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The Mighty Mekong Mystery

Joakim Öjendal
Elin Torell

Sida
SWEDISH INTERNATIONAL DEVELOPMENT
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Publications on Water Resources

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Copies may be obtained from:
Swedish International Development Cooperation Agency, Sida,
Department of Natural Resources and the Environment,
S-105 25 Stockholm, Sweden.
Telephone: +46 8 698 5100 Telefax: +46 8 698 5653

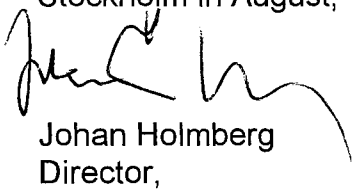
Foreword

The South East Asian region faces a steadily increasing pressure on its water resources. The ongoing rapid economic development in the region in combination with continued growth of the population with further concentrations to urban centres presents a steadily growing demand for water. A large part of the water resources in the region are carried by the Mekong River, and offers a spectrum of both present and future potential risks for conflicts regarding the utilisation/exploitation rights - and needs - of not only the water itself but also other related natural resources on which peoples livelihoods depend. Any major investment plans related to exploitation of the shared water resources will raise many important questions. These include how exploitation will be carried out and what possible social, economic and environmental consequences - costs, risks and benefits - for other concerned and involved stakeholders and parties it will have. Taking into consideration the vital importance of the Mekong River with its vast drainage area, the opportunities for creating a strengthened co-operation around an economically and environmentally sound management based on sustainable utilisation of the water resources must be found between the riverine countries. One such possible platform for co-operation may be offered through a strengthening of existing regional bodies, such as the Mekong River Commission.

Understanding the history of conflict development in a region is essential to be able to prevent conflicts and support sustainable solutions. It is our hope that this report may contribute to ongoing as well as future work and programmes within this area. The views presented are those of the authors and are not necessarily shared by Sida.

We would like to thank the authors, Mr Joakim Öjendal, Peace and Development Research Institute, University of Gothenburg, and Ms Elin Torell, Swedegroup AB, Gothenburg, for their contribution.

Stockholm in August, 1997



Johan Holmberg
Director,
Department for Natural Resources and the Environment

ABSTRACT

The Mighty Mekong Mystery -

A Study on the Problems and Possibilities of Natural Resources Utilization in the Mekong River Basin

This is a report commissioned by Sida on resource utilization in the Lower Mekong Basin (LMB). It is based on secondary academic sources, consultancy reports, development studies and on a large number of interviews conducted in the region by the authors. The report covers basically the "Lower Mekong Basin", containing Vietnam, Cambodia, Laos and Thailand, but includes, where necessary, also the Upper Mekong River Basin, including Burma and China. It takes its point of departure in the dynamic change these societies are going through and the role of the Mekong resources therein, in general, and in the tensions between the traditional and modern sector and between various actors in the region, in particular.

The report is centered around five parts. *Part I* introduces the pre-conditions for the report, its topic and its delimitations. *Part II*, covering chapter 2-4, describes empirically and historically the pre-conditions for development in the MRB. It does so by firstly giving a geographical overview of the region, its natural resources and its environment. A brief encounter of the social history of the basin is conducted and concluded in a modern economic setting, addressing perceived or potential problem areas. Part II is concluded with an historical description of the institutional setting in which the regional cooperation around the Mekong River has been carried out. In *Part III,* covering chapter 5-7, analyses is made in order to understand where "hot spots" and potentially overlapping and/or conflicting interests might appear. This analyses is restricted to three broad areas: the physical/environmental sphere, the economic sphere and the political sphere. *Part IV*, covering chapter 8, is where the "issues" are assessed. We conclude the chapter with a note on which critical knowledge gaps we have found and how to approach them. *Part V*, finally, contains the appendices including the Terms of Reference, a list over persons and organizations consulted, the Bibliography, and the MRC Agreement.

The report finds a number of issues around which the conclusions focus. i) It defines a number of "Hot Spots" where conflicts are more likely than in other places; ii) It states that the MRC-agreement for the moment will prevent international conflicts, but that there are still underlying difficulties such as an inherent conflict asymmetry in the basin and that there are potential domestics conflicts arising; iii) The report finds a competition between different sectors and claims that cash bringing modern sectors have an advantage, not necessarily due to their own inherent good, but due to the relative ignorance with which the traditional sectors are treated; iv) The report finds a contradiction between modernization and ecological preservation. This contradiction turns, however, unnecessarily large and a lot more could be done to respect "balance"; v) The gap between the huge, hypothetical, economic potential in the Mekong Basin, and what is internationally, socially and ecologically feasible is vast and calls for a rethinking of the whole development concept; vi) In the last couple of years "peace has arrived" to the Mekong basin

causing a lot of changes which need to be reflected in the institutional set up, and finally, vii) There are huge knowledge gaps considering the large interventions which are likely to occur in the next decades.

From these general issues a number of "guiding principles" are offered for continued debate and development cooperation in the LMB and its states. The development community should advocate: increased communication between actors at all levels in the system, higher degree of public participation, respect in depth and width for the sustainability concept, the disclosure of the potential of primary production and the traditional sectors, and the establishment of rules and laws regulating private sector involvement. In addition, regional politics need to be properly analyzed prior to any long term engagement, and the above mentioned knowledge gaps need to be closed.

PART I.

THE SETTING OF THE STUDY

ACKNOWLEDGMENTS

A study like this owes, by its very nature, gratitude to a large number of people. In five weeks we[1] have together visited five countries and a large numbers of institutions and organizations. In spite of us having extremely short of time in every location, and thus being fairly inflexible, the persons that we approached have frequently adjusted their already pressed schemes to accommodate our wishes. We are grateful for that. We have been in and out of a large number of different environments where we have, with no exception, been kindly received. I hope this generosity is reflected in this study.

Through our five week journey in the Lower Mekong River Basin we were especially encouraged in our endeavors by Lars Andreasson, Anette Björlin and Lars Y Nilsson; the latter earns a special reference for his ability of turning up at the right place in the right time. Magnus Torell has been a major supporter both through his enthusiasm for the issue of the report and sharing with us his excellent contact net. Formerly we were kindly received and assisted by the Swedish embassies in Laos, Vietnam, and Thailand through Göran Bergman, Marie Albin and Jesper R. Höstrup, and by Sven-Åke Svensson at the aid office in Phnom Penh. David Eizenberg at UNDP in Vientiane got out of his way to assist us. In Hanoi, we were friendly received by Le Than Luu, Vice Director at the Research Institute for Aquaculture No. 1. John Vijghen at CRD (Cambodian Researchers for Development) similarly provided all thinkable support in Phnom Penh. In the Philippines, the ADB, especially Henry G. Tucker and Thomas Gloerfeldt-Tarp, made a great effort to accommodate Elin Torell.

The study has benefited from a large number of formal and informal discussions with a large number of people interested in the Mekong development debate. The list over persons consulted is an attempt to reflect this source of knowledge. Bernt Bernander generously offered us his insightful comments. Bent Jørgensen has done "miracles" with the maps.

In course of the study we were invited by the Laos Government to a two-day field trip to Luang Prabang including an extraordinary reception; a trip which will be long in memory and high in appreciation. Finally, the most important actor(s) in all studies of this kind is of course the people(s) that it ultimately concerns. While we have made a deliberate effort to understand these questions also from a grass roots' perspective, we can only hope that we will be able to return at another time to more in depth understand the reality as it is understood from their point of view.

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[1] The authors are: Joakim Öjendal is a Ph.D. candidate at PADRIGU (Department of Peace and Development Studies), and works as a researcher at GESEAS (Göteborg Center for East and Southeast Asian Studies), both at Göteborg University. He is affiliated with AFI. Elin Torell is a Ph.D. candidate at the institution of Human Geography at Göteborg University. She is affiliated with Swede Group in Göteborg.

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Acronyms and Abbreviations

ADB	Asian Development Bank
AIT	Asian Institute of Technology
ASA	Association of Southeast Asia
ASEAN	Association of South East Asian Nations
ASPAC	Asian Pacific Council
AusAID	Australian Agency for International Developement
CITES	Convention on International Trade in Endangered Species
DOSTE	Department of Science, Technology, and Environment (Vietnam)
ECAFE	Economic Commission for Asia and the Pacific
EGAT	Electrical Generating Authority of Thailand
EIA	Environmental Impact Assessment
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agricultural Organization
FCDI	Forum for the Comprehensive Development of Indochina
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GNP	Gross National Product
GW	Giga Watt
GWh	Giga Watt Hour
HCMC	Ho Chi Minh City
IMC	Interim Mekong Committee
IRN	International Rivers Network
IUCN	International Union for the Conservation of Nature
LMB	Lower Mekong Basin
MC	Mekong Committee
MDRN	Mekong Development Research Network
MDSD	Mekong Dialogue for Sustainable Development
MOSTE	Ministry of Science, Technology and Environment (Laos)
MoU	Memorandum of Understanding
MRB	Mekong River Basin
MRC	Mekong River Commission
MRCS	Mekong River Commission Secretariat
MRIN	Mekong River International Network
MRLC	Mekong River Law Center
MW	Mega Watt
MWh	Mega Watt Hour
NEA	National Environment Agency (Vietnam)
NGO	Non Governmental Organization
PER	Project for Ecological Recovery
PRC	Peoples' Republic of China
QEC	Quadripartite Economic Cooperation
SEAL	the South East Asia League
SEATO	Southeast Asian treaty Organization
Sida	Swedish International Development Cooperation Agency
TERRA	Towards Ecological Recovery and Regional Alliance
TVA	Tennessee Valley Authority
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USD	United States Dollar

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1. INTRODUCTION

This is a study on the utilization of natural resources in the Mekong River Basin, MRB.[2] With a broad approach, it makes an inventory of overlapping economic, environmental and political interests. It dwells on some developmental problems that may arise from the changes of the resource utilization the MRB is currently facing. It also observes some potential future problem the basin, and its people, might face.

1.1. Background and Objectives of the Study

The Mekong River is one of the great rivers of the world. As such it has been the foundation for early civilizations, provided the lifeline for people for thousands of years, it has also been subject to romanticizing, exploration and colonial enterprises. The basin hosts one of the most diverse aquatic and wildlife areas of the globe and its reaches is, still today, only partially explored. While the basin has given rise to many powerful empires it is currently one of the least modernized areas of the world. During the cold war era river cooperation was, first, a strategy to unify the capitalist countries in the region, and, later, one of few topics around which the divided Mainland Southeast Asia could uphold a communication across its own "iron wall". Hampered by political conflicts, the development efforts on any major scale, based on the river's resources, has been impeded. So, in spite of an international and institutional river basin cooperation since 1957, the river is basically untouched by modernization: only one mainstream dam is constructed, and no one in the Lower Mekong Basin, it is not extensively used for irrigation and the river is only carrying a minor, albeit still important, part of the goods moving around in the region. By contrast, the people in the river basin uses its resources extensively for primary production. The absence of modernizing development projects is, however, about to change, as well as their day-to-day life.

Indicated through the liberalization of the socialist economic systems in the three Indochinese countries in the mid 80s, epitomized in the resolution of the Cambodia conflict in 1993, and concluded by the Agreement on Mekong River Basin cooperation from the 5th of April 1995 constituting the MRC (Mekong River Commission), a new era has come to the Mainland Southeast Asia. An era marked by potential cooperation and, in the case of the Mekong River, the possibility of major, common and profitable projects carried out for developmental purposes. Moreover, all four countries are launching growth strategies rapidly demanding an intensified resource utilization that must, e. g., satisfy a sharply increasing demand for electricity and be able

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[2] The Mekong River Basin is shared by six countries: China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. The *Lower* Mekong River Basin, which is where the political cooperation historically has prevailed, consists of the last four countries mentioned above. The Lower basin is the focus of this study.

to supply more water for the intensifying agri- and aquaculture. Rapid population growth and industrialization are ongoing processes further straining the resources of the Mainland Southeast Asia.

The Mekong Committee, born in 1957 with the mandate to coordinate the development around the Mekong River, soon got snared in the upcoming conflicts in the region. A full scale civil war in Vietnam, Laos and Cambodia was not conducive to any international river development. The Mekong Committee (MC) survived the communist take over in Indochina in 1975, but with the Khmer Rouge isolating Cambodia, the MC turned into an interim committee from 1978 (IMC). The Cambodia conflict, with Vietnam occupying Cambodia and Thailand vehemently opposing this, effectively kept Cambodia outside international recognition and kept the committee in its interim status. Hence the Mekong river was spared from the realization of any large scale development plans. Following the improved relations between the countries, the committee was reformed in the period of 1993-95, not entirely without complications, into an institutionally, and politically, strengthened Mekong River Commission (MRC). Moreover, the new era attracts a large number of stakeholders in the Mekong development. One emerging regional forum for cooperation is the Asian Development Bank's initiative "Economic Cooperation in the Greater Mekong Subregion", another is the recent interest from the side of the ASEAN to take part in the development process where the Mekong region is put in focus.

This pristine river basin, in terms of modernization, is facing large scale changes within the coming decade. It is, however, a sensitive object in all meanings of the word: the basin is a complex ecological system which is not easily changed and still maintained balanced. The social system is also delicate and facing changes; primary production risks being forced to give way for production in the modern sectors. As a resource base it is a cornerstone for all four Lower Mekong River Basin, LMB, countries. And as a regional concern it is one of the single most important foreign policy questions. Everywhere we went the question on environmental protection and the question on regional relations were raised; the former openly and the latter more discreetly. The two, environment and regional relations, seem to be the overall frame within which any major change has to take place.

Whether irrigation, hydropower, transportation or fishing is considered the natural resource related potential economic value of the basin is gigantic and the competition for the natural resources is, here as in other parts of the world, increasing. As often is the case with water competition, the stake is high. Both costs and benefits, risks and potentials, are high. Environmental, economic and political interest must be carefully balanced in order to realize anything coming close to its projected potential. Not only must this balance be between the international actors. The pace of change must be in concert with what the general public is prepared to accept; or, to dress it in aid language, *public participation* must be encouraged and achieved in

order to succeed with the development efforts. The question must be asked what sort of development people really want.

Different interventions need to be duly coordinated and, moreover, questions must be asked whether water resources and natural resource development are squeezing out other, and in the long run more development prone, sectors. Or, to put it differently: need other sectors be included in the MRC regional cooperation on equal footing as stated in the agreement? Or should MRC concentrate on water resources development exclusively, and how, in that case, can that be made compatible with the new agreement? The demand for coordination is not, however, restricted to coordinate different sectors or the development efforts of the four countries, but is extended to embrace contacts with a large number of different donors' demands and preferences. Furthermore, a large number of related development projects and research programs are springing up around the idea of Mekong River development. Some, like the Greater Mekong Sub-Region concept launched by the Asian Development Bank (ADB), is of major importance and need to be integrated in the planning by the MRC. *Regional Cooperation* is the keyword and *water conflicts* is the nightmare; both scenarios is fully credible. Insightful basin river management is of outmost importance.

Sida is a long-time supporter of the Mekong cooperation in the form of a joint coordinating body such as the Interim Mekong Committee. The work in the Mekong Committee has had development aspects, as well as security aspects which both has been attractive for Sida and other donors. The development aspects of the regional river cooperation is more urgent than ever. However, the peace promoting work of the former committee - the one of communicating across the "iron wall" - has shifted character. A more elusive, and perhaps underestimated, task rests with the MRC; one of regulating and accommodating different interest in the development process. As such "conflict prevention" is still one of its overarching, but often unmentioned, aims.

In this situation of changing agendas, rising number of actors, increased capital flow (both aid, public and private) and increased information generation, Sida decided to commission this report making a resource inventory and studying potentially overlapping, and rivaling, projects and ambitions. The objective of the study is to produce an open and descriptive report on resources and sectors of potential importance for the development of the region. Based on the descriptive part, an elaboration of areas for possible conflict and competition over resources at local and regional level should be made. The analysis also includes indications on possible environmental problem areas.

The study builds on material available in Sweden, at central institutions in the region, and on various government sources as well as on interviews with key persons working with, and deciding on, these

questions. Discussions have been held within the aid community, among researchers and analysts at universities in the region, as well as with several representatives from the concerned countries.

1.2. Studies on the Mekong River Previously Performed

One of the implicit aims of this study is to assess the available reports of the MRB Development. Therefore a brief overview of the available sources will be presented before we move on to the empirical parts of the report. This report is neither limited to water resources nor to the work within the MRC so therefore the material available is theoretically endless. Practically it takes its part of departure from studies and reports focusing on the Mekong cooperation and from institutions primarily dealing with this matter.

First we can note that surprisingly few academic studies have been performed on the Mekong River development and regional cooperation, and even fewer have been published.[3] Some articles have been published in academic journals and books. The bulk of these are published from 1994 and onwards.[4] A study which must be specifically mentioned is one on natural resource utilization in the LMB done by the Australian scholar Philip Hirsch. Beside these, and a few other academic pieces, our study relies on various sorts of reports from MRCS, government sources, bi- and multilateral development agencies, newspaper articles as well as sources from the NGO-community.

Two documents occupy a sovereign role in the future development of the MRB. The first is the "Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin" from 1995; the statutes for the MRC. The other key document, still in the making, is the Basin Development Plan (BDP); a plan which is "...the general planning tool and process that the Joint Committee would use as a blueprint to identify, categorize and prioritize the projects and programs to seek assistance for and to implement the plan at the basin level" (The Agreement 1995: 3). The MRC Agreement obliges the riparians to produce a master plan for the basin and the work to produce such a master plan, the result of which will be determining for future development efforts as well as the future of the MRC itself, has just started. Previously, two major Master Plans have been produced, one from 1970 and the "Revised Indicative Plan" from 1987. These are, however, by most analysts seen as outdated documents (albeit interesting, and still endorsed by some actors). The Terms of Reference for the BDP, which was agreed upon in the summer of 1996, is extensive and an interesting document in itself. The compilation of the plan itself, once started, is officially expected to take between 24

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[3]The most relevant Doctoral dissertations would be the following: Stoett 1994; Jacobs 1992; Le-Thi Tuyet 1973; Chaemsaitong 1973; Takahashi 1974; Sophonboon 1970; Ngo 1980. A few relevant master's thesis have also been traced: Jiuxu 1988, Beusch 1993; Mitchell 1994 and Öjendal 1997 ("Licentiate Thesis").

[4] The just published Stensholt (ed.) 1996 is so far the most comprehensive work shedding light on "Development Dilemmas" in the basin from a large number of different perspectives.

and 32 months to conclude. People viewing the process from the inside says, however, that it will probably take much longer than that. Another absent report related to the BDP (or even withholding the BDP) is the one on "MRC Rules for Water Utilization and Inter-Basin Diversions" which addresses the very core questions on the international problematique of the regional Mekong development.

Other crucial documents are the "Country Papers" in which the respective countries present their views on the Mekong Basin development. These are comprehensive reports going beyond water resources management and place their country profiles in relation to the proposed basin development.[5] The MRCS, in association with various consultancy corporations, produces large amounts of report, the most important which are the annual Work Program and the Annual Reports; the former is a "rolling action plan" for the Secretariat, listing projects in various stages of funding and implementation, and the latter a summary of activities during the year. Of course the various national development plans and environmental action plans are important documents as well to consult.

A large number of environmental studies are appearing. The major document would be the "Diagnostic Study" produced in cooperation between the MRCS and the UNEP (both regional and headquarters involvement). It is a comprehensive study which has been thoroughly researched and it reflects the present state of knowledge in this field. A somewhat minor, but nevertheless informative has been compiled by the same authors under the title "Greater Mekong Sub-Region - State of the Art Report" (1996). In addition (and before) the MRCS has produced an "Environmental Program" which preferably could be considered in conjunction with the joint DANIDA and Sida appraisal of that program presented in "Environment Program: The Mekong River Commission".

1.3 Perspectives and Delimitations

Proper utilization of natural resources is difficult and, historically, problems abound.[6] Far too often have valuable resources attracted the "wrong" activities and started processes leading to maldevelopment and exploitation; especially in developing countries with weak state administration, legal framework and inactivated civil societies. It is difficult for various reasons. Extraction of natural resources is often adding quite low value to the product, generating low wages and few spin-off activities. Furthermore, it has had a tendency to squeeze out other sectors, which might be more development prone in the long run. It tends to invite foreign forces not always concerned primarily with development of the country in question. Moreover,

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[5] The Vietnam paper was, however, missing at the time of the writing of this report.
[6] For a odyssey over the role of natural resources in development, see Vandana Shiva 1992.

the domestic economy might turn uneven, stratified and economic benefits may be geographically unevenly distributed.

This must, however, not be the case. Balance is a key word and here the aid community has a role to play. It is often poor countries that are, in an initial phase, forced to focus on developing their natural resources. A weakly developed legal, institutional and environmental frameworks make the balancing act difficult. In this case the role of the donors is even more pronounced since they have an influence over (and responsibility for) the financing of any major interventions outside the private sphere. Cambodia and, especially, Laos are more compelled to utilize the natural resources as an integrated part of their development strategy, while Vietnam, and especially Thailand have more diversified economies. This does not, however, mean that the two latter are less interested in the utilization of the natural resources of the MRB, only that they might be slightly less dependent on them. On the other hand, the geographical areas in Vietnam and Thailand falling within the MRB show similar dependence on the natural resources of the basin.

Regulation and distribution are two other key concepts when discussing the water resources of the MRB. The vast difference in water flow between dry and wet season (approximately a ratio of 1-30) has always been one of the driving forces for regulation of the river and one of the underlying factors for the perceived benefits of regulating the river. Major efforts have been made in order to define various master plans. These are, however, subject to changes of various sorts and, moreover, extremely complex undertakings. The lack of reliable regulation principles makes meaningful decisions in a number of areas and sectors very difficult to take. The benefits of regulation rests, in addition, on the construction of a credible system for distributing the gains since benefits and burdens will not naturally fall equally.

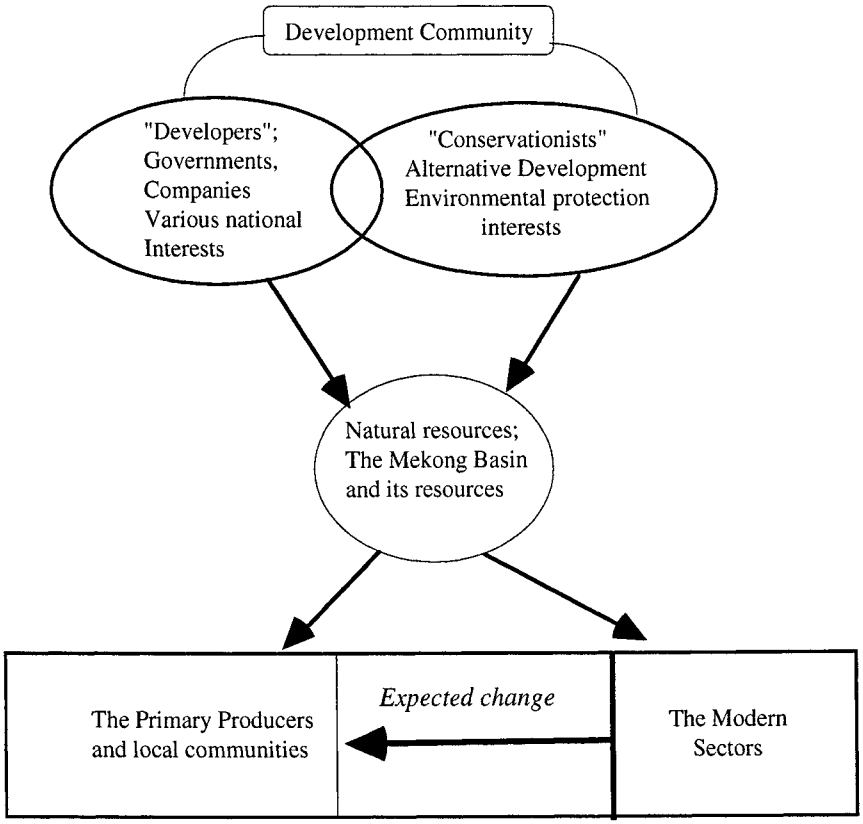
As we studied the resource utilization in the MRB, the figure 1 below crystallized. Various interests strive for different development profiles and the development community becomes the "referee" trying to balance the act. As a quiet spectator, not necessarily interacting in the game, we find the large majority of the people depending on the resources of the Mekong Basin in their day-to-day life, the "Primary Producers". Previously, the "Primary Producers" have had free access to the use of the natural resources, but now we see rising demand from what we can label the "Modern sectors".

This study is about the *present* resource utilization of the Mekong Basin and, to a minor extent, the *planned* resource utilization. Two very different patterns emerge whether we consider the present or the future, anticipated, use. This illustrates the rapid modernization expected in the coming decade in the countries of Mainland Southeast Asia. Another way of putting this is that the natural resources allocated to the primary producers will give way to producers in the modern sector. How to accommodate the proposed changes

without major conflicts, or maldevelopment, emerging is the challenge of the policy makers, but also to some extent, of the donors. To discuss this change from various angles is the bottom line of this study.

The structure of the study is to broadly outline the present resource utilization, but to concentrate on the sectors of major importance in the proposed change of the utilization pattern. We proceed similarly on the institutional and political side; based on empirical data we make an inventory of institutions and political "hot spots" in the region, but choose to concentrate on a few central institutions (especially the MRC) and on a few political dilemmas respectively. However, this delimitation should not be interpreted in a normative way. These sectors (like hydropower) do not need to be dominant, but again, we have very little knowledge of the potential of sectors like tourism, or the degree of reliance on production like opium growing.

Figure 1-1. Management of Natural Resources - a Battle Between Interests



"Developing" interests need to be balanced with sensitivity for ecological issues and local needs. The development community has then the difficult task, as all referees have, to know the rules as well as the players do. This report is a contribution in that direction, and the two most urgent balancing acts, are perhaps, as we have already mentioned, between "development" versus ecological sustainability, and between local production and various national interests.

Finally, the study focuses on the development of the Lower Mekong Basin. It does so for four reasons. Material is scarce on the development in the upper basin, the Lower basin has historically been where the political cooperation has been attempted, the MRC agreement - triggering some of the changes we see before us - involves the countries in the lower basin and, finally, for reason of the limited scope of the study. This should not cloud the fact that China (or Yunnan) is by now a major actor influencing both environment, economy and politics all the way to the South China Sea. Occasionally information on development in Yunnan have been included.

1.4. Disposition of the Study

After this introductory chapter the study is divided into four different parts with different purposes. Generally, the study starts with a wide and empirical description of geographical and historical conditions for the sub-region which subsequently will be narrowed to identifying overlapping and/or conflicting development interests, which, in turn will be further narrowed into an analysis of what is found to be the critical issues.

Part II, covering chapter 2-4, describes empirically and historically the pre-conditions for development in the MRB. It does so by firstly giving a geographical overview of the region, its natural resources and environment. A brief encounter of the social history of the basin is conducted and concluded in a modern economic setting, addressing perceived or potential problem areas. Part II is concluded with an historical description of the institutional setting in which the regional cooperation around the Mekong River has been, and will be, carried out. This chapter also includes a note on external institutional influences on Mekong cooperation.

In *Part III,* covering chapter 5-7, the analyses is made in order to understand where "hot spots" and potentially overlapping and/or conflicting interests might appear. This analyses is restricted to three broad areas: the physical/environmental sphere, the economic sphere and the political sphere.

Part IV, covering chapter 8, is where the "issues" are assessed. This chapter is divided into four broad categories: *Areas of Potential Conflicts, Competing Interests, Institutional Set-up,* and *Knowledge Gaps.* A discussion is conducted on the seriousness of the incompatible developments and ambitions found. We will return to what we perceive as the two major delimiting factors found for a "traditional" modernizing development in the LMB: environmental protection and international restraints. Moreover, the role of the general public is also mentioned. We will further discuss a number of knowledge gaps found along the way, which directly relates to the very complex process that this report deals with. The Terms of Reference for this study do not ask us to make any recommendations for what should be done development wise in the MRB. However, a few "guiding principles" are offered.

Part V, finally, contains the appendices including the Terms of Reference, a list over persons and organizations consulted, the Bibliography, and the MRC Agreement.

PART II.

DESCRIPTION AND PRECONDITIONS FOR THE DEVELOPMENT OF THE MEKONG RIVER BASIN

2. THE GEOGRAPHY OF THE MEKONG RIVER BASIN

> "Through this kingdom runneth the river Mecom into the sea, which the Indians name Captain of all the Rivers" (Jan Huygen van Linschoten, 1596)

2.1 Overview

The Mekong River[7] origins in the Tibetan Himalayas, at about 5000 meters above sea level. The 4200 km long river runs southward between the Yangtse river and the border to Burma. After the Golden Triangle, known as a center of opium production and trade, where Thailand, Burma and Laos meet, the Mekong river meanders south and east through the highlands of Laos before it continues as a 900 km long borderline between Thailand and Laos. The Khone falls at the border between Laos and Cambodia, and the 120 kilometers of rapids in northern Cambodia, together constitutes an obstacle that makes it impossible to travel by boat along the entire river. Something that the French was unaware of when they entered Indochina, with the aim of using the Mekong River as a route to China.

The Mekong River continues through Cambodia. At Phnom Penh it is joined by the Tonle Sap River, one of over hundred 100 tributaries of Mekong, of which the Tonle Sap River is the largest and most well known. Tonle Sap, which runs between a lake with the same name and the Mekong River, is famous since the flow reverses twice a year. When the Mekong River swells during the monsoon season, the water flow into the lake, but as the water subside, the flow reverses. Thus the Tonle Sap, or the Great Lake, act as a natural flood retention basin. During the wet season the lake is many times larger than during the dry season. The flooded forests and plain provide habitat for a multitude of fish searching for food and spawning grounds.

After the Mekong River meets the Tonle Sap it branches into the Bassac River, which runs side by side with the Mekong, until they spread out into "the nine tailed dragon" of the delta in Vietnam. Six sovereign states, China, Burma, Thailand, Laos, Cambodia, and Vietnam share the resources of the Mekong River system, together covering an area of 2,3 million square kilometers.

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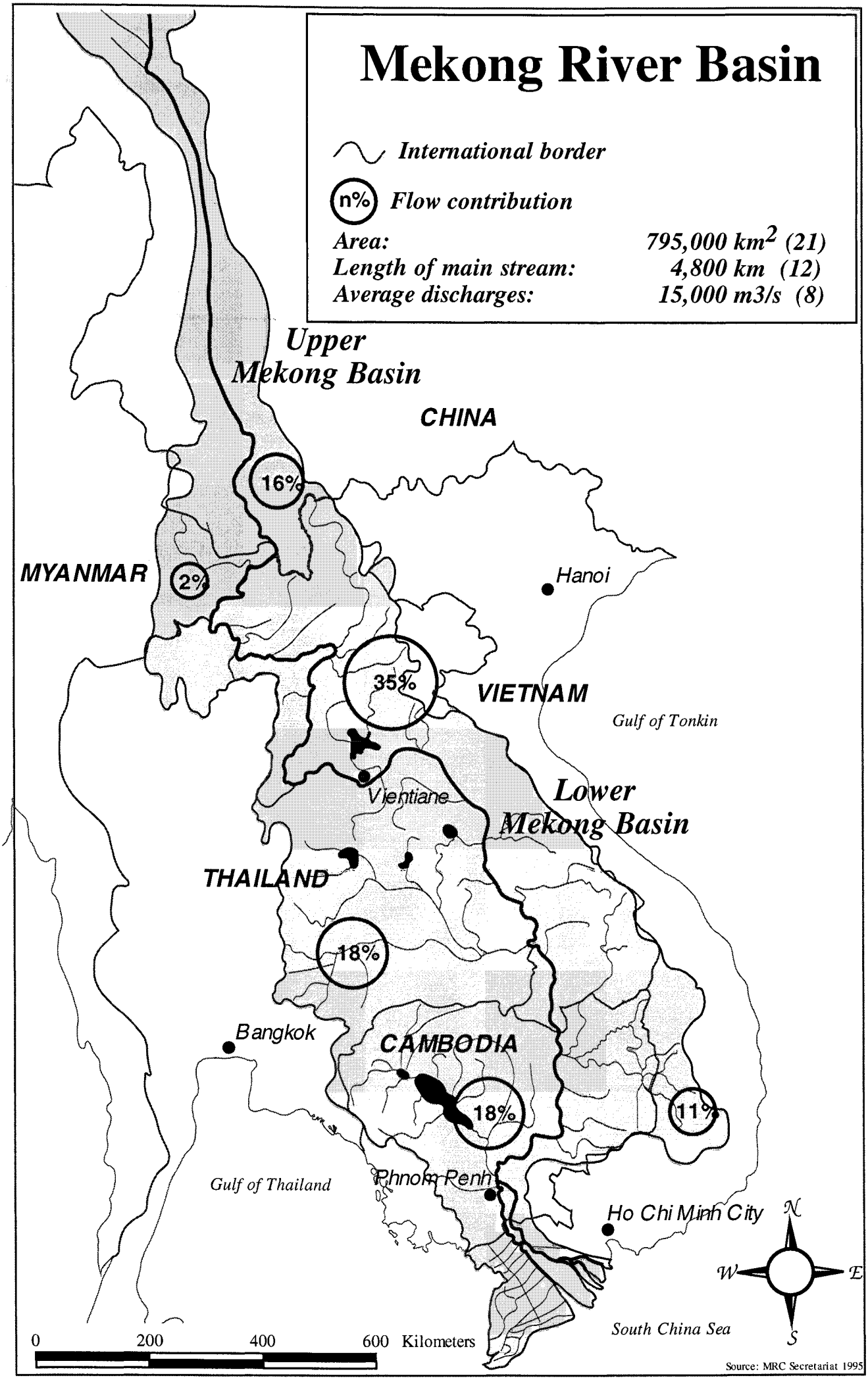
[7] The river has several names throughout its entire stretch. In China the common name is *Lancang Jiang*, or Lancang River. According to a Chinese legend, the river is named after one of three beautiful daughters of Snow Mountain, the two other daughters are said to have given their names to the Salween and the Yangtze. Mekong is a contraction of *Mae Nam Khong,* the Thai epithet of the river which means "the Mother of Rivers". In Laos and Cambodia, the name is similar *Menam Khong* respectively *Mekongk*, but in Vietnam, the river is known as *Cuu Long*, or the nine tailed dragon.


Mekong River Basin
International border
n% Flow contribution
Area: 795,000 km2 (21)
Length of main stream: 4,800 km (12)
Average discharges: 15,000 m3/s (8)
Upper Mekong Basin
CHINA
16%
MYANMAR
2%
Hanoi
35%
VIETNAM
Gulf of Tonkin
Vientiane
Lower Mekong Basin
THAILAND
18%
Bangkok
CAMBODIA
18%
11%
Gulf of Thailand
Phnom Penh
Ho Chi Minh City
N
W
E
S
South China Sea
0 200 400 600 Kilometers
Source: MRC Secretariat 1995

Map 2-1

It is the tenth largest river in the world, carrying over 475 000 cubic meters of water to the sea annually. The water level varies drastically throughout the year as the river is fed by melting snow in Tibet and two monsoons.

The Lower Mekong Basin, LMB, starts at the Golden Triangle at the border between Thailand, Laos and Burma. The catchment area of 600 000 km^2, cover 2% of Burma, 3% of China, almost the whole of Cambodia and Laos, about one third of Thailand and one fifth of Vietnam.

2.1.1 Geographical regions

The topography of the MRB ranges from rugged mountains and upland plateaus to low, flat deltaic areas. The character of the river changes drastically between the six riparian countries. Traditionally, the Mekong has been divided into two parts, the Upper and the Lower Mekong Basin, where the lower part of the basin has got most of the international attention as past cooperation between the riparian states has been focused on the four states of the LMB. Now, the cooperation is beginning to include also China and Burma, since it is becoming essential to see the river as a whole complex. In the past, the Chinese part of the Mekong Basin was, and still is, very isolated and unexploited, but as the region is becoming more and more important, for example as a generator of hydropower, the downstream countries are more eager to have China as a participant in the planning of the water utilization, thus slowly erasing the old fictive border between the lower and upper basins.

In Northeastern Thailand, the Mekong and its tributaries Mun and Chi are essential as a water source for agriculture and fisheries, including irrigated agriculture and aquaculture, but even though the Northeastern region comprises one-third of Thailand's population and land mass the national economic focus is mostly in the Chao Phraya river basin in central Thailand. The importance of the Mekong is much greater in Laos which draws definition as a nation from the river, illustrated in the national flag where the blue stripe represents the Mekong. The river runs along entire Laos, mainly as a western border to Thailand, but even if the river itself is not situated in the center of Laos it has always been the country's economic lifeline. About 70% of Laos comprises of mountain ranges, highlands and plateaus, hence most of the wet-rice cultivation is done in the vicinity of the Mekong, naturally the most populated part of the country.

In Cambodia, the Mekong runs through the lowlands dividing the country into two parts, veined by the tributaries. Just like in Laos it is a dominant topographical feature, together with the Tonle Sap lake and river. Phnom Penh, the capital of Cambodia and the furthest major point upstream that is navigable by ocean-

going vessels of about 5000-8000 tons throughout the year, is situated right by the junction between the Mekong and the Tonle Sap, making it a city well integrated with the river. The river system provides water for water supply, irrigation, fisheries and navigation, thus it is essential for the livelihood of Cambodians.

When the Mekong enters Vietnam it starts to subdivide to produce a classic delta pattern, with the Mekong and the Bassac rivers as the main features, but also constituting a web of minor streams and canals, giving a total of about 5000 kilometers of waterways. In Vietnam, the Mekong is situated in the southern part far away from the political center of Hanoi, although close to the economic giant Ho Chi Minh City. The main characteristic of Mekong from the Vietnamese point of view is to be a water supplier for rice culture in the delta region.

The Mekong Basin can be divided into six geographical regions (see map 2-2).

The Lancang River Basin

> "The terrific gorge of the Mekong engulfed us and our caravan looked like mere dots on the narrow trail against the huge cliffs." (Joseph F. Rock, 1926)

The upper Mekong Basin is situated in China. It is an area characterized by drastical changes in the elevation with high mountains, the highest peak, Kagebo peak, is 6740 meters compared with the lowest point of Simao port, situated at 317 meters. The average elevation fall of the upper reaches of the river is 6,17 meters per kilometer, illustrating the vast hydropower potential. The hostile terrain supports sparse populations with 7-145 persons per km^2. Most of the population is centered in the southern part where the mountains and valleys are medium or low with a limited amount of arable land. The main economic activity is agriculture, with frequent shifting cultivation. Other important sources of income are hunting, fishing and handicrafts. Although the population is scarce, the many minority groups forms a colorful ethnic mosaic, as there are 24 separate minority groups in Yunnan province, of which Yi is the largest. Other minority groups present in the Lancang River basin is Lisu, Bai and Nu.

The Northern Highlands

The Northern highlands, which straddle the borderline between the upper and lower Mekong, covers Southern Yunnan, Burma, Northern Thailand and Northern Laos. As the River flows into Thailand, the name changes to Mae Nam Khong, meaning mother of rivers. Just like the Lancang River Basin it is a remote area with a rugged mountainous terrain and a substantial potential for hydro-electric power. The population is sparse, only 8-15 persons per km^2 with few settlements larger than hamlets. Several hill tribes, like the Akha, Hmong and Karen, live in the area where they practice shifting cultivation, the main economic activity besides opium

production and handicrafts. Even though the Golden triangle also has a significant tourism industry, at least on the Thai side.

