.
- Van Zalinge, N.P. 1997a. Fisheries management and conservation issues in the Tonle Sap. Contribution to the Workshop on Options for the Development of the Tonle Sap Region, 27 May 1997, Phnom Penh, Cambodia.
- Van Zalinge, N.P. 1997b. Fishery research needs in the Lower Mekong basin from a Cambodian perspective. Contribution to the National Fisheries Workshop, 19-21 March 1997, Vientiane, Lao PDR.
- Van Zalinge, N.P. and T.S. Touch. 1996a. Catch assessment and fisheries management in the Tonle Sap Great Lake and river. Contribution to the Workshop on Fishery Statistics, 18-19 September 1996, Department of Fisheries, Phnom Penh, Cambodia. 24 p.
- Van Zalinge, N.P. and T.S. Touch. 1996b. Fisheries management in the Tonle Sap. Contribution to the Workshop on Management of the Tonle Sap Ecosystem, 11-14 September 1996. Organized for the World Bank/Cambodia National Environmental Action Plan. Seim Reap, Cambodia.

Historical, Cultural and Legal Perspectives on the Fishing Lot System in Cambodia

Peter Degen and Nao Thouk

Department of Fisheries, PO Box 582, Phnom Penh, Cambodia

DEGEN, P. and T. NAO. 2000. Historical, cultural and legal perspectives on the fishing lot system in Cambodia, p. 49-60. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

The fishing lot system is based on the traditional system of revenue collection prevalent since precolonial times, modified and simplified by the colonial administration. With the growing rural population, conflicts over the use of the resources of these very productive fishing grounds are increasing.

Community-based fisheries co-management has been suggested as an alternative to the current system to allow for the participation of communities through delegation of power and responsibility to local authorities. However, the fisheries management system cannot escape the existing political and social framework of patronage.

This paper outlines the historical, cultural and legal background of the existing system of fishing lots in Cambodia. It advocates that fishing lot system be used as the starting point in developing improved management options. The weakness of the existing system is not that the lot system does not work or is inefficient, but that it allows for abuses on the patron side of relationships. Existing patron-client relations should be used for awareness building and focus on exploitation patterns that allow for sustainable recruitment of fish stocks. The organizational capacity of fishers at the village level also needs to be strengthened, including their capacity to negotiate with their patrons.

Introduction

Since ancient times fishing has been a central element of Khmer culture, society and economy. The extraordinary carvings of the world famous reliefs at Angkor Wat testify to this importance. The very advanced culture of Angkor could only evolve and develop in the way it did by counting on rice and fish as the two main food staples. The importance of rice and fish as a means of livelihood for the rural population has not changed. Fish is by far the most important source of protein for the 10.7 million (NIS 1996) people of Cambodia, of whom 85% live in rural areas. The rural economy is highly dependent (90.1%) on primary production such as agriculture, hunting, forestry and fishing.

The river systems of the Mekong, Bassac, and the Tonle Sap Rivers (including the Great Lake) and their adjacent extensive floodplains, provide the basis for a subsistence farming-fishing rural society. The annual flooding of large plain areas of Cambodia, caused by the tropical monsoon and the melting snow in the central Asian highlands, imposes the yearly rhythm on the rural economy. The fluctuations in water supply and flooding during the year and from year to year demand a

high degree of flexibility to be able to benefit from this pattern. At the peak of the rainy season, more than 20 000 km² of plains, forests, shrub lands, and farmlands are under water (IMC 1992). The efficient use of the water masses, their currents, and their resources is of crucial importance to the livelihood of the people. The water is diverted by means of irrigation canals, stored through dikes or pumped from the rivers into the farmlands to obtain higher yields. A great variety of fishing gears and strategies are used to take advantage of the constantly changing conditions to minimize fish harvests.

The management of the freshwater capture fisheries of Cambodia is considered to be one of most developed and extensive systems of fisheries regulation in the world (IMC 1992). It comprises large-scale fishing operations in well-defined fishing lots and medium-scale operations that are licensed and regulated by the Department of Fisheries (DoF), as well as family fisheries. The latter can operate in all waterbodies at all times, except in specifically restricted areas. Threats to and pressures on fish stocks are increasing, as are conflicts between the different stakeholders (Ahmed et al. 1998). It is necessary to ensure the long-term availability of fishery resources to provide food security, income and

employment within the context of an improved fisheries management structure.

Recently the fisheries management system of Cambodia has been criticized on the grounds that the poor fisher can hardly make a living. The fishing lot system is considered to be responsible for damaging practices (Ahmed and Touch 1996; Thuok and Ahmed 1996). The open-access to fisheries outside the lots is regarded as the main threat to the freshwater capture fisheries in Cambodia (Van Zalinge 1997). This has led to recommendations for community-based fisheries co-management and participation of local communities through the delegation of power and responsibility to local authorities. The underlying assumption is that the village communities are organized bodies focusing on common social, economic, and political interactions.

The questions that arise from this are: What does "community" mean in the Cambodian context? What can "community-based co-management" mean in Cambodia? Are the "communities" homogenous and harmoniously compact? What is the experience and capability of handling common and conflicting interests within a community? Who are the players and how is the power structure organized? If a community-based management approach is to be a future option, what should be the first steps for setting up or strengthening organizational structures at the community level? How open is the "open-access" to fisheries? How damaging are the existing fishing practices to fish stocks? What kind of exploitation patterns will help to conserve resources?

To make improvements in the management system requires a deeper understanding of the fishing lot system as well as the organizational capacity of the fishing communities and their visions of sustainability. This includes not only legal structure but also existing informal management practices.

This paper is written in the context of international fisheries development cooperation in which a regional organization (Mekong River Commission) provides advice to the fisheries authorities of the Cambodian Government on training staff in fisheries research, setting up databases and developing options for the sustainable management of freshwater capture fisheries. The data presently available allow only for some initial insights into these issues. After more than a quarter century of civil war in which most of the historical documentation disappeared and no research was done, government staff have to be trained to be able to conduct research on issues relevant to fisheries management.

This paper aims to contribute to the process of refining research questions and defining concepts for designing feasible options for fisheries management appropriate to the environmental, cultural, and institutional-political conditions prevailing in Cambodia.

The Khmer Village Community

General key elements

The Khmer term *phum*, which has been translated into English as "village", has slightly different connotations than the translation reveals. It is not only a political administrative unit, but also means a hamlet or section of a village or any inhabited space, even if it has only one house (Ebihara 1968; Ovesen et al. 1996). The pagoda or *wat* may express the social unit of a *phum*, though several *phum* frequently share one temple. One of the central characteristics of Khmer rural communities is the lack of indigenous, traditional, organized associations, clubs, factions, or other groups that are formed on a non-kin principles (Ebihara 1968). As there are no integrating institutions such as communal houses, and there are no communal properties, the *Wat* assumes a unifying function to tackle community matters. Traditional Khmer society is deeply rooted in the culture of Angkor and is principally hierarchical. The success of the Khmer peasants in production and reproduction is considered to be directly linked to the protection and security available through the supreme cosmological position of the King (Ovesen 1998). This is a classic patron-client relationship. Between the King and the farmer there is a long chain of feudal collaborators to facilitate this relationship, often arbitrarily.

This pattern of rural organization was largely unaffected by the French Protectorate (1863-1953). Despite civil wars, Pol Pot times, multiple ideological indoctrination attempts and the United Nations Transitional Authority on Cambodia's (UNTAC) well-intentioned introduction of democratic election procedures in Cambodia, the structures of patronage remain (Ovesen et al. 1996; Vijghen and Sareoun 1996). Not only do they remain, they were probably strengthened by the need for more security and protection that people longed for. As a guiding social element in society, these patron-client relations are still in place today and are the "backbone of the political structure in Cambodia" (Ovesen 1998).

During UNTAC times, more than 380 000 displaced persons were resettled in areas that provided relative security and protection from Khmer Rouge forces on the one hand and some economic opportunities for survival on the other. The United Nations High Commissioner for Refugees (UNHCR) advertisement and the Governments' promise of land options succeeded in attracting hundreds of thousands of displaced persons into resettlement programs. They failed, however, in effectively providing them with land (Greve 1993). The resettled people survived on the availability of and access to abundant common resources based mainly in the floodplains (CNMC/NEDECO/MIDAS 1998). The process of integration into the new community was extremely difficult (Baron 1996), and those who succeeded in rebuilding their lives were

heavily dependent on reestablishing and strengthening patron-client relations.