The Annamite Chain

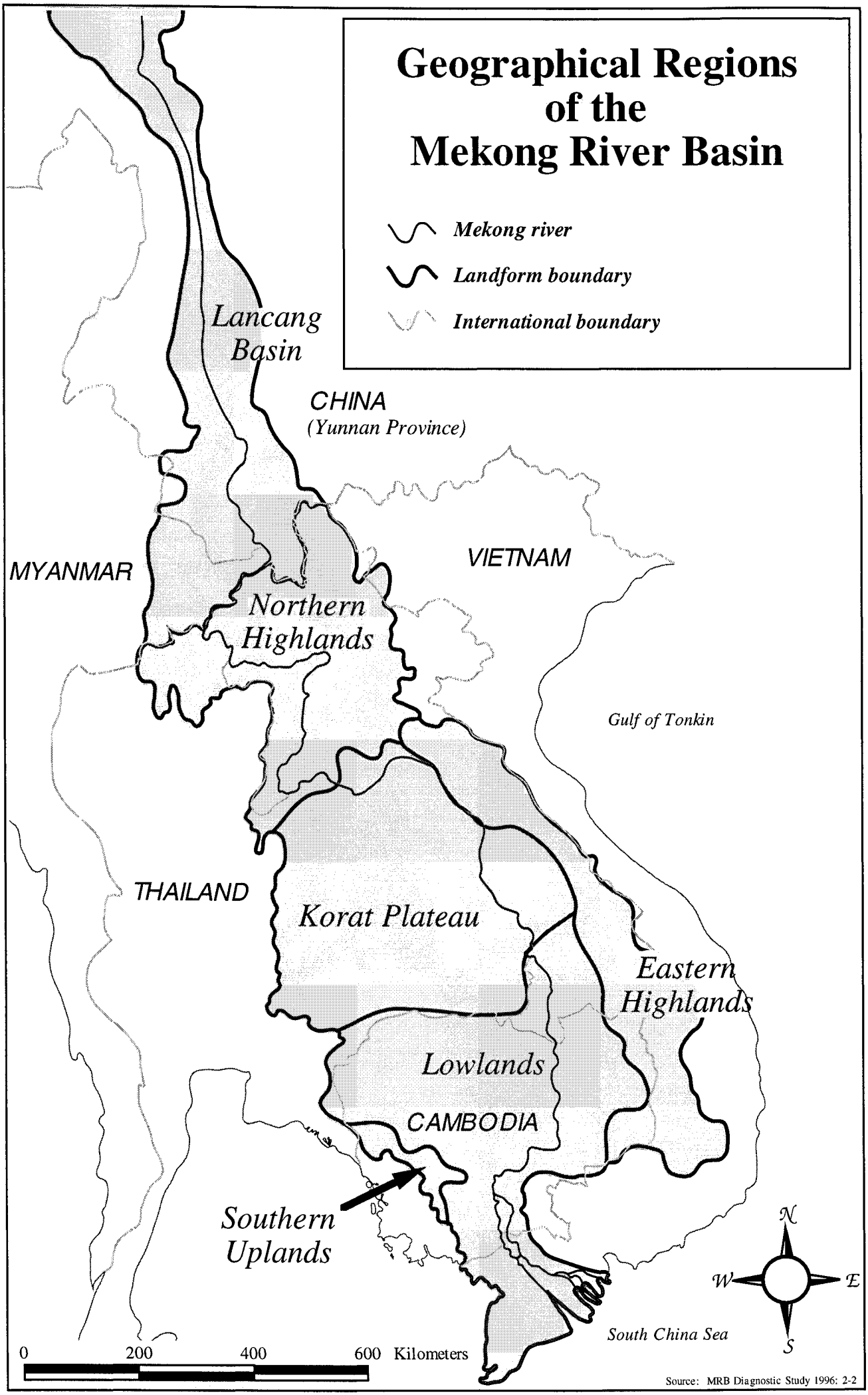
The Annamite Chain runs from north to south through Laos and western Vietnam (Central Highlands) down to the border between Cambodia and Vietnam. In certain places the terrain rises over 2500 meters above the Mekong's alluvial plain, and just like the Northern Highlands and the Lancang River basin it is a remote and sparsely populated, 6-33 persons per m^2, area providing habitat for a number of hill tribes that are conducting shifting cultivation as well as hunting and fishing. The mountainous terrain has several narrow river valleys, such as the Nam Ca Ding and the upper Se Bang Fai River, providing a significant hydro-power potential.

The Southern Uplands

The Southern Uplands is a small area which separates the Lowlands from the Gulf of Thailand. The area has a very low population density with less than 4 persons per km^2. It is an underdeveloped area with hunting and shifting agriculture as the main economic activities.

The Korat Plateau

The Korat plateau or Isan region, is a massive saucer-shaped sandstone plateau at between 100 and 200 meters above sea level with soil of low quality as it is sandy, permeable, and infertile. It is underlain by sedimentary Mesozoic rocks, hence it has a high content of salt. The plateau covers an area of 168,854 square kilometers, which makes it the largest single geographical unit of the Mekong Basin. The River splits the plateau into two parts one more extensive on the right bank in Thailand and one smaller on the Laotian side. Even if it is a poor, semi-arid rural area where farmers must rely almost entirely on the uncertain annual rains to water their crops, it hosts a considerable agricultural population. In Thailand the plateau supports a population of over 20 million, which is about one third of the total population of Thailand (ADB 1996: 67). Compared to the other regions of the Mekong River, Northeastern Thailand is experiencing a larger development of urban centers, like Udon Thani.


Geographical Regions of the Mekong River Basin
Mekong river
Landform boundary
International boundary
Lancang Basin
CHINA
(Yunnan Province)
MYANMAR
VIETNAM
Northern Highlands
Gulf of Tonkin
THAILAND
Korat Plateau
Eastern Highlands
Lowlands
CAMBODIA
Southern Uplands
South China Sea
N
W
E
S
0
200
400
600 Kilometers
Source: MRB Diagnostic Study 1996: 2-2

Map 2-2

the Mekong Plain

The Mekong Plain covers the flood plains and wetlands in Cambodia as well as the Mekong Delta in Vietnam. The Plain have historically been among the most densely populated and productive agricultural parts of the basin, except the lower Mekong delta which was largely avoided by permanent settlement prior to the mid-nineteenth century, because of the environmental obstacles, such as flooding and typhoons. Today the density varies between 10 to 570 persons per km^2. The population acquires a livelihood mainly from rice farming and fishing.

The Mekong Delta is the major food surplus region in Vietnam, with considerable potential for paddy extension and rice intensification as well as in other food crops, fisheries, aqua-culture, and plantation forestry. The Mekong Delta generates close to 45% of Vietnam's total food production (in rice equivalent) even if it covers only 12,0% of the land area and holds 22,6% of the population (Than and Tan eds. 1993: 201, and The World Bank..., 1995).

2.1.2 Climate

The climate of the Mekong region is influenced by two monsoons. The region has a quite uniform temperature regime, and it is the rainfall, rather than temperatures, which fluctuates over the year. It generally does not get warmer than 30°C, except in certain areas which may experience up to over 40°C. Temperatures decrease northward and away from the coast during the winter season. The lowest temperatures in Laos is 15°C and in Cambodia 22°C. The low temperatures are due to the influx of polar air masses from the land mass to the north.

During the northeast monsoon, which lasts from about mid October to March, the region, except the Vietnamese coast, experiences less than 6 cm of rainfall per month. About ten percent of the annual rainfall is recorded during this season. From mid May to September the climate is influenced by the southeast monsoon, which carries moisture from the Indian Ocean. Only a few areas, as for example southern Vietnam, receive less than 10 cm of rainfall per month. In other areas, like the windward facing slopes of the mountains in Laos, rainfalls over 50 cm per month are found. The inter-monsoon transition periods, April-May and October-November, is characterized by frequent and heavy storms.

Table 2-1. The average rainfall in the Lower Mekong Basin

Area	Rainfall
Lancang River Basin	Variable rainfall 600-2700 mm/year
Northern highlands	wet, 2000-2800 mm/year
Korat plateau	relatively dry, 1000-1600 mm/year
The Annamite Chain	wet, 2000-3200 mm/year
Southern uplands	very wet up to 4000 mm/year
The Mekong plain	variable 1100-2400 mm/year

Source: "Perspectives for Mekong Development" 1987; and "MRB Diagnostic Study" 1996.

In general the countries of the Lower Mekong Basin does not have problems with the total quantity of rain received each year. Rather the variation in rainfall through the year, between and from village to village years is problematic and may cause local droughts or flooding, disastrous for the specific area.

2.2 Natural Resources

The countries of the MRB is rich in natural resources, although there is a lack of precise information, due to the lack of capacity and the history of war and conflict in the area. Thailand and to some extent Vietnam are the countries that have the most reliable database. The Mekong region is heavily dependent on the natural resource base, and the whole area is relatively abundant regarding, for example, forest, water, fish and mineral resources. Most of the population, about 84% lives in rural areas, hence depends on the resources, such as water, agricultural land, forests and fisheries for their daily livelihood ("MRB Diagnostic Study" 1996: 4-1). At the same time, the natural resources are important in the national view of generating foreign currency by export, directly as raw material and food or indirectly through handicrafts. The natural resources are in some areas becoming degraded, mainly because of the increasing population pressure combined with a growing demand for exploitation in order to reach a higher economic development.

2.2.1 The Land Use

The land use of the countries of the MRB, 1993, is showed in table 2-2 below. Even if the region is primarily agricultural, only a minority of the land is classified as arable. There are several reasons for this, for example

in Cambodia and Laos the demand for agricultural land has been quite low because of a modest population density at the same time as areas under shifting cultivation may be defined as forest and woodland.

The source of table 2-2 is the FAO Yearbook 1994. There is a general lack of reliable statistics regarding the MRB. Many nationally reported figures are based on old investigations, and the definition of land types differs between countries. One example is the statistical definition of forest and woodland, which may be regarded as strictly forests or as land historically covered with forests, not used for agriculture. The real figure of forest cover is most likely much lower than the official figures since much of the forests are "secretly" exploited by illegal logging. One weakness with traditional land use statistics is that it does not consider areas covered by wetlands, flooded forests etc. In table 2-2 the areas covered by water can be discovered by subtracting the total land area including water with the total land are. Of course the area of wetlands are not static over the year as the water levels changes, for example in the Tonle Sap lake.

Table 2-2. Land use in the MRB 1993

Country	Total area (including water) 1000 ha	Total land area 1000 ha	Arable land 1000 ha (%)	Arable land harvested 1994 1000 ha (%)	Permanent pasture 1000 ha (%)	Forest and wood land 1000 ha (%)	Other land[8] 1000 ha (%)
Thailand	51,312	51,089	20,800 (40)	8,482 (41)	800 (2)	13,500 (26)	15,989 (32)
Laos	23,680	23,080	805 (3)	639 (79)	800 (3)	12,500 (53)	8,975 (41)
Cambodia	18,104	17,652	2,400 (13)	1,700 (71)	2,000 (11)	11,600 (64)	1,652 (11)
Vietnam	33,169	32,549	6,700 (20)	6,500 (97)	300 (1)	9,650 (29)	15,869 (50)
Yunnan	39,500		2,900 (7)	(32) (China)	10,700 (27)	16,100 (41)	9,800 (25)

Source: FAO yearbook 1994; "Strategies for Development of the Greater Mekong Area" 1996.

[8] Other land is land that cannot be used for agricultural purposes such as riverbeds, lakes and marshes, urban areas, roads etc.

2.2.2 Water Resources

Traditionally water has been seen as a free and abundant resource in the MRB. At present the demand is increasing rapidly, surpassing the decreasing supplies, hence the water resources are becoming more scarce, requiring careful management. Table 2-3 illustrates the water-availability in the Lower Mekong Basin. Although one has to bear in mind that the figures do not indicate the true quantity of water used per capita, since the users can obtain only part of the renewable water resources from the water bodies, because of the variability of stream flow between low water and flood seasons and the lack of storage sites on many catchments.

The area with least access to water per capita is the Korat Plateau, where the rainfall is uneven and unpredictable, thus causing both flooding and water shortages. The plateau is drained into the Mekong by two river systems, the northern Songkram river, and the larger Mun-Chi system in the Korat Plateau. As the soil is sandy it holds the water poorly, the area is largely deforested, and there is a lack of extensive reservoirs and water distribution systems to improve traditional water utilization for agricultural purposes. The groundwater resources are variable in both quality and quantity. Because of the Mesozoic rocks, the majority of the deep groundwater is highly saline and shallow aquifers produce fresh to saline groundwater.

Table 2-3. Water Resources in the LMB 1990

Country	Annual Internal renewable water resources (km^3)	Internal renewable water resources per capita (m^3/year)	Total renewable water resources per capita (m^3/year)
Thailand	110,0	1,9	3,8
Laos	270,0	65,2	65,2[9]
Cambodia	88,1	10,3	47,8
Vietnam	292,0	4,9	13,3

Source: "Environmental Soil and Water Management...." 1995

[9] According to ESCAP there is no annual river flow from other countries in Laos. However, this is not entirely true since the Mekong River carries water from China and Myanmar to Laos.

Laos is also rich in surface and groundwater resources, it has the highest availability of renewable water resources per capita in Asia. About 35% of the total flow of the Mekong River origins in Laos and 60% of the water flow at the Mekong Delta is contributed by the Laotian catchments. There are 14 important tributaries, like the Nam Ngum, Nam Beng and Nam Ou, which are high gradient streams flowing from mountains and forested areas. The combination of a mountainous topography and an abundance of water resources give a significant hydropower potential. The water quality is thought to be good, with only local exceptions.

As is shown in figure 2-3 Cambodia is abundant in water resources, even if a substantial part of the water comes from other countries making it dependent on upstream countries. More than 300 billion m^3 of water enters Cambodia from the Mekong each year. The main surface waters sources are the Mekong River and the Tonle Sap Lake, both changing drastically in volume throughout the year. The coverage of the Tonle Sap varies seasonally from 2,500 to 10,000 km^2. The extreme variations in water level combined with a varied perspiration, both between areas and within areas from year to year, makes certain places like the Elephant Mountains subjected to drought. There has been a lack of investigations about the Cambodian water quality, hence the information is unsatisfactory, but the quality of groundwater is thought to be generally good even if some concentrations of iron and salinity have been found in many provinces.

In Vietnam there are nine main river systems, of which the Mekong River and the Red River are the most important. There are also systems of canals and arroys and a great number of lakes, resulting in an abundance in water resources. As contrary to Thailand the surface water is quite evenly distributed throughout the country. If the water resources are used in a sustainable way they will be enough to meet the long term requirements for the development of industry, agriculture, transportation and basic daily needs (Nguyen Cong Thanh 1993: 20). Regarding water quality in the Mekong Delta, the tidal influence makes saline water intrude deeply into the river forming brackish water zones. Other factors disturbing the water quality are human and animal wastes, fertilizers, pesticides, toxic chemicals used in wars, and acid sulphate waters and soils, which is discussed further in chapter five.

One important note to make is that the Mekong river has an extreme hydraulic regime. As an effect of the monsoons, there are immense differences in water flow between high and low season. Hence, the high flows in September discharged into the sea is 25-30 times the flow in April, at the same time as the monthly flow in the dry season accounts for only about 1-2% of the annual flow. The changes in waterlevel is of course largely influencing for example agriculture, navigation, and hydropower stations. On the other hand may

hydropower dams, irrigation, etc. also influence the hydraulic regime - hence changes in water quantity downstream is a politically and environmentally sensitive issue.

2.2.3. Wetlands

Wetland is a definition of a wide range of water bodies like rivers, lakes, man-made reservoirs, farm ponds, wet-rice fields, etc. Wetlands are important ecosystems in the MRB, with significant physical, ecological and socio-economic functions and values. The direct benefits derived from wetlands are crop production, capture and culture of fisheries, water supply, wetland wildlife, hydropower generation, biodiversity, forest resources etc. There are also indirect benefits such as groundwater recharge and discharge, flood control, erosion control, sediment and toxicant retention etc.

The ecologically most important wetlands in the MRB are:
-The Tonle Sap lake and river system in Cambodia
-The Plain of Reeds in Cambodia and Vietnam
-The Melaleuca forests in the Minh Hai Province of Vietnam.[10]
-The Chi and Mun River System in Northeastern Thailand
-The coastline system

Cambodia, where about 20% of the total area is considered to be wetland, has two of the largest wetlands in Asia, the Tonle Sap complex and the floodplain system of the Lower Mekong River. In Laos most of the wetlands are located in the lowlands of the Mekong and its tributaries, there are several wetlands of international importance such as the Xe Pian-Xe Khampho-Bung Nong Ngom Complex and the Khone Falls-Seephandon Cataracts. Vietnam is a country rich in wetlands because of the large estuarine and delta systems. There are large areas of mangrove swamps, tidal mudflats, coastal brackish and saline lagoons, freshwater lakes, rivers and streams. The largest wetland area is found in the Mekong Delta with its river channels, rice paddies and mangrove forests.

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[10] Melaleuca is a type of mangrove forest. Mangroves are very important and productive ecosystems that are found along coastal areas and offshore islands. They occupy a transitional zone between marine and terrestrial environments. Mangroves are holophytic (salt tolerant), woody, seed bearing plants of which there are more than 50 species in Asia. They thrive along sheltered inter tidal coastlines on soft saline sediments that are often anaerobic and sometimes acidic. Mangroves are ecologically important since they produce leaf litter and detritus matter. This organic matter may be used as a food source for shrimps and fish. The forests are also a valuable physical habitat for a large span of coastal species like waterfowl, shorebirds, crabs, shrimps, and juvenile fish.

The natural wetlands of the MRB are threatened because of several reasons, like dam building, weed infestation, pollution, conversion of wetlands into rice fields or commercial aquaculture, and sedimentation of rivers, streams and reservoirs caused by commercial logging and shifting cultivation. The main underlying cause of the exploitation is population growth and the quest for economic development which both tend to lead to increased exploitation of biological resources.

2.2.4 Mineral Resources

The Mekong region has a wide range of mineral resources, (a further description of the production of mineral resources are found in chapter 6.1.5). Thailand has a number of minerals, like tin, copper, zinc, tungsten, and iron, of which tin and tungsten are found in northern and west-central regions. The Korat Plateau is rich in salt and potash, of local importance When it comes to Laos there is a lack of any comprehensive survey, but the country is believed to be rich in mineral resources, of which tin is the economically most significant. There are also some findings of coal and petroleum which are of potential value. Laos also has a high potential regarding precious metals, gemstones (mainly sapphires), lead, zinc, chrome and industrial minerals (such as potash, gypsum, rock salt and barite).

Cambodia is believed to have several mineral deposits of varying economic importance, there are metallic resources such as tin, copper, lead, zinc and antimony, and non metallic minerals such as phosphate and precious stones and minerals. Vietnam has about 90 different varieties of ore that are found at over 3000 sites, mainly in the northern parts of the country. Among the most important reserves are those of iron, bauxite, coal, apatite and gold. In the Mekong Delta the mineral resources constitutes mainly of cement clay, sand and peat. The basin are rich in mineral resources, but it is questionable to what degree they are commercially viable.

2.2.5 Forest Cover

The forest cover of LMB is declining at an alarming pace, as is shown in figure 2-1. The official statistics are often poor, since many areas classified as forests are actually degraded forests or shrubland. In Thailand deforestation has been a large problem, especially in the Northeast, where the present forest cover is estimated to be only 13% of the total land. The forest destruction has now been halted, mainly because of the 1988 logging ban together with a less availability of commercial timber resources and prime areas to clear for

farming. At present the annual forest loss is less than 0,3% per year, contrary to the earlier figure of three percent per annum, and timber imports are now satisfying the domestic demand (ADB 1996: 71).

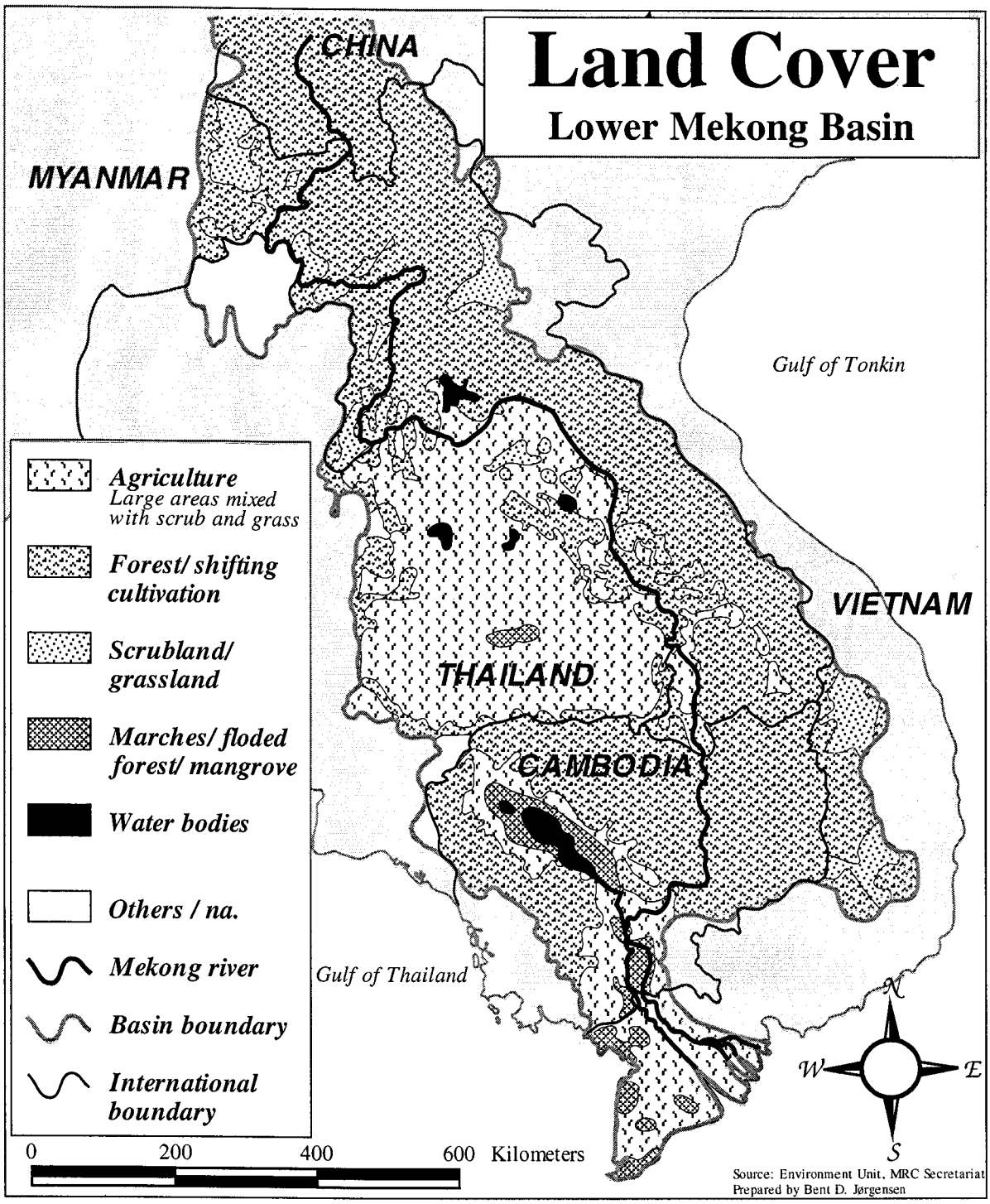
Laos is relatively rich in forest resources, and as illustrated in table 2--2, it has one of the highest ratios of forest cover to total land area in Asia, (Ibid.: 34). Although the annual deforestation rate is lower than in the neighboring countries, the forest resources have been declining significantly during the past two centuries, due to poorly regulated concessional logging, illegal logging, and the colonization of marginal hillsides by lowland agriculturists. Even if Laos has a forest cover of 47%, many of the areas are of poor quality as they have already been logged for their commercial species and larger-sized logs, thus it is estimated that only about 10% of the remaining forests are commercially valuable ("MRB Diagnostic Study" 1996: 3-3). Table 2-4 shows the main vegetation types in the Mekong Basin, as when defining the land use of the region, it is quite hard to draw strict lines between the types of vegetation, hence the definitions are drifting.

Table 2-4. Vegetation in the Mekong Basin

Region	**Vegetation**
Lancang River Basin	Meadow, pine forest, mixed evergreen and broad-leaved, arable land
Northern highlands	Grassland, hill evergreen and mountain forests
Korat plateau	Scrub and grassland, arable land
the Annamite Chain	Upland savanna, rainforest
Southern uplands	Dense forest
the Mekong Plain	Arable land, mangroves and other flooded forests

Source: "MRB Diagnostic Study" 1996.

Map 2-3

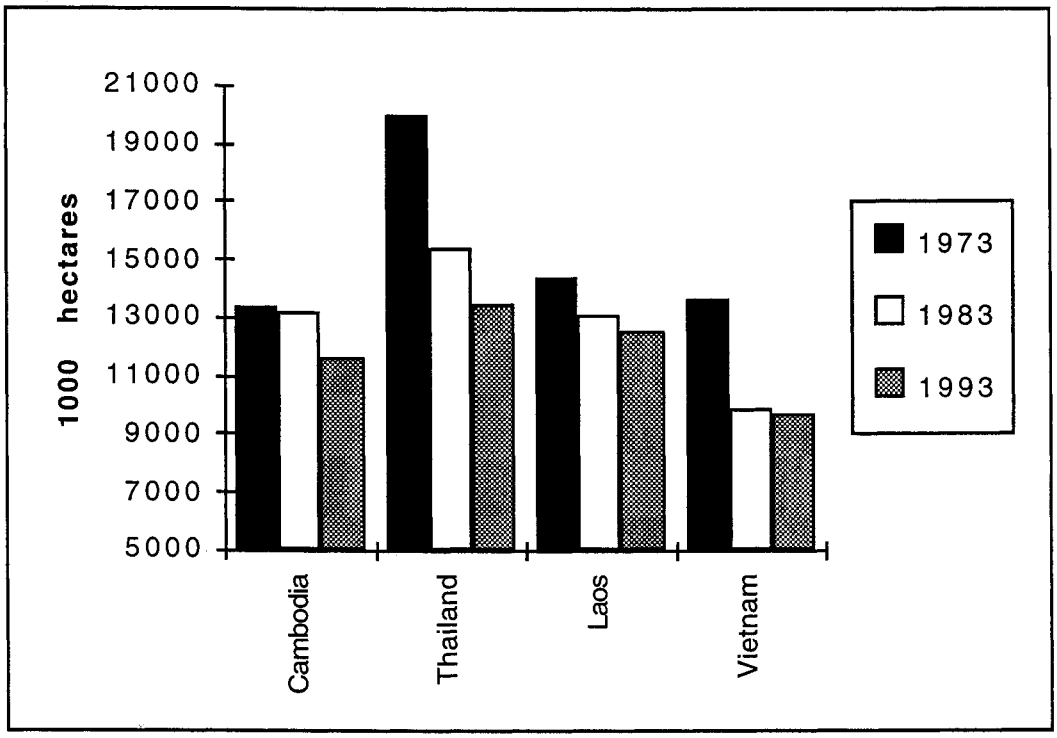

Land Cover
Lower Mekong Basin
CHINA
MYANMAR
Gulf of Tonkin
VIETNAM
THAILAND
CAMBODIA
Gulf of Thailand
Agriculture
Large areas mixed with scrub and grass
Forest/ shifting cultivation
Scrubland/ grassland
Marches/ floded forest/ mangrove
Water bodies
Others / na.
Mekong river
Basin boundary
International boundary
0
200
400
600 Kilometers
N
W
E
S
Source: Environment Unit, MRC Secretariat
Prepared by Bent D. Jørgensen

There is a lack of reliable information about the Cambodian forest resources. As in the other Mekong region countries, there has been a considerably forest loss during the past twenty years because of logging, fires and shifting cultivation. According to the World Bank, the area of forest and wood land was estimated to be 76% of the total land area in 1987-1989, but when the Mekong Secretariat undertook a study in 1989 their figure was 63%. The Government of Cambodia works under the assumption that 56% of the land area is forested, but Global Witness believes that the cover is closer to 30-35%. A matter of fact is that the forest cover varies remarkably between areas. Cambodia has five main types of vegetation, humid forests, sub-humid forests, savanna forest, open savanna forest and allied grasslands, and hydrophytic communities.

It has been estimated that over the last 3-4 years Cambodian forest has been cut with 3-5 times the sustainable rate. The main reason for this is the numerous illegal logging operations, one example is the Koh Kong Province, that between March and June 1995 was estimated to export about 6,000-7,000 cubic meters of rough cut timber to the Kalapanda Province of Thailand every week, generating approximately 210,000 US dollars for the Khmer Rouge per week (Global Witness 1996: 10). Apart from the illegal logging, the Cambodian Government is awarding forest concessions mainly to foreign companies, and if the forest cover only happens to be 30-35%, the government is in danger of selling Cambodia's entire forest area to foreign companies (Global Witness 1996: 3).

In Vietnam the amount of natural forest has been shrinking rapidly. Between 1945 and 1985 the Vietnamese population nearly doubled which meant that the demand for food grew. It was necessary to clear new areas for agriculture, but larger quantities of forests than usual were down because vast quantities of food were destroyed by aerial crop spraying. After the wars the need to reconstruct the country, and the pressure from a rapidly growing population, meant that large amounts of trees were cut down in order to build and rebuild homes, schools, roads, irrigation systems, etc.

Figure 2-1. The forest cover of the Lower Mekong Basin 1973-1993



Source: FAO yearbook, 1994, Production, 1995

In 1991 the total Vietnamese forest cover was 29% compared with 67% in 1943. In the Mekong delta the forest cover was 9% of total forest cover in Vietnam in 1991, a change from 23% in 1943 (Viet Nam, Environmental Program 1995). Thailand has a similar rate of forest cover, with about 28% of the total land area in 1990 (ADB 1996: 71), but in the North-East the forest cover is down to 15%.

2.2.6 Flora and Fauna

The Mekong River system contains a wealth of biological resources. Unfortunately the wildlife is declining throughout the region because of forest destruction, overfishing, environmental deterioration and uncontrolled illegal hunting. One of the major influences when it comes to the declining biodiversity is the rapid population growth.

The Mekong River hosts about 1200 species of fish, including numerous migratory fish species, of which some are endemic to the region. Unfortunately very little is known about their stock composition, length of

migration, spawning sites or early rearing areas, although it is evident that the freshwater wetlands along the banks of The Tonle Sap lake, Mekong and Bassac Rivers provides important spawning and nursery grounds for over 850 species of fish which has been recorded in the area. The success of the fish breeding is dependent of the nature of the flood dynamics, hence the maintenance of a high fish diversity relies on a variability in the flood regime. The wetlands of Cambodia and Vietnam host a large number of waterbirds, but as the wetland ecosystems are easily affected by improper management large areas have been destroyed or degraded.

Table 2-5. Biological diversity of the MRB

	Laos	Cambodia	Burma	Thailand	Vietnam
Area (million ha)	23,7	18,1	67,7	51,3	33,0
Mammal	157	117	300	280	201
Endemic mammals	1	1	6	8	5
Birds	609	545	967	919	586
Endemic birds	3	0	3	2	4
Amphibians	37	28	75	101	72
Reptiles	66	82	241	282	212
Swallowtail Butterflies	39	22	68	56	37
Vascular plants	8286	7571	7000	12000	8000
Endemic plants	1457	1175	1071	2742	800

Source: ADB 1996: Passim.

About, 4000 or 10% of the world's known animal species are found in Thailand, which also hosts about 15,000 species of vascular plants, and more than 500 tree species, although, as a contrary to Laos and Cambodia, there are limited areas with extensive biodiversity within the Thai part of the MRB, except at the borders ("MRB Diagnostic Study" 1996: 3-23). There is international recognition of the Thai biodiversity as

the Huay Kha Kheng and Thung Yai Wildlife Sanctuaries are being nominated as World Heritage Sites (cf. chapter 5.6).

Laos is even richer biologically, since it still has a significant coverage of natural forest habitat and wetlands. Today many of the species that used to be common throughout the region exist in the wild only in Laos, even if the size and landlockedness make the endemism higher in Thailand, Burma and Vietnam. There are 9,000-10,000 species of mammals, reptiles, amphibians, birds, butterflies, fish, and vascular plants in Laos of which the Kouprey, the oldest living bovine species, and the Javan rhinoceros are two of the most threatened mammals in the world. According to the "MRB Diagnostic Study", Cambodia has the best preserved biodiversity and contains mammal and bird species that are extincted from neighboring countries. One reason for the high biodiversity is said to be the large undisturbed mixed deciduous forest ecosystems.

The flora and fauna of Vietnam are also very rich and diverse. Some 7000 plant species have been identified and another 5000 different kinds are thought to exist. Many of the floral species are confined to small geographic ranges and occur at low individual densities which make them vulnerable to forest destruction and other imbalances in the surrounding ecosystem. It is said that 40% of the species of flora only exists in Vietnam. The Vietnamese wildlife is said to include 773 species of birds, 273 different types of mammals, 180 species of reptiles, 80 amphibious species, several hundreds of fish and thousands of invertebrate species. Many species are valuable and rare, such as the elephant, rhinoceros, tiger, leopard, black bear, honey bear, and the snub-nosed monkey.

3. THE HUMAN HISTORY OF THE MEKONG RIVER BASIN: A RIVER BASIN AND ITS PEOPLE

3.1 Historical Patterns of Settlement, Migration and Ethnic Composition

Southeast Asia was early a thriving region:

> "In the pre-nineteenth-century world, the Southeast Asian region was eulogized as a land of immense wealth; developments there were of crucial importance to the entirety of world history in the pre-1600 period/.../ By contrast, the early history of Southeast Asia and its international significance is not appreciated in the contemporary age" (Hall 1992: 183)

The Indianized kingdom of Fu-Nan dominated all the shores of the Gulf of Siam as well as the lower Mekong Valley from 1st to 6th centuries AD and thrived from a combination of agricultural production based on rice, and trade with seafarers to and from India and China. During the later part of the sixth century the Empire of Fu-Nan was outcompeted by the Sunda-people on the sea and squeezed by the Khmers on the mainland. The Khmers were largely based along the reaches of the LMB. With the ascendance of the Khmer a shift of the political power from trade based entities towards political entities based on rice growing, as well as a shift from the coastal areas to the areas around Ton Le Sap, was initiated. The famous[11] Angkor era (approximately from the 9th to the 15th century) was relying on sophisticated water management through a series of small earth dams (Liere 1980) allowing two to three rice harvests a year, and the abundant fish resources in the Ton Le Sap lake. In the late 11th century the Angkor Empire stretched over most parts of the LMB. In the 15th century, reacting to the pressure from the Tai, to internal disorder, and to a degenerating water management system, the Khmer capital moved to the vicinity of Phnom Penh and again shifted towards a more trade oriented society. Preference for rice as a staple as well as a perception of the crucial need for water management, still today occupy the people in the Mekong Basin. The Khmer empire is perhaps more than any other of the early kingdoms associated with the efficient utilization of the resources of the MRB.

The somewhat mysterious Champa kingdoms was founded around present day Danang in central Vietnam. The Chams are a Malayo-Polynesian people who came to Vietnam well before the Christian era. The Chams, which were influenced by India, established direct sea connections with India and adopted Hinduism in the mid fourth century. Buddhism began to influence the kingdom about five hundred years later, during the 9th century. The Chams developed a strong naval force which protected their existence as an independent and powerful empire for over 1,300 years. The Champa - as the chams' kingdom was called - got a lot of their income from semipiracy and plundering. They conducted raids along the entire Indochinese coast. They were

[11] This era produced the "Angkor Wat". One of the largest and most impressive ancient remains in the whole world. A site which certainly Will be of imporatnce for the future of the tourist sector in Cambodia.

squeezed between the expanding Khmers and Viets, but this many-faced and decentralized kingdom survived until the 19th century, albeit it had lost its principal power by the late 15th century. Still groups of Chams exist as a semi-integrated people in Cambodia and Vietnam.

The Thai and Lao are originally the same ethnic group, hence they have a common early history. As a consequence of Han Chinese expansion into Yunnan and the Sip Song Chau area of what is today north-western Vietnam, the Thai people began their southward expansion in the ninth century. The Thais succeeded rapidly, and in the middle of the thirteenth century they had occupied the Shan states of Eastern Burma, the upper reaches of the Chao Phraya Basin and the country to the east of the Mekong. In 1350 the Thai kingdom of Ayuthia was founded in the basin of the Lower Chao Phraya. Laos, earlier covered with independent principalities, also called Moung Swa, was united under the kingdom of Lan Xang by Fa Ngum in 1353, who declared himself king and Luang Prabang as capital (Jerndal 1993)

The Mekong River has traditionally been the main avenue when it comes to migration of population from North to South in mainland Southeast Asia. It is an area of ethnic diversity, as it has experienced a succession of migrations of peoples of which the strongest have occupied the precious plains, driving the other, often earlier, occupants to less desirable areas in hilly regions. Peoples from the southern parts of China have migrated southwards from China as a result of the Chinese territorial expansion from the Yellow river region to the south and southwest. Migrants like the large ethnic groups of Thai (or Tai), Khmer, Vietnamese and Mon have arrived gradually bringing with them an immense variety of ethnic, linguistic and religious traits. As a result Mainland Southeast Asia is one of the ethnically most diverse regions in the world, where Vietnam, Laos and Burma are the most diverse. Typically minorities are still living in a traditional way in the mountainous and remote areas. Deforestation, decreasing biodiversity and regulated waterways are often a direct threat towards their traditional way of living.

With the arrival of the colonial powers, especially France, the regional struggle for space and influence came to a halt. France was in its colonial enterprise initially interested in the possibility of reaching the Chinese hinterland through the Mekong River. A hope which was lost with the expedition of 1856 (de Carné).[12] France made little reference to the different peoples in the sub-region, but administered it basically as one entity with five sub-units. However, present day Vietnam being closest to the sea, and the most populated area felt the French presence heavier than did Laos and Cambodia who experienced a relative disinterest from the French. "Cochinchina", in the south of Vietnam, was the entry point for the French. For example, in the

[12] France sent an expedition up the reaches of the Mekong. The hopes, ignorance, disappointments and hardships experienced before the expedition, two years later reached Hong Kong, through the Mekong Basin and southern China are well described in Louis de Carné. He was one of the members of the expedition; a journey which in the end took his life.

delta in Vietnam, a lot of "development" work was carried out through large scale dredging and road construction (Breocheux 1995: 21). In Laos and Cambodia few major construction endeavors were undertaken.[13]

3.2. Political Evolution in MRB after World War II

The resistance towards the French colonial power grew after the second world war and in 1954 all Indochinese countries formally got their independence. It was however an imperfect independence, creating a civil war in Vietnam with a communist north and a capitalist south. Under the cold war logic, the north was initially supported by both China and the Soviet Union, while the south was forcefully supported by the USA. One of the most violent post-second world war conflicts - the Vietnam war - soon involved Laos and Cambodia and resulted in that the three countries in Indochina were all under communist rule from 1975.

Thailand was never colonized, but under long time pressure from both France and England, severely stressed by Japanese presence during the second world war, and shaken, (because of war allied with the losing side) by its aftermath. However, it remained formally independent, capitalist, and a close ally of the US in its war against communism in Indochina during the 60s. This was one of the main reasons for the US to support Thailand in its early development efforts of the Mekong River (Chomchai 1994). Thailand and Cambodia were on a similar level of economic development in the early 60s but, Thailand soon started to experience rapid economic growth.

The war in Vietnam grew into major proportions and drew Cambodia and Laos into it in the early 60s. It made any major regional development schemes impossible to carry through and it caused major damages to any development efforts. The delta area of the LMB, including eastern Cambodia, was particularly badly hit. In 1975 Laos, Cambodia and Vietnam was overtaken by communist regimes, creating an ideological rift making cooperation around regional resource difficult.

As a result from this ideological division of the sub-region there was high tension, little cooperation and virtually no trade or cross visiting between Thailand on one side and the Indochinese countries on the other. Moreover, while the Soviet Union was the supporter of Vietnam and Laos, Cambodia was under Chinese influence manifested by the extreme, isolationist, anti-modernist and violent Khmer Rouge. This created a rift

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[13] Of course it is grossly false to say the "the French" did the construction work; it was normally done by corvée labour carrying out extremely hard work at a high human toll. From 1886 to 1930, 1 425 000 hectares of land was drained and turned into farmland (Brocheux 1995: 21).

between the latters as well. Vietnam intervened in Cambodia in 1978 and overthrew the Khmer Rouge; a move which was fervently opposed by Thailand. This further increased the tensions between Thailand and Vietnam. The situation created a civil war in Cambodia with a Vietnam installed government in Phnom Penh (which was not recognized outside the east block, Cuba and India) and the Khmer Rouge led, and Chinese-US-Thai supported, resistance on its western border. The historic rivalry between Thailand and Vietnam over influence in Laos and Cambodia was revived, including occasional clashes between armed forces. The conflict stalemated which effectively kept Cambodia out of international cooperation until 1991, and blocked all work in the Interim Mekong Committee that needed Cambodian participation (i.e. any construction of international importance).

Following the vanishing cold war and the reformation of the economic systems in the Indochinese countries, the Cambodia conflict was negotiated into a UN-led solution through the holding of general elections in 1993. While the solution did not finally bring an end to the warring in Cambodia, it broke its international isolation, created an internationally recognized government in Phnom Penh, made substantial aid capital available, and removed any obstacle to the resumption of the work in the Mekong Committee. To overcome the legacies of the past and the inherited difficulties in the sharing of the resources of the MRB, proved, however, not to be as easy as one might have wished for (cf. chapter 4.).

Since 1993 the sub-regional relations have changed drastically. While underlying tensions in terms of historic rivalry, ethnic conflicts, border demarcation unclearity, fishing rights, natural resource extraction and water allocation issues still remain, the principal relations between the four countries have gradually improved. The 1995 inclusion of Vietnam into ASEAN was a milestone for future sub-regional relations and the incorporation of Cambodia, Laos and Burma in 1997 will further cement the improvement of sub-regional relations. Other institutional cooperation schemes are, possibly, in the making, facilitating continued regional conflict resolution.

3.3 Economic Activity and Trade

The economic situation in the Mekong Region is currently featured by a nominal high economic growth, even if the countries are at different levels of development. Thus, Thailand is keen on reaching a status as a Newly Industrial Country, NIC, while the former Indochinese states are at a less developed stage, illustrated by the huge leap between the Thai GDP per capita in relation to the Indochinese GDPs per capita. The common characteristics among Laos, Cambodia and Vietnam is that they all are in a phase of transition from centrally planned economies to market-oriented economies.

In the 1970s and early 1980s the three countries of Indochina were all following a system of central planning and public ownership, although the degree of state ownership and detailed planning varied both between and within the countries. During the later part of 1980s all three decided to turn towards a market economy. Thus, reforms were launched, *Doi Moi*, (Renovation), in Vietnam and *Chintanakan Mai*, (New Thinking), in Laos. Among the main features of the reforms were: 1. The use of market-oriented monetary policies to control inflation, including price liberalization, devaluation and interest rate reforms. 2. The reliance on or acceptance of the private sector as an engine of economic growth, including the privatization of state enterprises. 3. The adoption of an outward-oriented policy in external economic relations.

Table 3-1. Some indicators of the economies of Thailand, Laos, Cambodia, and Vietnam

Country	GDP real growth 1994 (percent)	GDP per capita 1993 (USD)	Inflation 1994 (percent)	Foreign debt 1994 (USD m)
Thailand	8.5	1,950	5.0	40,900
Laos	8.2	280	6.8	2,080
Cambodia	4.0	250	26.1	472
Vietnam	8.8	240 (1994)	14.4	19,600

Source: Asia Pacific Review 1996; "Basic Statistics about the Socio-Economic Situation in Laos" 1996; "Statistical Yearbook 1995" Socialist Republic of Vietnam.

The Thai economy is traditionally agricultural, but during the last two decades the industrial sector has been growing rapidly. Important sectors like textile production, construction materials, consumer goods and trade in imported products have emerged. An important note is though that most of the industrial development has taken place in the Bangkok metropolitan area, and that the Northern and, even more, the Northeastern regions are lagging behind. Agriculture is the main economic activity, remaining mainly at a subsistence level with low prospects for agrobased industries. The situation is not totally pessimistic as urban centers like Udon Thani and Khon Kaen are expanding at the same time as an increased cross border trade with Laos and Cambodia might generate more industries and other activities, hence creating more employment opportunities. In the Northern areas, the cross-border trade with Burma, China and Laos has already contributed to the local growth, especially in Chiang Rai and Mae Sai districts, where the tourism is another crucial economic sector.

Box 3-1. Vietnam, an economy in transition

Vietnam, an example of an economy in transition

Prior to 1986, the Vietnamese economy was centrally planned and subsidy-based. In 1986, the Vietnamese government launched a radical reform called Doi Moi which means renovation. The reform was said to be a "shift to a multi-sectoral commodity economy with socialist orientation". As a consequence the system of collectivization began to loosen up. Households were allowed to produce consumer goods and small private companies had the right to operate in certain parts of the economy. The needs of the population was supposed to guide the production and the heavy industry should therefore turn towards consumer goods. The production of food and export-goods were given high priority as well.

The first part of the renovation did not succeed in stabilizing the currency and controlling the inflation. In 1986-1988, the inflation was over 400%. Vietnam was then subject to a number of anti-inflation projects, such as liberalization of prices and a strict control of money issuance. The actions gave good results, lowering the inflation from 411% in 1988 to 70% in 1989. In 1994 the inflation was 14,4%. In 1994, the GDP growth was 8,8%. This was partly based on a growing export sector. Even though Vietnam has an impressive growth rate the country is still under-developed. The total output was worth 15 billion dollar in 1994. If the annual growth rate would be about 10% it would still take Vietnam a generation to reach the GDP of Thailand today.

The Mekong Delta has responded quickly to the Doi Moi reform policy. The area is oriented towards the primary sector, accounting for about 40% of the Vietnamese agricultural production and contributing significantly to the nations export earnings from fishery products and rice. The Mekong Delta accounts for about 20-27% of the GDP, depending on which source is consulted, and the growth rate of the economy is about 4,7% which is below the national average ("Vietnam Water Resources Sector Review", 1996). The industry and services sectors are still at an early stage, with emphasis on small scale processing of agricultural and aquacultural products, although the sectors are growing rapidly.

Source: ""Vietnam Water Resources Sector Review"" 1996; Vo Dai Luoc 1995; Financial Times 13 Feb 1995; Far Eastern Economic Review 15 June 1995; and Financial Times 7 Feb. 1995.

In Laos, the majority of the population generates their living from subsistence farming and a third of the population lives outside the money economy, a fact that makes it difficult to estimate the real income per capita. If calculating the GDP per capita, Laos is one of the ten poorest countries in the world, although this figure does not include the non-monetary incomes, from agriculture, fishing, hunting and barter trade nor the purchasing power parity.[14] The same statistical problem is found in the whole region which is very poor but maybe not to the extent that the official GDP per capita illustrates.

Since 1985-86 Laos has been putting effort into the transition from a centrally planned system to an emerging market economy. There have been some positive signs so far as the real GDP growth has been over 7%

[14] Purchasing power parity takes into account price differences between countries to provide a more accurate picture of personal wellbeing.

annually during 1989-1993 at the same time as the inflation has been brought down drastically from 76% in 1989 to 7% in 1993 (Chi Do Pham 1994). The industrial sector is still very minor, comprising less than 15% of GDP. It is confined to the area around Vientiane and is largely concentrated in the processing of agricultural or forestry products. Medium and large scale industries are few and mostly driven by foreign companies in joint ventures.

Cambodia is also in a transition phase towards a more market-oriented economy, a change that was initiated in 1985 and intensified in 1989. The macro-economic framework for development and growth is still incomplete. Like the other parts of the region, the economy is dominated by agriculture, contributing 48% of GDP and employing 85% of the labor force in 1993 (IBRD 1994: 10ff). Industries accounted only for about 17% of the GDP the same year. The fisheries sector is an essential contributor to the Cambodian economy, both as direct subsistence and as an important source of income, (cf. chapter six). Most of the industrial investment is occurring in or around the capital, Phnom Penh, while rural areas are dominated by agriculture and other natural resource utilization. After the economic reforms began, the socio-economic differences have grown, both between urban-rural areas and between different sectors.[15] In Phnom Penh, the average monthly incomes were four times larger than in the countryside in 1994.

3.3.1 Foreign Investments[16]

Foreign investments have a long history in South East Asia. One ancestor of today's Trans National Corporations, TNCs, was probably the British East India Company which established a trading base in the Malacca Straits in 1819. During the colonial era, plantation agriculture and mining activities were run by foreign controlled companies, however in Indochina these were passed into domestic control after the configuration of a socialist system. With exception of Thailand, which is an old target for foreign direct investments, the MRB began to open up for FDI in the late 1980s. Since then, the number of FDIs have virtually boosted in the region, especially in Vietnam where over 1,000 foreign investment projects, worth about 2 billion US dollars, were approved between 1987 and 1994. Laos has experienced a considerably smaller extent of foreign investments, although if taking into account the difference in country size, Laos has been more successful than its neighbor in terms of projects attracted, in 1994 there were 130 foreign investment projects approved in Laos (Basic Statistics.. 1995). Most of the recent foreign investments in the region has been oriented towards tourism and natural resource extraction. One exception is Thailand, where the

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[15] Before the reform, people were generally equally poor (Ovesen, Trankell and Öjendal 1996: 12)

[16] This section is mainly based on ("Strengthening Capacities in Trade, Investment and the Environment, for the Comprehensive development of Indo-China, ESCAP 1995 and Economic Cooperation in the GMS: Facing the Challenges"), ADB 1996

FDIs have been placed in "more advanced" sectors like chemicals and paper, services, electronics and electrical appliances, as well as light industries and textiles.

Table 3-2. Foreign Direct Investments in the LMB Countries.

Country	1967 (US$m)	1978 (US$m)	1993 (US$m)
Thailand	211	445	2,116 (1992)
Laos	83	n.a	n.a[17]
Cambodia	84	n.a.	59
Vietnam	152	n.a.	637

Source: ESCAP 1995 and Dwyer D.J. 1990

All of the MRB Governments have adopted some kind of policies towards increasing trade and investment, such as lowering of tax rates and the removal of restrictions. For example in Cambodia, foreign invested ventures pay a corporate tax of only nine percent from which they can receive tax holidays for up to ten years, and are exempted from import duties on many materials. As Laos and Vietnam, Cambodia launched a new foreign investment law in the late 1980s and then again in 1994. The new laws have been quite successful since the foreign direct investments which generated virtually nil in 1990 grew to 59 million US dollars in 1993.

One important emerging trend is the increasing significance of foreign direct investments originating from countries within Asia, notably Singapore, Malaysia, Hong Kong, South Korea, and Taiwan. An interesting note is that Japan is only a minor investor in the former Indochina countries. Thailand is the major investor in Laos and Cambodia, hence of the 563 approved foreign investment projects in Cambodia between 1989 and 1993, 127 were of Thai origin.[18] In the case of Laos, Thailand accounted for about 45 % of the foreign investments between 1989 and 1993[19].

[17] It is estimated that between 120-150 million dollars have been invested between 1989-1993.
[18] Compared with one Swedish.
[19] The Asia Pacific region accounted for 83% of foreign investment in Laos, and 69% in Cambodia, during the same period.

3.3.2 Trade

It is clear that the official trade between the MRB countries is not of major importance, with the exception of the Yunnan Province where Burma, Vietnam, and Thailand are among the top export markets. Although the official intra-regional trade is still quite weak, it has been growing quite briskly during the 1990s. There is historically a strong regional bilateral cross-border trade, both formal and informal within the region. For example the trade between Thailand and Laos has traditionally been active. The formal trade between the two countries were modest during the 1980s, but after the liberalization of the Laotian economy, the trade relations are now flourishing. Thailand is now the main Laotian trading partner. One statue of the increased cross-border integration is the newly built "Friendship bridge" over the Mekong. One problem in calculating the intra-regional trade is that there exist considerable discrepancies between the official statistics of the individual countries. For example Thailand states that the imports from Cambodia were worth 92,765,067 USD in 1992 while the Cambodian statistics indicate an export of 8,271.301 USD the same year (ADB 1996: 184f).

The former Indochina countries were virtually non participating in the world trade during the 1980s. The Laotian and Cambodian international trade is still quite minor playing a neglectable role in the international community. Cambodia has the lowest trade levels in the region, although the exports grew with 58% in 1993. In both countries, the principal exports are based on natural resources, even if there is, especially in Laos, an emerging trend towards developing new manufacturing-based export industries which take advantage of the low cost of labor. The trade has been growing rapidly throughout the region, official records shows that the Laotian exports grew with 120% and the imports with 67% in 1994. In Thailand the growth was more modest, but still 21% for exports and 18% for imports (ADB 1996). Thailand is without doubt the largest trader in the region, accounting for about 87% of the total exports among the six countries of the MRB.

Even if the borders of Laos, Cambodia and Viet Nam have opened up significantly during the last years, there is still a large illicit trade. The flourishing illicit border trade hampers eventual trade barriers or regulations which is very unfortunate since huge quantities of, for example, timber are transported over the borders. The timber trade is hence illegal, but that does not imply that the activities are unknown by the affected governments. In fact, the logging companies sometimes work in cooperation with the governments, military and organizations. It is, for example, said that in Cambodia, corruption is present on every level of the society and government, generating vast amounts of money from the timber trade (Global Witness 1996: 17).

Table 3-3 gives a summary of the trade situation in the Lower Mekong Basin. The table is self-explanatory, but there are some interesting notes to be made. One thing is that there is a trend towards a shift in trade partners. This is especially evident in Laos and Vietnam, where the trade with, or at least imports from, the

former Soviet Union was significant until the late 1980's. When the USSR collapsed in 1991 this trade declined sharply, instead trade with other countries in the Asia-Pacific region has emerged. This trend is also depending on the process of economic reforms and integration with the regional economy.

Table 3-3. Trade statistics regarding Thailand, Laos, Cambodia, and Vietnam

Trade	Thailand	Laos	Cambodia	Vietnam
Import 1994 (million USD)	54,435	96 (1992)	350.7	5,825
Export 1994 (million USD)	45,233	241	233.7	4,054
Principal exports 1994 (% of total)	Textiles and garments (13) Electrical appliances (9) Computers and parts (8) Integrated circuits (4) Precious stones and jewelry (4)	Timber and wood products (24) Textiles and garments (15.4) Assembled motorcycles (9.1) Electricity (7)	Timber (24.3) Rubber (9.0) Kapok (0.5) Soybeans (0.3) Maize (0.2)	Crude oil (20) Textiles and Garments (13.4) Coffee (10.7) Rice (10.5)
Principal imports 1994 (% of total)	Machinery (48) Manufactures (20) Chemicals (10) Fuel and lubricants (7) Crude materials (6)	Electricity Motor vehicles Petrol Construction materials Medicine Consumer goods	Motor Vehicles (15.9) Cigarettes and alcohol (14.2) Petroleum products (11.9) Investment goods (4.1)	Fuel. raw materials and machinery (87.8) Consumer goods (15.6)
Main destinations of exports 1994 (% of total)	USA (20.1) Japan (17.1) Singapore (12.5) Hong Kong (7.1) Germany (3.2)	Thailand (20.8) Japan (8.6) France (5.5) Germany (5.5) Netherlands (5.5)	Singapore (66.0) Japan (10.6) Thailand (5.1) Hong Kong (5.1) Taiwan (5.1)	Japan (28.6) Singapore (8.9) Germany (7.6) China (5.0) Australia (4.9) France (4.8)
Main destinations of imports 1994 (% of total)	Japan (30.8) USA (12.1) Singapore (6.6) Taiwan (6.2) Germany (5.1)	Thailand (48.5) China (6.4) Japan (6.2) France (3.6) USA (1.7)	Singapore (32.7) Indonesia (19.7) Former USSR (4.6) Thailand (3.5) China (3.4)	Singapore (17.4) South Korea (15.6) Japan (9.8) Hong Kong (7.8) China (5.5) France (3.7)

Source: "Basic Statistics about the Socio-Economic Situation in Laos" 1996; "Statistical Yearbook 1995" Socialist Republic of Vietnam; The EIU Country Report 1996; and The Asia Pacific Review 1996.

There are today several strong economic powers in the region such as Japan, Singapore, Hong Kong, and South Korea, that in many ways are able to compete with the "old industrial world", this is evident when looking at the trade pattern throughout the wider region. There has been a geographical shift in production, where for example Thailand, and to some extent Vietnam, has taken over some of the more labor intensive manufacturing industries such as textiles and electrical appliances. This is shown in the trade statistics where textiles and garments, electrical appliances, computers and parts, and integrated circuits accounted for 34% of the Thai exports in 1994.

3.4 Population and Social Conditions

The total population of the Mekong River region, including Burma and the Yunnan province was estimated to be 65,7 million persons in 1995 ("MRB Diagnostic Study" 1996: 4-1). The population growth varies throughout the region, as is shown in table 3-4, the average figure is 2%. The highest population growth are found in Cambodia and Laos, partly because the number of females reaching childbearing age is high in the two countries. In both Cambodia and Laos about 50% of the population is under 15 years of age, to be compared with the 31% in Thailand. The available data on population is only based on estimates as there are some uncertainties because of the limited data collection. The population density varies greatly within the Mekong region. The highest density is found in Northeastern Thailand and the Delta, as is shown in map 3-1. and table 3-4.

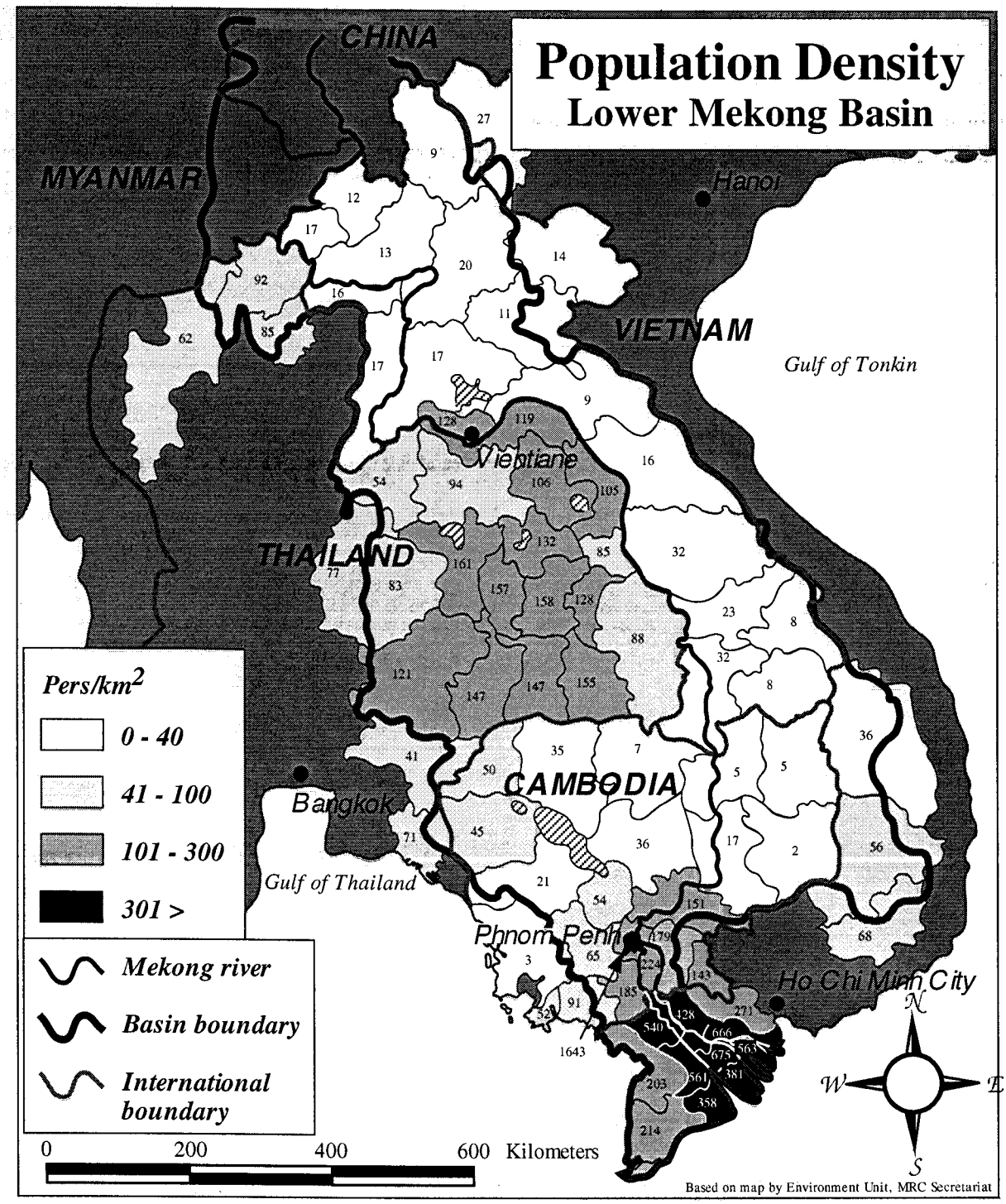
Table 3-4. Some population figures

Area	Total Population (million)	Population growth rate (Percent)	Population projection 2010	Population density (Pers/Km^2)	Rural population (Percent)
Yunnan	9,9 (1995)	1,6	12,5	67	84
Burma[20]	0,5 (1994)	1,4	0,6	21	--
Thailand (n-e)	21,0 (1990)	1,6	28,8	114	82 (all of Th)
Laos	4,3 (1995)	2,6	6,3	21	81
Cambodia	8,9 (1993)	2,8	14,2	45	88
Vietnam (delta)	17,4 (1991)	2,1	25,3	268	84 (all of Vie)
Total	62,0	2,0	87,7	132	84

Source: "MRB Diagnostic Study" 1996, p. 4-2.

[20] For all of Shanstate.

Map 3-1


Population Density
Lower Mekong Basin
CHINA
MYANMAR
VIETNAM
THAILAND
CAMBODIA
Hanoi
Vientiane
Bangkok
Phnom Penh
Ho Chi Minh City
Gulf of Tonkin
Gulf of Thailand
Pers/km2
0 - 40
41 - 100
101 - 300
301 >
Mekong river
Basin boundary
International boundary
0
200
400
600 Kilometers
N
W
E
S
Based on map by Environment Unit, MRC Secretariat

The countries of the Mekong River region have a low rate of urbanization, thus the population is still basically rural, even if the proportion of urban population is likely to increase significantly in the near future. As is shown in table 3-4 about 84% of the population is still rural in the region, although the figure varies over the year as people migrate to the cities during the agricultural low season. In for example Phnom Penh the real population is estimated to be near 1 million persons with a seasonal variation of around 300,000.

In general there are only one or two large cities in each country, such as Phnom Penh, Ho Chi Minh City and Hanoi, Bangkok, and Vientiane. These are the focus of most migration, leading to a severe deficit regarding infrastructure, such as sanitary facilities, which in turn gives problems of deteriorating environmental quality and public health.

Another migration obstacle is the resettlement of refugees, most predominant in Cambodia. By April 1993 about 370,000 Cambodians, living in seven boarder camps in Thailand and throughout the region were resettled, mainly into the northwestern provinces. Apart from these, about 320,000 persons such as demobilized soldiers have been resettled mainly in urban areas. The resettlement of refugees is expected to continue for some time as there are Cambodians living in other countries who will return to live or conduct business ("Cambodia First State of the Environment Report" 1994).[21]

The number of ethnic groups present in the Mekong River region are plentiful, giving a strong ethnic and cultural diversion of the region. As an example there are about 38 respectively 30 ethnic groups in Laos and Cambodia, leading to a situation in Laos where about 35% of the population come from some ethnic minority group ("MRB Diagnostic Study" 1996: 4-4).

3.4.1 Quality of life

The population of the Mekong River region faces a health situation that is quite serious, partly because of low access to safe drinking water, sanitation, and health services. The most severe circumstances are found in Laos, Cambodia and Burma, which all have a low health standard. The situation is not as bad in Thailand and Vietnam although the areas within the Mekong Region are more impoverished and underdeveloped when compared with the average national figures. Malaria and other diseases transmitted by mosquitoes are the principal diseases, linked with nutritional disorders and contaminated domestic water supply, poor sanitation, and poor hygiene.

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[21] The majority of the returnees comes from Vietnam and USA.

Table 3-5 gives a short summary of some indicators of the life quality in the region. In most cases, the worst situation is found in Cambodia, where shortage of safe water supply is a major health problem. The main reasons for the poor water supply and sanitation facilities [22] are firstly that all traditional wells and formerly drilled wells were abandoned, destroyed or contaminated during the Vietnam War and Khmer Rouge period, and secondly that there has been a lack of understanding, knowledge and central authority to implement water and environmental sanitation projects.

Table 3-5. Some indicators of the quality of life in the Lower Mekong Basin.

Country	Average life expectancy (1990)	Infant mortality rate per 1000 live births (1991)	Access to safe drinking water (1990)	Access to health services (1991)
Thailand	66,1	28	89% (U) 72% (R)	60%
Laos	49,7	99	40% (U) 21% (R)	67%
Cambodia	51,8	117	20% (U) 12% (R)	>50%
Vietnam	62,7	62	50% (U) 25% (R)	97%

Source: "MRB Diagnostic Study", 1996.

In the Mekong Region in general, the least access to health facilities are found in mountainous areas. The same goes for literacy as there is a lack of school facilities in remote areas. In general the education standards are quite low in the Mekong region, hence the mean years of schooling are below 5 years, although the region is better off than many other developing countries. One reason for this is that most persons have at least a few years of education which in a way is a consequence of the communist system in Indochina. One obstacle is that the ethnic minorities are lagging behind, seldom offered suitable education facilities. Another problem is that there is a lack of persons with adequate higher education, hence much of the advanced planning and management, such as the making of environmental impact assessments, are carried out by foreign experts. Thailand has the highest level of education where the national rural literacy rate is 92%. The worst situation is again found in Cambodia, where the rural literacy is only 30-40% ("MRB Diagnostic Study" 1996: 4-10).

As life quality is a relative measure, depending on the conception of the person asked, it is difficult to state a certain life quality by measuring for example GDP per capita or access to health services. Coming from the

[22] Only 13% of the population have access to sanitary facilities (MRB Diagnostic Study 1996)

western hemisphere it is easy to determine the quality of life, entirely seen from our standards, but given the wealth of natural resources, described in chapter two, the quality of life is better than the statistics indicates.

4. INSTITUTIONAL SETTING OF THE MEKONG RIVER BASIN COOPERATION

Extraction of natural resources often takes on an international dimension since these resources rarely are confined within the man made international borders. Natural resources extraction in general obviously affect national economies and the environment, both important aspects of neighborly relations. In addition, *water* flows from one land to another in an international river basin like the Mekong and literally connects the countries' different activities. One must remember that all human activities include water in one way or the other. As a result, traces of virtually all human activities is found downstream, thereby making natural resources politics - and water politics specifically - and regional relations insolubly intertwined. The need for institutional arrangements is often high. While this was early recognized in the LMB it has not been easy to deal with, given the sub-region's turbulent second half of the 20th century.

4.1. Regional Cooperation in Mainland Southeast Asia: A Brief Historical Account

The post cold war era seems to generate regional cooperation, in various forms, all over the world. So also in Mainland Southeast Asia. This does not, however, mean that regional cooperation is a new phenomenon in Mainland Southeast Asia. In spite of historic rivalry between Thailand and Vietnam, regional cooperation has sporadically blossomed in the modern era.

The first Mainland Southeast Asian regional organization was the SEAL (The Southeast Asia League)[23] in 1947, which sprung out of Thai-Vietnamese cooperation (Goscha 1990). It saw itself as "..an effort toward a regional development of common interest" (ibid.). SEAL was an unofficial organization, but there were plans for creating an official regional body called the South East Asia Federation. These plans were, however, swept away with the overthrow of the key player in the organization, the Thai Prime Minister Pridi. He was ousted in November 1947, and the new plans for regional organizations came, for a long time, to be rewritten according to the decolonization and the subsequent Cold War logic. This meant that Thailand and Vietnam became adversaries for the next 40 years with very limited direct contacts.[24]

Nineteen fifty-four is the year of formal independence for the Indochinese states, Cambodia, Laos and (North and South) Vietnam. The perceived communist threat triggered a series of attempts of regional cooperation in

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[23] The members were representatives from Vietnam (i.e. from the DRV (Democratic Republic of Vietnam), Cambodia (Free Khmer), Laos (Free Lao), Thailand, Burma, Malaysia, Indonesia and the Philippines.

[24] This is referring to the relation between Thailand and DRV (or North Vietnam), from 1975 to the late 80s it is valid for all Vietnam.

the capitalist sphere of countries in Southeast Asia: SEATO, ASPAC, ASA, etc. None of these were particularly successful, none had resource utilization on its agenda, and, none of them included any communist country (i.e. North Vietnam). In the group of regional organizations inspired by the cold war, the Mekong Committee[25] sticks out. Although it was grounded in a cold war logic of supporting and uniting non-communist countries it was also a UN-initiative complying with the UN dual goals of promoting economic development and conflict resolution on a regional basis.[26]

The idea of regional cooperation in the Mekong River development survived the political take-overs in Indochina in 1975 and was vitalized during the 80s. The main feature of regional politics throughout the 80s was however a bipolar structure that did inhibit any closer relation, or institutional contacts, between Thailand and Vietnam.[27] In the late 80s and early 90s, when battlefields were to be turned into marketplaces, the former adversaries found themselves in a situation where they were more or less forced into closer institutional contacts, but with very limited experiences on appropriate forum and procedures for doing so. The Mekong Committee and its secretariat was the only institution that had a long history of dialogue between Vietnam and Thailand.

The paradox here is that when the overall relations between Thailand and Vietnam gradually improved, the working atmosphere in the Mekong Committee deteriorated. In 1991 the work stalled and came practically to a standstill in 1993/1994. The coming re-admission of Cambodia following the Paris Peace Agreement and the real possibility of picking up large scale development strained the former basis and put the whole river management formula into question. Moreover, the rationale for the committee, and perhaps even more for its secretariat, needed to be remodeled and to find a new role in the development of the Mekong River Basin. A process which is not entirely finished yet (cf. chapter 8).

Following drawn-out negotiations, in April 1995, The Agreement on Cooperation for the Sustainable Development of the Mekong River Basin was signed by representatives of the four riparians to the Lower Mekong River Basin. At the time, or rather throughout 1994, the river basin cooperation, based on the foundation of the former Mekong Committee and Interim Mekong Committee, was on the brink of breaking down several times. This was perceived in many camps as the last chance of rescuing the long standing cooperation. Preceding, and following, this agreement a large number of other regional initiatives have been launched; both from "within" the region and from external agent (cf. chapter 4.3).

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25 It was formed in 1957, consisting of Thailand, Laos, Cambodia and South Vietnam. See further below.
26 As stated in the UN Charter, Chapter VIII.
27 The relation between Thailand, and Laos and Cambodia is less clear-cut, but basically follows the cold war logic. Throughout the 80s Cambodia and Laos were under strong influence of Vietnam.

It should be underlined that until 1992, outside the river cooperation, no organization had joined the four recognized governments in the lower basin and in no political constellation had Burma and China been involved in regional and/or sub-regional cooperation. Finally it can be noted that previous regional organizations like SEAL, SEATO, and even MC, achieved little in the economic field, but was rather politically initiated, and for political purposes. With the MRC it is perhaps the first time any genuine sub-regional organization aims, as a principle goal, to achieve sustainable economic development based on the "wise use" of the basin's natural resources and due concern given to environmental demands. As such the MRC occupies a special role and this time in history a unique chance.

4.2 Institutional Framework for Cooperation in the Mekong River Basin

4.2.1 The Mekong Committee (1957-1978)

There were originally three major initiators for the Mekong project. It was the UN-body ECAFE (Economic Commission for Asia and the Far East, based in Bangkok), the participating national governments and the more elusive American interest to consolidate the non-communist forces in the region. The latter contributed with authority within the UN system and with a number of early studies of the prospects and potential of the Mekong River. Especially important was a reconnaissance tour in 1955 supported by the US Department of the Interior, the "Wheeler mission", (UN 1958), and, later, a study supported by the Ford Foundation (White et al 1962). The "Wheeler mission" presented a road map that served as a catalyst for enhanced regional cooperation and acceleration of the pace of the work with the Mekong River both internally in the region as well as externally for donors. It also explicitly encouraged the work in the Mekong Committee (Sewell & White 1966: 20ff; Chomchai 1994). Moreover, the Water Resources Division of the ECAFE saw the huge potential economic benefits, theoretically gaining all involved parties and all economic sectors, to regulate the river and decided to sponsor the MC.

The early development planning of the Mekong River was heavily dependent on the experiences in the US with the TVA (The Tennessee Valley Authority) and highly influenced by individuals being involved in that large scale river basin development scheme.

> "As the best-known attempt at integrated river basin management, the TVA [Tennessee Valley Authority] has provided one model for projects throughout the world. Many of these projects have been promoted by the ex-TVA executives who, in transferring their individual experience, have influenced project design towards the TVA model." (McDonald and Kay 1988; also referring to Okun 1977, and Saha and Barrow 1981)

The ECAFE decision to widen the flood control study to international rivers, the US interest of joining non-communist forces (especially after the division of Vietnam), the common interest from the riparian governments and the obvious international character of the river all pointed towards the need for an institutionalized regional cooperative body. Thus, on 17 September 1957 the four riparians Thailand, Laos, Cambodia and South Vietnam, signed the statutes and the Mekong Committee was born. Decisions were to be taken unanimously and chairmanship was to rotate among the member states ("Committee for Coordinating...." 1957, art. 2). The focus of the Mekong Committee activities would be i) data collection, ii) preparation of an overall plan, iii) planning and design of individual projects, iv) maintenance of existing projects and v) ancillary work (MS 1989:14). The committee was to concentrate on technical and coordinating activities and it was not vested with decision making power (even though it signed some agreements; see Convention on Power Supply between Thailand and Laos 1965, ibid: 16). Decisions were to be taken in consensus. A large effort was made to try to give the Mekong Committee an independent position; both from the UN-system and from the member governments. Still it had to retain good relations with the UN-system and, of course, the legitimacy from its respective government. The solution was that the Committee was "..established by.." the governments, but acting "...in response to decisions taken by the UN's ECAFE...." (ibid.). This ambition was further underlined by the installment of the Executive Agent and his office (The Mekong Secretariat).

The optimistic development of the Committee soon came to a halt though. In the mid-60s the Vietnam war had reached major proportions and was about to spread into Cambodia and Laos. No major projects could be carried out and the atmosphere in the region was hardly fostering the commencement of any large scale or long term projects. In spite of this, the ambitious "Declaration of Principles" for the cooperation on the LMB were worked out and adopted in 1975. Ironically, in the same year the Khmer Rouge took power in Cambodia and kept it to 1978. The result was a Cambodian absence in the Committee.[28] Obviously the committee could not continue to work in its original set-up (requiring consensus decisions by all four countries), and to be able to continue to work an *Interim Mekong Committee* (IMC) was set up in 1978.

4.2.2 The IMC (1978-1995)

The interim Committee was given an early blow when Vietnamese troops ousted the Khmer Rouge by a large scale invasion of Cambodia. However, in spite of very tense Thai-Vietnam (and Cambodia) relations the

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[28] The Cambodian absence has triggered a debate on whether the Khmer Rouge were thrown out or voluntarily rejected regional cooperation (Hiebert, 1991: 24). It seems like *absence* is actually the best way of describing the Khmer Rouge standpoint. They simply did not react to invitations (Bernander, personal communication).

Interim Committee slowly got going, and from 1981 and onwards it was operational. However, only minor projects, feasibility and pre-feasibility studies were conducted. Data and information were thus compiled in ample measure for what has been felt as the "real" development of the Mekong River; the mainstream projects (cf. MS 1987). The work was focused on certain projects and their specific data requirements, rather than on the collection of primary data for the basin determining the hydraulic regime of the basin, ecological balance, or for accumulated effects of combined interventions. The secretariat has, referring to this period, been called a "project formulation factory" - largely because its preoccupation to formulate projects without necessarily having any comprehensive plans for the use of the result of the sometimes uncoordinated project proposals.

The masterplan from 1970 was rethought in the "Revised Indicative Plan (1987) for the development of land, water and related resources of the Lower Mekong Basin" (MS 1987), this was a modified plan, but it was still mainstream dam, hydropower and large scale oriented. It was planned to generate 23.3 GW of power by creating a "cascade" of mainstream dams with a storage capacity of 136 billion m3 (MS, 1987). This is to date the most authoritative plan on long term development. These plans are, by now, highly criticized and generally regarded as unrealistic. They draw critique for reasons of creating, social and environmental problem, for the need to forcibly move a large number of people, and for the misuse of existing local production resources. They are also politically sensitive. In 1995/96 parts of these plans have, however, been receiving renewed attention.[29]

It became quite clear that the Interim Mekong Committee (IMC) would not be able to implement any mainstream projects without Cambodia.[30] It was just as clear that the Cambodia conflict had to be solved, and a government recognized, before Cambodia could re-enter the Interim Mekong Committee. The statutes for the Interim Mekong Committee stated that the Mekong Committee would resume its existence "...Once all members of the latter Committee [the MC] have decided to participate in that organization." (IMC, 1978: Art 3). Cambodia would thus automatically be re-admitted into the regional river cooperation once it had an internationally recognized government.

The Paris Agreement, embodying the political solution of the Cambodia conflict, was signed in October 1991 and the "Free and Fair election" was conducted in May 1993. It was recognized by all major parties to the conflict and the path was ostensibly open for renewed cooperation in the Mekong Committee. In the wake of this successful conflict resolution in Mainland Southeast Asia, the prospects for consensus around the future

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[29] See for example the "Sambor project" in Cambodia in the 1996 Work Programme of the Mekong Secretariat (W.P. Code: 3.1.53/95, MKG/R.95015). This has, however, not been particularly appreciated by some central donors.

[30] This was impossible for a number of reasons including regional politics, international law, risk taking etc. The most obvious reason, however, was that no donor would be willing to fund any major projects as long as there was a major unresolved and violent political conflict in the midst of the Lower Mekong Basin.

development looked bright. The two major obstacles - the ideological competition and the Cambodia conflict - were both removed. New dynamics are, however, at play that focus - among other things - more concretely on the struggle for water and related resources and diverging national interests. In this milieu the Mekong River Commission (MRC) was born.

4.2.3 The Mekong River Commission (1995 -)

From 1993 it was clear that Cambodia would rejoin the Mekong River cooperation. There were, however, diverging meanings on *what* they should return to. Vietnam preferred to restate the MC from pre-1978, while Thailand preferred an entirely new organization, with new statutes, to be set up (cf. 7.3.1). This disagreement deadlocked the organization and its reformation for at least two years.