Since the last democratic elections organized by UNTAC in 1993, much attention has been paid to the Cambodian countryside in the form of rural development and community development projects (MRD/CDRI 1998). The reconstruction of rural organizations and the strengthening of their capacity for self-help has been done through the (i) introduction of new democratic organizations such as the Village Development Committees; and (ii) identification of existing interaction patterns at different levels of the village community and the enhancement of their self-help capacity. Both procedures show promise. A project on rural development in Kampong Thom province identified a variety of existing self-help groups in the villages. Of the 19 identified groups, five were located above the village level, that is, at pagoda level. Only two of them were located at the village level. The remaining 12 self-help groups were found to operate as mutual exchange groups below the village level (Aschmoneit et al. 1997). This coincided with observations made in other provinces that suggested that people, especially from the poorest strata of the village community, tended to join mutual exchange groups for meals, emergencies, gratitude, means of production, cooking and other functions. People who succeeded in getting wealthier were likely to abandon the self-help groups below the village level. Solidarity is perceived as a need for the poor. Wealth, on the other hand, seems to be related to the successful management of patron-client relationships. The Pagoda Committee seems to be the most respected and stable community organization in the countryside but may not serve as a partner in community-based fisheries co-management. In line with Buddhist perceptions, monks and respected elders do not want to be involved in fisheries.

The fishing village

Fishing villages also have the same underlying cultural patterns of social and political organization. A household survey in the main fishery provinces in Cambodia in 1994 revealed that 73% of the household members regarded themselves as farmers. On the other hand, only 10.5% of the household heads considered fishing as their main source of income and 34.1% of them were involved in fishing and fishing related activities on a part-time basis (Ahmed et al. 1998). The fishing villages are subject to flooding and receding waters. There are also some floating villages, especially in the Tonle Sap Great Lake, where the position of the floating houses shifts seasonally according to the lake water level and movement (Fig. 1).

No single fisher association, club, or cooperative has been reported in the fishing communities. The organizational structures of small-scale and medium-scale fisheries are mainly family and household based. These family crews also play an important role in the exploitation of the fishing lots either through contractual agreements with lot owners, or sub-lessees, or sub-sub-lessees, or through poaching.

The fishers who live in these agglomerations of floating houses and temporary shelters on stilts usually operate with gears that do not require a labor force exceeding the nuclear family. These gears are classified and regularized in the Fisheries Law as medium-scale licensed fishing gear and unlicensed family or small-scale fishing gear (Fig. 2). The licensing system does not have an upper limit on the number of gears to be licensed. Thus, it is not a tool for the management of fisheries resources but a way of collecting revenue. The gears belonging to the family fishers can be used legally and without any restrictions except those imposed through property rights and licenses owned by the bigger fishers. According



Fig. 1. Kampong Thom province. Floating village on the boundary river between two fishing lots in the flood forest area of the Great Lake. The barrage, operating a bag net, in the main branch of the river behind the village belongs to one of the fishing lots.

Fig. 2. Siem Reap province. A fisher takes his *lop* traps into the flood forest. He has paid the owner for the right to fish with this specific trap in a defined area of the fishing lot.



Table 1. Number and type of fishing lots and fish sanctuaries, 1980-1997.

Year	Total no. of lots	No. of fishing lots by type						Fish sanctuary
		Lake-stream lots	Bag net lots	Bag net lots for white lady carp	Bag net lots for prawn	Bag net lots for seed of <i>Pangasius</i> sp.	River sand bank lots	
1980	307	143	96	-	13	-	55	11
1981	307	143	96	-	13	-	55	11
1982	307	143	96	-	13	-	55	11
1983	307	143	96	-	13	-	55	11
1984	307	143	96	-	13	-	55	11
1985	307	143	96	-	13	-	55	11
1986	307	143	96	-	13	-	55	11
1987	307	143	96	-	13	-	55	11
1988	307	143	96	-	13	-	55	11
1989	302	141	76	7	13	31	34	13
1990	302	141	76	7	13	31	34	13
1991	301	141	76	8	13	31	32	15
1992	301	141	76	8	13	31	32	15
1993	298	141	74	8	13	31	31	15
1994	298	141	74	8	13	31	31	15
1995	279	141	63	8	13	31	23	15
1996	279	141	63	8	13	31	23	15
1997	248	141	63	8	13	0	23	15

Source: DoF (1998).

to a household survey (Ahmed et al. 1998), some 86.8% of household heads are engaged in family fishing, 9.5% operate licensed gears, 1.2% uses large-scale gears in fishing lots and 2.5% are employed as laborers.

The Fishing Lot System

A fishing lot is a geographically defined river location (*dai*), stretch of river, river beach, or temporarily flooded land that may or may not include flooded forest areas (Figs. 3 and 4). The lease to each fishing lot is auctioned every two years. The winner in the auction has to pay part of the fee in advance and the rest is paid in pre-established installments. Each of the fishing lots (Table 1) leased out under this system has a Burden Book. This

document defines the specific location of the lot on the map, with the relevant water bodies, conservation areas, and communal fishing areas. It also specifies the beginning and end of the fishing season and the type, number, and location of gears allowed to be operated in the lot. Special notations may refer to tax payment and other relevant conditions.

The total area under fishing lots sums up to 8529.22 km² for the whole country (Plate 1 and Table 2). The biggest lot, a research lot,¹ is more than 500 km² large and is located in the Tonle Sap Lake area, where the lots are generally larger in size than river lots or *dai* lots. No comprehensive studies have been undertaken so far on the number of villages located within these sizeable lot areas and in their immediate vicinity and how they relate to each other.

Historical perspective

The fisheries laws and regulations were formalized and written down for the first time by the colonial administration of the French Protectorate and published in several complementary Royal ordinances in 1908. This constituted a formalizing of pre-existing exploitation patterns in fisheries rather than an introduction of new regulations. The purpose was to extract revenue for financing the colonial administration.

Under the reign of King Norodom (1859-1897) and his predecessors, the King was entitled to arbitrary dues on fishing throughout the kingdom. The collection of the taxes was done by "general farmers" who purchased the user rights to the fishing grounds. This privi-

leged group had absolute control over all the waters of Cambodia. It comprised mainly of Chinese traders and investors who divided the concessions obtained from the King into sections that they further subleased to other "farmers" at a suitable price. The income generated through the transfer of concession rights from the "general farmer" to the subcontractors frequently exceeded twice the amount paid to the royal treasury (Darboux et al. 1906; Pétillot 1911). The subcontractors in turn subleased their concession to other farmers who could also divide up their grants and transfer them further to the lower levels of the social and economic hierarchy. Thus, between the State as the concession holder and the actual fishers who fished the waters, the old regime made it possible for five, six or sometimes even seven middlepersons who could make relatively high earnings with little risk or effort. There were no set of rules on how the contracts were negotiated. Dues could be paid in fish, which was received at lower than the market price and allowed the concession holder to derive an additional profit. Renting of boats and fishing equipment was also frequently an essential part of sub-leasing agreements (Pétillot 1911).

This situation did not change in the initial decades of the establishment of the French Protectorate in Cambodia, which became known for imposing the highest tax rates on the peasant farmers in all of Indochina. The ordinances of 1908 succeeded in allowing the colonial treasury to increase its tax income from fisheries by 17% in the first year. In 1910, the taxes from fisheries covered one-ninth of the administration budget of the French Protectorate, compared to one-eighth that was provided by taxes from



Fig. 3. Kampong Thom province. Long bamboo fences installed at the edge of the flood forest. The timing, location and size of fences are specified in the Burden Book of each fishing lot.



Fig. 4. Kampong Thom province. A series of arrow-shaped traps in the flooded forest area are combined through a bamboo fence with a barrage installation in the riverine area.

Table 2. Area and type of fishing lots by province, 1996.