Finally the statutes of the MRC was agreed upon ("Agreement..." 1995). A number of far reaching changes were introduced in this new agreement. *Firstly*, *sustainable* development is given a much higher, indeed principle, priority. The Agreement is named "Agreement on Cooperation for the Sustainable Development of the Mekong River Basin", and phrases like "...minimizing harmful effects...", "Protection of the Environment and Ecological Balance" and "To promote...the full potential of *sustainable* benefits..." (our italics) are commonplace in the Agreement.[31] *Secondly*, it widens its scope into other, only marginally water related, activities. Areas of cooperation, the Agreement says, should be, but not be limited to, "irrigation, hydropower, navigation, flood control, fisheries, timber floating, recreation and tourism" (Art. 1). Furthermore, besides water also "related resources" should be included in the cooperation. *Thirdly*, the consensus principle was done away with, and the agreement instead outlines the specific rights and obligations to use the water. This is a rather sharp break with previous practices and, one could argue, the very reason why the former MC-Agreement had to be renegotiated (cf. 7.5). The consensus principle was not anymore, in the light of increasing water shortages, acceptable for upstream countries, notably Thailand. As a consequence the Agreement gives more leeway to national, rather than regional, projects - at least seen from a legalistic point of view. As a counterweight it ties the signatories to the international law in these questions meaning, inter alia, that water should be shared *equitably* and that *harmful effects* downstream are not acceptable as a result from upstream activities. *Fourthly*, higher political authority - "the status of an International body" (Agreement..." 1995:7) - is given the MRC (as compared to MC and IMC). This has been an ambition for a long time in order to make MRC more operative (MS 1989). *Fifthly*, and finally, the membership is not altered - compared to the original set-up - but the inclusion of China and Burma is imminent, pending largely on their will to join the MRC. They have participated as observers since April 1995.

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[31] See article 3, 2 and 1 respectively.

In the Mekong Committee, the *Secretariat* was formerly the technical/administrative wing of the cooperation and the *Committee* was the political body taking principle decisions. Now there are three levels in the system: the *Secretariat* retains basically its functions, but with a less powerful and more technical position. The intermediary level is filled by the *Joint Committee,* which is the body overseeing the execution of the overarching policies determined by the *Council.* The latter has ministerial representation, and the former has representation on head of department level. As an indirect result of the new deal the secretariat will move to Phnom Penh and Vientiane on a five year rotating bases, starting from 1998 in Cambodia.

"If it was not for the donors, the Mekong cooperation would have broken down", one source told us as a description of the negotiation of the new river deal. Admittedly, given the level of animosity amidst the process, the agreement must be seen as a success. However, it is a political compromise with many question marks around it. Jurists and long time observers complain that it is carelessly drafted and it is quite obvious that many tricky questions are built into the new agreement. For example, in article five on water sharing, concepts such as "dry season" and "natural flow", etc., are largely undefined. The immediate continuation of negotiations in the establishment of "MRC Rules for Water Utilization and Inter-Basin Diversions" and the creation of a permanent sub-committee on this topic is further evidence of remaining problems needing attention (MRCS 1995:12).[32]

4.3 External Influences in the Development of the Mekong River Basin

The "outbreak of peace" in the "Greater Mekong Sub-Region", has not only triggered a modified cooperation in the MRC, but also a rush into the Mekong development issues by researchers, donors and the private sector alike. The Indochinese countries need to be harmonized, it is said, with the other ASEAN countries in order to create regional balance. Therefore a lot of interest has focused on regional schemes aiming at achieving integration on a sub-regional level.

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[32] The objective of this sub-committee is to ensure that "the Mekong River system in a reasonable and equitable manner in their respective territories" is used sustainably. An objective which seems, from its semantic composition, to be another political compromise which will be difficult to resolve.

4.3.1 The Role of the ADB

Most resourceful and politically influential of all initiatives is the ADB-initiated scheme for the "Greater Mekong Sub-Region" (GMS), albeit not one particularly addressing resource utilization. During the last few years, the ADB has increased its involvement in both planning and financing mechanisms for Mekong development, while the MRC on the other hand is struggling to maintain its donor base and traditional niche in regional planning and coordination.

> "The GMS is an informal grouping of neighboring countries, which have categorically disavowed any intent to form a trade bloc. The countries collaborate on specific activities within the framework of existing relationships." (ADB 1996:3).

It Greater Mekong Subregion Initiative is a sector specific, development scheme, involving five countries and Yunnan province in China. It aims at, and is fueled by, a potential market of 220 million people. Since 1992 ADB has, in concert with the six members, focused on seven sectors[33] and identified a large number of projects. So far focus has been on infrastructure construction, where the transport sector, including extensive road and rail networks projects, as well as extension of water transport capability and upgrading of air transport facilities, have been promoted. Until June 1996, 7.6 million US dollars have been donated as technical assistance to support subregional activities (ADB 1996: 7). As for the future, work on the transport sector alone is budgeted to 10 billion dollar.[34]

Since the political situation has settled down in the MRB, possibilities exists for a new phase of integrated regional relationships. From the ADB point of view the aim of the GMS-Cooperation is to bring the six countries together with economic ties, enhanced by for example cooperation within transport, infrastructure, and tourism. ADB should be one of the regional forums for cooperation, side by side with MRC and ASEAN. The main overlaying goal of the cooperation seems to be economic development. Environmental sustainability seems to be a secondary issue, although it is said that environmental considerations shall be included in the decision process.

While ADB as an external actor has played a crucial role in this sub-regional economic cooperation, it prides itself that the cooperation still is ran by its members: "A notable feature of this cooperation is the full ownership of the entire initiative by the participating countries. ....with ADB playing a coordinating role" (ADB 1996:3). Annual conferences has been held with top level participation from the various countries since

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[33] Transport, energy, telecommunications, environment, human resource development, trade and investment, and tourism.

[34] As a comparison can be mentioned that the MRCS, in full swing, has a total budget of approximately 73 million USD for 1996.

1992, and working groups have been arranged in certain sectors. The masterplan, three years in drafting, was approved by the member countries in December 1995. Until June 1996 ADB had provided 280 million USD in loans for prioritized transport and energy projects, and it plans to disburse another 250 Millions USD for 1996-98.

This ADB scheme is huge in its ambition and controversial, even inside the ADB, for many different reasons. *Firstly*, it is criticized for being too ambitious and too costly. *Secondly*, one can question whether this is the prioritized development strategy for the various countries or if it is irresistible just because the large sums of money involved and the powerful role of the ADB (now and in the future). Are, it is commonly questioned, the various countries with weak administrative structures in the cash stripped GMS economies really in control of this scheme? *Thirdly*, even though it might generate economic growth, is this what the people in GMS need? *Fourthly*, due to the size of the program the private sector has to be heavily involved in various BOT[35] and other cost sharing arrangements. (From where less environmental and social considerations might follow). *Fifthly*, it has been criticized for not having a proper presence in the region (Headquarters in Manila), and thus having limited capacity of being a well functioning "catalyst" between the countries as well as limited possibilities of being well informed. *Sixthly*, coordination with other regional cooperation organizations - notably the MRC - is weak,[36] risking overlapping, or even contradictory, development efforts. Obviously, activities within the sectors of energy, transport, environment, and tourism relates to the activities of the MRC. However, in the ADB-scheme, and in the MRCS´ Work Program only few references to each other can be found, and few changes in their respective programs can be discovered. *Finally*, in several countries the domestic human resources are the most serious development constraint and a large number of able resources are tied up in this scheme. Moreover, as we found, in the situation of lacking coordination and cooperation between government departments, which is a common situation in GMS, the assertive ADB program may create domestic rivalry situations.

Nevertheless, it seems that this ADB scheme has the highest momentum (and most resources) of all initiatives for regional development. In the Mekong countries´ development strategies the ADB-scheme play a central role. As mentioned earlier, ADB has run up to become one of the key actors (if not the key actor) in regional development. There are several signs underlining this; firstly the meetings held by the ADB are frequently visited by high officials (for example vice primeministers) from all six MRB countries (noteworthy is the lack of such high officials at the MRC meetings), secondly, one can note that the ADB projects and initiatives are

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35 BOT is "Build-Operate-Transfer", BOOT is "Build-Operate-Own-Transfer", and BOO is Build-Operate-Own.
36 Officially the coordination is regarded as sufficient (MRCS 1996). Unofficially it is, however, readily acknowledged as a problem.

receiving a massive attention in the regional press. Hence, the ADB needs to be observed closely for anyone involved in sub-regional development in Mekong Region.

4.3.2 The UN-System

The UN-system was (through the ECAFE and ESCAP) instrumental in the creation of the Mekong Committee and has since played a significant role in that subregional cooperation. ESCAP, in coordination with other UN-bodies, has been one of the major financial supporters and provided a continuity and legitimacy to the work of MC/IMC/MRC. Moreover, UNDP stepped in and took over the chairmanship through the rough period of 1992-1995. It chaired a number of sessions and offered "good offices" through a mediator who toured the region, drafted suggestions for the new Agreement, and tried to facilitate conflict resolution.

ESCAP has its Headquarters in Bangkok, but has generally a wider approach than the Mekong Sub-region. It does however conduct sector studies in the sub-region and addresses sectors like, e.g., mining, environment and energy. UNDP has offices in all four countries, and the Bangkok office has a coordinating role. UNDP communicate frequently with MRC(S), as well as with the National Mekong Committees, in its various national programs but has no major "Mekong Sub-region" program and deals to a very limited extent with natural resources development, but prioritizes human development. Together the UN Agencies contributed 6.1% of the MRCS budget in 1995.

4.3.3 Other Initiatives for Sub-Regional Development

Beside the ADB and the MRC itself "The Greater Mekong Sub-Region" has received a lot of international interest the last couple of years. It has been in focus at several international conferences on the initiative of the host (e.g. Germany and South Korea). It was highlighted at the ASEM-meeting[37] in Bangkok in March 1996, and at a recent donor meeting in Vientiane, where 20 countries and 8 international organizations were represented (most of them with several participants). AusAID has commissioned a major study on resource utilization in the Lower Mekong River Basin (Hirsch 1996), and the Japanese Ministry of Foreign Affairs (The Greater Mekong Task Force 1996) one on development options in LMB. ADB is also planning an inventory study of resource utilization. A major conference (one of many the last couple of years) was recently held at Monash University in Australia (Stensholt 1996). Eleven bilateral donors have provided the bulk of the

[37] ASEM is Asia-Europe Meeting at the highest political level.

funds used by the MRCS during 1995; nine of the donors contributes 10% or less.[38] The MRCS expects donor interest to increase. Moreover, several countries have launched their own initiatives in related sub-regional development/research (see below). In addition to this there is a large interest from the private sector.[39]

ASEAN - with Malaysia and Singapore in the lead - has from its 1995 December summit meeting in Bangkok shown some interest in the Mekong development. In June 1996 they launched the ASEAN-Mekong Basin Development Cooperation (ASEAN-MB). Its aim is to raise the living standards of the Mekong countries (meaning Cambodia, Laos and Burma) and thereby facilitate their interaction with, and entrance to, ASEAN.[40] First on the agenda - as Malaysian proposition - is a railroad connection from Singapore to Yunnan (in China) which has reached the pre-feasibility stage. It has, moreover, been suggested that a fund should be established that could administer resources aimed for Mekong development. Private sector involvement is encouraged as well. Yet, this fund has not attracted any major resources. While the economic commitments are limited so far and its concrete plans are rather open ended, the *political* significance of the ASEAN involvement can hardly be overestimated. The Mekong initiative, it has been suggested, could become another working group/project under the ASEAN umbrella like other sub-regional cooperations are. Thereby it would raise the political stake in the cooperation considerably, and certainly reduce the prospects for the outbreak of violent conflicts. Overtones are also heard that this initiative is a part of larger East Asian regional (re-)arrangements such as the enlargement of ASEAN and the possible creation of EAEC.[41] If this holds water, the Mekong cooperation would be the stage where the most extended East Asian regional interests have been able to meet so far.

The Quadripartite Economic Cooperation (QEC), involving Thailand, China, Laos and Burma, was launched in the midst of the difficult negotiations with the MRC and in some quarters it was perceived as an alternative to MRC. It aims at "Economic Cooperation and peaceful relationship" and focus on infrastructure construction and tourism development.

The *Forum for the Comprehensive Development of Indochin*a (FCDI) is a Japanese initiative, serving to support development in the Indochinese countries and to make it possible to integrate these into the wider ASEAN grouping. The *Mekong Development River Network* (MDRN) is a network - funded by Canada -

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[38] Denmark sticks out here by contributing 35% followed by the Netherlands 14%, Japan 10%, Australia 9.7 and Sweden 8.1% for the year 1995 (MRCS 1995:42).

[39] South Koreran firms have, alone, in August 1996 229 projects running valued at 476 million USD in the GMS related to natural resources utilization (Bangkok Post 27/8 1996).

[40] Vietnam joined ASEAN in the summer of 1995. Laos and Myanmar entered the association in July 1997. Cambodia was scheduled to join as well, but was put on hold due to the recent political turmoil. It is likely, however, that Cambodia will become members within a not too distant future.

[41] EAEC (East Asia Economic Caucus) is pushed by Malaysia, but vigorously opposed be the USA for its Pan-Asian outlook. If ASEAN involves in the Mekong cooperation and succeeds in joining ASEAN-Japanese-South Korean interests, a body similar to EAEC - albeit under cover - would have been attained.

consisting of academics in all six Mekong Countries. It aims to foster research and information sharing around the Mekong development issue, as well as to discuss the possible resource utilization, and its limits, in the Mekong sub-region. The *Mekong Dialogue for Sustainable Development* (MDSD) is a body aiming at providing communication between stakeholders, decision-makers and other interested in integrated watershed management issues.[42] Loosely associated to MDSD is the *Mekong River Law Center* (MRLC), which deal primarily with coordination the various legal regimes in the sub-region. Other, California based, information and debate facilitating networks are the MRIN (Mekong River International Network) and the IRN International Rivers Network); the latter a world wide action oriented anti-dam group.

The exact degree, purpose and effect of external influences are extremely difficult to grasp; even for the actors inside the process. Coordination is badly needed, but nobody is interested in being coordinated. So far the MRC is the only genuinely regional organization/institution, but it is also one which struggles to find a new role under the new agreement in a new era. It has previously dealt mainly with water management but is now based on an agreement which directs it to pick up new responsibilities (and drop others). Responsibility for water management is not sufficient for dealing with all the different development initiatives launched for the region. What seems to be lacking is a coordinating body on a sub-regional level emanating from within, with the mandate of coordinating sub-region wide development activities.

Finally, the well organized Bangkok based and action oriented NGO-community[43] must be mentioned. Their keen interest in the development debate, well documented knowledge, mobilization capability, and their firm connection with the local communities makes them a resource to count on. The most internationally well known are *Towards Ecological Recovery and Regional Alliance* (TERRA), *Project for Ecological Recovery* (PER) and FOCUS.

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[42] As a background can be mentioned that the communication between, e.g., the MRCS and the National Mekong Committees on the one hand and the NGOs/civil societies in the concerned countries on the other has been strained to the degree of non-communication.

[43] There are of course a large number of (I)NGOs involved in this debate in one way or the other. E.g. IUCN, Wetlands International, OXFAM etc. See further "Persons Consulted", appendix IV.

PART III.

INVENTORY OF POTENTIAL PROBLEM AREAS OF DEVELOPMENT OF THE MEKONG BASIN

5. INVENTORY OF POTENTIAL PHYSICAL AND ENVIRONMENTAL PROBLEM AREAS

The environmental condition of the Mekong River region is in general quite good. Reasons for this are absence of large scale development schemes, lack of industrialization and relatively low population. However, there are a number of problems such as loss of forest, soil and water destruction, population increase, water disasters, poor technology and infrastructure, and regional imbalances. The problems are often interlinked and it is difficult to solve them separately.

As the Mekong River region is likely to change path of development the environmental conditions will probably deteriorate in the future. Air and water pollution in the region are expected to increase significantly, because of expected increases in motor traffic and industrial activity. The overall demand on natural resources will most likely grow as a consequence of fulfilling goals of economic development but also as an involuntary outcome of population growth.

5.1 The Limits of Available Resources

There are two interlinked limits to the available resources of any region; quantitative limits like population growth, and qualitative limits such as environmental degradation. Population growth is one of the main underlying causes for the increasing scope and magnitude of the environmental problems. When the population increases, different sectors, like forestry, agriculture, industries will claim access to the same resources, leading to a situation of rivalry. The greatest problems regarding population growth are found in the Mekong Delta and in Northeastern Thailand, together hosting about 62% of the Mekong River Basin inhabitants. In these areas the expansion of for example agricultural land has more or less reached its limits, this is illustrated by the fact that in the delta, there are currently 2,4 million hectares of land used for agricultural and aquacultural activities. The area is seen as the main target for future expansion of the Vietnams agricultural output, but from an environmental point of view, the potential for increasing the amount of agricultural land is said to be limited to only 0,2 million hectares ("MRB Diagnostic Study" 1996: 5-2).

In Cambodia and Laos, the demand for land is not as severe yet, but in these countries the population growth is still high. As more than 50% of the Laotians are below 15 years of age, the population is expected to double over the next 25 years which will put significantly higher pressure on the country's resources,

especially on land and forests. A pressure that, some believe, is unsustainable already at the present situation and present habits.

River basins are the focal point of human activity in many developing countries and the main activities are traditionally resource based. The strive towards economic development causes an increased complexity of the economies and a larger interdependence between sectors, but this does not necessarily mean a reduction of the dependence of natural resources. The hunt for economic development can increase both the occurrence and severity on resource depletion. Unregulated economic growth in general creates pollution, destroys natural habitats and encourages excessive depletion of natural resources.

The Mekong River Region is an economically underdeveloped area under pressure to achieve economic growth. Since the main comparative advantage of the Mekong River region is the richness in natural resources such as water, forests, minerals and biodiversity, it is not surprising that development strategies are based on this resource base. However, in some parts of the region, such as the Mekong Delta, this has resulted in the over-exploitation of mangroves and the loss of habitat in favor of, in this case, agriculture and aquaculture achieving short term gain, but reducing the potential for long term sustainable growth. If the strategy of utilizing the resource base is implemented it is important to have an integrated approach where the environmental impacts are considered at the same time as the alternatives are thoroughly considered. Another comparative advantage in the region is the relative abundance of cheap labor, a factor used by the governments in their efforts to obtain foreign direct investments, (cf. chapter 3).

5.2 Valuable Habitats and Eco-systems at Risk

The Mekong River region hosts a number of sensitive and unique ecosystems, such as the Great Lake and the Tonle Sap Floodplain in Cambodia, a very productive waterbody crucial for the biodiversity and regeneration of fisheries of the region. The lake is facing several threats such as water pollution, a future reduction of the water level and destruction of the flooded forests. Around the Tonle Sap lake the flooded forests are under intense human pressure. Remote sensing has showed that the forest cover has decreased from over one million ha to only 361,700 ha of flooded forest and 157,200 ha of degraded forest and associated vegetation types. The main causes of this forest clearing are timber production, collection of firewood, and conversion of wetlands to agriculture (ADB 1996: 20).

A similar problem is facing the Mekong Delta, where the mangrove forests are disappearing at a unsustainable pace. One example is the Minh Hai province where the area of mangrove forests declined drastically during the

war with the United States, from about 300,000 hectares in the early 1960's to a figure of 86,000 hectares in 1980. Even though there have been some attempts of reforestation after the war, the forest cover has been continuing to decline to a level of 67,000 ha in 1994. The mangrove forests are essential for the breeding of fish. World bank supported consultants have calculated that 1 hectare of mangrove forest provide habitat for 0,7 tons of capture fish yield. This suggests that the 19,000 hectares of lost forest since 1980 has contributed to loss of 13,000 tons of capture fish yield, which is about 13% of current fish harvests (Coastal and Marine Environmental Management for Minh Hai Province, Socialist Republic of Viet Nam: 1996).

There are invisible benefits generated from mangrove forests, as from many other ecological "micro-systems", since they help to stabilize the coastline and protect the coastline from damaging natural forces like storms, typhoons, and tidal bore. When neither of the benefits from mangrove forests or other ecosystems are calculated in decisions by governments regarding the future of the area in question, this will inevitably lead to poor resource allocation and resource management conflicts in the long run. Hence government actions actually encourage activities which result in non-optimal resource use and environmental damage.

As is described in chapter two, the biodiversity is great in the Mekong River region. This biodiversity is now threatened by excessive hunting and deforestation caused by logging and shifting cultivation in combination with a lack of proper reforestation measures. Many species are today classified as rare and endangered or even under threat of extinction. The highlands of Laos, Cambodia and Vietnam are one type of areas that hosts many rare and endangered species, like the Giant Muntjak, a type of deer. In the Mekong River itself it is possible to find river dolphins and giant catfish. The wetlands are another kind of valuable ecosystem which provide habitat for many unique species such as migratory birds. The problem of endangered species is transnational as there are no border controls for animals. When the forests of Tonle Sap are disappearing, this is likely to affect fisheries in the whole basin (Hill and Hill 1994).

5.3 Degradation of Physical Resources

The status of the physical resources of the Mekong River region is quite good, although with some exceptions, especially local degradation. The MRCS has, in the Mekong River Basin Diagnostic Study, created a general projection of the status of the resources at present and a forecast of the probable conditions in ten years time. In this study it is concluded that the greatest concern in the basin is the degradation of water quality. Table 5-1 illustrates the present and future status of the physical resources of the Mekong River Basin. It shows that although the information base is quite modest in the area, some conclusions may be drawn, such as that soil productivity is expected to decline.

Table 5-1. The Present and Future Status of Physical Resources in the Mekong River Basin.

Physical Resource	Information Base	Current Status	Future Status
Surface water hydrology	Fair	Very good	Good
Surface water quality	Fair	Good	Fair
Ground water hydrology	Poor	Very good	Very good
Ground water quality	Poor	Good	Fair
Soils	Fair	Good	Fair
Geology and Minerals	Fair	Very good	Very good
Air Quality	Fair	Very good	Very good

Source: "MRB Diagnostic Study" 1996: 2-36.

5.3.1 Acid Soil and Water

The problem of acid-sulphate soils is foremost present in the Mekong Delta, where approximately 40% of the land is covered with acid sulphate soils, which is a natural phenomena ("Strategy and Action Plan for Mitigating Water Disasters in Vietnam" 1994). These should ultimately be left untouched, in order to reduce the amount of sulfuric acids and other toxic substances washed out by rain or irrigation, but population pressure and increasing demand for agricultural products have led to reclamation of these areas. If the acid is washed out by floods or irrigation, it can cause downstream environmental difficulties if the water which passes through acid sulphate soils is not properly diluted and drained. If the acid is washed out by seawater flooding this will adversely affect the cultivation of salt-sensitive rice.

Acid water, occurring as a result of interactions with acid sulphate soils and surficial waters, is an extensive water quality problem in the Mekong Delta. It reduces agricultural and aquacultural capabilities. If the pH value of the water is less than 4,5 few fish species will survive, at a pH value below 3,0 most of the aquatic and plant life will disappear. The water has the greatest acidity during the beginning of the rainy season since the rain releases the acid from the dry top soils.

5.3.2 Soil Salinization

The problem of soil salinization is particularly difficult in the Korat Plateau and in the Mekong Delta, because of saltwater intrusion and salt leaching. There is a linkage between irrigation, poor drainage and salinization. If land is irrigated without adequate drainage, water will evaporate and the salt will crystallize, thus sterilizing the soil. In Northeastern Thailand the problem multiplies as there are deep rock salt beds in the ground, which leaches into the soil. Another possible contributor is salt rock mining, an economic activity in the Northeast. Waste water from salt production may either be discharged directly to paddy fields, or discharged to rivers and extracted lower down.

One consequence of the saline soils is that tributaries in the Korat Plateau contains significantly higher concentrates of salt than rivers in other parts of the basin, except in some canals of the Delta. The Mekong River delta also suffers from saline soils, but these tend to be caused by seawater flooding rather than by irrigation. Moderately saline soils can still produce quantities of salt-tolerant crops like rice, but the yields are much lower than on non-saline soils.

5.3.3 Salt Water Intrusion

Salinity intrusion is the major water quality problem in the Mekong Delta during the dry season, from January to June, as it affects rural water supply at the same time as damaging agriculture. An unfortunate fact is that the mid-dry season is a time when maximum demand of water coincides with the minimum flow of the river. The problem arises when the flow from the Mekong River towards the coast is not strong enough to prevent seawater backflows, in severe cases an intrusion up to 70 kilometers inland is possible. At present about 1,7 million hectares, or 43%, of the delta is affected by saline water intrusion ("Vietnam Water Resources Sector Review" 1996).

The problem of salinity intrusion is of major concern in Vietnam, and every development scheme upstream that potentially could generate less water to the downstream countries, such as using the Mekong for irrigation of Northeastern Thailand, is seen as a threat. Even without changes in the upstream water utilization, the areas affected by salinity are projected to be about 2,2 million hectares in the future ("Vietnam Water Resources Sector Review" 1996: 17). There is a risk that upstream utilization of water, generating less water downstream, in combination with high tides and storms will create a future situation that is much worse as a consequence of sea-level rise caused by the green-house effect.

5.3.4 Deforestation

Deforestation is, as described in chapter two, a hot issue in the Mekong River Region, seen by many as *the* major regional environmental problem. Thailand has already utilized most of the available forest resources, leading to strict measures. This does not necessarily mean that the total deforestation rate has shrunk in the region as the pressure on Laotian, Burma and Cambodian forests has grown. In 1985 the total forest cover in the Lower Mekong Basin was estimated at 27% which is lower than all the national levels (MDRN 1994: 28). The deforestation causes severe environmental problems such as increased erosion and siltation, and biodiversity loss.

There is a general dispute over the causes of deforestation. The neo-Malthusians claim that it is population growth while the critics declare that it is logging, ranching, unequal land holdings, everything but population. Others mean that deforestation depends on a combination of population growth and increased pressure for economic development, two features that both are present in the MRB. With increasing populations, the demand for agricultural output grows, hence the solution is either to clear new land or to increase the productivity. In countries like Laos and Cambodia, where the present possibilities to increase the productivity are low, the most likely option is certainly to clear new land, while Northeastern Thailand and the Delta are more prone to intensify the agriculture. All four countries have goals of fast economic development, and cornerstones for this development are often forest destructive, like commercial logging, agriculture, and hydropower.

Figure 5-1. Causes of deforestation

Population growth is often mentioned as the main underlying cause of deforestation, while economic development is seen as something necessary and non-destructive. Other interests claim that it may well be the other way around. It seems like population growth have a greater impact on rates of deforestation in places with small forests (i. e. not the MRB). Hence population increase accelerates forest destruction when the population lives around already fragmented forests. On the other hand is the relationship between economic development and deforestation, in poor countries with a large forest-body, evident since it is easy to utilize the

forests direct or indirect in order to stimulate economic growth. In the MRB causes of forests depletion related to economic development are mainly illegal and legal logging, infrastructure development such as roads, hydropower development, and commercial agriculture and aquaculture (cf. chapter 6).

5.3.5 Soil Erosion and Sedimentation

Soil erosion caused by running water is a major contributor to the land degradation in the Mekong River Region. Wind erosion exists, although not as severe as water erosion. The main human cause of soil erosion is forest clearing for agriculture and logging. The vegetative cover in a forest protects the soil, therefore the erosion is generally less in forests than in open fields. Soil erosion is a local problem in the Mekong River region, especially in the Central Highlands of Vietnam and in the Yunnan province. In some areas of the Central Highlands the erosion rates reach 150-170 tons/hectare/year, leading to a loss in nutrients.[44] Soil erosion is often associated with shifting cultivation in areas where population pressure has led to a significant decrease in the rotation period or where traditional low land farmers move their agriculture to neighboring uplands as the yields of their lowland fields are declining.

Soil erosion inevitably leads to sedimentation of the rivers. Sedimentation has both positive and negative effects, it is an important nutrient to fish, and needed as a soil revitalizator in areas subjected to annual inundation. Each year between 10-30 millimeters of fertile silt are deposed on wetland forests and floodplains in Cambodia and Vietnam by the Mekong River. Sedimentation may on the other hand also cause changes in hydrological regimes, disturb aquatic ecosystems and fisheries, and affect navigability, the turbidity of streams increase at the same time as surface waterflows may decrease.

In some tributaries in Laos the sediment load has reached serious levels, especially after heavy rains. In Yunnan province the high elevation rate, averaging at 32,2% in the mountainous areas, creates a serious problem of erosion. It is said that over 50% of the sediment loads in the Mekong origins in Yunnan province. Thus if the proportion of sedimentation changes as a cause of for example hydropower construction, this will have severe impacts downstream. As is described in chapter 6.3.4, hydropower projects can have two effects on siltation. First and foremost, the dams may stop the silt from passing through the area giving a decreased amount of silt downstream. Secondly, the lower rate of silt following the river may cause an increased erosion downstream, since the flow may be more harsh.

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[44] If the topsoil erodes at a rate of 120 tons/ha/year the related nutrients loss is equivalent to: 6,5 ton/ha of organic matter, 199,2 kg/ha of Nitrogen, 163,2 kg/ha of Phosphorous and 24-33 kg/ of Calcium and Magnesium (Eiumnoh A. and Shrestha R.P. 1995).

Cambodia is stressed by heavy siltation in the confluence between the Tonle Sap River and the Mekong as well as at the entrance of the Tonle Sap Lake. In a least favored situation the Great Lake would be totally filled by sediment, although the eventual occurrence of this situation is very uncertain, forecasts estimates that it may take from 10 to 60 years to fill the lake ("MRB Diagnostic Study": 1996).

5.3.6 Water Degradation

The Mekong River Region is so far blessed with a relatively good water quality. The MRCS established a water quality monitoring network in 1985, performing chemistry analyses, pesticide residue tests and bacteria analyses. According to the MRCS the water quality has so far been satisfying, but it is difficult to monitor short term changes in water quality because of quick dilution. Locally the water quality is distressed by natural processes such as soil erosion and siltation, evaporate salt leaching, saltwater intrusion, and acid leaching. Human activities such as agro-chemical use, and industrial and domestic waste discharges are also affecting the water quality. For example, a number of cultivated areas in Thailand and Vietnam are experiencing a poor water quality because of the use of fertilizers and insecticides. Hilly and mountainous regions usually have good water quality but in some areas the ground water is hard with a high content of iron and high corrosive power by carbonic acid, making it unsuitable for industrial use.

The water quality is deteriorating due to a number of factors: industrial and agricultural development, urbanization, population growth and increasing demands for water use. It is hard to estimate the pace of deterioration, since there is limited information about effluent levels from industry and agriculture. However, the above mentioned factors lead to production of more and more liquid waste from settlement and industrial areas which then flows into rivers and lakes and pollutes the water environment. Some areas of the Mekong River are facing a moderate to severe level of eutrophication, nutrient loss, organic pollution, salinization, toxic metals, and microbial pollution. At present most of the water quality problems arise from natural processes, such as acid-soil leaching and saltwater intrusion ("MRB Diagnostic Study": 1996).

Regarding ground water, there are only limited data available on Cambodia, Laos and Burma. However, estimations indicates that there is a large untapped potential. In the Korat Plateau the ground water is generally of poor quality and the yields of aquifers are low. The water commonly contains high concentrations of chloride, sulphate and iron, and many wells are biologically contaminated.

Another problem in the Mekong River Region is sea water intrusion into ground water. This happens when freshwater aquifers near the coast are contaminated by sea water because of over pumping of ground water and

reduced dry season flow. In the Mekong Delta this phenomena severely disrupts agricultural enterprises and households which rely on ground water during the dry season.

5.4 Natural Disasters

Natural disasters, like droughts, floods, earthquakes, mud slides, and typhoons are common in Mekong Region. The worst disasters are caused by floods which cause regular and substantial suffering, loss of life and economic damage. In 1991 there was a major flooding in Cambodia, causing severe damage. About 650,000 persons were affected of which 21 died. The material losses were great as about 150,000 houses and 143,000 hectares of rice fields were destroyed. Heavy rains and flooding in Cambodia is the main cause of flooding in the Mekong Delta, where the floods are prolonged and widespread since the area is largely unprotected. This happened again in large scale in 1996.

Typhoons are common in northern and central Vietnam during the period June to October. In the South they are more rare, nevertheless some typhoons travel across the Troung Son Mountain Range into the Mekong Delta about once in five years, bringing substantially more rainfall than usual into the basin. Thus, generating extremely severe floods downstream in South Vietnam as well as in Laos and Cambodia ("Strategy and Action Plan for Mitigating Water Disasters in Vietnam" 1994).

The Yunnan province of China is struck by natural disasters such as earthquakes and mudslides, the later caused by the steep topography in combination with the increased development schemes, such as logging. By 1988 the province recorded 88 earthquakes above 5.0 on the Richter scale, and 6 earthquakes between 6.0 and 7.0 (ibid.) Unfortunately, inappropriate human activity seems to have intensified the consequences of natural disasters. ("MRB Diagnostic Study" 1996: 4-16)

5.5 Other Man Made Changes

Some of the environmental obstacles facing the Mekong River Region are caused by natural forces, such as typhoons and earthquakes, but most of the problems are directly generated or at least enlarged by human actions. The most obvious man-made disasters are those caused by wars, with both direct and indirect human and environmental suffering, although non-obvious political mismanagement may be as disastrous for the environment.

5.5.1 Political Mismanagement[45]

During the time of centrally planned economy in Laos, Cambodia and Vietnam, enterprises and to some extent agriculture were predominately state owned. Producers had to accomplish the quantitative output targets fixed by the state, at the same time as there was a goal of self-sufficiency which meant neglect of trade opportunities and specialization potentials. The main goal was to reach quantitative targets which in the long run was environmentally destructive since other targets like environmental sustainability or resource conservation were largely dismissed.

The countries of the MRB have been, and to some extent still are, facing a situation where governmental agencies have had overlapping functions. Although duplication may generate creative tension, it may also, as in former Indochina, lead to serious interagency conflicts in policy making and jurisdiction. A large proportion of environmental problems stem from the fragmentation of environmental responsibility, the lack of coordination between the institutional units responsible for different sectors, and the difficulties of integrating environmental planning into the policies and programs of these sectors. These institutional difficulties constitute the familiar gap between policy and implementation. Lack of coordination between governmental organizations, both within state level and between local authorities and the state, are still very much present in Laos, Cambodia, and Vietnam, causing environmental inefficiencies. The center-local interaction is a problem in Thailand as well.

At the administrative or bureaucratic level, effective management demands cooperation and coordination between different government agencies as well as with the private sector. With limited budgets and sometimes with limited interest, it is obviously difficult to create a suitable interagency climate for effective environmental and natural resource management. In the past, Vietnam, Laos and Cambodia had no environmental ministries, no demands for environmental impacts assessments, and no coordinating bodies to pay attention to environmental affairs. However, this is something that today, at least officially, is put high on the agenda. One result of the non-existence of environmental ministries was that each sector planned to maximize production with no concern for the effects of its activities on other sectors. In Vietnam, which is one step ahead of the two other in this respect, there is now a ministry of science, technology and environment, MOSTE. In Cambodia, a Ministry of Environment was established in 1993 with the mandate for formulating the environment policy which is presently lacking. In Laos, environmental questions are handled by the Science, Technology and Environment Organization, STENO, within the prime ministers

[45] This section is mainly based on interviews carried out in the MRB during November 1996.

office. At present the environmental management systems are largely sectoral in both Laos and Cambodia, where each ministry undertakes environmental management functions related to their sector.

5.5.2 Fertilizers and Pesticides

In northeastern Thailand and the Mekong Delta the use of pesticides and fertilizers is high. The rate of fertilizer and pesticide use in the other parts of the region is not fully known, although the application rate of fertilizers is thought to be low compared with other developing countries. In Cambodia the rice fields are relatively pesticide free. According to the FAO statistics the pesticide use in Thailand was 36,700 tons of active ingredients in 1993, the figure for Laos was 50 tons. The main environmental problem associated with the use of chemical fertilizers like nitrogen is the leaching of nitrates into ground water and run off into streams and other surface water, hence use of fertilizers without careful planning and countermeasures will speed up the eutrophication process.

Unfortunately the quantity of fertilizers and pesticides are expected to increase in the years to come, due to economic reforms and other incentives to farmers to increase productivity (MRC, 1996). The use of pesticides has, e.g., increased sharply in Vietnam during the last few decades. In 1960 only 0,5% of agricultural land was treated with pesticides compared to today's figure of 90%. There are at least four kinds of environmental problems arising from the use of pesticides. The first is toxication of humans, secondly there are residues in the water, soil and food. A third effect is that the fish, frogs and snakes that lives in the rice fields die, thus halting a crucial source of protein and income. The fourth effect is the resistance of pests to pesticides which increases the needed amount of pesticides to maintain control.

In Cambodia the use of inorganic fertilizers has increased from 8,000 tons per year in the period 1965-1990 to about 40,000 tons per year in 1991-1992. Still this is a relatively modest figure compared with the 1 million tons used in Thailand or the 500,000 tons used in Vietnam, ("Cambodia First State of Environment Report" 1994). The increasing use of chemical fertilizers is accompanied by a leveling off in the use of organic fertilizers. This may generate problems since the continuous intensive cropping of land without addition of sufficient organic matter eventually leads to deterioration of the soil structure, since the plants' ability to use nutrients efficiently decreases, hence reducing the crop yield.

5.5.3 War Consequences

During the Vietnam war the countries of Indochina suffered from intense ground battles as well as some of the heaviest aerial bombing in the world history. Not only Vietnam but also Cambodia and Laos was subjected to substantial warfare.[46] In Laos a total of 580,344 bombing missions were launched from 1964 to 1973, which is the equivalent of one planeload of bombs every eight minutes around the clock for nine full years ("Lao National UXO Programme" 1996). It is conceivable that 30% of the anti-personnel cluster bombs failed to explode.[47] Together with the staggering amount of unexploded ordinance, UXO, left from the extensive ground battles the unexploded bombs created a severe problem which is still present more than 20 years after the war ended. The UXO continues to maim and kill, causing great human suffering, sadly enough often injuring children. Apart from the human suffering the UXO contamination is one of the basic causes of poverty in affected provinces as some land only can be farmed at great risk and consequently is abandoned.

Mines and unexploded ordinance is a huge problem also in Cambodia, which by any measure is one of the most heavily mined countries of the world. Most of the Cambodian mines are thought to have been laid between 1983 and 1992. They were distributed in a low density across large areas of land. Even if almost every province have minefields, the problem is especially severe in a crescent around the northern end of Tonle Sap. It is estimated that between 35-40,000 persons have been injured so severely that they have been forced to do an amputation, and still about 150-200 persons are injured by ordinance every month. The main reason for injuries is that people need the resources blocked by the mines, hence forcing them to take a chance by for example go beyond the beaten track in search of firewood. Currently the rate of clearance is so slow that with the present pace it would take 300 years to clear all recorded minefields ("Cambodia First State of the Environment Report", 1994).

Chemical warfare was extensively used during the Vietnam war. By using defoliants and herbicides, the Americans tried to expose the guerrilla fighters from their hideouts in the dense vegetation. About 72 million liters of Agent Orange, Agent White and Agent Blue[48] were sprayed on 16% of South Vietnams land area. It is estimated that 86% of the sprayed areas were forested and the remaining 14% were cropland. The mangrove belts were severely hit, nearly 40% of the mangrove forests in southern Vietnam were destroyed. The size of the forests that were ruined were large enough to supply Vietnam's timber harvesters for 30 years (Phan Nguyen Hong and Hoang Thi San 1993: 98).

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[46] Laos is the per capita most heavily bombed nation in the world, and in Cambodia two times as many bombs were felled between 1969 and 1973 than over Germany during World War II.
[47] Contrary to the failure rate of some 10 percent estimated by the manufacturers.
[48] Agent Orange (1.124:1 mixture of 2,4,5,-T also containing dioxin) and Agent White (3.882:1 mixture of 2,4,-D and Picolarm) interfered with the metabolism of the plants which killed them. Agent Blue (2.663:1 of Sodium dimethyl arsenate and dimethyl arsenic) prevented plants from retaining any moisture.

The chemical warfare used had a severe impact on the Indochinese environment and population. The dioxin contained in Agent Orange is highly cancerogenic and mutagenic. Dioxin is still present in the food chain and there appears to be reason for concern that cancers and genetic malformations may continue to increase in the future. The soil was also affected by the chemical warfare. The deforestation and waves generated by motor boats plying the rivers and canals daily caused severe erosion along the river banks. The former forested areas were damaged by strong sunlight, high temperatures, a high evaporation rate and insufficient tidal activity. This made the bare soil oxidize and convert into acid sulphate soil.[49]

5.6. National and International Initiatives Regarding Environment

The countries of the Mekong River Region are devoting themselves more and more towards environmental protection. For example, all four countries have been formulating policies, strategies and plans for environmental management. However, there is still a lot to be done if the current achievements are to be sustained and further opportunities developed. Table 5-2 gives an overview of the national environmental initiatives as well as international conventions, (cf. chapter 7).

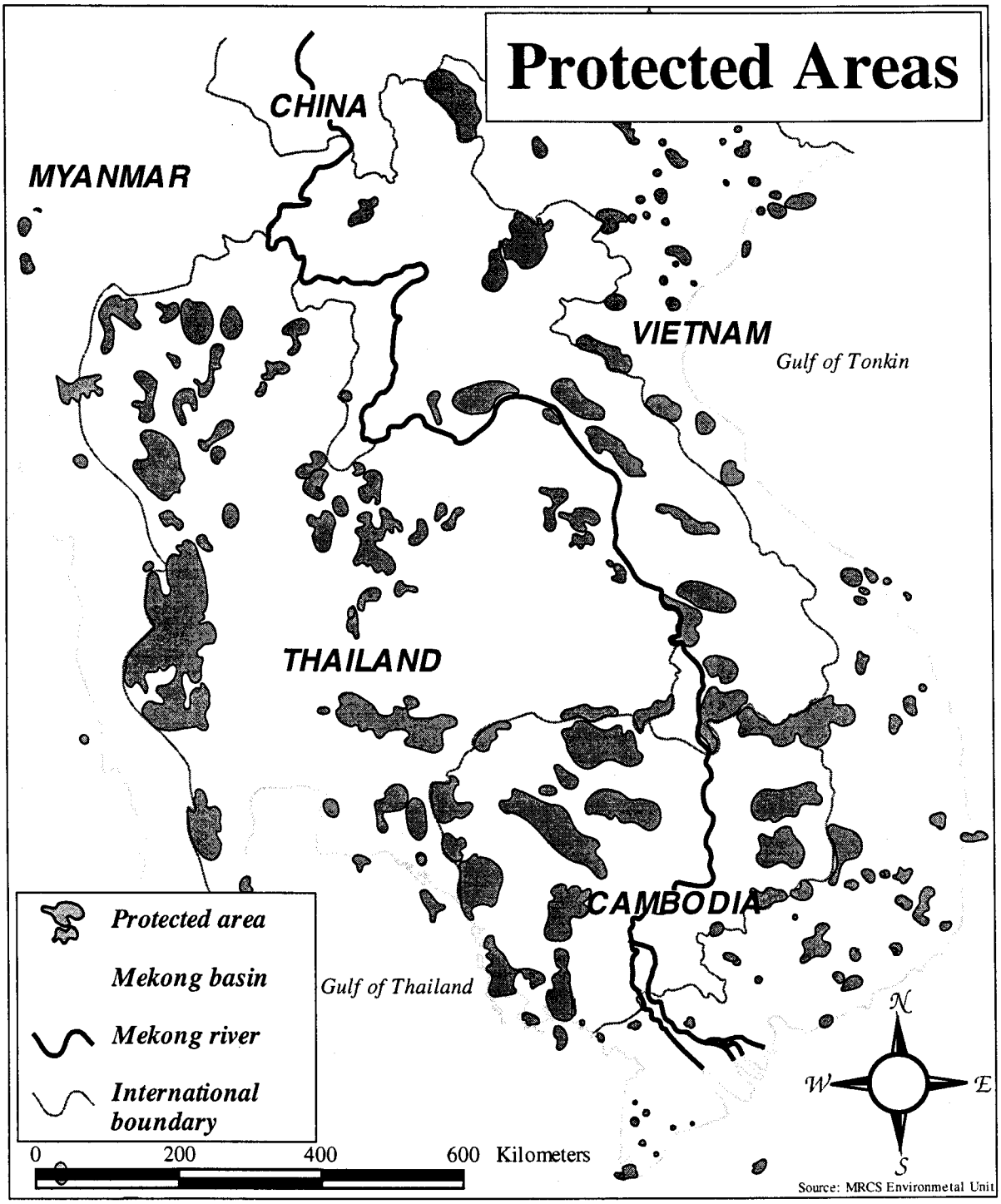
Table 5-2. National Environmental Initiatives and the MRC-agreement

Initiative	Thailand	Laos	Cambodia	Vietnam
State of the Environment Report	1995	1995	1995	1994
UNCED National Report	1992	1992		1991
National Conservation Strategy	under prep.			1985
National Environmental Action Plan	1993	1993	1995	1995
Protected Areas Action Plan		1993		
Biodiversity Action Plan		1995		1993
Tropical Forests Action Plan		1995		1991
Wetlands Action Plan			1995	
The MRC-agreement	1995	1995	1995	1995

Source: "MRC, 1996

[49] Acid sulphate soils are characterized by low ph, high levels of potentially toxic aluminum and poor fertility, see further section 5.3.1.

Map 5-1


Protected Areas
CHINA
MYANMAR
VIETNAM
Gulf of Tonkin
THAILAND
CAMBODIA
Gulf of Thailand
Protected area
Mekong basin
Mekong river
International boundary
0
200
400
600 Kilometers
N
W
E
S
Source: MRCS Environmetal Unit

The new Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, MRC-agreement, (cf. chapter 4), focuses on cooperation in all fields of sustainable development, utilization, management and conservation of the water, and related resources of the Mekong River Basin, (MRC, 1996: 3). Environmental problems are seldom specific to one country, thus there is a need for an integration of environmental planning between the MRB countries, one example is the MRC Environment Programme which came in late 1996. However, a programme like that can not work on its own, but needs to receive full commitment from the concerned national agencies. Hence, in addition the MRB states must have a genuine set of national environmental laws and acts, as well as ratify or accede different international conventions in order to commit themselves to observe specific international environmental standards.

Table 5-3. International Conventions regarding the environment

Convention	Thailand	Laos	Cambodia	Vietnam
The Convention n Wetlands of International Importance Especially as Waterfowl Habitat, (Ramsar Convention)	ratified			ratified
The Convention on Biological Diversity	signed		ratified	ratified
The Convention Concerning the Protection of the World Cultural and Natural Heritage	ratified	ratified	ratified	ratified
The Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES	ratified		signed	ratified
The Convention on the Conservation of Migratory Species of Wild Animals				
The United Nations Framework Convention on Climate Change	ratified			ratified
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	signed			acceded

Source: "MRB Diagnostic Study" 1996.

International conventions and treaties place different obligations on the signatories. If the governments of the MRB were to ratify all of the above mentioned conventions, and implement them, this would be an important mechanism for securing that there is a common approach among the governments regarding environmental and conservation issues. One example is CITES, which is an important tool in the struggle to halt the international trade of endangered species. Transboundary problems like the depletion of biodiversity can also be enhanced by creating transboundary Natural World Heritage Sites, for example by making the Nkai-Nam Theun region in Laos a Natural World Heritage Site, and the link it to the Vu Quang reserve in Viet Nam.

Box 5-1. International Conventions

The Ramsar Convention
The Ramsar Convention provides specific protection for wetland habitats. The Convention states that the contracting parties should: 1) promote the conservation of wetlands and waterfowl by establishing nature reserves and providing adequately for their wardening; 2) encourage research and the exchange of data and publications regarding wetlands and their fauna and flora; 3) endeavor through management to increase waterfowl populations on appropriate wetlands; 4) promote the training of personnel competent in the fields of wetland research, management and wardening.

The Convention on Biological Diversity
The purpose of this Convention, which was signed in Rio de Janeiro in 1992, is as its name reveals to conserve the earth's biodiversity, but also to promote the sustainable use of its components and to encourage equitable sharing in the benefits arising from the utilization of resources.

The Convention Concerning the Protection of the World Cultural and Natural Heritage
This convention has the aim of encouraging all states to protect unique natural and cultural areas, and recognizing that the international community has the obligation give financial aid to support these. There is a World Heritage Committee which establishes and publishes a World Heritage List of sites of exceptional natural or cultural value, as well as a List of World Heritage in Danger which cover sites threatened by serious and specific dangers.

Convention on the International Trade in Endangered Species, CITES
CITES has the objective of combat illegal trade and over-exploitation of endangered species, it is one of the principle means through which international trade in animals and plants is controlled. One tool is the establishment of lists of endangered species for which international trade is either prohibited or regulated through a permit system.

The Convention on the Conservation of Migratory Species of Wild Animals
The aim of this Convention is to protect endangered migratory species and to encourage international conservation agreements for vulnerable species that are not yet endangered. The convention lists over 50 species, mostly birds but also whales, marine turtles etc., as endangered. According to the convention, the species on the list are excluded from commercial hunting. On the contrary should the member states conserve and restore habitat areas for migratory species.

United Nations Framework Convention on Climate Change
This convention was also signed at the UN conference on Environment and Development in 1992. The purpose is to regulate the levels of greenhouse gas concentration in the atmosphere to an extent that it does not hamper the economic development or world food production activities.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
The convention prohibits the export of hazardous wastes to countries where the exporting state "has reason to believe that the wastes in question will not be managed in an environmentally sound manner".

Source: MRC, 1996 "Environment Programme"

A positive side-effect of becoming party to the conventions is that it may provide funding and technical support. Another advantageous consequence of effective implementation of international conventions is that

they often require cross-sectoral cooperation and coordination, something that has been, and to some extent still is, lacking in the region. An effective integrated planning process is central for a sustainable development, since it eases the implementation of Government policies. In an ideal situation public participation and non-governmental organizations would also be participating in the planning process, because like Gunnar Myrdal once said "The masses may be passive about policy decisions, but within this passivity there is often resistance to the carrying out of these policies" (Environmental Planning and Management 1986: 152).

5.7 Towards a Sustainable Development

In discussions over development, one often hears the argument that there has to be a choice between development and modernization on one side and ecology on the other. However, is this necessary? Within the term *sustainable development* lies both components, *development*, which one can interpret as putting an end to absolute poverty by giving people adequate access to food, clothing, shelter, self-respect, education, health-care, political rights, clean water, etc., and *sustainability* or environmental soundness, explained as a development that is not built on the exhaustion of resources that can not be replaced or substituted.

Modernization, which is a general goal throughout the MRB, inevitably changes the human interaction with the environment. Table 5-4 below gives one view of the different stages in resource management. In short, this theory claims that the environment is a bank of resources, which in the beginning is abundant and vast in comparison with the population. The needs of the population are then satisfied by collecting for subsistence, i.e. the gathering phase. As the population increases and the consumption patterns change, the pressure on resources grows and we move into the mining phase which eventually leads to crisis. In this phase scarcities develop - hunted species disappear one by one, soil yields fall, and firewood becomes scarce. Hopefully, when depletion reaches a level where it becomes visible and even painful the adjustment begins until we reach the phase of sustainable development.

The MRB can not be placed in one of the phases of resource management, since the region, and sectors are unevenly exploited. However it is evident that the whole region, more or less has left the gathering stage and has entered the mining phase, and with the case of some rare species and habitats already reached crisis. The question is if the general crisis stage is necessary, or if there could be a leap directly to the sustainable management phase. One problem is that environmental impacts tend to build up slowly often in a way that is difficult to spot, with several factors causing the obstacle in an interdependent and complex way. Then when

the problem is spotted and their causes understood, a suitable technology and social organisation to deal with them have to be developed.

Table 5-4. Stages in Resource Management

Production system	**Resource condition**	**Ownership**	**Plantfood**	**Animal**	**Fish**	**Wood**
Gathering	Abundant	Communal	Gathering	Hunting	Fishing	Gathering
Mining	Depleting	Mixed	Declining fallow	Over grazing	Overfishing	Deforestation
Crisis	Exhausted	Mixed	Falling yields, erosion	Deserti-fication	Stock decline	Wood shortage
Sustainable management	Sustainable	Private plus collective control of commons	Conservation Sustainable use of fertilizers, ploughing, and irrigation.	Arable-livestock, controlled grazing	Controlled fishing, fish-farming	Forest management agroforestry

Source: Harrison 1993: 248

If the stage of crisis is to be overleaped in the MRB, at least two measures should be taken:

Curbing the model of extracting maximum profits in minimum time.

One main underlying cause for this behavior is that the authorities lease out concessions for logging, mining, aquaculture, etc. where the duration and requirements of the concession are insufficient. In this situation there will be no interest among the users to ensure a healthy re-growth, but merely seen as an "Ali Baba's cave to be stripped over night" (Harrison 1993: 98) One example is the commercial brackish water shrimp culture in the Delta, where the shrimp ponds often are distributed through bidding games. The one who wins the bid, will receive the right to use the area for shrimp farming for five or ten years. After this period a new auction takes place if the land is still farmable. The owner of the pond is in no way assured that he (only men are shrimp-farmers) will gain access to the land in the next auction. Thus, the best solution is to utilize the area as much as possible while they can.

The polluters pay principle should be adopted

If the polluters pay principle is adopted, the true value of resource utilization is realized. The problem is that polluters are often backed up by strong financial and political interests, while the pollution victims, such as rural populations, environment, or even future generations, are scattered, politically weak and hard to organize. In the case of for example hydropower, the common case is that only construction costs are included in the budget. Sometimes, as with the case of the Nam Theun-Himbun project in Laos, an environmental protection agreement is being negotiated. In this case one million US dollars of the project budget are allocated for this purpose. This is only a minor sum compared with the estimated total costs for plant construction (including transmission lines) of 280 million US dollars. If the true costs, related to depletion of biodiversity including fish resources, loss of social and cultural values, and decreased access to agricultural land, would be imposed on the producers, the environmental cost would be immense, and maybe (not only in the case of hydropower) it would seem more attractive to check alternative development possibilities. If then the decision to build for example a hydro power dam would be taken, the damages made by the project would be fully compensated.

6. PRESENT PATTERNS OF RESOURCE USE AND ECONOMIC ACTIVITIES (LOCATION AND OUTPUTS) INVENTORY OF POTENTIAL PROBLEM AREAS

The aim of this chapter is to describe the different sectors of resource utilization and industrial development of the Mekong River region. We have grouped the economic activities into four clusters, natural resources production, the informal sector, industries and transport. Within the groups there are both similarities and differences. The main focus is to generally describe the situation in the Lower Mekong Basin, with examples taken from individual riparian countries.

6.1 Primary Production

The countries of the Mekong River Region are dependent on the production of natural resources, in terms of agriculture, forestry, fishery, aquaculture and mining. The economies, especially in Laos and Cambodia, are heavily dependent on primary production of natural resources, as is shown in table 6-1. The figures regarding Thailand is not representative for the northeastern part of Thailand which is substantially more dependent on natural resource production than the national statistics shows.

Table 6-1. Origins of Gross Domestic Product 1994

	Thailand	Laos	Cambodia	Vietnam
Agriculture, forestry and fisheries	11,8	56,4	51,2	28,7
Industry and construction	45,3	17,8	13,9	29,65
Services	28,1	23,7	34,9	41,65
Others	14,5	2,1 (mainly import duties)	0	0

Source: "Statistical Yearbook 1995" Socialist Republic of Vietnam; "Basic Statistics about the Socio-Economic Development in the Lao PDR" 1995; and EIU Country Report 3rd quarter 1996.

6.1.1 Forestry

> States are formed by agricultural peoples and run from urban bases. Forests in such states are used and abused to benefit urban and agricultural interests. (Harrison 1993: 99)

The forests are essential for the economy of the riparian countries, as a local energy supply, building materials and as a means of generating foreign exchange. At present the forests are diminishing drastically, because of the logging activities, both legal and illegal, and the large cross border trade and transport of timber. The logging conducted is quite inefficient, in Laos about 30-40% of the volume and value is lost because of waste, breakage and decay. The main reasons for this are poor planning, equipment and technique.

The potential commercial forest area of Laos is estimated to be 2,5 million ha, although only 1,2 million ha are of interest for timber production as the rest is either located in remote areas or within protected areas. A significant share of this areas has already been logged. It is estimated that over the past four decades approximately 360,000 ha of forests have been logged legally in Laos, while another 180,000 ha may have been affected by illegal logging, leaving only 660,000 ha of easily accessible unexploited production forest. To some extent logging bans exist, but they are quite ineffective. Activities such as hydropower preparation are sometimes given an unofficial permission to clear large areas. Illegal logging is negative as it contributes to the forest destruction at the same time as it does not generate any governmental revenues. Thailand has banned logging since 1988. As the timber demand grows by about 5% per year, Thailand has become the major wood importer of the region, as is shown in table 6-2.

Table 6-2. The international trade with forest products in the Lower Mekong Basin.

Trade with forest products	1990 (Cu M)	1990 (1000$)	1992 (Cu M)	1992 (1000$)	1994 (Cu M)	1994 (1000$)
Thailand Imp	4137849	1,004,643	4833559	1,369,855	4756000	1,630,235
Thailand Exp.	194172	122,613	499617	175,653	629720	319,255
Laos Imp	1000	950	684	443	929	730
Laos Exp.	139400	20,493	244553	47,905	282771	56,979
Cambodia Imp	100	99	1315	896	1471	846
Cambodia Exp.	40639	6,370	590923	104,630	475931	81,877
Vietnam Imp	20800	6,637	36923	22,400	81220	49,159
Vietnam Exp.	635311	102,936	326753	75,227	217286	34,950

Source: FAO statistics 1996

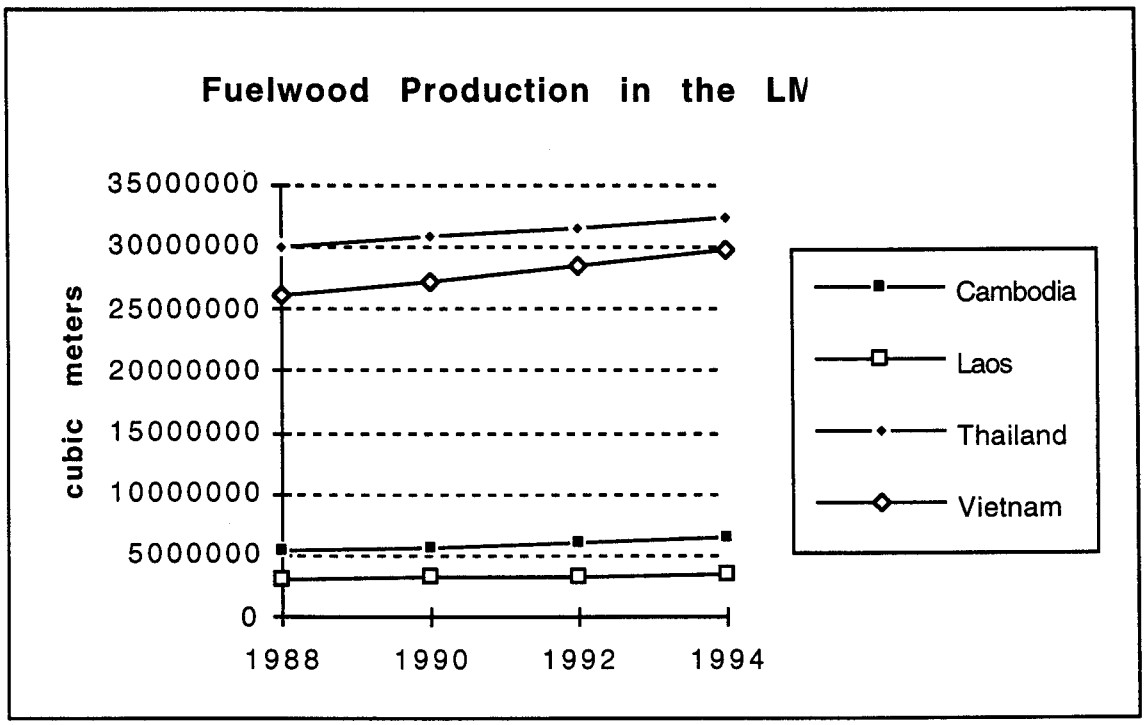
Thailand imports most of the timber from Laos, Cambodia, Burma and Vietnam, both legally and illegally. According to official statistics Laos has exported about 25,000-30,000 cubic meters of timber to Thailand since the Thai logging ban 1988. In order to curb the commercial logging, Laos banned exports of raw logs in 1988, although it is estimated that another 150,000 cubic meters are exported illegally, apart from the logs that are thought to be transported into Cambodia and then back to Laos as Cambodian transit logs on their way to Thailand. This is a lucrative activity where both resource and export taxes can be avoided at the same time as it is very difficult to control. The illegal logging is often run or supervised by powerful groups like the military which makes it very difficult to control. Also Vietnam is thought to be a major recipient of Lao logs.

Wood is also an important export item for Cambodia, where timber accounted for about 3% of the GDP during the 1980s. The annual deforestation rate has been approximately 0,5% although it has been quite uneven. During the Vietnam war large areas of northern Cambodia were bombed, seriously affecting the forest cover. Also during the Khmer Rouge rule the deforestation rate was significant depending on the large share of urban population that were moved to the countryside and were forced to clear land in order to extend the country's agricultural area. In the period of 1991-1993 when there was an absence of clear central authority and control, it is believed that all four fractions used incomes from natural resource exploitation in order to finance their warfare and campaigns. During 1989 to 1992 it is possible that the deforestation rate was nearly 3% annually. In 1992 the UN passed Resolution 792 which aimed at putting an end to the timber trade between Khmer Rouge and Thai traders. As sawn wood was excluded from the ban, the decrease in logs crossing the border was made up by a large number of new Cambodian sawmills producing for export.

Fuelwood is the main energy source for the majority of the Mekong Region inhabitants, where about 90% of the people depend on wood and charcoal for cooking and heating. It is difficult to estimate the amount of trees felled for this purpose, since the collection of such material is done on a day to day basis and is not marketed. For example, approximately around 30 million m^3 of wood are used for cooking in Vietnam each year, (Far Eastern Economic Review, 7 June 1990, p. 46) which is shown in figure 6-1. It is estimated that 620 kilos of charcoal is used per household and year in Phnom Penh. Another crucial use of the forest resources is as building materials for local houses.

In Vietnam about 50,000 ha of forests are destroyed each year through the collection of both firewood and timber, another 50,000 ha are ruined because of agricultural clearance and forest fires. At the moment 100,000-150,000 ha of wood are replanted per year, but the success of the new plantations is not yet known.

Figure 6-1. The fuelwood production in the Lower Mekong Basin 1988-1992



Source: FAO statistics

The forestry sector can be sustainable as long as it is managed in an environmentally sound way. Small scale logging and swidden agriculture, which does not utilize larger quantities of forests than will be replaced by a natural regeneration is not a problem. The damaging effects arises when the scale of deforestation intensifies as a consequence of population growth and pressure for economic development, as is described in chapter five. Apart from the direct logging, some forests are felled as a consequence of other activities such as dam building, mining, road construction, agriculture, and commercial aquaculture. In this sense timber generates an indirect income while carrying out other economic activities. The other side of the coin is that almost all sectors, with the exception of fisheries and the informal sector, contribute to the environmental degradation related to deforestation, such as soil erosion and sedimentation.

6.1.2. Fisheries

The fishery sector of the MRB is said to be of great economic and dietary importance, even if a substantial part of the catch is informal, used for subsistence. The freshwater fisheries of the Tonle Sap lake and the

brackish water and estuarine fisheries of the delta is by far the most productive (MDRN 1994). The fisheries production of the Lower Mekong River is officially said to be about 357,000 tons per year, with 8% origin from aquaculture. This figure is mainly based on estimated catch data, however it is likely to be grossly underestimated. Based on household surveys in Thailand and Cambodia, it is most probable that the real catch is about 1,000,000 tons per year (Catch and Culture, Mekong Fisheries Network Newsletter, No 1, August 1996). According to the "MRB Diagnostic Study", the fish production in the Lower Mekong Basin is estimated to be at least 500,000 tons per year and as high as 887,000 tons/year. The last figure is used in figure 6-2 Fish is an important component in the daily protein intake, and fisheries play an often underestimated economic role. In Cambodia over 80% of the daily protein intake comes from fish, out of which over 60% is caught in the Tonle Sap, one of the most productive freshwater fisheries in the world. The daily consumption of fish per year varies from 6,5 kg/per capita in Laos to 21-30 kg/per capita in the Mekong Delta ("MRB Diagnostic Study" 1996).

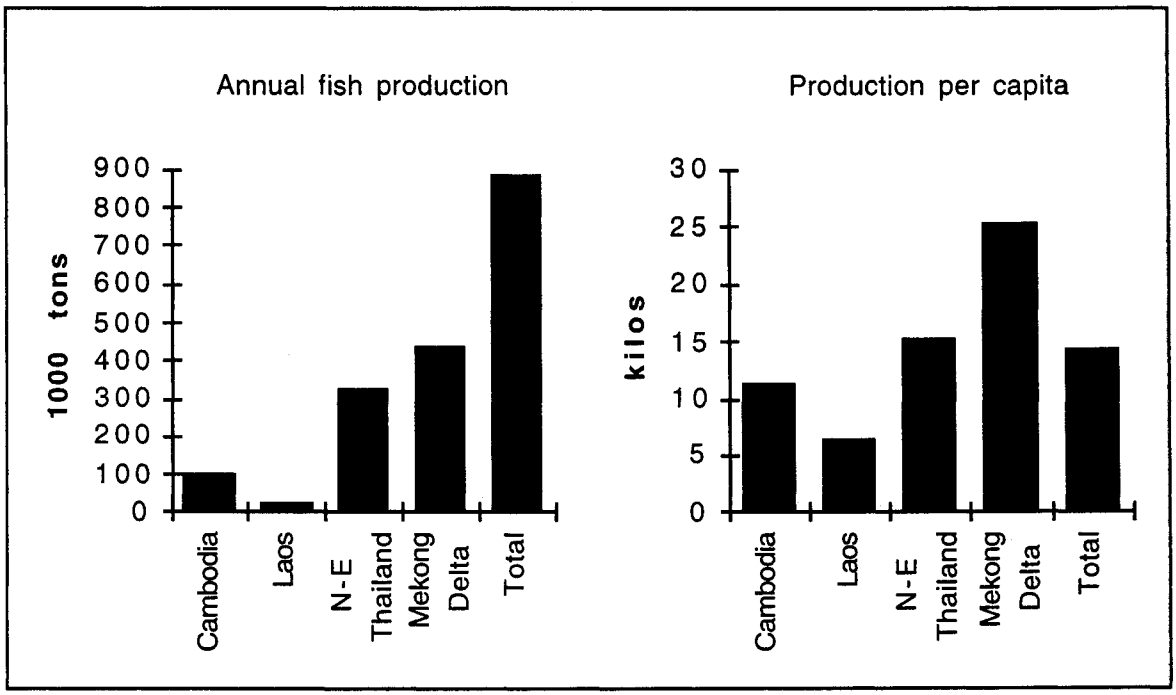
In rivers and in coastal areas like the Mekong Delta, the fisheries are often small-scale and family based, producing for a local market. Most of the fish caught in the Mekong River Basin are either consumed directly by the family who caught it, or sold/bartered at the local market. There is only a small minority of rural households, mainly in Cambodia and Vietnam, that lives exclusively on fisheries, but almost all rural families are part time fishermen or fish farmers. The fishermen use low technology gear and small boats. The small-scale fisheries have encountered increased competition among them selves because of population growth, as well as from large-scale fisheries that are rivals in the fishing-grounds and aquaculture. This has in the Mekong River region led to the use of unsustainable fishing methods such as small mesh sizes, dynamite, poison and electricity.

In many parts of the world the fish resources are overexploited and the use of more effective fishing methods does not always lead to a larger catch per effort, since the fish resources have declined. There are reports claiming that the fish catches in the Mekong Basin are declining, although there is no evidence since nobody seems to know how much fish there was in the first place. However, it is clear that there is a strong pressure on larger species and that several species, like the giant catfish, is threatened or disappearing at the same time as the average size of the fish is becoming progressively smaller. An estimation of the total freshwater fish production of the Lower Mekong Basin Countries is shown in figure 6-2. It illustrates that it is difficult to state any significant decrease in fish stocks since 1988.

Another often totally neglected source of aquatic products is for example crabs, shrimps and frogs caught in wetlands, ditches, swamps and ponds that possibly could generate another couple of 100,000 tons. This source of fish is especially important for poor rural people without access to land or fishing lots as it constitutes a

major source for their subsistence, sources that are completely lost to them if swamps and wetlands are converted into agricultural fields or if ditches are drained. Wetlands and swamps are also probably of major importance for the maintenance of fish stocks during dry seasons. The extent to which this is the case is not known.

Figure 6-2. Annual fish production in the Lower Mekong Basin

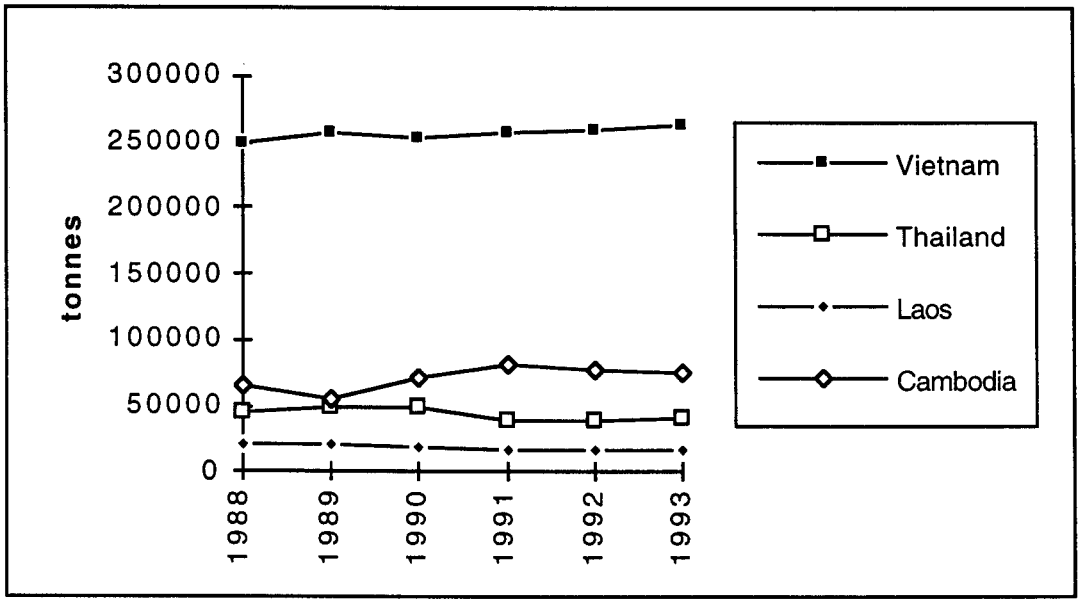


Source: "MRB Diagnostic Study", 1996.

The Mekong River plays an important role in the life-cycle of many fish species. Migrating fishes utilize the seasonally different environmental conditions throughout the river. Hence, they move freely along the river, visiting different reaches at different times, depending on which place is most suitable for spawning, rearing or simply as a passage corridor. There are two ecologically and commercially important groups of migratory fishes in the basin. Firstly there are forage fishes, which are of critical importance to the food chain of many other species and makes up a large quantity of the subsistence catches, although low on the food chain. The second group comprise of the larger economically important cyprinids and catfish. Construction of hydropower will inevitably obstruct the migratory fish, and for example shut them out from spawning grounds. Even if some say that the problem can be solved, by providing for example fish ladders, this is not a waterproof solution since there is a lack of research and development on passage facilities for tropical fish species. For example a fish ladder, developed for Scandinavian salmon may not effectively suit other fish. A second problem is that fish moving downstream through the project area will be subject to entering and

turbine-related mortality. In this sense a hydropower project will alter the numbers and species of food fish that the rural population needs for their subsistence. (Hill and Hill 1994).

Figure 6-3. Freshwater fish production in the Lower Mekong Basin, 1988-1993



Source: FAO Fishery Statistics Yearbook 1993.

The fishery sector does not individually disturb any of the other sectors, but is on the contrary threatened by several activities such as hydropower described above. The fishery sector has for a long time been undervalued in the sense that subsistence fisheries is not included in national statistics, leading to a situation where decisions about for example hydropower are made on inadequate data, giving an undervalued cost structure. Other human activities that affect the fisheries sector, by changing the living environment and reproduction patterns, are the destruction of forests. Increasing pollution of the environment and living habitats due to discharge of industrial waste, remains of pesticides used in agriculture that flow into rivers and lakes, oil and gas spills and everyday life wastes also influence fishery resources. The number of oil spill catastrophes could increase substantially in the near future since the offshore activities are expected to increase. There are also many tankers from the Middle East that go through the waters of the South China Sea on the way to East Asian countries. The most obvious negative environmental impact caused by the fishery sector is the irrational and destructive use of dynamite and other unsustainable fishing methods. Not only does dynamite fishing kill the juvenile fish but it also affects the possibilities for rehabilitation of fish populations since it breaks down the surrounding environment.

6.1.3 Agriculture

Agriculture plays a vital part of the economy for the countries of the Mekong River Region. About 75% of the population is dependent on agriculture and fisheries for their subsistence and cash income. It is a key sector when it comes to development strategies of the region, as the riparian countries all have national goals of being self-sufficient in rice. At the moment Thailand and Vietnam fulfill the goal of self-sufficiency, in 1995 they were the two largest rice exporting countries of the world, together with the USA. That year the Thai rice export was worth about 1,952 million dollars compared with the Vietnamese export of 442 million dollars (FAO 1996). Cambodia, which produced a small surplus with the harvest of 1996 after many years of food deficits, might not be able to repeat that, with the harvest of 1997. Export of agricultural products is attractive since it generates foreign currency. The trade balance when it comes to rice is shown in table 6-3.

Table 6-3. Trade Balance in Rice 1994

	Thailand	**Laos**	**Cambodia**	**Vietnam**
Trade Balance (Tons)	+ 485863	- 1800	- 5100	+ 197000

Source: FAO Yearbook Trade, 1994

Rice is by far the most important crop in the region. In areas where rainfall is the sole source of supply, the harvest is limited to a single crop, but there are two harvests a year in many regions of the basin. In the south, where the conditions are favorable in terms of water and temperature three harvests per year can be found. Some diversification to upland cropping has taken place in the Mekong Delta, Northeastern and Northern Thailand, but as the new crops are not able to give a sufficient economic return, most farmers prefer to keep at least a small amount of rice fields. Table 6-4 shows the production of a selection of other crops in 1990 and 1996.

One obstacle facing the riparian countries is the problem of land ownership. In large areas of the Mekong Basin, land ownership is unclear, especially among minority groups. One example is Thailand where over 40% of the land is used without legal land title. This often leads to an insecurity among the settlers, which will not encourage long-term planning as they know that there is a risk that they may loose the land to other purposes.

Table 6-4. Production of cassava, maize and coffee 1990 and 1996

Country	Cassava (1000 tons)	Maize (1000 tons)	Coffee (1000 tons)
Thailand			
1990	20,700	3,722	71
1996	16,000	4,360	75
Laos			
1990	65	66	5
1996	68	62	8
Cambodia			
1990	60	88	0,160
1996	90	60	0,250
Vietnam			
1990	2,276	671	94
1996	2,496	990	198

Source: FAO statistics

The population is growing at a fast pace in the region, causing a larger demand for food and land. In many parts of the Mekong River region it is quite difficult to expand the agricultural land. Cambodia, Laos and Vietnam have the problem of unexploded ordnance which puts a limit to the cultivated area. At present only 1,9 million ha of land is used for agriculture in Cambodia compared to of the 2,5 million ha which were cultivated in 1960. When it is not possible to expand the cultivation on primary land, secondary areas like high slopes or land with saline or acid soils will be used.

Table 6-5 below illustrates the rice production of the LMB. Thailand and Vietnam are two of the major rice producers in the world, but in terms of output per hectare they are still behind for example the USA where the production is 6.718 tons per hectare and Indonesia with 4.400 tons per hectare. The world average output of rice per hectare is 3.651 tons.

Table 6-5. Rice production in the Mekong River Region 1994

Country	Total rice production (1000 tons)	rice output ton/ha	population per ha cropland
Thailand	18447	2.15	2.4
Laos	1653	2.59	3.6
Cambodia	1,800	1.06	3.1
Vietnam	22500 12120,9 (delta)	3.46 3.99 (delta)	11.5
China	178,251	5,87	2,5 (Yunnan)

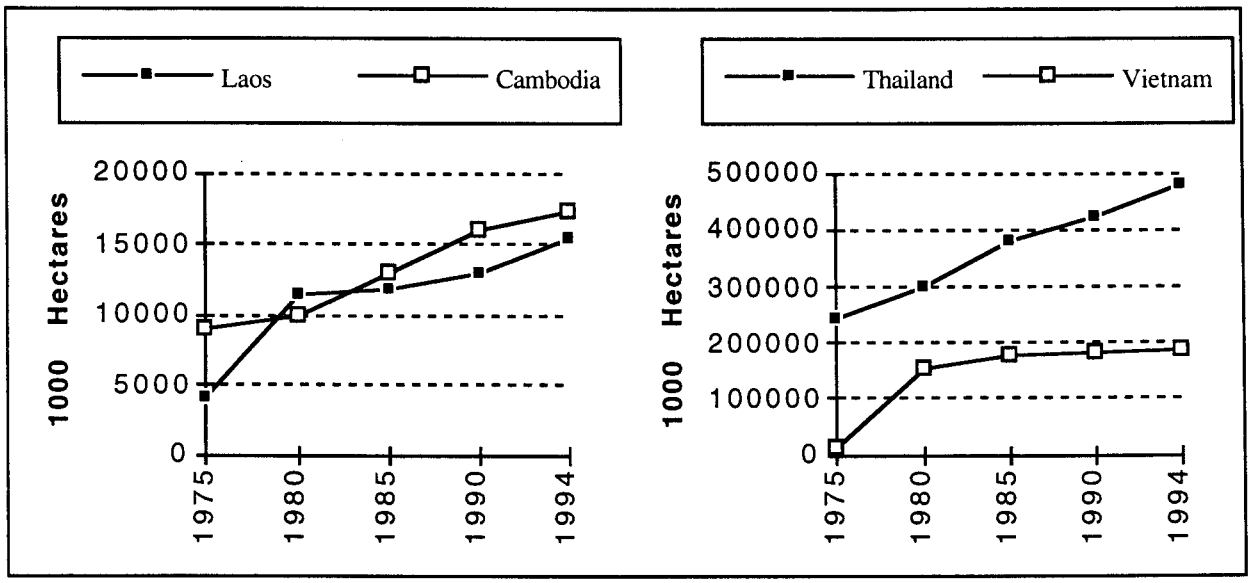
Source: FAO Yearbook, Production 1994; "Strategies for Development of the Greater Mekong Area" 1996; and "MRB Diagnostic Study" 1996.

There are several reasons for the low productivity, like insecure land ownership, lack of irrigation, low level of pesticide use and relatively infertile soils. Although the area under irrigation is relatively low, especially in Laos and Cambodia, there has been a spatial expansion during the last 20 years, as is shown in figure 6-4, below. Agro-chemical use is quite low in the Mekong Region, especially in Laos and Cambodia, but as the agriculture becomes more intensive, the use of chemical pesticides and fertilizers is likely to increase. On the other hand a significant amount of other products seldom reflected in the statistics such as frogs, fish, crabs, snails and snakes are still abundant and of vital local importance in areas where pesticide use is low. A source of income and subsistence that disappears with an increased use of pesticides, since such poison kills the aquatic life in the ponds.