Province	Total lot extension (km ²)	No. of fishing lots						Total
		Lake-stream lots	Bag net lots	Bag net lots for white lady carp	Bag net lots for prawn	Bag net lots for seed of <i>Pangasius</i> sp. ¹	River sand bank lots	
Kampong Cham	634.36	13	-	-	-	-	14	27
Kratie	90.20	11	-	-	-	-	8	19
Prey Veng	1 484.02	20	-	7	13	10	-	50
Kandal	1 702.60	19	38	1	-	21	1	80
Phnom Penh		1	25	-	-	-	-	26
Takeo	518.44	20	-	-	-	-	-	20
Kampong Chhnang	439.83	20	-	-	-	-	-	20
Pursat	405.77	7	-	-	-	-	-	7
Battambang	1 447.00	12	-	-	-	-	-	12
Bantey Meanchey	203.00	4	-	-	-	-	-	4
Siem Reap	796.00	7	-	-	-	-	-	7
Kampong Thom	808.00	7	-	-	-	-	-	7
Total	8 529.22	141	63	8	13	31	23	279

Source: DoF (1998).

¹ In 1997, bag net fishing for *Pangasius* seed was prohibited.



Plate 1. Location of fishing lot areas in Cambodia.

rice paddies (Pétillot 1911). In the following decades, no major changes have been introduced in the system of auctioning the fishing lots and guiding them through Burden Books and eventually enforcing the law (Chevy and Le Poulain 1940).

During Democratic Kampuchea (DK) times (1975-1978), fishing cadres, often of nonfishers, were formed to operate certain gear in the traditional lot areas (Luco 1997). The DK's obsession with increasing rice production and persecution of ethnic Vietnamese and

Cham led to negative impacts on the recruitment of fish stocks by cutting down large areas of flooded forest. It also led to the loss of fishing expertise among the Cham and Vietnamese fishers.

During the Vietnamese occupation (1979-1991) and under the continuing civil war the fishing lot system was reinstated under the rule of socialist solidarity groups (*krom samakki*). Each *krom samakki* group could receive a section of a lot to fish. For example, in Kampong Chhnang province, the local fisheries office fished five lots and the cen-

tral DoF from Phnom Penh allocated itself two lots, while other government departments (such as the Commerce Department) and provinces with no fishing grounds like Kampong Speu, fished the other lots (Swift 1997). Since the capacity of the governmental agencies to fish was underdeveloped, a successive subleasing of the lots was necessary to obtain revenues and financial support for the administration (IMC 1992). The traditional patron-client system probably proved very useful in running the lots (Vijghen and Sareoun 1996).

The review of the legal ordinances from pre-war times resulted in the Fiat Law of Fishery of 1987. It confirmed the fishing lot system as the most important management tool for inland fisheries. The income DoF derived from selling concessions of fishing lots is around two-thirds of its total budget (DoF 1998). The extent of vested political and economic interest in the fishing industry hampers the government in the protection of fishery resources, in spite of its legal power to control access to the fisheries.

Fishing lot management

Fishing lots continue to be big business as well as a major source of declared and undeclared tax collection, framed within a sociopolitical system of patronage.

The lot owner

Most of the present lot owners have been running their lots for two or even more concession periods (Luco 1997; Swift 1997). Lot #13 of Kandal province has been operated by the same lot owner since 1985. During the bidding process the incumbent lot owners have an advantage over new bidders. This advantage stems from: (i) ownership of the right equipment for operating the lot; (ii) possession of extensive empirical knowledge about the real productivity of the lot (which is likely to differ substantially from the officially reported one); (iii) experience in management of a complicated patron-client financing system in which several levels of leasers and less economically powerful medium and small-scale fishers participate; and (iv) empirical knowledge about the local social systems of behavior of poachers, relations of fisheries officers, efficient protection mechanisms for the fishing lot and other key information. These advantages translate into lower transaction costs, such as the costs of acquiring information, negotiating contracts and enforcing them.

Participants in lot operations

The Burden Books follow a standardized 12-article scheme. They give details of the operation of each fishing lot in the country. There is enough flexibility for each fishing lot owner to arrange specific agreements with local stakeholders like the police, military, fisheries officers, inspectors, fishing patrols, navigation police, district authorities, fisher groups, as well as individual fishers. The lot owner usually agrees on subcontracts prior to the auction in order to collect the starting capital for the bidding (one-third of the base amount for bidding has to be deposited

with the DoF in advance). The organizational chart of the fishing lots actually differs from lot to lot. There might be only one "lot owner fishing operator", which is predominantly the case in the *dai* (or bagnet) fisheries. There might also be a "lot owner and share holder company" followed by various "subleasers nonfishing operators" at one or two levels, and a sizeable number of "sub-sub- and sub-sub-subcontractors fishing operators". Even these operators may sell small fishing rights (*pun chalat*) on a temporary basis and with well-defined spatial limitations to fishers operating with small gears. Fishing lot # 19 from Takeo province is one concrete example of an existing organizational and fee structure (Table 3).

In riverine and lacustrine lots, the organizational structure tends to be more complex than in *dai* lots or in river sandbank lots, which are much more easily controlled by a single fishing operator. The subdivision of the lot into smaller fishing domains constitutes an efficient way of controlling the fishing lot, whereby control is handed over to somebody in exchange for a negotiated payment. Most of the riverine-lacustrine lots contain specially designated common property areas (specified in the Burden Book) for communal fishing activities with small gears. In practice, these areas are often inaccessible as they are scattered

The use of damaging and even illegal fishing gear within and outside fishing lots has frequently been reported (IMC 1992; Ahmed 1996; Luco 1997; Swift 1997; Van Zalinge 1997; Ahmed et al. 1998; CNMC/NEDECO/MIDAS 1998). On the other hand, little attention has been given to the protection activities of lot owners and fishers (Swift 1997). Some current protection measures for fishery resource are: (i) fishing lot owners and operators protect the flooded forest against encroachment, especially in the northern part of the country in the lake lots of the Tonle Sap Great Lake; (ii) despite the two-year auctioning cycle, the practice of long-term engagement in fishing lot operation promotes a longer-term resource exploitation perspective. Lot owners usually operate with minor fishing gears during the so-called closed season and they protect the flooded forests in that period; (iii) it has been observed that fishers and lot owners do not always pump drying ponds, whether they are common property areas within the fishing lot or not; and (iv) lots are fished during a specific period of the fishing season. Outside this period, large-scale fishing gears are not used and fish can move freely.

In Takeo province, there is virtually no flood forest left. This is mainly due to the expansion of rice area and also to the harvesting of juvenile trees and bushes to be used in illegal brush traps (*samras*). It has been observed that at the beginning of the fishing season in December, a large amount of brush is shipped into the fishing areas to be used in *samras*. In the Vietnamese province of Long An, situated in the floodplains of the Mekong and Vam Co Rivers, the practice of *samras* is being abandoned as brush is becoming too expensive.

Table 3. Fishing operators, divisions, fee structure and sublease arrangements in Takeo Fishing Lot #19, 1997.

(Sub-) leaser fisher	Leasing price paid to owner (Riel) ¹	Lot area/ section	Residence of fishing operator	Type of fishing operation	Other lease and sub-lease arrangements
A	700 000 village	#1	Kampong Leav village	Daay Tube net (large-scale)	Leaser also had to pay 150 000 riel to Kandal province fisheries officials. (This section is located within Kandal province, but belongs to the fisheries office in Takeo province.)
B	270 000	#2	Preik Ta Hing village	Barrage	
C	400 000	#3	Kampong Preah village	Pond	Kampong Reap commune
D	Free! (In return for security)	#17		Canal	The local police get this operation without paying the lot owner. They resell it to Vietnamese fisher who uses a barrage at the mouth of Prammuey Mekara canal.
E	600 000	#4	Kampong Leav village		Subowner sold fishing rights (<i>pun cralat</i>) plus fished by himself.
F	1 400 000	#5 #6	Kampong Leav village		Leaser is uncle of E (above). The subowner sold the southern part of his section (Ref. #6) to two people in Kampong Leav village for 400 000 riel, plus sold <i>pun cralat</i> and fished himself.
G	Unknown	#7			This section is divided into many small strips sold to people in nearby villages.
H	2 500 000	#8 #9 #10	Kampong Reap village		The subowner sold the southern part of his section (Ref. #9) to someone in his village for 150 000 riel; Kro Bay (Ref. #10), also to someone in his village. He sold the pond for 400 000 riel and <i>pun cralat</i> in the remaining section (Ref. #8) plus fished there himself.
I	150 000	#11	Kampong Preah village		
J	150 000	#12	Kampong Preah village		He also bought Pou Chenna pond.
K	150 000	#13	Tuol Chan Toek village	Canal	(Preik Sdei commune)
L	150 000	#14 #15	Preik Sdei commune		The owner sold 100-m wide stripes along the mouth of the Stoeng Angkor Borei River (Ref. #14) for an unknown total riel. He sold fishing rights in the rest of the section (<i>pun cralat</i> , Ref. #15), and sold rights to various canals. In addition, he fished in the two ponds in the section, Sena Dek Cho and Boeng Traw.
M	3 600 000	#16	Preik Sdei commune		The owner sells <i>pun cralat</i> for a short time during the open season only. During closed season, the owner above (L) sells <i>pun cralat</i> . He sells some canals for an unknown amount. He also uses a barrage with net at Stoeng Sandaek, and pumps out a canal and some small ponds.
N	3 Chi ²	#18	Prey Thmey commune		Fished-out pond at Preik Ta Nun.
			>13 700 000 (compared to official auction price of 12 350 000 riel)		

Source: Swift 1997: annex 8; own adaptation.