The Mekong Delta has the largest population density of the region, and the pressure on land is high. In the Mekong Delta the potential for agriculture is 2,6 million ha of which 2,4 million ha is already used ("MRB Diagnostic Study" 1996). At present much of the land which is converted into rice fields is natural coastal lowlands and wetlands. When wetlands are converted into rice fields the whole ecosystem is threatened since the natural vegetation is cleared. Wetlands are often subjected to resettlement schemes, people migrate to the area, and the former common land is distributed to the new settlers. This creates social conflicts between the new settlers and the people who lose the opportunity to use the land. Even if Vietnam has the highest productivity per hectare of the four countries in the lower Mekong Basin, the post-harvest losses are great, 13-16% for paddy, compared to the world average of 10% or 3,6-5% in Japan. Hence one of the big issues for Vietnam (and certainly also for Laos and Cambodia albeit statistics on this are missing) is to make the rice production, transportation, and storing more efficient.

Shifting cultivation is widely spread in the Mekong River region. It is mainly practiced in the highlands and mountains where irrigation is not possible. Minority groups are the main users of this method. The most common way of shifting cultivation is rotational shifting cultivation, in which land is cleared from forest and cultivated for 1-3 years. The area is then left fallow for 10-15 years to restore its fertility. When the land is left fallow for enough time this is a sustainable way of agriculture, but with the growing demands the land is cultivated too soon, which may upset the environmental balance. If the land is not left fallow for a sufficient time the soil will not be revitalized, hence giving a smaller output at the same times as the threat of soil erosion increases. In Cambodia, shifting cultivation, especially in the northeastern provinces with an average population density of less than 20 persons/km^2 the practice is not an environmental problem. However, in certain areas with higher population densities, the fallow period is now only 3-5 years, which is not sustainable ("MRB Diagnostic Study" 1996: 5-3).

Figure 6-4. Areas under irrigation in the Lower Mekong Basin.



Source: FAO statistics

Agro-forestry systems a kind of shifting cultivation, where the land is cleared from forest and is then cultivated permanently with a mixture of short term and long term crops. One advantage with this system is that the land is continuously used at the same time as it is kind to the environment. The agro-forestry systems are not widely used because it requires special knowledge about basic agricultural and forestry techniques at the same time as it is limited to areas that answer to the environmental and marketing requirements.

Traditional agriculture performed within the limits of available resources is possibly conducted in a sustainable system of different economic sectors like forestry and fishing. Sadly enough, an increased competition over land is soon likely to be experienced throughout the MRB, generating a situation where agriculture may be incompatible with other sectors. The agricultural sector may then be jeopardized by for example mining activities, industries and the related pollution and hydropower dams.

As is mentioned earlier, population growth puts a larger pressure on agricultural output. However another reason for intensified agriculture is industrialization and other economic development. In the process of industrialization and urbanization the pattern of labor will change, whereas people will move to industrial centers leaving fewer persons to produce the same or a larger quantity of agricultural products than before. In this situation it is possible that more unsustainable methods will be used, such as excessive use of fertilizers

and pesticides, shorter fallow periods, inappropriate irrigation, and use of marginal lands. These in turn puts a larger strain on the environment, causing erosion, salinization, and depletion of soil fertility.

6.1.4 Aquaculture

Aquaculture is a means of producing fish, shrimps, mollusks, etc. by cultivating them in man-made ponds or cages. It is a fast growing sector along the coasts and inland waterbodies of the riparian countries. It provides protein to the local diet, at the same time as it is a way of earning foreign currency by export. Hence, the development of aquaculture has a high priority among the governments. At present aquaculture holds a relatively small share of the fisheries production in the Mekong River Region, however it is thought that the sector will grow in significance. Traditional types of fish culture has been integrated in the rice production, as fish has been kept in the paddy fields.

The importance of wetlands and flooded forests for local production is not known but it is estimated that they are of significant importance.[50] When pesticides and herbicides are introduced this is a threat to the fish, since it is not able to survive under the new water conditions. Hence when estimating the profits made by the increased rice production, one has to take the loss in fisheries and other aquatic species like frogs, snakes, eels, etc. into account. Table 6-6 shows the freshwater aquaculture production of the Mekong River region, although the estimated figures are, like in the case of capture fisheries, very uncertain and is most likely underestimated. According to the "MRB Diagnostic Study", aquaculture accounts for about ten percent of the total fish production in the LMB, or between 36,000 and 86,600 tons per year.

The Cambodian aquaculture almost ceased during the Pol Pot area. As the nutrition level is very low in Cambodia, aquaculture is thought to be a good generator of nutrition since inland aquaculture, in small scale low input systems is inexpensive, simple and productive. The aquaculture production has increased with over 500% from 1984 to 1992.

The government of Vietnam has encouraged shrimp farming for export since the early 1980s. The utilization of mangrove land is supposed to be regulated by the ministry of forestry. Despite this people clear large tracts of mangrove forests for shrimp farming. Two reasons for this are the evident profits from exported shrimps and decreasing catch yields from the sea because of lack of facilities and materials, and a reduced reserve of shrimps in the sea.

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[50] This estimation has been done by experts interviewed in the region

Table 6-6. The freshwater aquaculture production of the Mekong River region

Country	Freshwater aquaculture production (tons)	percent of total fish production
Thailand (Northeast)	7,330 (1989)	12
Laos	1,830 (1988)	6,7
Cambodia	8550 (1992)	7,3
Vietnam (delta)[51]	25000 (1990)	5,7

Source: MRCS: 1992; and "Cambodia First State of the Environment Report" 1994.

In the Mekong Delta, brackish water shrimp culture has become popular, since it generates a higher income, at least in short term, than for example rice cultivation. Aquaculture for high value species has a larger perspective than small-scale fishing, since the production is made for an international market, often involving large investors (Carpenter and Maragos 1989: passim). Many persons have left their traditional jobs like rice farming or fishing in order to cultivate shrimps in their own ponds or work as laborers for other shrimp farmers. A lot of people migrate to the mangrove areas from neighboring areas with less opportunities for money generation. At the same time the old shrimp farmers expand their shrimp ponds. This migration flow causes local problems since it makes the population increase very rapidly in the certain area.

There are three kinds of aquaculture farming systems, extensive, semi-intensive, and intensive. In extensive aquaculture systems, the cultured organisms are kept at low densities and may occasionally receive additional nutrition through fertilization. In semi-intensive aquaculture, culture organisms are kept at higher densities than in extensive systems. Fertilizers are often used and sometimes complementary artificial food is given to the shrimps. In intensive aquaculture the culture organisms are kept at high densities. Feeding is regular, often containing special food manufactured to provide the shrimps with maximum nutrition.

Most of the aquaculture in the Mekong River region is extensive with yields of about 2 tons per hectare and year. Intensive ponds are relatively rare since there is a lack of sufficient feed. But there are more intensive and semi-intensive culture systems such as Pen and Cage culture, common in the Tonle Sap lake and in the Mekong mainstream of Vietnam.

[51] The production has not been estimated, although this is a likely figure according to the Review of the Fishery Sector in the Lower Mekong Basin

Aquaculture as an integrated part of wide agricultural system is sustainable and a good source of protein and income. However commercial shrimp farming, as conducted in the delta is largely environmentally unsustainable since it destroys the mangrove and causes a severe loss of biodiversity. At the moment, the commercial shrimp farming carried out in the delta can be seen as a kind of shifting cultivation, since the ponds are abandoned as soon as the mangroves and nutrients are lost.

The introduction of commercial aquaculture in wetlands disturbs the traditional pattern of land use, since former common land is converted into private property. A new competitor over wetland resources is introduced, the shrimp or fish farmer. Before the aquaculture was introduced, everyone were able to fish, hunt and collect firewood in the wetland area. Hence both farmers and fishermen becomes dissatisfied as they looses an extra source of income. In delta areas, aquaculture compete with the fisheries sector over the aquatic resources, which gives a smaller catch for both groups. These worsened conditions may then force the fishermen to use unsustainable fishing methods like dynamiting and electric netting. Agriculture may be both disturbing and nourishing aquaculture production. As mentioned before pesticides and herbicides kill aquatic resources, but on the other hand fertilizers may be a good nutrient for the fish or shrimps cultivated.

6.1.5. Mining

All of the MRB countries are thought of as being rich in mineral resources, although there are many areas that are not yet investigated. In Cambodia the mineral investigations began in the 1950s, when significant deposits of for example sapphires, rubies, alluvial gold, alluvial cassiterite, silica, bauxite, magnese and coal was found. The development was stalled by the periods of war and internal conflict. The only significant exploitation carried out was the gemstone production in the region of Pailin in the Battambang province, which was done under contract of the Khmer Rouge (ESCAP: 1995.). These mines, still under operation, are only nominally under control of the Cambodian Government.

Exploitation of the Cambodian minerals is at present largely prevented by the lack of information on actual findings, limited access and difficult market conditions. There is currently active mining of construction materials such as sand, gravel, granite, clay etc., as well as of certain industrial minerals, for example phosphate and limestone. It is difficult to estimate the extent of this mining as the extraction has been done uncontrolled with respect to the government and tax collectors. There is currently also a small scale mining and trade in placer gold in various parts of Cambodia.

In Laos commercial mining of tin, gypsum, coal, salt, gemstones and construction materials has so far been carried out in small scale, of which tin, gypsum and sapphires are exported. In 1995 the total export of tin and gypsum were 512 tons, respectively 124,200 tons, in both cases there has been a decrease between 1994 and 1995. Laos is also thought to be rich in for example gold and iron ore, the first being panned from streams over most of the country. The mining sector constitutes about 1% of the total Gross Domestic Product of Laos.

Vietnam is very rich in mineral resources, although there are few findings in the Mekong River region of the country. The minerals which have been exploited are for example iron, copper, chromate, tin, lead, zinc, tungsten, rare earths, placer gold, gemstones and coal. In the Dak Lak province of the Central Highlands, a part of the MRB, there are abundant reserves of kaolin and bauxite. However, the lack of capital resources, modern technology, energy and infrastructure will most likely cause any bauxite and aluminum production to be delayed at least until the next century (ESCAP: 1995).

In Thailand, mining accounted for 1% of the GNP 1993 and employed 3% of the workforce. Thailand is the world's third largest tin exporter, but has suffered from depressed markets which followed the collapse of the International Tin Agreement in 1985. In that year the tin export was valued over 11,000 million baht compared with 455 million baht in 1993 (Asia Pacific Review 1996). The Northeastern region of Thailand is rich in salt and potash. Several big mining companies are now considering taking an interest in a major potash discovery in the Udon Thani region. Since 1993, the Asia Pacific has outlined two potash fields in the Udon Thani region. An initial feasibility study suggests that the smaller of these fields could support a mine with an annual output of 2 million tons of potash for 24 years (Financial Times 1996 Sep. 11).

Mining is seen as difficult from a sustainable point of view. Mines are developed in order to exploit non-renewable resources for their financial returns. The major profit from mineral extraction goes to the shareholders. The local communities may benefit from an improved infrastructure and employment opportunities. This "benefit" may ironically be environmentally destructive since an improved infrastructure attracts other pollutive activities. The exploitation of minerals can cause socio-economic effects like land use conflicts as the extraction requires land which someone has to give up. Mineral extraction gives environmental impacts, both from the exploration and mine development as well as from the mine operations. The mines may lead to fresh water and marine pollution, destruction of habitat, and air pollution. In the end the mining industry will most likely disturb other economic sectors, such as fisheries because of pollution and tourism as a consequence of destruction of unique environments.

At the moment, the mining sector is not of major economic importance in the MRB. However, as there are supposed to be substantial findings, the sector is seen as a large potential for future economic development. It shares some similarities with oil, natural gas, hydropower and in some sense the forestry industry. One of the main features is that huge international interests are present, something that is quite attractive to the poor governments of the MRB. The chance of generating foreign investments is set high on the agenda, sometimes above environmental sustainability or public participation. Another similarity, as mentioned above, is that the greater portion of the economic return is placed in the pockets of the state or international companies, and not in the hands of the primary producers.

6.1.6 Oil and Natural gas production

Vietnam has large offshore oil reserves with good prospects for commercial development. In 1994 the oil reserves were estimated to be nearly 10,000 million tons. The production is still quite modest, the largest field, the Bach Ho block, 200 km of the Mekong Delta, produced 2,7 million tons in 1994. The same year Vietnam exported 7 million tons of crude oil (20% of total exports) at the same time as the import of petrol oil was 4,5 million tons. Vietnam spends huge sums importing refined crude oil to fuel industrial growth. Currently the gas found, when exploring the oil resources, are left unexploited, hence with the result that large quantities of gas flare of ("Viet Nam, Environmental Program..." 1995).

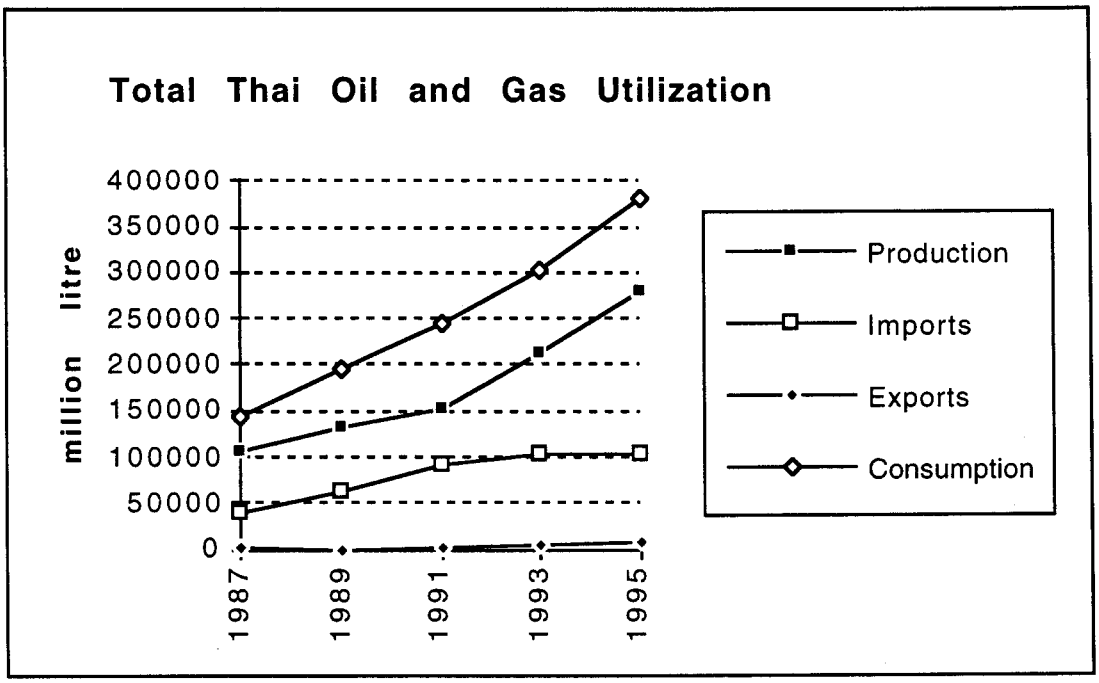
Cambodia, Burma and Thailand are also actively exploring and developing their offshore oil and gas deposits. Thailand has found significant offshore natural gas reserves in the Gulf of Thailand. The country is trying to reduce its dependence on imported oil by developing use of indigenous natural gas, as for example the Erawan field which produces over 5,8 million cubic meters of natural gas every day. There are onshore natural gas deposits on the Korat Plateau (The Asia Pacific Review 1996). In 1995 the Nam Phong gas field produced about 0,23 million cubic meters of natural gas every day.

As is shown in figure 6-5 the Thai import of oil and gas has not grown at the same pace as the consumption, hence the dependence has decreased in relation to the national production. Thailand has even started to export some of the petroleum produced. The consumption of petroleum products is definitively largest in the Bangkok Metropolitan area, where over 45% of the petroleum products where consumed compared with about 9% in Northeastern Thailand.

Cambodia found Oil in the Gulf of Thailand in 1994, but at present all commercial petrol used in the country is imported. It is estimated that Cambodia has a high potential for natural gas and modest potential for oil,

enough to meet its own energy needs as well as becoming an important export item. At present four offshore blocks are leased to three foreign consortiums who are prospecting the areas. In the exploration of oil in the Gulf of Thailand, Cambodia has overlapping offshore claims with both Thailand and Vietnam ("Cambodia First State of the Environment Report" 1994). Cambodia has some on-shore potentials as well, but this has so far attracted less attention. Oil has also been discovered in Laos, between Thakhek and Pakse in the Vientiane Valley.

Figure 6-5. The petroleum production, imports, exports and consumption of Thailand



Source: Oil and Thailand 1995

The oil and natural gas findings are not yet large enough to make the individual countries, of the MRB, self-sufficient, however it is likely that the oil, natural gas and coal resources in Burma, Yunnan, Cambodia, and Laos are large enough to meet future domestic needs and even support some energy exports ("MRB Diagnostic Study" 1996: 5-29). In terms of environmental degradation, the highest risk of offshore oil and natural gas production, oil spills which are polluting and disastrous for the animal life. When it comes to onshore production, the effects are similar to the ones present in the mining sector.

6.2 The Informal Sectors

The informal sectors are quite important in the Mekong River Region, although seldom included in national economic analyses. For the many persons living in the region, hunting, subsistence fishing, handicrafts and non-timber forest products constitutes an essential part of the income, providing sustenance, security and independence, especially in those communities that are dependent upon an unpredictable rainfall to support upland rice production and those being only loosely connected to the national economy due to remoteness. The people who live in and around the forests often possess a complex knowledge and culture necessary to understand the forest, needed to survive in it without reducing its diversity.

Historically the informal activities have been carried out on common land such as forests and wetlands, but as the market economy finds its way into the remote areas much of the natural resource base is being expropriated by the state or the private sector in order to invest in tree plantations, dams, resorts, nature reserves, roads and other infrastructure. If this continues and if the rural population is not compensated for the loss of income an increased impoverishment will most likely occur, in the end leading to an acceleration of urbanization. Moreover, lifestyles, cultures and even whole minority groups are threatened by this "development".

6.2.1 Hunting

There is a long tradition of hunting in the Mekong River region. Most families fish and/or hunt in order to obtain their daily protein intake. In the past hunting was conducted mainly for local consumption, but the situation is slowly changing. The level of hunting has increased in the last decades, as a cause of increasing populations, the availability of modern automatic weapons[52] and a growing commercialization. The latter is a result of increasing prices and improved access to remote areas. In Laos there is today a major international trade in wildlife and wildlife products to Thailand, China and Vietnam, both as pipelines to other countries and as direct consumption. This trade also includes wetland wildlife, such as turtles and Siamese crocodiles, and high value plants and plant products.

The possibilities for sustainable hunting is threatened by several factors. Firstly there are threats arising within the sector, because of population growth, and changes in consumption and technology patterns. Affluent consumption patterns, like national and international demands for furs, shells, traditional medicine,

[52] The existence of guerrilla warfare and widespread access to advanced weapons tend to be disastrous for wildlife.

spectacular birds, butterflies, etc. stimulates local collectors and where the remaining populations of the species are small, this collecting pressure can be a severe threat. Technology also plays a role in the sense that new intensive technologies, such as dynamite fishing or automatic weapons, makes it possible to harvest a larger quantity, often including juvenile species, with disturbed regeneration as a consequence.

However the threats arising because of other sectors may well be as severe. As the competition over land grows between different sectors, such as agriculture, forestry, hydropower generation, and other industries, there will inevitably be a depletion of biodiversity, leading to reduced hunting possibilities. This is a situation evident in the whole MRB, where a combination of the above mentioned issues are leading to a worsened situation for both the hunters and their targets.

6.2.2 Handicrafts

In the MRB there is a long tradition of local production of handicrafts such as textiles, woodcarvings, basket weavings, jewelry etc. The statistics on the value of this sector are not available but it is believed to be significant. The lack of information about handicrafts is in itself revealing a poor interest among decision makers to develop industries based on traditional skills. Development of the handicraft industry may go hand in hand with an increase in the tourist sector as most tourists are interested in buying locally made souvenirs and tokens. The industry may also be a significant contributor to the generation of foreign exchange because of a potential increasing international trade with for example locally made textiles. In addition there is a lot to learn from the handicrafts, both from the small scale traditional construction methods, which are formed after the unique conditions present in the areas, and from the design. The popularity of culturally and ethnic influenced fashion is quite significant, and the promotion of such handicrafts could be a developmental alternative.

6.2.3 Non-Timber Forest Production

Non-timber forest products, NTFPs, like nuts, honey, medicinal plants, oils and resins, and wildlife for food are important elements of household economies and nutrition. It is an important social security or welfare mechanism in times of rice deficit. If the forest resources are diminished because of clearing, expropriating, or environmental degradation the natural resource buffer is lost, hence there has to be considerably more rice and other food staples produced in order to replace the income lost from the NTFPs. This situation is worsened if the loss in forest resources are combined with decreasing yields and increasing population levels. In the MRB,

the situation with growing competition both within and between sectors, are leading to forest destruction with consequences for the gatherers of NTFPs that are similar to the hunting sector. If the forest destruction will continue to grow, the NTFPs are likely to become more valuable as the over-exploitation will lead to a situation of scarcity. Then it is even more important to implement strategies encouraging sustainable use, since the higher value of the products will further increase the utilization.

Cambodian studies have found that one Cambodian village uses about 300 different species of native plants in the daily life ("Cambodia First State of the Environment Report" 1994). In Vietnam about 2,300 plant species are harvested in order to be used as food, medicine, construction, textile production and water-proofing ("Biodiversity Action Plan for Vietnam" 1994). Again it is very difficult to estimate the extent and value of this production, although absent from commercial statistics it is believed to make up a significant value with a potential for generating substantial future economic returns through international trade.

In development and project planning it seems like the products described above are systematically under valued for several reasons. One is that rice occupies such a dominating role. "The importance of gathering and non-timber forest products is often under-estimated in wet-rice cultures...." (Ovesen et al 1993: 26-30). Other reasons might be lack of information or even that less importance is paid to the livelihood of the poor and unarticulated peoples.

6.2.4. Opium

The Golden Triangle has an international reputation for being one of the major, if not the main, poppy growing areas of the world. In Burma the opium production is said to pay for the arms used, by for example, the Shan in their struggle for independence. Throughout the region it is minority groups, like Hmong, Yao, Karen, Akha, Lisu and Lahu all belonging to the Sino-Tibetan language group, that are the main producers. Poppy is a good crop as it is possible to grow in secondary quality soils, and since it has a relatively high market price. Of course the opium production is not included in any of the national statistics, but in certain parts of the region a large part of the population is dependent on the poppy for their living. It is estimated that Laos produced 130 tons of opium in 1992, involving 60,000 households in the northern half of the country (Country Strategy Note....1996: 14)

The fact that opium production lies outside the national sphere gives it an odd situation. It is, at least formally, not wanted by the governments, at the same time as it is a crucial source of income among the farmers conducting it. The largest threat facing the opium production is not other sectors like forestry or

agriculture, but rather the incorporation of remote areas into the national economy. As the development proceeds, infrastructure development such as roads will inevitably increase the state control over the informal sectors, since there will be a better access to remote areas. The question is, just like in the situation with illegal logging, how eager the governments are to shut down the industry. It is probably a battle between international pressure and prospects for informal financial return.

One area where the Opium production has decreased during the last decade is Thailand, where the production has been halted because of a combination of strict law enforcement and the launch of alternative cash cropping. However it is not probable that the total opium production has decreased, but merely moved elsewhere in the region.

6.3 Industrial Development and Tourism

Historically, the Mekong River region has been an area of intense economic activity. The river was used as a means of transport and several markets were located by the river banks. A period of closed borders during the last 30 years turned the trade flow away from the Mekong Region finding substituting trade routes. Starting in the late 1980s, the markets of Vietnam, Laos, and Cambodia began to open up and it became easier to cross the borders. This has given new prospects for the development of trade, industrial development and tourism in the region. It is now possible to launch the MRB as one entity in order to attract both tourism and foreign direct investments.

6.3.1 Industries

The rate of industrialization is quite modest in the Mekong River region. The country most industrialized is Thailand, although the bulk of the Thai industries are located outside the basin, mainly in the Bangkok metropolitan region. In Thailand the main industrial products are: processed food, precious stones and jewelry, cement, sugar, refined oil, synthetic fibers, textiles, assembled vehicles and parts, paint, steel, etc. Nakhorn Ratchasima is the main industrial center of the Northeast.

In Laos and Cambodia the industrial sectors are small and the industrial development is at an early stage, as is shown in Table 6-1 earlier in this chapter. Production of tin concentrates is the main industrial activity in Laos, but there are also some small-scale manufacturing industries that produce for example beer, cigarettes, detergents and rubber footwear. One growing industry in both Laos and Cambodia is the textile industry.

Vietnam is not yet heavy industrialized, even if there is a rapid ongoing industrialization. The Mekong Delta is mainly concentrated on agro-industries like rice milling and polishing, breweries and canneries. The number of industries are moderate, partly because of a lack in infrastructure and transport facilities. Despite this, the environmental situation is quite serious in certain areas struck by for example water pollution.

The industries of the MRB are often situated in population centers, and have some positive economic and social impact on the region since they provide employment and may have a demand for local supplies. A negative factor is that there may be an increased pressure on land and water resources, in the sense that there will be an enlarged competition over resources for different uses. Cities and the industrial sector compete for resources with agriculture and forestry. Cities and industries usually expand on and eat up prime agricultural land, leading the agriculture to move into more and more marginal areas. To make room for buildings and plants, sensitive areas like wetlands are confiscated causing a depletion of flooded forests or other critical habitats. The industries are often pollutive affecting the ecosystem with, for example, waste water and air pollution. Even if the industrial development is at an early stage in the Mekong River region, it is important to take action to prevent future environmental problems .

6.3.3 Tourism

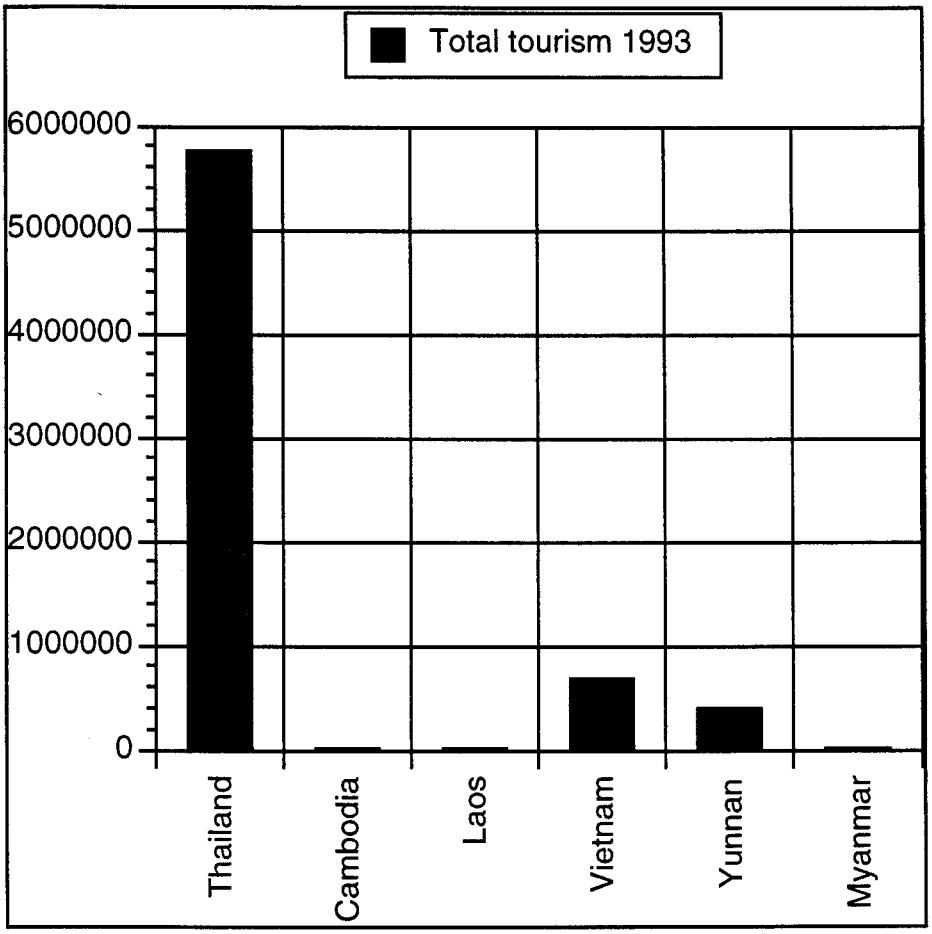
Thailand has by far the largest number of tourists per year, which is shown in figure ??. In 1993 the country had close to 6 million tourists, compared to Cambodia's 7166. There is a slight difference in the origin of the tourists between the Mekong River countries, but in general, the countries that has the largest share in the Mekong region tourism are: Japan, USA, Thailand, France and Germany.

One obvious reason for the Thai lead in the tourism sector is that the other countries have been more or less involved in wars during the last decades. Vietnam and Cambodia have been and Burma still is subjected to international embargoes. In all of the socialist countries there have been a strict control over the amount of tourists and visitors that came in to the countries, and it has not always been a simple thing to achieve a visa. Today it is becoming easier to enter the countries, and now the main restraint in the development of tourism is, in all of the countries except Thailand, the lack of infrastructure and service functions. In order to increase the amount of tourists there has to be an upgrading of airports, roads, telecommunication, and the number of hotels etc.

Tourism is seen as one of the major means of earning foreign exchange and to increase economic growth in the future. All countries, even Thailand, have unexploited beaches, hills suitable for trekking, an impressive

natural resources, wildlife, a social and cultural uniqueness, etc. In the cooperation of the ADB Greater Mekong Sub-region program, the Mekong Region is launched as one entity. For example, in late 1996 a brochure, promoting the whole region, was produced in order to attract tourists.

Figure 6-6. The total tourism in the countries of the Mekong River region, 1993.



Source: ADB, 1996 "Economic Cooperation in the Greater Mekong Subregion Facing the Challenges"

The tourist industry gives, in the ideal situation, financial return to local communities in the form of enhanced employment opportunities for example with souvenir shops selling local handicrafts. Tourism requires basic utility and service infrastructure such as roads, hotels, water, and power, hence the area has to provide these necessities. Construction is potentially damaging to marine and wetland ecosystems, especially when removal of ground cover and vegetation is involved.

Tourism has several social and environmental impacts that often turn out to be negative. It brings a social differentiation, reliance on cash income, dependence on imported goods and loss of productive capacity in other work. The structure of the ecosystem changes, wetlands may be filled for host hotels, but if the environment deteriorates, then this is a threat to the tourism industry since it is often environmental uniqueness that attracts tourists. The very features that attract customers are those threatened by careless development. The communities have a dilemma where they have to weigh financial success against environmental quality.

As tourism requires an attractive environment like unspoiled beaches or a spectacular wildlife, it competes with other sectors over space. Oil exploitation, hydropower development and forestry, all alters the environmental conditions on which tourism relies. Unfortunately the potential losses in tourism are seldom calculated in assessments when planning for the utilization of natural resources, such as allowing construction of dams, oil exploitation, or widespread deforestation.

The tourism industries of the Mekong River countries are yet in an early stage, and the impact on the environment is generally quite low, except in Northern Thailand. The experience from, for example, Chiang Rai is however a good indicator that tourism is a huge potential industry as millions of dollars is generated annually through tourism. When discussing the future development of tourism in the region, sustainability and eco-tourism are frequently used words. It is important that local communities get involved in the planning of rural development and that they will benefit financially from the tourism industry.

6.3.4 Power Generation

When talking about power generation in the Mekong Region, the main topic is obviously hydropower generation since there is a huge development potential (37,000 MW) in the region, but still it is important to note that hydropower is yet rather minor compared with the total energy production. In 1995 the electricity generated by hydropower accounted for 3,8% of the total indigenous energy production in Thailand. Other sources of energy used in the region are fuelwood and other biomass, draft animals, oil and natural gas, and coal and lignite. Fuelwood is still the major source of energy supply in rural areas of the region. The energy situation in the Mekong River region is shown in Table 6-7 below.

There is a substantial hydropower capacity in the Mekong River Region, as is shown in Table 6-7 above, although less than 5% is yet developed. At present there is only one mainstream hydropower plant, the Manwan dam, in the upper reaches of the Yunnan Province, with an installed power capacity of 1,500 MW.

There is an overview of selected ongoing and planned hydropower projects in the Mekong River region in Appendix II.

About 98% of the present total energy demand in the Mekong region origin in Thailand and Vietnam. The energy consumption is very low in Laos and Cambodia, a consequence of relatively small populations in combination with a low level of industrialization. Thus, the demand is expected to increase significantly as the countries continue to develop and the industrial sectors grow. In Vietnam the demand is higher than in Cambodia and Laos, but not near as high as the level in Thailand.

Table 6-7. The energy situation in the Mekong Region

Region	Hydro-power potential GWh/year	Power demand 1993 (GW)	Estimated power demand 2020 (GW)	Electricity demand 1993 (TWh)	Estimated electricity demand 2020 (TWh)	Percent of households supplied with electricity
Yunnan	71,500	2.0	11.2	12.9	72.3	19
Burma	500	0.5	2.5	3.3	14.5	7
Thailand	26,100	9.8	61.8	61.6	411.3	72
Laos	102,300	0.05	0.3	0.3	1.8	13
Cambodia	36,300	0.09	0.8	0.6	4.9	4
Vietnam	10,000	2.0	11.2	12.4	93.0	10

Source: The Mekong River Basin Diagnostic Study 1996

Laos, a future Kuwait of Indochina some dream, with its many tributaries windeling down the hills of the Annamite Chain and the Northern Highlands has the largest potential for hydropower generation in the LMB region. Only a minor part of the potential is yet developed, but there are many actors, with Thailand in the front-line, who wish to see a large Laotian hydropower expansion. Thailand already has several hydropower plants, and the suitable sites are already exploited, hence potential new dams have a low hydropower capacity compared to the costs on the supply side. In addition a forceful environmental lobby, in Thailand, opposes future dam building. The Thai energy demand is large, and growing with 10% per year in Thailand, hence a good solution for them would be to import the energy form the neighboring countries. About 45% of the primary energy supply came from imported sources in 1995 (Thailand Energy Situation 1995). An important note is that Northeastern Thailand only accounts for about 10% of the Thai energy demand.

Laos hydropower potential is estimated to be about 18,000 MW of which only about one percent has been developed (Sivixay 1996:195).[53] At the moment Laos has one large hydropower plant, the Nam Ngum power station situated on the Nam Ngum river 80 km north of Vientiane. It has an installed capacity of 150 MW generating 800 GWh annually. There are other smaller stations, with the Xeset hydropower station being the second largest. The Laotian power sector has two objectives; to meet increasing domestic needs and to increase export earnings from electricity sales (Chi Do Pham, 1994). Laos has signed agreements with both Thailand and Vietnam, binding Laos to export 3,000 MW respectively 1,500 before the year 2009. As Laos currently produces about 220 MW of electricity annually, of which 80% being exported to Thailand, it is obvious that a large hydropower development is planned. Vietnam is also interested in importing Laotian electricity in order to satisfy the growing demand.

Much of the Cambodian electricity supply was destroyed during the Khmer Rouge period. After this period, Cambodia has received some assistance from the Soviet Union, but only 4% of the Cambodian households have access to electricity. There are considerable plans for development of new power generation, but in short term it is foremost through diesel engines and cycle gas turbine stations. Hydropower is in the long term another alternative as the country has abundant hydropower resources, but there are several disadvantages such as the cost of large scale development, the time taken to complete a project, and the impact on environment and local population.

In addition to this, Vietnam has own plans for the development of hydropower in Mekong River tributaries situated in the Central Highlands, something that in the long run could induce consequences, such as less water flow, in Cambodia and the Mekong Delta.

Construction of hydropower plants brings on several obstacles, since it is a major assault on the surrounding environment. Social impacts are common as there are a number of persons, often from minority groups, who have to leave their land in order to make room for the dam. When they are resettled in new areas, long-term injurious impacts are likely to occur on the environment and the biodiversity, as there will be clearing of land for agriculture, hunting, fisheries, and depletion of timber. Another concern is that the population is moved from a well known surrounding with traditional ties, to a new environment and new neighbors. In countries with a high population pressure such as Vietnam the competition of land will grow, causing social conflicts between or within different ethnic groups and villages. Hydropower competes with several other sectors, such as fisheries, agriculture and tourism, over available resources. Throughout the MRB there are strong national focuses on hydropower. There are several reasons to this. First of all there is strong national and regional

[53] In other sources the figure is set to 13,000 MW ("Lao Economic Development Policies..." 1996: III-1). The lower figure probably excludes the mainstream potential.

pressure for development of electricity. Secondly it is a sector, just like mining, which attracts foreign direct investments, something most wanted by the MRB governments.

Although hydropower is a renewable form of energy it is not completely so as reservoirs have a finite life time and do get silted up. The silt which follows the river remains in the dams, eventually causing the dam to clog up, at the same time as there will be a less silt content in the river which may affect the fish that are used to live with a certain silt content. Another probable cause is that the delta will be affected as it is dependent of the river borne silt to compensate for the sea water erosion, this effect may partly diminish by the fact that erosion of river banks will grow as the silt content lowers.

Hydropower dams will inevitably change the water level of a river as it is able to control the water flow. Often there will be a reduced flow, causing higher water temperature and deteriorating living conditions of aquatic resources like fish. But there may also be an increased water flow, which gives a higher risk of flooding. There are many pro's and con's in hydropower development, but if the decision to build a dam is taken, the full environmental and social costs relating to the development should be included in the cost of dam construction and operation, and hence influence the cost per unit of electricity generated.