¹ US\$ 1 = 2 500 riel at time of data collection.

² US\$ 400 = 10 chi = 1 riel.



Fig. 5. Kampong Chhnang. A lonely checkpoint in a midst of flood area in a fishing lot.



Fig. 6. Battambang province. A boat operated by the guards hired by a fishing lot owner to patrol the lot area.

An interesting example is that of a lot owner in Takeo province who has got several consecutive concession periods. He has already cleared 25 ha of flood forest within his lot for conversion to paddy fields. Since catch rates were declining noticeably, he decided to convert the area and started clearing the shrub land. The land law provides that "if any temporary possessor (...) got 5 consecutive years and the land is free within record in the enrolment register and does not belong to anybody, the temporary possession shall become a legitimate owner of the land" (Land Law, Part 2, Art. 74, Kingdom of Cambodia 1992). Under this law, a land title provides him legal ownership, something concession cannot offer. Thus, a land law provides an incentive for clearing flooded forest areas. Though the flood forest is under the jurisdiction of the Department of Fishery, as soon as it is cleared and used as paddy fields, other departments, such as the Department of Land Titling, get involved.

Participation of villagers

Participation of villagers in the fishing lots is not based on an organized structure. It is an individual enterprise based on the system of patronage. Lot owners (patrons) do not relate to villages as a whole but to individuals in

the village as subleasers and fishing operators who may acquire certain fishing rights. As a result, relations between the people from the nearby villages and the lot owners can be tense and sometimes lead to conflicts.

Even in cases where villages are located within the fishing lots, inhabitants are not legally entitled to fish during the open season. Thus, poaching is inevitable and constitutes an essential element of the relationship between lot owners and people living in adjacent villages. The villagers are in general more interested in rice farming and tend to clear the shrub land in order to increase their production base. They do not derive any immediate benefit from preserving the flood forest for the fishing lot operators. Ricefields still provide a sizeable amount of fish for food and eventually for selling or for exchange (Tichit 1981; Gregory and Guttman 1997).

In practice, however, under the rights of the fishing lot concession there is also a series of access rights and access strategies open to the villagers. As observed in Takeo fishing lot #19, all the fishing operators who fish in this lot live in the nearby villages. Their involvement in the lot fisheries ranges from written agreements with the lot owner or the sub-contractors for seasonal involvement, to shorter and more localized verbal agreements. There

may be options for advance payments for share-cropping as well as arrangements defining a specific area in which a limited number of a specific gears can be operated. Last but not the least, poaching is a widespread method of access to fish resources in the lots. Even children sometimes obtain permission to fish leftovers in ponds in exchange for rice. At peak times in barrage lots, villagers from within the lot are invited to participate in the labor intensive fish harvest in exchange for fish (Swift 1997).

An exceptional example of convergent interests has been reported from fishing lot #10 in Battambang. The 250 families of one village used to clear flood forests and poach within the lot. The conflict level between villagers and the lot owner was high. Through a process of negotiations supported by outside intervention, both sides agreed to allow the villagers to fish within the lot with a certain type of gillnet that targeted lower value fish. This was in exchange for their agreement to stop cutting the flood forest and poaching on other higher value species. The DoF supported the agreement by lowering the concession fee for the lot owner.

Ethnic Dimension of Fisheries

In Cambodia, inland fisheries have a very obvious ethnic dimension and it is a sensitive one. While the ethnic Khmer are basically farmers, the ethnic Cham and ethnic Vietnamese are considered to be fishers (Ebihara 1968). The stake of Cham and Vietnamese fishers in the Cambodian fishing industry has to be considered when designing management options that involve partnerships with the primary resource users.

The Cham, organized along Muslim religious traditions, are excellent fishers and boat builders. They show a greater sense of solidarity at the village community level than the Khmer (Ovesen et al.1996). Though the Cham have clearly defined villages with mosques, they often spend long periods of time with their families on their boats during the fishing season (Fig. 7). A fishing lot owner in Takeo reported that only Cham fishers organize larger fishing groups. They designate a leader who negotiates a concession with the lot owner or subcontractor for a large group or even for the village.

Historically, Vietnamese fishers have had a predominant influence at the operational level in Cambodian inland fisheries. At the beginning of the century, 60% of the fishers in Pursat were reported to be Vietnamese (Darboux et al.1906). The Vietnamese are still known as the best fishers (Luco 1997; Swift 1997). It is rumoured that they can smell the fish and have a very deep knowledge of the habits of the different fish species. They know exactly how, where and when to install a certain type of fishing gear. They have a long tradition of being involved in fishing lot operations, although lot owners are usually Khmer or Sino-Khmer. All fishing lot owners consult a Vietnamese master fisherman about the best strategies for acquiring and exploiting their lot. Due to the widespread anti-Vietnamese sentiment in Cambodia, the Vietnamese tend to settle near police stations or military posts. Their insecurity is alleviated because of patron-client relationships. In Kampong Chhnang, Vietnamese fishers have exchanged their Vietnamese style pirogue for a Khmer type boat in order to be less conspicuous. Cham and Vietnamese are rarely involved in conflicts with authorities or lot owners. They are willing to agree on the fishing fee as well as pay the license



Fig. 7. Angkor Borei, Takeo province. A group of Cham fisher families living on boats during the fishing season.

fee for their gears rather than pay fines and risk further discrimination.

Conclusions

The overall framework of cultural, economic and political processes of Cambodia limits the options for sustainable management of fisheries. The patron-client relationship makes "community participation" in the western sense impractical. The weakness of the system is not that it does not work or might be too inefficient, but rather that it is arbitrary and allows for abuse.

Fishing is strictly a rural activity and one of a number of activities to obtain food, income and employment. Improvements in one production activity may translate into a negative impact on another. For example, increasing rice production by intensifying the use of chemical pesticides might have a negative impact on the productivity of fish in the ricefields and eventually threaten food security. Thus, an integrated approach is necessary.

Fisheries management is fundamentally concerned with the stakeholders' capacity to communicate and negotiate common and differing interests in fisheries while preserving the recruitment capacity of the fish stocks. The importance of fisheries relative to other activities obviously depends on alternative production opportunities outside the sector. The capacity to analyze impacts on the fisheries environment, to communicate interests, to organize interest groups, to negotiate agreements and plan sustainable development is not fishery-specific but belongs to the broader framework of self-help capacity. Rural development programs are essentially concerned with the enhancement of the self-help capacity of rural organizations and institutions.

The fishing lot system covers the main inland fishing areas of the country. Improvements in the management of fisheries have to be addressed within and through this system. Community-based management as usually envisioned may well be impractical in Cambodia. It is unrealistic to expect that community-based management structures that have been successful elsewhere can simply be replicated here (Kurien 1988; Hannesson 1998). Co-management, where the resource users at different levels of responsibility take decisions and actions to safeguard the recruitment capacity of fish stocks, seems to be a more promising approach.

The patron-client relationship should be used for strengthening knowledge of exploitation patterns that allow for sustainable recruitment of stocks. This will strengthen the fishers' capacity to organize themselves and monitor levels of resource exploitation and protect fish stocks. It will also strengthen their capacity to negotiate their position within paternalistic and unequal

relationships. Improvement of management within the patron-client relationship does not rule out intervention focusing on strengthening the self-help capacity of villagers (Aschmoneit et al. 1997).

Improving fisheries management has to be addressed through the fishing lot system. In much the same way as the French Protectorate "introduced" the fishing lot system, its radical "abolishment" in favor of an engineered community-based management system is not likely to result in any real changes in the methods or people involved. The system should be used as a starting point to address resource stewardship. The existence of common property areas within the fishing lot system, and as defined in the Burden Book of specific fishing lots, could provide a potentially good platform for communication and negotiation on access rights and sustainable resource management.

References

- Ahmed, M. 1996. Integration of socioeconomic research in fisheries management and development in the Mekong sub-region. Paper presented at the Third Annual Meeting of MRC Program for Fisheries Management and Development Cooperation, 25-27 June 1996, Vientiane.
- Ahmed, M. and S.T. Touch 1996. Management of freshwater capture fisheries of Cambodia — issues and approaches. *Naga, ICLARM Q.* 19(1):16-19.
- Ahmed, M., H. Navy, L. Vuthy and M. Tiongco. 1998. Socioeconomic assessment of freshwater capture fisheries of Cambodia. A report on household survey. Project for the Management of the Freshwater Fisheries of Cambodia, Phase I. Mekong River Commission, Department of Fisheries and Danish International Development Assistance.
- Aschmoneit, W., C. Sotheavy, K. Kalyan and T. That. 1997. Grassroot organizations in the traditional rural community Stong District, Kampong Thom, Cambodia. GTZ, Kampong Thom, Cambodia.
- Baron, N. 1996. Psycho-social needs assessment of people affected by armed conflict in Battambang Province, Cambodia. UNICEF, Phnom Penh, Cambodia.
- Chevy, P. and F. Le Poulain. 1940. La pêche dans les eaux du Cambodge. *Travaux de l'Institut Océanographique de l'Indochine. 5^e Mémoires*, Gouvernement Général de l'Indochine, Saigon.
- CNMC/NEDECO/MIDAS. 1998. Environment in the Tonle Sap area. Sectoral studies 1. Natural resources-based development strategy for the Tonle Sap area, Cambodia (CMB/95/003). Final report. Vol 2. Phnom Penh, Cambodia.
- Darboux, G., J.Cotte, P. Stephan and F.Van Gaver. 1906. *L'industrie des pêche aux colonies*, p. 278-353. Tome II, Indochine. Marseilles, France.
- Deap, L., S. Ly and N.P. Van Zalinge, Compilers and Editors. 1998. Catch statistics of Cambodian freshwater fisheries 1994-1997. Project for the Management of the Freshwater Fisheries of Cambodia, Phase I. Mekong River Commission, Department of Fisheries and Danish International Development Assistance. Phnom Penh, Cambodia.
- DoF (Department of Fisheries). 1998. Statistics of the Department of Fisheries of Cambodia: fishing lots, provincial distribution, spatial extension, auction prices. (Unpublished).
- Ebihara, M. 1968. Svay, a Khmer village in Cambodia. Colombia University, Ann Arbor, Michigan, USA. Ph.D. thesis.

- Gregory, R. and H. Guttman. 1997. Capture and culture ricefield fisheries in Cambodia, p. 99-106. *In* H.J. Nesbitt (ed.) Rice production in Cambodia. IRRI-AusAID Project, Phnom Penh, Cambodia.
- Greve, H.S. 1993. Land tenure and property rights in Cambodia. Phnom Penh, Cambodia.
- Hannesson, R. 1998. Studies on the role of fishermen's organization in fisheries management. Fishermen's organizations and their role in fisheries management: theoretical considerations and experiences from industrialized Countries. FAO Fish. Tech. Pap. 300. FAO, Rome, Italy.
- IMC (Interim Mekong Committee). 1992. Fisheries in the Lower Mekong Basin. Review of the fishery sector in the Lower Mekong basin. Annex 5. Interim Mekong Committee for Coordination of Investigations of the Lower Mekong Basin, Bangkok, Thailand.
- Kingdom of Cambodia. 1992. Land law. The National Assembly of Cambodia, Phnom Penh, Cambodia.
- Kurien, J. 1998. Studies on the role of fishermen's organization in fisheries management. The role of fishermen's organizations in fisheries management of developing countries (with particular reference to the Indo-Pacific region). FAO Fish. Tech. Pap. 300. FAO, Rome, Italy.
- Luco, F. 1997. La gestion communautaire et la société traditionnelle Cambodgienne. Village dans la forêt inondée du lac Tonlé Sap. Commune Kongpong Kleang, province de Seim Reap, district de Sothnikum, Cambodge. Étude socio-anthropologique. Report for FAO, Project GCP/CMB/002/BEL. Seim Reap, Cambodia.
- MRD/CDRI. 1998. Learning from rural development programmes. comparative analysis. Learning from Rural Development Programmes Conference, 17-18 March 1998. Work. Draft. Ministry of Rural Development and Cambodia Development Resource Institute, Phnom Penh, Cambodia.
- NIS (National Institute of Statistics). 1996. Demographic survey 1996. General Report. National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia.
- Ovesen, J. 1998. Some reflections on rural development and Cambodian culture. Background paper for National Workshop on Rural Development Structure in Cambodia, 22-23 January 1998, Ministry of Rural Development, Sihanoukville.
- Ovesen, J., I.B. Trankell and J. Öjendal. 1996. When every household is an island. Social organization and power structures in rural Cambodia. Uppsala Res. Rep. Cult. Anthropol. 5. Uppsala, Sweden.
- Pétillot, L. 1911. La pêche et les poissons. Une richesse du Cambodge. Paris, France.
- Swift, P. 1997. Developing a research framework for the fishing lot system in Cambodia. Two preliminary case studies on fishing lots in Takeo and Kompong Chhnang Provinces. Report for the Project for the Management of the Freshwater Capture Fisheries of Cambodia. MRC/DoF/DANIDA. Phnom Penh, Cambodia.
- Thuok, N. and M. Ahmed. 1996. Cambodia's Great lake: how to sustain its ecological and economic diversity. Paper presented at the 1996 Annual Meeting of the International Association for the Study of Common Property, 5-4 June 1996, Berkeley, USA.
- Tichit, L. 1981. L'agriculture au Cambodge, p. 352-359. Chapitre VII: La pêche familiale. Phnom Penh, Cambodia.
- Van Zalinge, N.P. 1997. Fisheries management and conservation issues in the Tonle Sap. Contribution to the Workshop on Options for the Development of the Tonle Sap, 27 May 1997, Phnom Penh, Cambodia. CNMC/UNDP Natural Resources-based Development Strategy for the Tonle Sap Area Project.
- Vijghen, J. and L. Sareoun. 1996. Customs of patronage and community development in a Cambodian village. Pap. No. 13b. Cambodian Researchers for Development, Institute for Social Research and Training, Phnom Penh, Cambodia.

Pilot Schemes for Community-level Forest Management in Lao PDR: A Case Study of the Nam Ngum Watershed

Khamla Phanvilay

National University of Laos, Department of Forestry, Dong Dok Campus, Vientiane, Laos PDR

PHANVILAY, K. 2000. Pilot schemes for community-level forest management in Lao PDR: a case study of the Nam Ngum watershed, p. 61-67. In M. Ahmed and P. Hirsch (eds.) *Common property in the Mekong: issues of sustainability and subsistence*. ICLARM Stud. Rev. 26, 67 p.

ABSTRACT

Community-based management of common resources has increasingly been recognized by government agencies in the Lao PDR. Since the late 1980s, government policy on natural resources management has been re-examined as part of a complete and fundamental overhaul of the legislative framework to devolve natural resource management rights and responsibilities to local communities. The new resource management policy and resource tenure-related legislation is embedded in broader development principles such as the consolidation of macroeconomic reforms, the improvement of public sector performance, the improvement in living standards of the whole population and the abatement of natural resource degradation.

While resource exploitation and degradation have accelerated with the reforms introduced by way of the New Economic Mechanism, there have been concomitant changes in resources use and management. A decentralization policy on resource management has been introduced in the form of allocating resources (land and forest) that were previously administered directly by the State to local authorities and individuals.