6.4 Transport

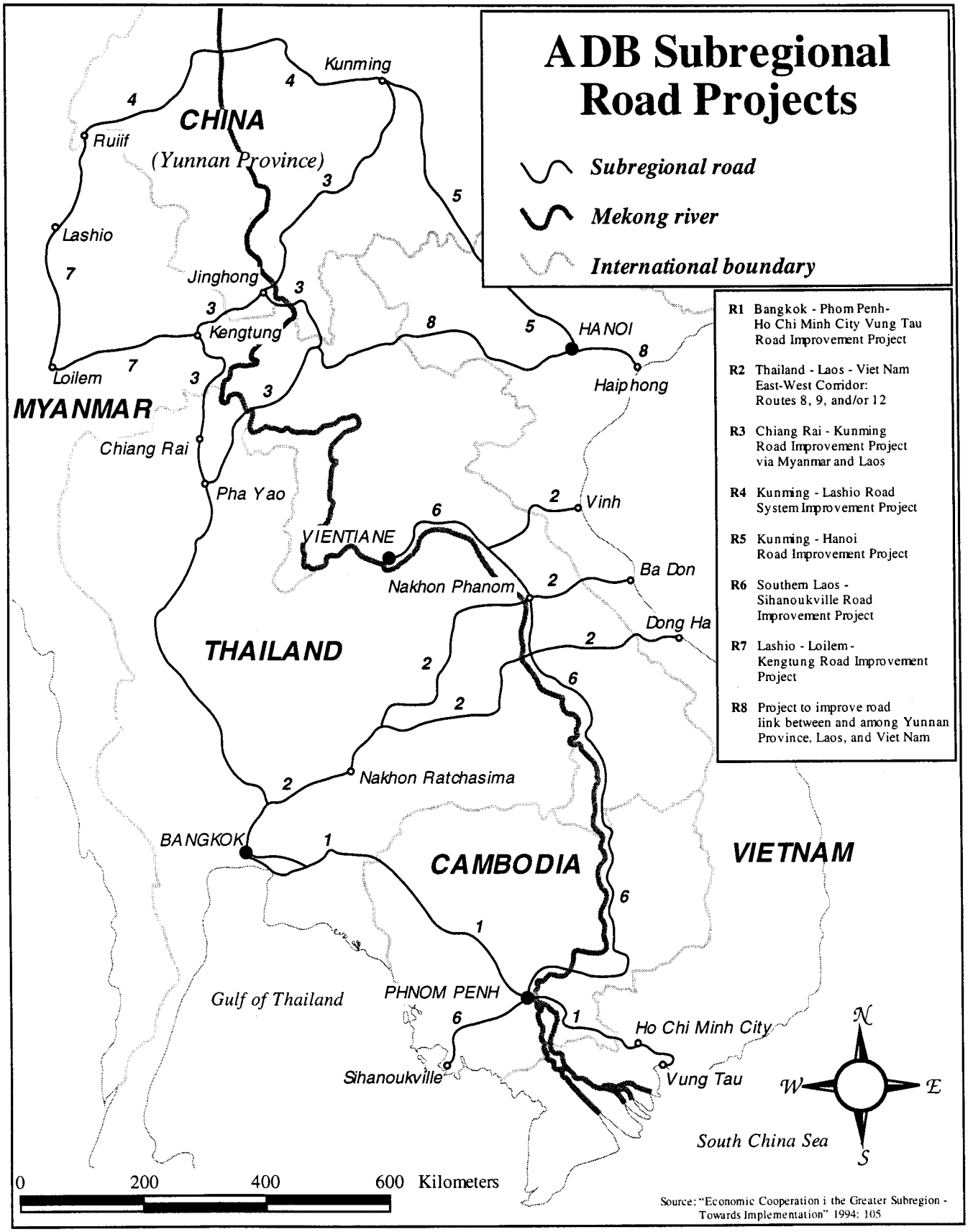
Water transport is the traditional mode of transport in the Mekong River region, although nowadays roads are the dominant way of moving goods and people, except in the Tonle Sap and Mekong Delta areas where water borne transport is essential. As a whole, the transport network of the Mekong River region is under developed. The road and rail networks are of bad density and quality, or totally lacking as is the fact with railways in Laos. The road quality is especially problematic during the wet season. In Laos only 20% of the entire road network is paved, the reminder is made of gravel or dirt. Roads of better quality are found in Thailand and Yunnan. There are several plans for improving the transport network of the Mekong Region. The Asian Development Bank, ADB, serves as a coordinating agent in organizing the transport network. At present there is only a light official regional cross border trade. The only trade-routes of some significance are Phnom Penh-Ho Chi Minh and Nong Khai-Vientiane. A heavier cross border trade may be created as a result of the ADB plans for the construction or improvement of three large road transport corridors:

- The Bangkok-Phnom Penh-Ho Chi Minh City-Vung Tau road project;
- Thailand-Laos-Vietnam east-west corridor project; and
- Chiang Rai-Kunming road improvement project via Burma and Laos.

Railways can and do, especially in Thailand, play a vital part of the regional transport network, although the current freight and passenger volume of the railways are only one quarter of the one in the 1960s. Railways are a good alternative to roads when transporting bulk loads or passengers over long distances as it is more efficient, less energy consuming and creates less environmental impacts.

Some say that improving the transport network is crucial for the regional economic development. Possibly, the better transport facilities would stimulate economic activity at the same time as it might become economically feasible to exploit resources in former remote areas. Improved roads, in an ideal situation, improve the movement of goods and passengers, supporting rural development through for example making it possible for farmers to change from rice farming to cash crops and generating new employment opportunities as a result of easier access for tourists or the location of new industries.

Not everyone agrees to this positive scenario, as several negative impacts can be found as well. The construction of a large transport network would inevitably change the landscape and force some resettlement. During the construction phase the area will be subjected to some damage, such as increased erosion and silt runoff. In the long run the ecology will be damaged directly through the construction but also as a result of increased harvesting of biological resources because of increased access to untouched forests and critical watersheds. Social and cultural impacts can also arise because of encroachment of historical or cultural areas and the abandonment of cultural heritage for foreign goods. People will most likely be more moveable which unfortunately may cause a greater spread of certain diseases like HIV.


ADB Subregional Road Projects
Subregional road
Mekong river
International boundary
R1 Bangkok - Phom Penh- Ho Chi Minh City Vung Tau Road Improvement Project
R2 Thailand - Laos - Viet Nam East-West Corridor: Routes 8, 9, and/or 12
R3 Chiang Rai - Kunming Road Improvement Project via Myanmar and Laos
R4 Kunming - Lashio Road System Improvement Project
R5 Kunming - Hanoi Road Improvement Project
R6 Southern Laos - Sihanoukville Road Improvement Project
R7 Lashio - Loilem - Kengtung Road Improvement Project
R8 Project to improve road link between and among Yunnan Province, Laos, and Viet Nam
CHINA
(Yunnan Province)
Kunming
Ruiif
Lashio
Jinghong
Kengtung
Loilem
MYANMAR
Chiang Rai
Pha Yao
HANOI
Haiphong
Vinh
VIENTIANE
Ba Don
Nakhon Phanom
Dong Ha
THAILAND
Nakhon Ratchasima
BANGKOK
CAMBODIA
VIETNAM
Gulf of Thailand
PHNOM PENH
Ho Chi Minh City
Sihanoukville
Vung Tau
South China Sea
N
W
E
S
0 200 400 600 Kilometers
Source: "Economic Cooperation i the Greater Subregion - Towards Implementation" 1994: 105

Map 6-1

6.5 Statistics and Sector Competition - An Illustration

In the writing of the section above, the weaknesses of the statistics available have been evident. Discrepancies of 50%, or more, between different sources have not been unusual; other data, seemingly highly relevant for the development planning in the basin, does simply not exist. Although the traditional sectors like, fisheries, agriculture, forestry, etc., play a significant role in the MRB region, the information base, both in terms of resource utilization, local significance and impacts, are underdeveloped. Unfortunately, the significance of the traditional sectors are seldom recognized, rather it is the more modern sectors like tourism and hydropower, that obtain most attention, as a consequence of their expected ability to generate fast economic returns.

A feature of the planned basin development seems to be inflated hopes for the future output based on assessments within single sectors and within confined geographical areas. We claim this based on two assumptions. Firstly, cumulative effects have rarely been regarded; neither sector wise nor geographically (can large scale irrigation at the Korat Plateau be realized at the same time as the full agricultural potential of the delta is realized?). Different interventions in different sectors will, of course, interact with each other. Sometimes they will do this in a positive way, but more often different sectors interfere with each other (non–sustainable forestry will deplete the possibilities for the traditional use of the forest; hydropower development tend to destroy fishery etc.). Secondly, there are different ways of utilizing natural resources and "the worse" it is done the more it might impede development in other sectors. (Tourism, conservation of the Tonle Sap/Angkor Wat and traditional handicraft might just as well be mutually conducive as disruptive). So, if proper coordination is not undertaken, the range of *incompatibilities* will increase drastically.

The Table 6-8 below is a rough guide to where we can find the sharpest incompatibilities, as well as the strongest synergy effects in the development of different sectors. One problem when studying sector compatibility is that there is seldom an easy answer. An example is the forestry sector, where the construction of hydropower dams gives a need to harvest forest, at the same time as hydropower projects bring on road construction etc. which also stimulates logging. Hence, when looking at hydropower from the commercial logging sectors point of view, it is conductive with forestry. However if the goal is sustainability of forest resources, it is more appropriate to see hydropower development as having a negative impact on forestry. Another striking observation is that – given the wide range of rating given to the different sectors – done inferiorily, some sectors become highly incompatible with a large number of other sectors. Lack of data (information, societal information etc.) might then lead to a situation where projects are launched that unnecessarily disrupt other activities. In other circumstances a thorough knowledge might turn an expected

incompatibility into conducivity. In this light the lack of data, and highly diverging data, is a main obstacle to the sustainable development of the MRB.

Table 6-8. Sector Incompatibility[54]

Impact on / Impact from	Forestry	Fishery	Agriculture	Aquaculture	Mining	Oil and Gas Exploration	Informal Sectors	Industries	Power Generation	Tourism	Transport
Forestry	-------	B-D	A-E	D-E	B-C	B-C	C-D	A-C	A-C	D	A-B
Fishery	B	-------	B	B-D	B	B	B-C	A-C	B-C	A-C	A-C
Agriculture	A-D	B-D	-------	A-D	B	B	C-D	A-B	B	B	B-C
Aquaculture	B	B-E	A-E	-------	B	B	B-C	A-B	A-E	B-D	B-C
Mining	B-D	D	C-D	C-D	-------	B	C-D	A-B	A-B	D	A-B
Oil and Gas Exploration	B-D	D	C-D	C-D	A-B	-------	C-D	A-B	A-B	D	A-B
Informal Sectors	B	A	A	A	B	B	-------	A-B	B	A	B
Industries	B-D	D	C-D	C-D	A	A	C-D	-------	A-B	D	A-B
Hydropower Generation	A-D	D	C-D	A-C	A	A	C-D	A	-------	D	A
Tourism	B-D	A-C	B	B-E	E	E	A-B	B-E	D	-------	A
Transport	A	B-D	A-C	A-C	A	A	A-E	A	A	A	-------
Environment	E	C	C-E	C-E	E	E	B-C	E	E	C-E	E

LEGEND:
A = Possibly conducive
B = No relevance
C = No major interference
D = Mutually interfering
E = Definitely negative impact. Possibly incompatible

Table 6-8 is an attempt to illustrate compatibilities and incompatibilities between sectors involved in the MRB.[55] The table should be read from left to right, where each box shows the impact from one sector in the left-hand column on another sector in the first row. Since there are many aspects to consider when analyzing the compatibility between two sectors, the letters in each box should be interpreted as tendencies, where in the

[54] This table is not based on any quantitative research, but on the authors' understanding of the situation. It should thus be taken as indicative, rather than authoritative.
[55] Please note that this table is illustrative. Various interpretations are possible.

case when there are more than one letter, the definition is uncertain depending on different circumstances. For example in the case of agricultural impact on fisheries, agriculture could be anything from possibly conducive to mutually interfering with fisheries.

When analyzing the sector compatibilities illustrated in Table 6-8 a few patterns can be sorted out. The sectors of production can be divided into certain clusters depending on the relation to other sectors.

1. *Supporting sectors:* The sectors in this cluster are seldom disturbing other sectors, but rather conducive to them. The most supportive sector is the informal sector, which does not disturb any of the other sectors, but may support for example industries based on traditional handicrafts and tourism. Supporting sectors are often affected by development of other sectors, illustrated by the fact that the informal sectors are diminishing on the behalf of sectors such as power generation, oil and gas exploration or mining.

2. *Compatible sectors:* The characteristics of this cluster is that these sectors are compatible to other sectors in the sense that they support each other. The best example is the transport sector, which increases the access to remote areas, and improves the possibilities for commercial forestry and hydropower, at the same time as the development of these two inevitably leads to an improvement of the transport sector.

3. *Insensitive* or *Bulldozer sectors*: This cluster is formed by sectors that are largely insensitive to development in other sectors at the same time as they often are disturbing the others. Mining, power generation, and oil and gas exploration are such sectors. The development of these sectors are often controversial, generating protests from environmentalists and NGOs. However, the bulldozers are often backed up by strong economic and political interests.

4. *Sectors sensitive to scarcity of space*: These are often traditional sectors such as agriculture and forestry which have co-existed with other sectors in a system without disturbing each other in the past. When space becomes scare these sectors face a growing rivalry over land, leading to a situation when they may become incompatible with other sectors. One example is agriculture which in a situation of land availability may co-exist with forestry. If the situation changes to land scarcity, agriculture may on the other hand be incompatible with forestry as well as with other sectors.

The last row in table 6-8 indicates the environmental impacts of different sectors. It shows that all of means of production will affect the environment in one way or the other. The only exception is the informal sector which, at least traditionally, works in co-existence with the environment, however in a situation of land scarcity even this sector may be somewhat destructive.

7. DIVERGING POLICIES AND INTERESTS: POTENTIAL PROBLEM AREAS

Building on the assumption that there is a number of incompatibilities in the proposed development of the Mekong River Basin, we will in this chapter try to sort out where these incompatibilities could find a political outlet. After finding the "conflict figuration" the chapter will give attention to the LMB's states policies and their rationales, the degree of conflict resolution the last couple of years, and the role of the MRC-Agreement. It continues scrutinizing the political role of the upper Mekong Basin and finishes with a discussion on "Public Participation". While a number of conflicting interests are present in regard to natural resource utilization, it is largely through the water ways that this turns into friction between various actors.[56] Moreover the MRC Agreement is the only sub-regional agreement which is regulating the behavior of the actors in any authoritative manner.

7.1. Conflict Figuration

Political and social conflicts over large scale natural resource exploitation typically appear either horizontally, between states, or vertically, between states and the civil society opposing and/or being negatively affected by these interventions. It has, furthermore, been observed in the literature on fresh water related conflicts, that there is a trade off between vertical and horizontal conflicts; agreement on international level tend to create tensions on subnational level (Wallensteen 1995). This worry has also been echoed by the NGO-community in the Lower Mekong River Basin arguing that "Agreement could hasten dam building" (Ryder 1994: 1).

Or to borrow a quote from Philip Hirsch:

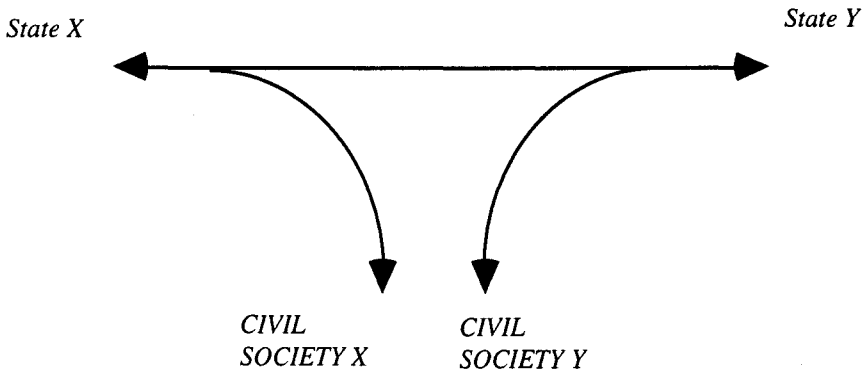
> Resource competition in the Basin is intensifying at a number of levels. Most attention has been given to international dimensions of competition, but the development and deepening of market economies in situations of poorly defined individual and community resource tenure also leads to much more local and immediate competition, for example between neighboring upland and lowland cultivators. New economic actors in the resource sector, notably corporate stakeholders, add further forces for competition. Thus easing of geopolitical conflict ironically coincides with - and to an extent facilitates - resource based conflicts. (Hirsch 1996: 60).

Consequently, the upcoming disputes on political issues in regard to the proposed development of the basin has focused on internationally diverging interests *and* the nature of socio-political change this will induce. The level of grass root involvement ("Public Participation") has lately turned into a key element for the future

[56] In addition, unclearly demarcated borders and, possibly, pollution through the airways are other sources of friction over natural resources. Especially the former, and especially at sea, is an important aspect in Southeast Asia in general but not particularly relevant for this study.

development of the Mekong Basin. Obviously the policies pursued by the different governments are crucial elements in the development of these disputes.

Figure 7-1. Conflict Figuration



NOTE: It has been observed that there is a certain "trade-off" between vertical conflicts between states and horizontal conflicts between states and its civil society

The former has been addressed (but not necessary solved) through the successful negotiation of the MRC agreement, and through the just started work on hammering out "Rules and regulations for the use of water" by a "task force" initiated by the MRCS. The task is, however, difficult. Upstream and downstream demand on water and its related resources is a common case where conflicts between countries sharing the same watershed emerge. The sharpening awareness of the globally limited resources - and especially the attention recently being given water as a limited good - reinforces this potential conflict. Whether cooperation or conflict will mark the relations in the Lower Mekong River Basin is dependent on a limited number of policy choices which we will consider in the next sub-chapter.

The lack of broad based *public participation* in the proposed development plans for the basin has received harsh criticism from the NGO-community, the Bangkok based press, as well as from some donors. This is, in the long run, a blueprint for conflicts:

> "... control over access to - and control of - resources frequently take place between centre and periphery; i.e. between the majority population and different minority groups, or between political authorities in need of foreign exchange and local people who fight for their physical and cultural survival. (Burrell et al 1996: 43).

With the exception of Thailand the resistance has not yet mounted to any manifest conflicts. However, several donors say bluntly that they will not continue to support the work within the MRCS if they do not come up with a credible program for this. As a response the MRCS has started to actively incorporate this into its work beginning in the autumn of 1996. This is, however, a novel activity from the side of the MRCS as well as an alien feature to many countries involved in the process. Given the nature and difficulties of generating any genuine public participation, this is an arduous task.

It is, moreover, difficult to launch this given the outlook of the MRCS work program of 1996. However, the Work Program of 1996 explicitly aimed at improving the "soft" side of the development planning and resources for "Human Resources Development" has increased to approximately 11 million USD (of a total of 73 million USD). Other efforts that could be interpreted as a change in the direction of a more sensitive development strategy is the "Microhydropower" and "Run-of-River" projects; both attempts at generating hydropower without building devastating dams. It is a long way to go though, before this is a dominant feature of the work program,[57] and, of course, the policies from the various governments are at the end of the day determining the outlook of the planned development and the degree of public participation desired.

7.2 Policies on Sustainable Resource Utilization in the Mekong River Basin[58]

The Mekong River's water, and related resources, are great assets for the six countries. Their different geopolitical situation and different level of development gives them, however, different rationality for the use of the resources. The great demand for energy in combination with the great potential in this sector is said to be driving the development. Major dams, necessary for large scale efficient energy generation, is, however, the interventions most at odds with other uses (see table 6-8 chapter 6.5.). Large scale irrigation ranks second in the league of the most attractive intervention. Unfortunately it tends to require major reservoirs, and is very difficult/costly to manage properly.

Beside these, the river and its related resources can be used for a variety of activities which often rank lower in priorities, but nevertheless is crucially important for people in the basin such as fishery, local transportation,

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[57] Moreover, an analysis of the "in the pipe-line projects" reveals that, at best, 8 out of 28 projects are of the kind that it is possible to ask the affected people what kind of development they really want (MRCS 1995).
[58] For a basic document on policies and needs, see Sompongse Chantavorapap & Le Huu Ti 1995.

drinking, bathing, water for sanitation, gathering of forest products, foraging, etc. In the sections below, we try to distill national policies and rationalities for participation in the Mekong cooperation. We should then keep in mind, that these "national policies" are normally expressed by a state elite, and the strengthening of the state is not necessarily the same as fostering the well being of its people. The "non-modern" use of the resources seems to be little valued as a resource for development by national governments and many developments agents.

7.2.1 Thailand's Interest and Policy

Geopolitical situation

The Mekong Basin occupies more than a third of Thailand (182 000 Km2) and approximately 21 million people live there (38% of the total). The Korat Plateau, which is the major Mekong Basin area in Thailand,[59] is lagging behind the rest of the country. It has a GDP less than 50% of the national average and it is frequently mentioned as a region that needs to be prioritized in terms of development investments.

Thailand is the exception among the four countries (or even among the six). A number of circumstances gives it the upper hand in relation to the others: It has a level of GDP at around 2 000 USD per capita, many times higher than the other countries. It possesses a cadre of engineers and managers as well as capability of self financing far exceeding the other three countries. The level of industrialization is also far higher. Thailand is, furthermore, an upstream country (in relation to Cambodia and Vietnam, but in reality a mid-stream country, including China and Burma). Finally, it has superior contacts with the outside world. These circumstances added together, give Thailand quite a leverage over, but also responsibility for, the development in the lower basin.

Sector Priorities

Overall *industrialization* has occupied a basic priority in Thailand's development strategy; one which also has proved to be successful with a growth rate of 11 per cent per annum since 1990 ("Country Paper on Thailand" 1996: 17). Since 1993, Thailand has pursued an explicit "relocation policy" in order to industrialize outlying areas. The areas falling with in the Mekong Basin has priority number three, meaning that they are given the highest possible priority for industrialization (ibid: 18). Although most industrialization in Thailand has taken place in the Bangkok area, a modest but important industrialization has been noticed in the provincial towns in the Northeast. This is likely to be further encouraged and to continue in the near future.

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[59] There is two more minor areas which drains into the Tonle Sap basin in Cambodia, and small parts in the North of Thailand which also belong to the Mekong Basin.

Agriculture has enjoyed long time economic growth and provided the basis for the coming industrialization. During the twenty years 1961-1981 it grew at the rate of 4.8 % per year, far outweighing population growth. Since then the growth has declined, but it still lies in the range of 3% annually. The present strategy - laid down in the plan 1992-1997 - is to restructure the agricultural production to more marketable and high priced products, to increase the efficiency of natural resource use, encourage technology transfer and to provide farmer management training (ibid: 15). Thailand aims at leaving the "low-end-products" and shift to the "high-end-products" and at the same time remain (or return to) environmentally sound production. For the 1997-2001 plan "area approach" and "holistic development" are the themes.

Tourism is another success story in Thailand. It has multiplied more than 30 times between 1977 and 1994. In 1994, the tourist sector generated 145,211 million Bath (or 13 per cent of export earnings). Thailand expects - during the 8th plan - the tourism sector to grow with 15% annually in terms of revenue.

Other sectors - fishery for example - is not specifically mentioned in Thailand's official paper for its plan for the Mekong Basin Cooperation, in spite of its large importance for the local production and consumption. This might be taken as indication of the relative nonchalance that is being given to traditional sectors.

Formal Commitment to sub-regional sustainable development

Thailand has signed a number of the internationally binding agreements and conventions, shown in table 5-3. The MRC-Agreement is binding the signatories to both "sustainable development" and to regional cooperation. To not create "harmful effects" downstream is one of the clearest and most direct guidelines on regional water use standard in that document as well as in international law. The fact that Thailand has signed Ramsar, CITES, and the Biodiversity conventions as well as the Framework Convention on Climate Change, strengthens the Thai commitment towards the international community as well as towards the riparian countries. Moreover, Thailand has the most comprehensive legislative basis of the four countries of the Lower Mekong Basin. Even if Thailand is the only country without a national environmental plan, the environmental issues are dealt with in the five-year development plans. In the seventh plan (1991-1995) there was an emphasis on the strengthening of national resource and environmental management.

Analysis of National Interests in regard to Mekong Basin Development

Thailand has three basic needs, of national importance, which could be satisfied through the utilization of the Mekong resources. They are all in one way or the other at odds with downstream demands. *Firstly*, Thailand perceives a lack of water in the Chao Phray basin (feeding the Bangkok area). To divert water from the Mekong basin would ease that pain. This is not a new plan and of course highly politically controversial in

regard to downstream needs. This plan goes under the name of *Kok-Ing-Nam* and has been researched for at least 15 years, but information about the current status is scarce. It is not only politically and legally highly controversial, but also technically complicated, involving major diversion structure on tributaries (and perhaps even on the mainstream) and extensive channels. Many experts doubt it will ever be built.

Secondly, there is a strong urge to develop Northeastern Thailand. Irrigation has been viewed as a way of increasing output in this largely agricultural area. Only 10% of the farmland is irrigated as compared to 35% in the rest of the country (Chuong Phanrajsavong 1995), and productivity is low. Water is considered as one of the major development constraints. The water from the Mekong is seen as one way of resolving the chronically unreliable rainfall, to drastically increase the agricultural productivity and to create a large number of work places. The major irrigation scheme is the *Kon-Chi-Mun* project. A major network watering the main part of the northeast taking anywhere from 25 to 60 year to complete and at a projected cost of 42 billion USD. The recently completed Pak-Mun dam is, by critics, regarded as the "starter" for this scheme. The construction was preceded by a major debate and it has been severely criticized for many different reasons, among them disregard for the local populations' needs, the impact on the environment (especially the fisheries; locally and for the whole basin), and for insensitivity to international concerns.

Thirdly, Thailand calculates that it needs to increase power supply with 10% annually for the foreseeable future. Thermal plants, nuclear power and hydro power are all considered in order to solve the deficit problem. Since there are low prospects for future Thai development of hydropower, Thailand is discussing suitable arrangements with neighboring countries, especially Laos. One MoU has been signed implying that Laos will deliver 1,500 MW to Thailand by the end of the year 2 000. Another MoU is signed for additional 1,500 MW by the year 2007. This could, moreover, be increased due to private sector involvement. Questions on dependency, environmental protection and Laotian public participation has been raised in regard to these plans.

The above mentioned "needs" are commonly aired in response to natural resource development. It is sometimes argued however, that Thailand is not necessarily best served by concentrating on the delicate development of natural resources or through modernizing the agriculture, but rather through a more decisive relocation policy in terms of supporting small scale industries as well as promoting higher level of education to the "backward" parts of the country.

7.2.2 Laos' Interest and Policy

Geopolitical situation

Laos is the country with the smallest population and GDP, but with the largest area per capita, the largest remaining stock of primary forest and the highest hydro power potential of all four countries. It hosts the Mekong for the longest stretch and its catchment area covers basically the whole country. Laos contributes the most substantial part of the water (approximately 35%). It is also the only country bordering all the five other countries sharing the Mekong river. It is believed to be rich in minerals, as well. Laos combines the position as a key country in the Mekong river affairs, abundant with natural resources, but with very little "weight" to back up this crucial role. This is a risk factor for Laos as well as for the Mekong Cooperation in the long run.

Laos' economy is not very diversified and natural resources extraction is often mentioned as the only reasonable base for Laos' future development strategy. However, the ratio population versus the amount of natural resources available is favorable; perhaps the most favorable of any Asian country. So given a clever management of these resources the situation needs not in itself be a problem. Electricity (from hydropower), and forest products made up 64% of the countries' export earnings in 1993.[60]

Laos will, for the foreseeable future, partly depend on external resources; whether it comes from powerful neighbors or from the donor community. China and, especially, Thailand will certainly be influential in the future. Thailand's projected energy deficit "fits" Laos' large potential in that sector. These are circumstances which tie these two countries together. Vietnam, finally, has an historical "interest" in Laos and might also be interested in buying hydro power on a fairly large scale.

Sector priorities.

Hydropower is regarded as the major natural resource that Laos can benefit from in the future. In addition to the MoU signed with Thailand, an MoU has been signed with Vietnam where 1,500 to 2,000 MW will be exported to Vietnam by the year 2010. As of 1st December 1995 there have been licenses, concessions or MoUs signed for an installed capacity of 6,850 MW, generating 38 GWh at a projected cost of 9.5 billion USD ("Lao Economic Development Policies..." 1996: 43).[61]

Forest products are the other major export earner for Laos. Currently, it seems like logging is carried out at a far too hasty and indiscriminate pace to be sustainable. Approximately 120,000 hectares is exploited annually

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60 Of these timber stood for 47% and Electricity for 17% .

61 Including the Hongsa Lignite plant on 600 MW.

("Lao Economic Development Policies..." 1996: 39). In addition a large number of illegal national and international logging is going on (cf. Hirsch 1993).

Agriculture, fishing and *livestock production*, which 85% of the population is dependent on, has a backseat role to hydropower. Irrigation, which has a theoretical potential of 600,000 hectares, is likely to be dependent on which hydropower plans that are realized and to which extent irrigation fits into these plans. However, six geographical areas are designated for targeted development to mainly improve rice yield in order to reach self sufficiency ("Lao Economic Development Policies..." 1996: 51f). "Soft parts" such as institutional strengthening and improvement of credit facilities are favored in this context. Fishing is an important trade in the traditional sector as well as an important source of protein. The per capita consumption is reported to be fairly low, but is certainly underestimated as most "primary production" is due to data gathering difficulties. The overall catch is, officially, estimated at 30,000 tons, although it is said to be declining rather sharply. Increased research, community work, and fisheries extension services are foreseen. Only 3% of the land area is presently cultivated. Little of the Laotian agricultural production is marketed and no major investments schemes are foreseen in this area.

Tourism is, on the contrary, seen as a prioritized sector for the future. It has increased six times in the period of 1991 to 1996. Tourism is especially interesting in concert with the "Golden Quadrangle" cooperation expecting tourists to come from Thailand and China. It is heavily dependent on the development of transportation capacity and other infrastructure improvement, as well as on the conservation of the environment. *Transportation* is also one of the important sectors to be developed in regard to Mekong Basin development. In addition to the Laotian goods that is carried on the river, the ADB-led GMS cooperation has prioritized the transportation sector. In this cooperation Laos will play a crucial role due to its location and size.

Formal commitment to sub-regional sustainable development

Laos has only signed one of the internationally binding agreement and conventions, the World Heritage Convention, although the country has been working out several national plans in order to achieve a sustainable development, hence there are plans regarding the national environment, protected areas, biodiversity and tropical forests. Laos has been rather successful in establishing a protected area system. In 1989 more than 10% of the country had been classified as National Biodiversity Conservation Areas.

Analysis of National Interests in Regard to Mekong Basin Development

Laos has many tromps on hand, but a difficult game to play. *Balance* is, again, a keyword. It needs to utilize the natural resources in the Mekong River Basin, but with a high degree of sensitivity. The natural resources

need, for some time to come, to be the base for future development, but, on the other hand there is a risk that Laos will be ran over by more weighty actors in the chase after valuable assets. In connection to this there is a risk that *exploitation* rather than *development* will be the dominant feature and that the *sustainable* development will be undermined.

Laos needs to balance various external influences so that it is neither dominated by foreign powers, nor generates malicious international relations. It is difficult to handle the Thai interest in the hydro power sector. Already it is reported that Thai interests push its Laotian partners around. On the other hand Laos can not deny Thailand to take part in the generation of power in Laos. Vietnam also has an interest here.

Laos needs finally to balance the modern sectors versus the traditional ones. The figures on the potential of the "modern" development of various Mekong basin resources are intoxicating. E.g. it is mentioned that if the planned hydropower and infrastructure investments come through, Laos would have an economic growth of 15% by the year 2 000. How will the small economy of Laos be able to take this? How will the primary producers be able to retain their way of living? The majority of the latter is, for the moment being, often too remote to enjoy any possible benefits of modernization.

> While some integration has been experienced for hydropower production, timber exports and assembly/re-export, further potentials such as cross-border trade, transport, investment and tourism are possible in more sustainable value added service and production sectors within and outside the region. ("Lao Economic Development Policies...",1996: 1)

As an illustration of the somewhat twisted sector interest we note that of the foreign investments in the period of 1988 to June 1995, hydropower stood for 76.5% and tourism, as number two, for only 7.0%. Agriculture, employing 85% of the population, attracted less than 1% of the foreign investments during this period. Amusements like "Laos will be the Kuwait of Southeast Asia" is frequently aired. This is however a gross simplification of the situation given the inherited difficulties of large scale natural resource utilization.

The plans on exploitation of large scale hydro power are already delayed and there are strong reasons to believe, judging from difficulties with the first ones, that the plans are too optimistic and are underestimating environmental, social and funding difficulties inherited in dam building. Commitment already made to sustainable development and biodiversity may be one reason to further restrain dam building. There is little opposition from any "civil society" in Laos, but the proposed development will cause a major impact in the habitat and livelihood of many different people. The minorities, that is practicing slash-and-burn agriculture, is perhaps most affected group. It will also change the profile of the economy quite drastically. Funding, finally, is difficult to obtain from most bi- and multilateral donors when social and environmental problems abound. However, the private sector might step in and fund quite a large portion of the proposed plan.

7.2.3 Cambodia's Interest and Policy

> "Since 85% of Cambodia lies in the Mekong Basin, to develop the basin is to develop Cambodia to 85%" (Khy Tanglim, Vice-Chairman, Cambodia National Mekong Committee).

Geopolitical situation

Cambodia lies, geographically, to 85% within the Mekong Basin; population wise it is over 90% that live in the Mekong catchment area. 85-90% of the population live in the countryside, making a living from a combination of agriculture, fishing, forestry, foraging and small scale business.

Geopolitically Cambodia share some Mekong predicaments with Laos; it is a country with powerful neighbors which have not, historically, always respected the borders of Cambodia. It has few resources to protect its interests, and it needs to adhere to international agreements to safeguard its current position in the Mekong cooperation. It shares other features with Vietnam; it is largely a downstream country subject to potential droughts, flooding and pollution. It has little chance of influencing upstream countries and difficulties of making rational long-term plans. Finally, it has some uniquely Cambodian problems; it has an unusually delicate ecological regime, it is the "newcomer" in the Mekong cooperation implying that it, arguably, lags 20 years behind in planning and it has, moreover, domestic political turmoil which the others are largely spared.

Cambodia has difficulties to combat poverty and to keep up self sufficiency in food production.[62] This is in spite of a favorable population per km2 ratio. Cambodia was the region's largest per capita exporter of rice in the 60s, but has since had difficulties utilizing its potential. Improved water management is often seen as the key to drastically improve paddy production.

Sector Priorities

33% of the *hydropower* potential in the LMB is theoretically said to be found in Cambodia (IMC 1988: XIV; Sivixay 1996: 195).[63] Of these 1 (!) MW is presently generated. This potential in combination with present poverty and hope on future modernization builds a high pressure on the development of the hydropower sector. The demand is presently less than 100 MW (of which 70-80 MW in Phnom Penh) and the forecast expects the

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[62] Last year was the first year since the 60s that self sufficiency in rice was achieved, but it is expected to drop again this year due to severe floodings.

[63] Chuong Phanrajsavong has a much smaller figure on 2 200 MW (1996: 35). A recent consultancy report estimares the potential to between 5 300 MW and 8 135 MW.

demand to rise to 175 MW in the year 2 000, to 380 MW in 2010 and to 706 MW in 2020 (Huon Rath 1996).[64]

On the supply side Cambodia is currently totally dependent on import of oil to generate energy. In the future however, Cambodia, expects to be a regional exporter of energy. Six hydropower projects are listed in its "short and medium term development plan", with a total capacity of 340 MW. None of these have passed the level of feasibility studies.[65] The "Long term" priority list, comprise seven projects with a combined capacity of 2 955-6 090 MW (depending on which alternatives one chooses).

The projects on the short term list are small or medium size (the largest will generate 127 MW), while the projects on the long term list are generally large projects which certainly will find problem of financing, at least with aid money. Even with a successful dam building strategy it will take at least 5-10 years before Cambodia will be able to export energy. Even the short term list is, however, often regarded as too slow to satisfy the immediate needs and plans are made for introducing oil driven power stations.

Cambodia is an *agricultural country* and one of the poorest countries in the world. 90% of the population live in the rural areas and it is easy to understand why increase of agricultural production and attainment of food security are two of the major strategies of the country. For good and bad, "increased agricultural production" is, in Cambodia, perceived as synonymous with increased rice production. Raised rice production is, in turn, intimately connected to irrigation. The yield per capita is frustratingly low in Cambodia; approximately 1.5 ton per hectare.

The Khmer Rouge made, during 1975-79, irrigation into one of their primary goals and they attempted to dig a "grid-system" of irrigation canals throughout Cambodia (the "Pol Pot canals"). Since this was done with no knowledge about and, no reference to, topography, geography or any other natural conditions it caused considerable harm. It still causes innumerable problems with irrigation and even environmental problems on a large, indeed national, scale.

A major study has been done by MRCS/Halcrow in order to update the information and status of the existing, but malfunctioning, irrigation system in Cambodia (Halcrow 1994). This study has been fully endorsed in Cambodia and its recommendations are used as a priority list. It recommends that 8 projects be carried out and

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[64] Different figures appear again. Chuong Phanrajsavong gives the following estimates produced by the MRC: 176 MW in the year 2 000, to 586 MW in 2010 and to 1649 MW in 2020 (1996: 31).

[65] The exception is Kirirom, which was built in the 60s but has degenerated since. Now it has a broken headway, malfunctioning generators, non-existing transmission lines etc. The reparation of the actual dam is a minor undertaking, but a major transmission line need to be built.

that 97 projects (larger than 500 hectare) would be considered. This would increase the annual rice production with 11%. This rehabilitation venture has also become one of the priorities in rural development.

Fish is abundant in Cambodia and the Tonle Sap is said to provide the most productive fresh water fishing in the world. Fish is the primary source for protein intake, with Tonle Sap playing a crucial role. It provides, moreover, a culturally important feature of the Cambodia diet: *Pra Hok* is a fermented fish and rice porridge enthusiastically eaten,[66] and even stored for long periods.

Declining fish catches are therefore alarming for Cambodia. Ecological degradation, newly arrived fish diseases, unsustainable fishing methods, negative impact from fertilizer and pesticide use, siltation of the Tonle Sap, overfishing and eradication of wetlands (and thereby the spawning grounds for the fish) is said to reduce fish catches. The department of fisheries claims that 72,500 tons were caught in 1995 which would be a 6% increase as compared to 1992, but a 28% decline as compared to 1970 (Ty Thany 1996: 12). The list of problem above might be valid, but whether the catches actually are going down is controversial (see chapter 6.1.2). Typically, non-marketed catches and catches by people with another primary trade that is fishing on the side, are not visible in the statistics. "Rice farmers in Cambodia are not farmers they are fishermen that have found that growing rice is a good way of growing fish." (Fishery expert).

The *environment* is very concretely tied to the primary production in Cambodia. Unfortunately, lack of regulation, piecemeal law making and mismanagement of natural resources in Cambodia has resulted in major environmental degradations.[67] The special water regime connected to the Tonle Sap is deeply entrenched in culture and perceptions on national identity in Cambodia. *Tourism*, finally, (also tightly connected to the state of the environment), is seldom mentioned in Cambodia in connection to the Mekong Basin development. Angkor Wat at the tip of the Tonle Sap is, however, one of the major tourist sites in Southeast Asia (and the world) as long as Tonle Sap or the surrounding forests do not disappear. Several other areas are suitable for tourism as well.

Formal Commitment to sub-regional sustainable development

Cambodia has signed a number of the internationally binding agreement and conventions, shown in table 5-3. Moreover, Cambodia has so far signed or ratified three conventions concerning environmental protection; Biodiversity Convention, World Heritage Convention and CITES. At present, Cambodia is striving to list the Tonle Sap as a World Heritage site. The Government has also submitted application documents regarding

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66 To everybody else's big surprise!

67 The most obvious examples are the "Pol Pot Canals" mentioned above, but more recently the deforestation has accelerated, possible causing, and certainly adding to, major environmental problems. The huge floodings of 1996 were, in some circles, largely blamed on deforestation (in Cambodia and upstream).

other conventions such as Ramsar and the UN Framework Convention on Climate Change. One reason for the importance of strengthening and developing international links regarding environmental protection is that Cambodia lacks both an environmental policy and an environmental law.

Analysis of National Interests in regard to Mekong Basin Development

Cambodia combines the extremes: on the one hand it lags behind most countries in the region in terms of wealth, it has abundant natural resources to utilize and great chances of doing so. On the other hand it presides over an extremely sensitive ecological system with large segments of the people being heavily reliant on primary production, and has deep seated social conflicts as a remain of the drawn out civil war. Cambodia has, furthermore, a very narrow information and knowledge base from which rationale decisions can be made; especially on the role and value of primary production.

Of the eight Cambodian "priority plans", five involves irrigation and hydropower (Mok Mareth 1996: 105f). The largest (the Sambor project) and the one nearest in implementation (arguably Kirirom) are both basically hydropower projects. It is no doubt that energy and agriculture (irrigation) are the driving sectors in the strive for modernization. However, the circumstances around the Tonle Sap, including its historical importance, have made the Cambodian authorities wary of the value of environmental protection. Fishing, finally, is another prioritized sector that need to be highlighted in the Cambodian context.