Very few investigations of policy implementation for community-based resources management have been carried out. Several of these have been conducted by the Department of Forestry within the Lao Ministry of Agriculture and Forestry through different donor-supported programs and projects. This paper will highlight recent experiences in the implementation of the new national resource management and land use allocation policies through case studies which reveal the implications for both local and national governments.

Introduction

Since 1989, the government has issued new resource management legislation with an emphasis on rising levels of responsibility and stewardship among the population, and promoting awareness of costs as well as benefits of resource exploitation. Particular attention has been made to shifting cultivation and illicit logging. At the same time, provincial, district and village level participation in resource conservation and management have been promoted, as has a sense of local ownership. Such ownership is not based on legal title but on an acceptance by the government of *de facto* rights of management by local people. This, in turn, is based on the State's awareness of its limited capacity to manage at the local level, leading to an approach that emphasizes co-management in the use and conservation of natural resources.

In the absence of prior experience of this type, local government officials have considerable difficulty in achieving the potential for more effective and sustainable re-

source use based on local systems of common property management. It has proved difficult to bridge the gap between legislative intentions, the implementing regulations at the national level, and their interpretation and implementation at the local administrative levels. So far the regulation reaches the local level (district and village) through the dissemination of paper documents that are interpreted differently by different localities. Central authorities are quite limited in their capacity to manage resources locally due to lack of personnel and funds.

The case studies provide a better understanding of the special conditions of common property management at the community level, and can provide feedback to the local governments for implementing national policy. According to the legislation related to natural resource management, some form of co-management of natural resources has been in existence. Traditional customs, rules and structures, in which local people have individually and collectively played a significant role in conserving and managing resources, are seen as a basis for local

participation in resource management, particularly in areas long used for settlement and agriculture. In many cases, resource exploitation is regulated by traditional beliefs. For example, trees are believed to house the spirit of dead ancestors and this deters villagers from excessive logging. Apart from land and forest resources, water is another common management and conservation interest at the local level. Upper watershed areas are usually protected, particularly if they are at the head of streams that feed local irrigation systems. Traditional water management is also long-standing in the form of small-scale weirs and channel construction and maintenance, together with rules of water allocation. Nevertheless, considerable work is required to bring traditional and state management systems closer together if co-management is to work effectively. This also requires an understanding of ethnic differences in land, water and forest management. Traditional forms of resource tenure and management have yet to fully receive formal recognition. At the same time the tools to assist local resource management are still being learned and requires some testing with different cultural conditions of the ethnic people.

Several of the case studies involve different districts within the strategically important and prominent Nam Ngum watershed in central Lao PDR, where district officials were specially trained in participatory community-based resource planning methods. (Paek, Phoukood, Vangviang and Long sane districts). Some tools and methods are introduced to district officers or even villagers to collect necessary data and information for analysis. This will help identify how the resources are to be managed and used sustainably for the future.

Background

The Lao PDR is a small, landlocked country in Southeast Asia. The country was established in 1975 after three decades of fighting for independence. Since 1986, economic reforms announced by the Lao government under the title New Economic Mechanism have signified a shift from a command economy towards a market economy.

Most productive activities in Lao PDR have been heavily dependent on the country's natural resources. At the local level, people's lives are mostly subsistence-oriented, with economic activities based on land, forest and water resources. At the national level, dependence on these resources is also high. The country's most obvious comparative advantage is thus in its natural resource base, notably its forests.

With the high economic dependence on natural resources, the government is faced with the difficult task of simultaneously promoting natural development, taking care of livelihood requirements and maintaining a careful and balanced approach to resource management. The key challenge is promoting sustainable use of

resources, both to serve local needs and enhance national income.

The importance of land, water and forest resources to the economy is evident in the fact that, whereas agriculture accounts for only 15% of national export income, it makes up more than 40% of GDP. Of course, much of this lies outside the cash economy. Conversely, forestry contributes about 40% of export earnings and 15% of GDP (World Bank 1993). Development of forest and water resources is one of the main priorities of the government. In particular, hydropower is targeted as the base for both national industrial development and increasing foreign exchange earnings.

Although the country has only 4.5 million inhabitants on a land area of 236 800 km², 90% of the land area is made up of rugged uplands. Soil fertility is generally low. About 80% of the population live in remote rural areas and shifting cultivation is a major practice.

Laotians are made up of several ethnic groups. The diversity of ethnic groups is simplified officially by division into highlanders (Hmong), uplanders (Lao theung) and lowlanders (Lao loum). Livelihood varies by ethnic group, but also within groups. Most of the land with potential has already been occupied, and lowlanders have access to the most fertile and easily irrigable wet rice land. The largest highland minority is the Hmong, who believe in animism, practice shifting cultivation, and who migrated from Southern China in the 19th century.

Since the establishment of Lao PDR, the government has issued and disseminated rules and regulations on resource use. Until recently, however, little attention had been given to questions of resource tenure or prohibited land uses. This was because, under the economic conditions prevailing after the wartime destruction and displacements, emphasis was placed on local self-sufficiency at the provincial and even district levels. Most measures and resource management programs were applied flexibly, with priority given to catering basic economic and immediate livelihood rehabilitation needs following the war. Normally, cooperatives established under the socialist system treated resources as common property. In fact, poor management meant that cooperatives were often a pretext for open-access to resources as individuals struggled to rebuild their lives. Often this led to a rapid degradation of the local resource base, and an abandonment of existing traditional resource conservation and management practices. In the case of large-scale resource development, planning was centralized, with no community involvement except to inform local people of decisions made. Local people had no role in planning such resource exploitation or reaping any of the benefits. Under the cooperative system, perhaps the main constraint on resource exploitation was the limited development of markets, restricting the extent to which resources became commodities. Likewise, economic isolation and stagnation held back large-scale forest and hydropower exploitation.

While rapid resource exploitation and degradation have accelerated with the reforms associated with the New Economic Mechanism, there have been concomitant changes in resource use and management.

The Nam Ngum Watershed

Background

The Nam Ngum River is one of the major tributaries of the Mekong. The watershed and the study area are defined as the area draining into the Nam Ngum reservoir (Fig. 1). The watershed is nationally important for electricity production, while locally its resources are the main source of livelihood for the approximately 80 000 subsistence cultivators and close to 200 communities from diverse ethnic groups living above the dam.

Administratively, the Nam Ngum watershed covers parts of two provinces (Xiang Khouang and Vientiane) and one special zone (Xaisomboune). The largest communities are in Phonesavanh, Xiang Khouang province, where many ethnic groups have settled for decades. In the lower part of the watershed, near the dam, communities have also settled in the last 30 years, especially along road number 13B in Vangvieng district of Vientiane province and Saisomboune Special zone.

Resource management in Nam Ngum watershed was the subject of a preliminary study carried out by the Centre for Protected Area and Watershed Management (CPAWM), Department of Forestry (DoF), Ministry of Agriculture and Forestry, Lao PDR, during 1992 and 1993



Fig. 1. The Nam Ngum watershed and catchment of the Nam Ngum dam in Lao PDR.

through support from the International Development Research Centre (IDRC). This study involved a combination of data collection on resource use, pressure, competition, conflict and changes over the whole watershed, with the intensive participatory observation of two communities. Findings and study implications can be summarized as follows:

- There is substantial pressure on natural resources and food production systems in the Nam Ngum watershed area. Implication: significant changes in land, forest and water use and management are required in order to achieve a sustainable pattern of production.
- The nature of resource degradation and resource conflicts vary significantly from one part of the watershed to another, based on a range of social, historical and ecological parameters. Implication: an overly generalized approach to watershed management should be avoided in favor of one based on local knowledge and participation of communities and local authorities in each area.
- Community management of forest, land and water resources is long-standing and widespread throughout the watershed. Implication: local/traditional practices and arrangements should be seen as the starting point for resource management initiatives and planning.
- Resource competition and conflicts can be identified at a number of levels: within the communities; between communities; between local people and external claimants (notably forestry and hydropower); between ethnic groups with different agroecological practices, or differently stated, between upland and lowland production systems. Implication: there is a need to develop conflict pre-emption and resolution procedures at a number of levels, including more participatory impact assessment procedures for externally conceived projects.
- Ambiguity of both individual and community resource tenure is a basic source of competition, conflict and resource degradation. Implication: demarcation and definition of resource tenure at the village level need to be backed up at the district and other levels.
- At the district level, division of duties is often unclear; district level staff lack technical and organizational experience; and district staff tend not to be involved in activities at the village level, relying more often on written directives. Implication: district level staff need support, including technical and organizational training and experience in community liaisoning, in combination with more clearly defined duties in the field of forest, land and water resources management.
- From a local perspective, there are ambiguities in government policy regarding rights and duties of village, district, provincial and national authorities. Implication: the rights and duties regarding resource management, planning and enforcement need to be clarified.

Resource management in the watershed

Following the findings from phase I, the second phase of the study was carried out through CPAWM with the support of IDRC. Four pilot areas (Fig. 2) were selected mainly to represent the range of management challenges identified during the first phase of the study. Each pilot area has its own characteristics in terms of resources and socioeconomic conditions. Baseline information relating to three areas can be summarized as follows:

Namon and Huai Nyaang villages in Long San district

These two villages are located on the edge of Nam Ngum reservoir, have two different ethnic groups with different temporal settlement periods and share resources. Namon village used to be in the area flooded by the Nam Ngum reservoir, which means that it is representative of a community whose resource base has been integrated into hydropower development. The village was re-established close to the original village in 1975. During the 1980s, a Hmong community was established at neighboring Huai Nyaang due to the government policy on resettlement and administrative manageability. This reflects the general situation prompted by the government policy of resettling

shifting cultivators in closer proximity to lowland cultivators.

Nam Phao and Mouang Soum

Mouang Soum is an old established community with a well-established and hitherto sustainable resource management system. The community has managed its resource base and this is reflected in the land use patterns where wet paddy is the main farming system supplemented by the shifting cultivation of other staple crops adjacent to the paddy fields. Mouang Soum has been targeted as a resettlement site for Hmong returnees from Thailand and the surrounding uplands and reservoir-edge communities, which will lead to a sharp increase in pressure on the resource base.

Nam Phao is a community recently established in the 1960s and adjacent to Mouang Soum village in the east. The people in this community are from diverse geographical and ethnic origins. The clearance and degradation of resources in Nam Phao have spilled over into forests traditionally managed and protected by Mouang Soum villagers. More problems and difficulties arise where new administrative boundaries have been drawn.

Longkone

Longkone is a recently established village, having settled at its present location in 1994. Settlement in the area has been affected by periodic insecurity and displacement, reflecting one of the key background problems that has historically constrained the livelihoods of most communities in Nam Ngum watershed. Longkone and surrounding areas are eyed by the district as potential recipient sites for resettled communities from elsewhere, lending a particular urgency to establishing the limits of sustainability in agricultural production.

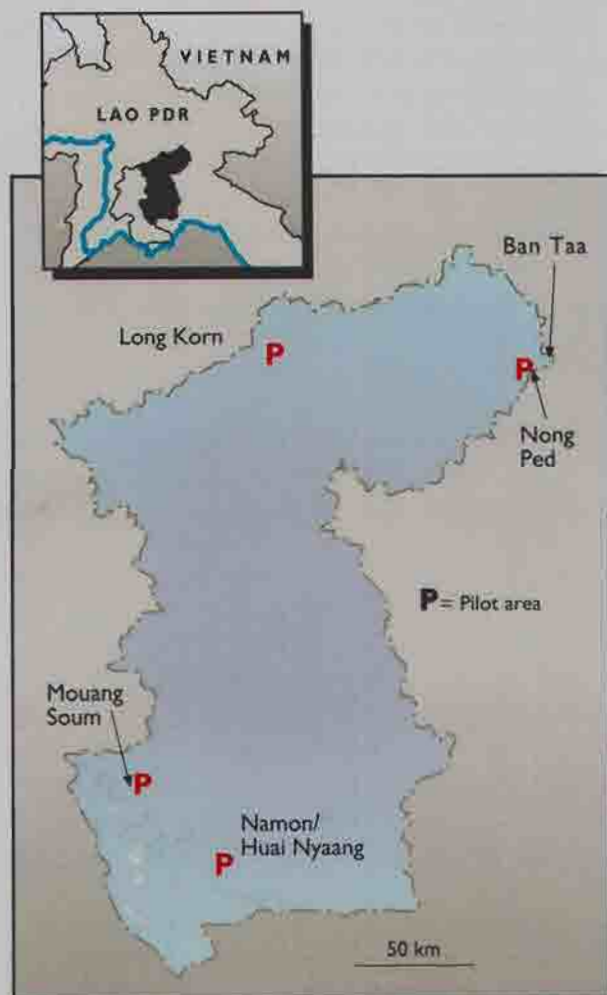


Fig. 2. Nam Ngum watershed showing pilot areas.

Community-Based Resource Management and Conflict

Resource pressure

Forest and land resources are also considered scarce as assessed by the declining level of resource quality and quantity. Although tenural rights to these resources have not yet been clarified, local communities and individuals observe customary rights in accessing and using these resources. Indigenous communities have long established traditions and rules to protect and use these resources. However, population growth through in-migration adds pressure to the use of natural resources. New communities have mostly settled in places where infrastructure is present and market opportunities are possible. Meanwhile indigenous communities who have occupied the territory and have utilized resources observe and recognize rules and regulations in resource use. Yet the newcomers

usually do not recognize the rules of the indigenous communities. Instead, they have encroached and exploited the resource that the indigenous communities have protected and conserved. Most of the conserved and protected forest areas and watersheds retain and regulate water for the lower paddy fields. Typically, where new and indigenous communities exist, conflict of resource tenure and utilization has occurred (e.g., the forest resources in Huai Nyaang, Namon, Nam Phao and Mouang Soum).

Land use

Paddy land is considered the most important land use unit for all communities in the watershed. So far, rice is still a major staple crop for all Lao people. Meanwhile the potential land for paddy development is geographically limited and scarce. In most cases, arable land in lowland areas is occupied by lowlanders and customary rights toward this land have been recognized by individuals and communities nearby. Shifting cultivation is another land use practice that is generally done in most upland areas. Though lowlanders are engaged in paddy cultivation, many of them still practice shifting cultivation for supplementary crops (even rice). More than half of the population in the study areas has practiced shifting cultivation.

As population increases in both lowland and upland ethnic groups, the requirement for land also increases. Comparing the present population with the area of paddy fields, the ratio is about 20 persons per hectare of paddy land where the yield of 1 ha is about 2 t. Currently, rice production is insufficient when compared to the requirement of the population. Supplementary rice production has been made through shifting cultivation. The new government policy limits slash and burn cultivation for three years in order to promote land development in rural areas as well as to diminish encroachment of natural forests. The present extension service is poor. Upland cultivation remains unsustainable because soil and land use in sloping areas lack soil improvement and conservation. This results in decreased yield when farmers grow crops in the same plot for more than two seasons.

In rural areas, where shifting cultivation practices still continue in the uplands, land use conflicts are commonplace. Land resources are considered and understood by local people as common property, where villagers have the customary rights to claim and use the land based on the capability of the family labor in clearing and developing the land. Shifting cultivation is considered as a sustained farming system if the land area is sufficient to rotate the practice from 10 to 15 years. However, due to population growth, the rotation is shortened and the suitable land becomes scarce and cannot absorb this cultivation practice anymore. Shifting cultivation has always been practiced on tops and along the edges of the mountains where water source for lowland paddy in the lower slopes originates. This results in land use conflicts between communities and households who use the land for cultivation

in different geographic patterns. In some case (Namon/Huai Nyaang and Nam Phao/Mouang Soum), land use conflict is related to paddy expansion and water resource availability for paddy expansion.

Forest management

The forests are an important source of food, medicine, construction material and income for the rural population. Usually, local people use forest products in their daily livelihood. However, some nontimber forest products are in high demand in both local and international markets. This results in the exploitation of forest products due to open-access. Resource exploitation to satisfy market demand creates competition at different levels: between individuals in a community, between two or more communities, and between outsiders and the local community. Forest resources in the local context and in the present situation are considered common property. Their utilization is controlled by district (or central) and community regulations. Meanwhile the customary rights of local people are recognized through the regulation of natural resource management at the national level.

In 1994, the new policy on territory based-management and administration village boundary demarcation was introduced as a first step to land allocation and land use zoning at the village level. In practice, each village should identify its own territory for management and administrative purposes, in effect carrying out land use zoning for forests, agriculture and infrastructure at the village level. The intended output is a village-level land use plan. In the case of Namon and Huai Nyaang, the two communities have not reached an agreement to divide the territory. Instead, they propose that there not be a boundary between the two communities because Namon villagers are afraid that they will lose their rights to use forest resources that have been claimed by Huai Nyaang villagers. Due to the different temporal occupation on forest resource between Namon and Huai Nyaang villages, the two communities cannot settle the village boundary, especially forest demarcation issues. However, Huai Nyaang people also claim that without their management and protection, those forests will be cut down by other villagers and small traders who try to encourage people to cut and sell the trees.

Experience from the study area indicates that market opportunities also create competition in resource use. When management guidelines are missing, resource exploitation will exceed the rate of growth and will result in the degradation and unsustainable use of such resources since an over-control of utilization has changed the perception of the resources from being common property to open access. For instance, fishing in Nam Ngum reservoir persisted despite rules and regulations against fishing in spawning grounds. The same experience happened with the gathering of nontimber forest products like rattan, bamboo, cadamon, aromatic wood and others. There were no rules developed at the village level in collecting

and exploiting these resources. This situation reflects the conflict between newcomers and the old community in terms of rights to use the forest. It indicates to the central policy authorities that it is not always necessary that each community has its own territory for resource management. It means that the community itself can make decisions whether the resource should be divided or jointly managed as community common property.

Water resources

Water use is now becoming a new issue for communities who use water for irrigating paddy fields. People who have lowland paddy as well as upland paddy areas are now blaming people who practice shifting cultivation along mountain slopes where the water originates. Furthermore, conflict in water use between paddy owners at the top of the weir and at the end of the weir prompts the need to share and distribute the water, especially during the transplanting period when a large volume of water is needed at the same time.

Training Local Authorities in Natural Resource Management

Potential and limitations

The village community is the most basic administrative unit. The committee and village leaders are elected by the villagers. Village-level resource management is grassroots-based and involves direct resource users; it takes advantage of traditional management systems. However, its key limitation is the absence of authority when dealing with inter-village disputes, disputes with outside resource claimants such as loggers, and, in some cases, even within the community. Conflicts arise due to the diversity of interests within individual communities and they require higher (district) arbitration. According to present resource management policies, local community involvement in resource management decisions is given a priority. However, community participation in resource demarcation and management also requires that property rights to the resources are redefined and protected.

The district is an important level in resource management due to its status as the unit of the bureaucracy that is closest to the resource users. Most personnel employed at the district offices are residents of the area under their jurisdiction. However, district level limitations include a shortage of relevant personnel, high turnover in some districts, lack of experience and appropriate training and, above all, inadequate resources.

In Lao PDR, the capacity of the village authorities and committees for resolving conflict is considered to be good (Kirk 1996). However, in some cases, conflicts have remained hanging in the balance for many years. The conflict between villages when it comes to rules is said to be difficult to resolve due to the reluctance to upset long-ex-

isting relations between communities. However, conflict resolution at the village level has two aspects. One is reliance on the traditional practice, where the senior committee in the village is consulted and gives recommendations to resolve the conflict. Another is reliance on the administrative channel, where any conflict that cannot be solved by the village is sent to the district and follows the judicial system.

Presently, the district level officials in charge of resource management lack the experience and skills for resource management, especially in organizing the local people in the process. Part of the experience in the Nam Ngum watershed involves training these officials, who have different technical backgrounds. The purpose of the training is to guide them in the process of resource management and utilization. The training is followed by field implementation. However, the process needs to be sustained and follow-up activities need to be done. Building capacity at the village level has to be encouraged for long-term program sustainability. This can be done by training local people in both theory and field practice in order to create awareness of local key stakeholders in sustainable resource management, conservation and development.

Tools and Methods

Maps are a useful tool in helping local people identify their own resources and management needs. The Nam Ngum experience of using a simple map that was prepared together with local communities provided satisfactory results in helping local authorities and people to identify resource use and decide the course of management. Although the tenurial system is not yet fully realized and implemented, this tool can nevertheless guide local people in defining their farming areas, forests for conservation, protection and production, and areas to be reserved for future use by the communities.

Organizing exchange visits between farmers allows them to exchange experiences and ideas. A study tour for farmers and local staff to other countries in the region where the living conditions and development trends are similar (e.g., northern Thailand) perhaps strengthens the resolve and adds to the knowledge of farmers and local staff in the conduct of their own resource management practices. This method can only be used in cases where the project has enough funds and resources.

Small revolving funds for local communities is a key project support mechanism. Buffalo bank was established to provide funds to Longkone in Xiang Khouang province. Two areas in Namphao and Namon were also extended schemes of revolving funds. Based on the initial evaluation, the revolving fund has resulted in an end to further forest clearance and has significantly enhanced food security for the villages. This intervention was the catalyst for a participatory land-use planning exercise that has achieved a strong community consensus in identify-

ing areas for maintaining forest cover for other uses as well as setting aside areas for agricultural production.

Conclusion

Resource management capacity-building at the community level needs the understanding, participation and a common consensus in methods, rules and utilization. The experience and traditional knowledge can be used as basis for the development of any rules and regulations in community resource management. The practice of resource demarcation and management requires institutional and personnel capability. Currently, resource management is relying on some key individuals. Ensuring the continuity of district programs has been a key problem due to frequent staff changes and changes in the mandate of the organizations.

Short training courses and study tours provide considerable benefits to local staff and community leaders.

- Resource allocation and local community intervention for better management are necessary and these strategies have been supported by government policy. Resource management and demarcation initiatives were anticipated to help ease conflicts over and degradation of forests, land and water resources.
- The level of awareness of community responsibility for resource stewardship has increased substantially, and among village leaders there is a sense of accountability for the condition of forests within village boundaries.

- Boundary demarcation is ill fitted to existing resource use and management practices especially in Namon and Huai Nyaang.
- Present policies on resource allocation need to adapt to the differences among ethnic groups.
- Resource management by local involvement and participation needs economic intervention in terms of livelihood development and improvement. The intervention should start with small-scale enterprises that fit local conditions. Large-scale intervention is also necessary in order to provide conditions for creating more sustainable land use practices within a participatory resource planning framework.

Acknowledgment

The author would like to acknowledge IDRC for providing the opportunity to prepare this paper. The main portion of this paper is derived from the final report on Resource Management in Nam Ngum Watershed authored by Dr. Philip Hirsch. Special thanks are given to Dr. Hirsch and Dr. Stephen Tyler for their valuable comments and suggestions.

References

- Kirk, M. 1996. Land tenure development and divestiture in Lao PDR. GTZ and Vientiane, Lao PDR.
- World Bank. 1993. Staff appraisal report: Lao PDR. Forest Management and Conservation Project, World Bank, Washington, DC, USA.

Common property in the Mekong: issues of sustainability and subsistence. M. Ahmed and P. Hirsch, Editors. 2000. ICLARM Stud. Rev. 26, 67 p.

TITLES OF RELATED INTEREST

Fisheries co-management and small-scale fisheries: a policy brief. R.S. Pomeroy and M.J. Williams. 1994. 15 p.

A brief for fisheries policy research in developing countries. M. Ahmed, C. Delgado and S. Sverdrup-Jensen. 1997. 16 p.

Toward guidelines on running multi-country, multi-site projects. M. Ahmed, R.A.V. Santos, M.C. Balgos, C.M.V. Casal, L.R. Garces and M.L. Tungala. 1997. ICLARM Conf. Proc. 55, 13 p

Sustainable inland fisheries management in Bangladesh. H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy, Editors. 1999. ICLARM Conf. Proc. 58, 280 p.

Fisheries policy research in developing countries: issues, priorities and needs. M. Ahmed, C. Delgado, S. Sverdrup-Jensen and R.A.V. Santos, Editors. 1999. ICLARM Conf. Proc. 60, 112 p.

TO ORDER and for more information on ICLARM—The World Fish Center publications, contact:

The Communications Unit Manager
P.O. Box 500, GPO
10670 Penang, Malaysia
Tel.: (604) 641-4623; 641-4652; 641-4655; 641-4729
Fax: (604) 643-4463; 643-4496
E-mail: ICLARM@cgiar.org

Visit our home page at <http://www.cgiar.org/iclarm>