The *primary national concern* in regard to Mekong Basin development must be to safeguard the water regime determining the Mekong River-Tonle Sap Lake interaction. This importance is argued by Cambodia and recognized by other actors in the sub-region and has consequently deserved a clause of its own in the MRC-Agreement (Art. 6). To attain this the Mekong River needs to keep (a large degree of) its annual flooding, i.e. the wet season flow must be maintained to a certain degree. A *second concern* is to not drastically remove/change the resource base a large part of its population is living from. *Thirdly*, it needs to develop its natural resources *without* causing large scale environmental disruptions. *Fourthly*, it needs to retain good neighborly relations (in which the Mekong cooperation could be a practical vehicle). This is a difficult combination of requirements of the Mekong Cooperation (cf. chapter 8).

7.2.4 Vietnam's Interest and Policy

Geopolitical situation

For Vietnam, as for Thailand, the Mekong Basin occupies minor, but important parts of the country (25 and 35% respectively). Vietnam has two significant parts of the country covered by the Mekong Basin: the Mekong Delta and the Western Central Highlands.[68] The Mekong Delta produces about 45% of Vietnam's paddy production and hosts approximately 14 million persons. The Western Central Highlands is where the bulk of Vietnam's Mekong hydropower potential - that is falling within the Mekong Basin - is situated.

Of the four countries in the Lower Mekong Basin, Vietnam has the highest population. This, and the history of Vietnam makes it, together with Thailand, one of the two major powers in the Lower Basin. Since Vietnam has no abundance of arable land the pressure on the resources is high.[69] The formerly sparsely populated and very complex delta area, is now viewed as an area with a high future potential. This is in spite of that salt water intrusion and acidification are constant menaces to agriculture (and living). The hydropower potential in the Central Western Highlands is also important due to the rapidly growing economy which is thirsty for energy; especially in the south.

Vietnam's location as the furthest downstream country makes it, however, vulnerable to change in the water regime. The circumstances in the delta makes it sensitive to too little, too much and too polluted water. This makes Vietnam dependent on upstream users' behavior and economic activities, and thus indirectly on agreements regulating these behaviors.

Sector Priorities

The *agricultural* production in the delta is viewed as having a great potential. From 1988 when parts of Vietnam were facing serious food deficits, it has become the third largest rice exporter in the world, although there are quite significant regional differences in food production. The entire delta covers 3.9 million hectares with high potential for agricultural production. Large parts display modest production results due to salt water intrusion, soil acidity, and water logging. It is reported from Vietnamese sources that the area under rice production could be increased by 25% and that 700,000 hectare could be saved from salinity intrusion if

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[68] Strictly speaking there are four parts of Vietnam belonging to the Mekong Basin. The two northern ones are, however, very small and plays little role in terms of natural resource development.

[69] The population pressure on agricultural land is 900 people per km2, as compared to less than 300 per km2 in the neighboring countries (Sompongse Chantavorapap & Le Huu Ti 1995: 18).

properly managed (Tran Hoang Kim, 1994:8).[70] Another source, however, is more conservative in deeming what is suitable for rice growing (cf. the figure of only 200,000 hectares left to develop in chapter 6).

The potential of *rice* growing is often highlighted. It has experienced a dramatic increase in output in the period 1986-1993. The paddy yield in the delta is rising quicker than in other parts of the country. During the period 1986 to 1989 paddy under cultivation rose 6.7%, productivity (yield/hectare) rose 17.8% and total production 25,4%. Corresponding figures nationwide are 3.7%, 14.9% and 18.8% respectively (General Statistical Office 1991:62f). The export value from the Mekong Delta region quadrupled in the years 1986-1989 (from 85.6 to 317.3 in million dollar equivalent, Statistical Publishing House, 1991:286). However other crops like groundnut, pepper, pineapple, jute, coconut-trees, tobacco and sugar cane are grown in the delta with good results. Experiments with tree growing has, e.g., in some cases proven to be economical superior, and environmentally friendlier, to attempts at expanding areas under paddy cultivation. Furthermore, the potential for *fishing and aquaculture* may be one of the still largest untapped potentials (Statistical Publishing House, 1991), although done improperly it may be environmentally disastrous.

Total food production shows an increase of 33% over the period 1986-1990. National food production in Vietnam averaged 324 kg/person in 1990; in the delta it was 658 kg/person (in Dong Thap province it is as high as 916 kg/person). These improvements have taken place in spite of the fact that the public investments in agriculture in the delta have been cut by half in the same period of time (Vietnam Economic Review, 1994:39).

The Mekong Delta Masterplan states that the delta has high potential but needs to be managed properly. It is moreover based on an assumption that the water flow will remain constant; a condition unlikely to be fulfilled. Moreover, cumulative effects of various development interventions (in Vietnam and elsewhere) are extremely difficult to foresee.

In the footsteps of Doi Moi - with its focus on foreign investments, rapid industrialization, and acceptance of individual consumerism - the need for *electricity generation* is also sharply rising; well over 10% annually from 1986 and onwards. The need prompts the pace to increase further rather than decrease (General Statistical

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[70] The Mekong Delta is commonly regarded as having a high untapped potential. Compared to the Red River Delta most figures show a higher potential, but with a lower result. The area suitable for double cropping (84% of the total) is higher in the Mekong Delta than in the Red River Delta, but actual double cropping lower (averaging 1.3 compared to 1.8); suitable, but uncultivated, areas are larger in the Mekong Delta; overall agricultural soil per capita is three times higher in the Mekong Delta (1 680 m2/capita); road and market infrastructure is better provided for in the Red River Delta. In addition it must be noted that the "crop growing soils" are 3.3 times larger in the Mekong Delta than in the Red River Delta and the overall potential access to water is far higher (Statistical Publishing House, 1991:42; Vietnam Economic Review, 1994:39). For a further discussion on the delta area see McAdam and Le Nguyen Binh (1996) and Christopoulos zzz.

Office 1991:28). Demand is said to be rising from 2,910 MW in 1995 to 5,505 MW in the year of 2 000, to 21,327 in 2015 and further to 28,180 in 2020 (Chuong Phanrajsavong 1996: 31).

The Western Central Highlands has a large potential for hydro power.[71] A number of projects have been studied for a long time (e.g. the Yali Falls I and II, Ry Ninh, and the Pleikrong).[72] The Yali Falls project is potentially the first major Vietnamese project in the MRC era.

Formal Commitment to sub-regional sustainable development

Vietnam is the country that has signed the largest number of the internationally binding agreements and conventions in combination with a number of national plans regarding the environment, such as the national plans for environment, biodiversity and tropical forests. The MRC-Agreement is binding the signatories to both "sustainable development" and to regional cooperation. Moreover, when it comes to the development of the Mekong River, Vietnam has produced a Mekong Delta Master Plan in cooperation with UNDP and the World Bank. Since Vietnam can not control the impacts of upstream activities, the plan deals only with the delta. One reason that Vietnam has ratified most conventions regarding sustainable development; the Ramsar Convention, the Biodiversity Convention, World Heritage Convention, CITES, etc. is that the conventions are essential international tools towards conserving the nature. Vietnam has difficulties when trying to influence the strategies of the upstream countries by itself, an obstacle common to downstream countries.

Analysis of National Interests in regard to Mekong Basin Development

The clearly most important objective for Vietnam in light of Mekong Basin development is to retain the quantity and quality of water reaching the delta during the dry season (December to May). Given the development plans upstream, the threat towards the delta is quite massive on both these accounts and the Masterplan's calculations are only realistic if a status quo on water quality and quantity is maintained. Environmental protection, which is another priority, hinges to some extent on the availability of clean water. Another objective is to prevent devastating floodings. This is, however, a less clear-cut objective; floodings are necessary to improve the soil and flush out salinity and acidity and people have adjusted to the *normal* cycles of the river. Furthermore, siltation might increase through the ongoing deforestation, but, on the other hand, decrease through the building of major dams in China.

The realization of the existing hydropower potential in the Central Western Highlands is regarded as important. This is, seen from a perspective of international relations, less problematic for Vietnam since it is an upstream country in these sub-basins. It is more problematic seen from an environmental or social point of

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[71] Conservatively estimated to 2 000 MW (Chuong Phanrajsavong 1996: 29).
[72] See MRCS' Work Program (several years) for further information.

view; large tracts are already severely degenerated (Sompongse Chantavorapap & Le Huu Ti 1995: 20) and minorities in the area might be forced to move. The proposed dams could also be used as a potential flood control and assurance that enough water will reach the delta, but the size of the dams are far from enough to secure this.

Going beyond the narrow view of natural resource utilization, it is of course utterly important for Vietnam to maintain, and improve (sub-) regional relation. This is something which could be achieved through a constructive engagement in the Mekong Basin cooperation.

7.3 Conflict Resolution?

One rationale for the Mekong Commission (and the IMC) has been to work as a channel of communication preventing potential conflicts and mitigate others that have emerged. A task which it has, given the level of conflict in the region the last three decades and given how other institutions have failed in doing this, been performing rather successfully. Ironically, in the period of 1992-1995 the situation was the reversed to the situation during the cold war; a number sub-regional cooperation schemes[73] were growing successfully, but the Mekong River cooperation were deteriorating. Neither the IMC nor the MC, were able to absorb the combined tensions of Cambodia's return and the real possibility of picking major development work. Instead a process was started which eventually led to the MRC-Agreement. The following sub-chapters is an assessment of the underlying conflicts leading to the breakdown of the IMC and the conflicts which are still not resolved.

7.3.1 The International Aspect of Mekong River Management

The statutes for the Interim Mekong Committee stated that the Mekong Committee would resume its existence "...Once all members of the latter Committee [the MC] have decided to participate in that organization." (IMC, 5/1 1978, Art 3). Cambodia would thus automatically be re-admitted into the regional river cooperation once it had a recognized government.

It was thus widely assumed that the absence of Cambodia from the (Interim) Mekong Committee would be terminated at the same moment as there was a regime in Phnom Penh that was recognized by Bangkok.

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[73] Such as the GMS, initial discussion on extension of ASEAN and various proposals to integrate the Indochinese countries into the wider Southeast Asian sphere of countries. See 4.3.3.

Discussions on the Mekong River were, in spite of a slight administrative disorder during the UNTAC interregnum, quickly transferred to the proper authority in Cambodia. The Mekong Secretariat was also extraordinarily quick in its administrative treatment of the new situation, when including Cambodia already in the work program for 1992.[74] Thailand would then host a meeting in February 1992 in Chiang Mai, northern Thailand. The meeting would transfer chairmanship from Thailand to Vietnam and confirm the re-admission of Cambodia into the Mekong Committee.

The meeting was, however, hastily called off by Thailand, who wanted to consider their position on the re-admission of Cambodia into the Mekong Committee. Instead they presented a proposition where Cambodia's admission would be connected to an admission of China and Burma to the Mekong Committee. Thailand called for a new meeting, but this time the Vietnamese, who did not fancy this development, declined to come. Vietnam did not particularly enjoy Thailand's proposition and especially not its coupling to Cambodia's re-admission. The situation was deadlocked.

It is widely believed, however, that the Cambodia admission and the possible inclusion of China at this stage was a side issue, where the real issue were Thailand's possibility of breaking free from the previous, restraining, agreement. The original, Mekong Committee, was quite clear that the river was a common resource and that its destiny could only be decided in consensus. In addition, the 1975 joint Declaration of Principles was based on the "Helsinki Rules" which, inter alia, proscribes inter-basin diversion. Thailand also seemed to fear a new situation where Cambodia, Vietnam and, possibly, Laos would veto Thailand's plans. At one time the cooperation was virtually on the verge of breakdown and it was not self-evident that the cooperation would continue:

> If joining the Committee means the loss of Thai sovereignty [veto rights by downstream countries], we can go it alone. It is the three Indochinese countries which will benefit from joining the committee in the future. (Thai Deputy Foreign Minister, quoted in Chaipipat 27 March 1992)

Thailand pursued its demand for Chinese and Burmese participation, a claim that neither Cambodia nor Vietnam necessarily opposed in substance, but refused to tie to the Cambodian re-admission. In spite of a number of informal meetings during 1992 the situation did not improve and the Mekong cooperation faced its worst crisis since the late 70s. A fateful meeting in Kuala Lumpur 14-16 December 1992 brought crisis and promises. At this meeting it was, as persons present claim, only the pressure from the donors (including the UNDP) that kept the negotiations alive. Large sums of money have been invested in the Mekong Committee over the years and it was in none of the donors' interests to see the cooperation break down at this stage. A

[74] Semi-secret contacts had been established between the Secretariat and Cambodia in the 80s.

platform was, reached from where it was agreed to appoint a Mekong Working Group (MWG) for further negotiations.

Thailand claimed the preposterousness of the 35 year old statutes - formed in a totally different context - and demanded re-negotiations. Cambodia and Vietnam thought that Thailand did not play fair when it acted against the statutes because they did not suit them anymore. Thailand had the upper hand though, being upstream, being far richer and having a potential cooperation with China and Burma in the making. Thailand also considered - as we have seen above - to continue with their plans for water development outside the cooperation of the Mekong Committee.[75]

The UNDP intervened and took over the chairmanship temporarily and assigned a senior UNDP official knowledgeable in international law on water management, and well acquainted with the Mekong River project. The idea was that a knowledgeable/neutral person would be able to make the agreement adhere to international law without being biased. He toured the region in early 1993, discussed the situation at a number of meetings and asked for "national position papers". He compiled them and came up with a proposition for new statutes for the Mekong River cooperation. The proposition has been negotiated in 1993 and in 1994 resulting in the MRC-Agreement.

The negotiations were at times difficult and the results were mixed. Questions on safe guarding water quality and water quantity were argued over and some of the problems were not resolved, but rather built into the MRC-Agreement.

7.4 Potentially Remaining Conflict Issues in the MRC Agreement

The bulk of the remaining conflict issues are stated in article 26 of the MRC-agreement which also compels the contracting parties to continue to find solutions to these. They are:

i) establishing the time frame for wet and dry seasons;

ii) establishing the location of hydrological stations;

iii) setting out criteria for determining *surplus* quantities of water during the dry season on the mainstream;

iv) improving upon the mechanism to monitor intra-basin use; and,

v) setting up a mechanism to monitor inter-basin diversions from the mainstream.

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[75] See the "Quadripartite Economic Cooperation" (QEP), or more common, "the Golden Quadrangle", chapter 4.3.3

Since the right to water utilization is connected to dry and wet seasons (article 5) it is important to define when these seasons are considered to start and stop. The right to inter-basin diversions is subject to the agreement of the Joint Committee during the dry season, unless there is a "surplus quantity of water available". This quote also explains why iii) above is an important one; when is there a "surplus"? On neither of these accounts consensus has, so far, been able to be reached.

ii) Is not very controversial, but still very important. Most parties expect/fear that the quality of water will start to deteriorate with increased use of pesticides and fertilizers, with the proposed increased industrialization and with intensive aquaculture. To be able to "prove" where the sources for any future pollution are a solid function for measuring needs to be established. Moreover, there is a suspicion that water quantity will be an issue that need to certified and proved to be safe guarded.

Downstream countries are in need of information on water access and therefore want insight into any diversion plans (iv), especially into any *inter-basin diversions* (v). This is, of course controversial for reasons of national sovereignty and the perceived "right" of "doing what one wants on one's own territory". On these five points there is a common understanding that further negotiations need to be carried out. A new issue is the meaning of *notification*. 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" (MRC-Agreement, Article 5. Our italics). How substantial should a notification be?

Finally, we have the issue of inclusion of China and Burma. This is perhaps less of a conflicting issue, but still one of primary importance. China is the upstream country to all countries and the party launching mainstream dams and other projects (see below 7.5). Thailand wants to include China into the MRC-Agreement (in fact it sees the exclusion of China as one of the major flaws in the Agreement) and the harder conditions the agreement sets for the upstream countries, the less the chances are of including China. The role of China, or rather the Yunnan Province, is becoming increasingly important and it is already one of the key players in Mekong sub-regional cooperation.

7.5 The Upper Mekong River Basin[76]

Historically, the international development cooperation around the Mekong River has been confined to the four Lower basin countries. This is largely due to the geopolitical history of the region. This is, however, about to change which also is evident from other joint schemes.

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[76] Or, as it is called in China, Lancang Jiang.

Burma hosts a minor part of the basin and a part which is far away from the "heartland" of Burma. Except the symbolically important aspect of breaking its political isolation, the Mekong Basin cooperation is not a major issue for Burma (and Burma is not very important for the other parties in the Mekong Basin cooperation).

With China the situation is totally different. Approximately 20% of the discharge into the South China Sea emanates from the upper MRB. So, in spite of that a relative limited part of the overall water resources comes from China, the role of China is still very important. It is a political giant, a large number of people lives in the basin, it has great plans for its future, and it is the furthest upstream country. China, is not a rich country, but it can nevertheless mobilize both engineers and capital enough to carry out basically any intervention it would like to (including transbasin diversions) if it is deemed a priority project. Some 10 million people live in the Lancang Basin of which 48% are from minority peoples. The average income per capita is nominally 142 USD per year. Income and literacy is lower in the basin area than in the rest of Yunnan. The immigration to the Lancang Basin is high.[77]

There is no doubt that China has a need for the basin's resources. Generally speaking, China lacks water and risks facing a food deficit within short. The Mekong River and the Yiang Tse Kiang river are for a stretch rather close to each other and transbasin projects have been discussed. This is, however, a major and technically extremely complicated project which perhaps will not be launched for a long time. The prospects of using the water for irrigation in the Chinese part of the Mekong Basin is also limited given the steep river sides and the few areas suitable for agriculture. A concern has, moreover, been launched over industrial pollution emanating from China. This has so far not been confirmed by any measurable changes.

For hydropower there is huge and, for the province Yunnan, very significant plans. A large amount of insecure information on these plans have been circulating. Frightful images of what is going on, and what the plans are, and what the downstream effects would be, have been abundant.[78] [79] The original 8 dams mainstream "cascade" has been reduced to 7 dams where the first (Manwan, 1 500 MW) has already been constructed and delivers, since 1993/94, electricity to Kunming.[80] The next one (Dachaoshan, 1 350 MW) has just begun construction and two more (Jinghong 1 500 MW, and Xiaowan 4 200 MW) are being planned to be in operation before the year 2010. Together these will provide 8 550 MW installed capacity at an

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[77] Figures from this section is taken from MDRN, 1994: 34f.

[78] Lately more information has been coming out. See e.g. MDRN, 1994: 85f; Chapman, E. C., & He Daming, 1996; MRB Diagnostic Study 1996; and Wang Shui 1996.

[79] The following section relies to a high degree on Chapman, E. C., & He Daming, 1996.

[80] The capital of Yunnan province and one of the largest city in southwestern China.

investment of 4 596 million USD before 2010. In the next round, 2010 to 2020, another 6 850 MW are planned to be installed for a cost of 3 150 million USD.

The projected downstream impact can, up to 2010, in the dry season and under ordinary circumstances, be an increased downstream flow of at least 50%, and by 2020 up to 200% increase. In the rainy season, up to 25% reduction is possible with the completion of the 2020 dams. These figures are of course subject to definitions on wet and dry season and on the water management policy of China.

This represents a huge change in the ecological regime of the river and, ironically, the reduction in the high flow is probably more critical than the increase in the low flow. The Tonle Sap, and other flooded areas and wetlands, needs the high flow and the succeeding flooding in order to keep up its biological reproduction. Changed siltation patterns downstream is another result of the dam building in China.[81] The impact of these changes is very vaguely known. The fish populations are likely to suffer from both mainstream dams and from a changed water regime further downstream. In addition there is of course a political risk of having a major power controlling the primary source of fresh water. Besides the downstream effects, the harmful effects in China itself are also worrying. Of 30 000 species in China 18 000 are said to be found in Yunnan (MDRN 1994: 23). The forest cover has been reduced from 55-60% of the land cover in 1954 to less than 30% at present (ibid). Both biodiversity and forest cover are dwindling at an alarming rate (ibid). The Lancang is rich in fish which is the main protein source in the area. The fish is dependent on migration in and out of tributaries due to the mainstream's high velocity and cold water. The tourism sector is deemed to have an excellent future, would anyone dare to invest in it, due to the fantastic and untouched landscape.

The benefits from the dams are, besides the electricity output, increased dry season flow, increased flood control, and - to see this particular benefit one have to be a mainstream dam advocate - greater possibility of planning further interventions downstream.[82] Moreover, the development of the hydropower is the inroute to mineral resources extraction but also to industrialization in the long run (MDRN 1994:85).

These plans put a lot of stress on the already difficult equation of utilizing existing resources in the basin without causing havoc to the ecological regime, increasing political tension or putting the large majority of people that, in one way or the other, depends on primary production under the present water regime in jeopardy. If China is going ahead with its plans, and there are few reasons to believe that they should not, coordination is a keyword and reasonably China (and Burma) should join the MRC. Few such large scale

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[81] A major part of the silt comes from China and is brought far down in the basin.

[82] This is however debated. Experiences from other international watersheds shows that international coordination on water releases are very difficult and rarely works effectively.

interventions have been done in the world without any prior agreement of some kind. Moreover, some cynics argue, given the Chinese plans it does not matter much how well the utilization is planned downstream. The upstreams impact will be determining anyway. This is an argument not endorsed by this study, but it is certainly a factor to take into serious consideration. In the current water regime only one fifth of the water comes from China. However, should any transbasin plans be realized the situation is still critical.

7.6 The Social Aspect: Forging Public Participation

> "Failure to include human values in planning and implementation of development projects has resulted in the continuing loss of biodiversity and increased social conflict" (Hill, 1995: 1)

To secure the support from, or even to regard, the grass roots of the Mekong Basin in planning for the future has not been a predominant feature this far.[83] This is perhaps no coincidence. To achieve genuine public participation in the Mekong Basin is difficult for many different reasons:

i) Since the early 90s there has been a large interest in utilizing the resources of the Mekong Basin which has created a forced development agenda. There is a risk that large scale and poorly researched projects will be carried out, without asking the affected people *if*, *how* and *when*. Seen from the other side, it is "a risk" that public participation will impede the modernizing agenda.

ii) In all four countries there is a wide rift between the modern and the traditional sectors. Modernizing projects tend not to see, or at least to be insensitive to, traditional production and local needs. The development pressure is largely deriving from interests advocating "modern" uses of the water and for cash benefits rather than to improve the subsistence economy that most people in the basin are living in. Taking the latter literally, there is, thus, an inbuilt contradiction between the interventions aiming at national growth and public participation.

iii) In none of the four countries there is a tradition of grassroots' participation in national affairs. In Thailand and Cambodia there is a cultural legacy and political tradition of hierarchical relations. In Vietnam this cultural tradition is more elusive, but (and this goes for Cambodia and Laos as well) the centralist socialist legacy has not fostered any tradition of Public Participation; neither has recent experiences of warfare and large scale violence. The lack of working local democratic processes aggravates the difficulties for the local

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[83] Epitomized by the much publicized exclusion of the NGOs from the UNDP-MRCS arranged "Insight Workshop" in April 1996 in Bangkok.

administration to communicate with the local people. The same lack of democratic structures makes it difficult to channel findings, would questions be asked, upwards in the system.

iv) Partly as a consequence of the above mentioned, but also on its own account, the MRCS and its program are neither compiled as a result from a participatory process, nor has the MRCS been pushing any such process. There is an obvious risk that the positioning of water management on the regional level will serve to further exclude the general public from the decision making process. International, or transnational, cooperation tends to distance decision making from the grassroots.[84]

v) Lack of appreciation and knowledge of the livelihood of the local communities and the underestimation of the potential of local production is seriously undermining the future existence of the traditional sectors. There exists little relevant research from development studies, anthropology, economic geography etc. on resource utilization in local communities in this sub-region. The little that exists is rarely (if ever) referred to in project planning; even less used as a tool for planning.

vi) The donor community bears also some responsibility for the lack of public participation in the planning process. Many present donors have been supporting MRCS for a long time without pushing this issue.

In spite of, or perhaps because of, these massive difficulties there is now, ostensibly, an increased will for improving the element of public participation in the Mekong development process. The Bangkok based NGO community has required that the following agenda should be the hallmark of the future Mekong Basin cooperation:

> "* A review of existing and proposed plans and programs using an open process in each of the member states so that all parties are accountable to the people of the Mekong River Basin.
>
> * Thorough study of plans and projects, effective distribution of information about plans and projects, and comprehensive public consultations prior to approval of projects by the MRC.
>
> * The development of plans and project approval must be based on consensus among member states and public participation at the local, national and regional levels within the Mekong River Basin." (Watershed, 1995:29)

Matoba, the Chief Executive Officer of the MRCS, has written that management of the land and water related Mekong basin should be guided by a number of principles of which two are:

> "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.

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[84] The "democratic deficit" is a problem often mentioned in regard to EU and transnational governance.

> 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: 5).

In terms of public participation it seems like there is little difference in perspectives; at least judging from the rhetoric. Moreover, one of the largest donors states 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 decision-making 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 socio-economic 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"

Furthermore it states that, the work with the BDP (Basin Development Plan) should be done "upwards not downwards", NGOs should be formally invited and the principle of public participation should be formerly endorsed by the governments. This perspective is supported by many other donors. The Policy and Planning division of the MRCS 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 pre-requisites 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 1996: 3, bold in original)

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

> "Governments 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: 25)

While there is a long way to go it seems like the concept of Public Participation has taken root in regard to Mekong Basin development and that the joint forces quoted above should make a difference. Changes are

needed in the MRCS Work Program as well as the mode of development planning from both the MRCS and the national government agencies.

PART IV

CONCLUSIONS

8. ISSUES, CONCLUSIONS AND "GUIDING PRINCIPLES"

Part IV serves a summary and conclusion of the findings in Part II and III. We have chosen to divide this into four broad categories: *Areas of Potential Conflicts, Competing Interests, Institutional Set-up* and ***Knowledge Gaps***. We conclude the report with a very brief section of "guiding principles".

Besides summing up the previous discussions, this concluding chapter aims at unmasking a number of the "contradictions" in the "Mighty Mekong Mystery" and to channel these into guiding principles for the continued work with the development process in the Mekong River Basin.

8.1 Areas of Potential Conflicts

8.1.1 Geographical Potential Conflict Areas - the "Hot Spots"

During interviews and discussions in the MRB region a number of geographical and thematic **Hot Spots** emerged as illustrated in Map 8-1. Each of the hot spots is intertwined in a web of both environmental, economic and political issues.

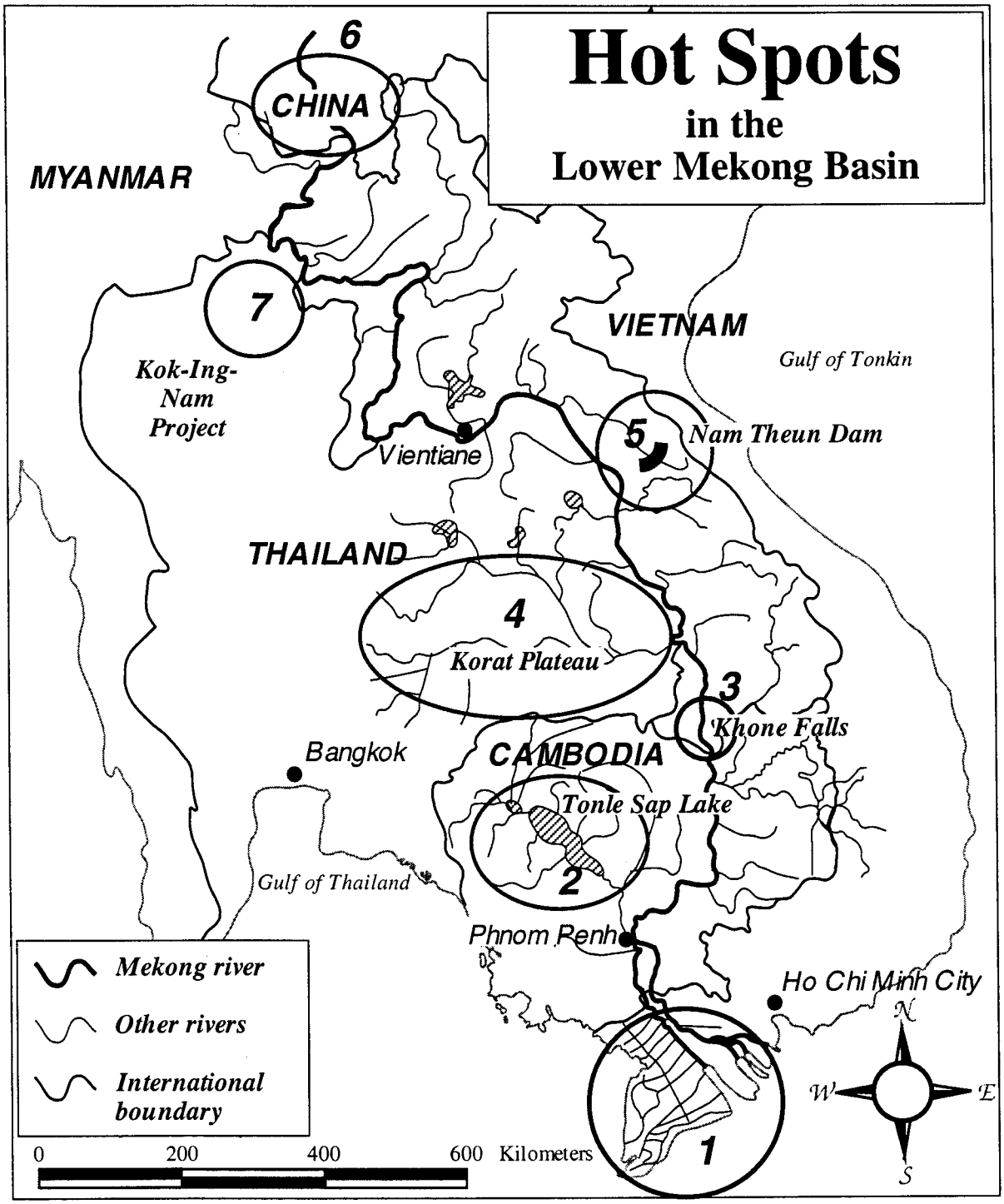
1. The Mekong River Delta

The Mekong River Delta is a hot spot in the sense that it is economically important for Vietnam as the main area for agricultural expansion and a major habitat, at the same time as it is an ecologically sensitive area, struck by acid sulfate soils, salt water intrusion and flooding. The flat and low lying topography results in an extreme sensitivity to man-made activities. This sensitivity makes the Delta vulnerable for the future actions of the upstream countries, i.e. water diversions and mainstream hydropower dams. Within the delta itself, different interests over the resource utilization are colliding. Environmentalists claim that the sensitive areas, especially the mangroves should be protected from future interventions, while economic interests want to utilize the whole area for intensified agricultural and aquaculture expansion.

2. The Tonle Sap Lake

The Tonle Sap Lake has been called "The shining centerpiece of Cambodia's constitution" (Woodsworth 1995: 99), illustrating the importance of the lake, culturally, economically and environmentally. It provides one of

Map 8.1


Hot Spots
in the
Lower Mekong Basin
CHINA
MYANMAR
VIETNAM
Gulf of Tonkin
Kok-Ing-Nam Project
Vientiane
Nam Theun Dam
THAILAND
Korat Plateau
Khone Falls
Bangkok
CAMBODIA
Tonle Sap Lake
Gulf of Thailand
Phnom Penh
Ho Chi Minh City
Mekong river
Other rivers
International boundary
0 200 400 600 Kilometers
N
W
E
S
1
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3
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5
6
7

the most productive fisheries in the world, with an outstanding biodiversity, at the same time as the hydrological feature, with the change in water flow, is a natural flood regulator downstream. Its surroundings provide Cambodia's most productive agriculture. A number of rivaling activities claim the right to utilize the lake, such as tourism, fisheries, forestry, etc., at the same time as there is a risk that upstream activities may change the quantity and quality of water reaching the lake. In a worst case scenario the lake may decrease or even disappear as an outcome of sedimentation and the fish and forest resources may diminish to a level where it is not able to support the surrounding population as well as leading to severe repercussions throughout the MRB.

3. The Khone Falls

The Khone Falls on the border between Cambodia and Laos is an extraordinary sight, with high potentials for development of tourism. The area has a majestic wildlife with for example river dolphins, something that makes it important from an environmental point of view. Plans for development of mainstream hydropower projects adjacent to the Khone falls, are the main threat to both tourism, fisheries and biodiversity. The present unsustainable fishing and fishing methods as well as unacceptable forestry practices are another threat to the area.

4. The Khong-Chi-Mun Project

The Khong-Chi-Mun project aim at (it is claimed) irrigating large parts of the Korat Plateau. Thus, it is a very controversial project leading to downstream fears about diminished water quantity and quality. Even if the irrigation is done in a manner that leads back the same amount of water to the Mekong, it is most likely that the water will be of less quality because of salinity, pesticides, acidity, etc. A large scale irrigation of the Korat Plateau may be environmentally destructive also for the area itself leading to salt leaching, erosion, etc. Thailand is determined to increase economic development in the Korat Plateau, with the main target being an increased agricultural productivity, but the area has other potentials as well, such as tourism and small scale industries, which in the long run may be well as economically feasible and much more environmentally sane.

5. Hydropower Development in Laos, illustrated by the Nam Theun 2.

Hydropower development is very controversial, throughout the MRB. In the past most of the plans were related to Thailand, with the Pak Mon dam as one example. At present, most of the planning activities are going on in Laos (and China), backed up by Thai and other international interests. The Nam Theun 2 project has been getting a lot of attention recently since the World Bank has been uncertain as a result of poor environmental and macro-economic impact assessments. It is widely disputed if hydropower development is a salvation for the Laotian economy or if leads to environmental destruction, eschewed economy and international economic dependency. Hydropower development inevitably leads to local changes in the

environment and it hampers other sectors like fisheries, but it is also questionable since it may give rise to changes in the downstream water regime.

6. The China Factor

China is not yet a member of the MRC, and in many senses it is a sovereign player on the arena. As the most upstream country China is not particularly sensitive to the downstream countries needs regarding the river. It has few incentives to negotiate with the others about the future development, except as a way of improving the neighborly relations in order to increase trade and other economic development. There is a significant mainstream hydropower potential in Yunnan, with the Manwan dam already in operation. The potential mainstream dams in Yunnan are, downstream, seen as threats, since it gives Yunnan the power to control the water flow, however, it may also lead to a situation where the water flow will be controlled in a manner that increases the water flow during the dry season. Another controversial activity is logging, that leads to increased soil erosion and siltation (which on the other hand may be hampered by the dams). The dam building and other development options such as forestry are disputable also within Yunnan, which has a rich biodiversity and a vulnerable environment. There are voices calling for biodiversity conservation and for example expansion of eco-tourism in Yunnan, two development options that go badly with unchecked forestry and hydropower projects.

7. The Kok-Ing-Nam Project

The Kok-Ing-Nan project is maybe the most controversial of all the Thai plans for the utilization of the Mekong. It is a plan to divert water from the Mekong and lead it into the Chao Praya River Basin. Naturally, this action would cause changes in the water flow, leading to changes in the estuary ecosystems and downstream agriculture, fisheries and human uses. The downstream countries are concerned, and need assurance that the potential adverse impacts will be mitigated, if the project are to be fulfilled without severe tensions between Thailand and the downstream countries.

8.1.2 Potential Political Conflicts - An Actors' Perspective

The most obvious contradiction, viewing the basin *as an international system,* is the different interests, plans and ambitions that are to be found with the various states. Downstream countries want to cooperate in river basins whereas upstream countries has a moderate interest of this. This is a general wisdom which, to some extent, goes for the MRB as well; Vietnam is eager to draw Thailand into the MRC cooperation, while Thailand is more interested of including China. Thailand is, furthermore, moderately interested in downstream cooperation at all. This overarching conflict asymmetry is further illustrated by Thai perceptions of Chinese

major plans and Vietnamese suspicions on future Thai diversions and pollution. In which areas do we then find the tensions, and which are the counter forces to these tensions?

Overall relations have been, and still are, improving between the countries in the LMB. Conflict resolution in the wide sense is making headway. Former conflicts have turned into common interests and to some extent the neighbors' possible success is a part ones own success already. A certain communality of interests has emerged. The exception is perhaps in the field that we are interested in here, namely that of natural resources where diverging national interests have been gulfing rather than narrowing. More concretely, the MRC-agreement is for the moment accommodating diverging interests. The parties are however, not necessarily very satisfied/interested with/in the agreement and, as we have seen in chapter 7, a number of difficult issues are still to be resolved - especially the outcome of the negotiations on article 26 on rules of water diversions need be closely observed and supported. The ADB-led scheme is non-committing initiative and restricts thus formally not the respective actors against one another. Its (neo-) functional approach may in the long run, however, serve to tie the region into interdependence and thereby raising the cost of playing up conflicts. The risk is rather that ADB stumbles on its ambitious and controversial set-up. On the political side the inclusion of Vietnam into the ASEAN regional grouping might be a step towards consolidating more stable relations. Finally, economic growth may take the edge of the natural resource competition, but since this economic growth to some extent and for some actors rests on the utilization of natural resources it might just as well turn the other way.

Other conflicts might erupt along the central-local dimension. It is well-known that international water agreements risks causing domestic turmoil (cf. Öjendal 1997). The center do not always have the same rationalities as the local areas have. National growth is (has been made into) an imperative in the post cold war era and especially in the booming East Asia. To generate economic growth, major infrastructure projects are often launched. One of the reason for conflicts along these lines is that the center tends to get the benefits of the large scale modernizing projects, while the local areas have to bear the burdens. Rarely do redistribution mechanisms of benefits and burdens work satisfactorily. We must not forget that the articulation of the "national policy" is made by a modern elite in the urban areas, whereas the vast majority of the people in the LMB live in rural areas depending on primary production. The conflict around the Khong-Chi-Mun project is evident of this. In addition, shrinking space and resource base might pit various communities against each other causing social instability.

"Resource capture" is a concept describing the situation where there is a fear of not having access to sufficient natural resources and capturing as much as one can while one can. This is the situation which must be avoided. Instead a process where trust and communication prevail must be supported. The long term disclaimer

is however that even if succeeding in building political structures that is able to resist the temptation of resource capture, the underlying resource scarcity is - as long as the societies in question are basically relying on primary production - a permanent force pitting the actors against each other.

8.2 Competing Interests

8.2.1 Sector Competition - Visibles and Unvisibles

Throughout the MRB there are ambitions of rapid development. The development schemes have a number of goals, including economic growth, and increased foreign direct investments and trade. There is no overall solution on how to achieve this development, since it largely depends on the specific conditions of an area or country, but in the case of the MRB it is more or less clear that the development, to a large extent, will lean on the natural resource base. In the MRB, the quest for development has brought on an increased competition between sectors, as the different sectors interfere with each other (cf. 6.5).

Development of different sectors, like fisheries, forestry, mining, etc. may, or may not be compatible with other sectors since there are, supporting and compatible sectors, bulldozers, and sectors sensitive to scarcity of space, (cf. 6.5). In an ideal situation development should be based on compatible sectors supporting each other. One example of this kind of sector could be small scale industries founded on traditional handicrafts. In reality much effort is spent on developing the bulldozer sectors, i.e. hydropower and mining, often backed up by strong economic and political interests. Foreign direct investors show significant interest in these sectors and there is a risk that the need for quick development financed by FDIs in the long run will lead to a situation where most of the incomes from these sectors will be placed in the pocket of investing companies. It will most likely not generate immediate improvements of the living conditions of the general population.

When taking decisions about utilization of an area, or a natural resource, there is seldom a sole option on how to use it. For example in the case of the Khone Falls in Laos, the area is magnetizing fisheries, tourism, hydropower, biodiversity conservation, forestry, etc. Some of the options are compatible, (i.e. biodiversity conservation-sustainable fisheries-eco-tourism), while others are conflicting, (i.e. hydropower is disturbing fisheries as well as tourism). It is not an easy task to decide upon how to use the area, however, "the worse" it is utilized the more it might impede development in other sectors and the general environmental condition of the area. Hence, an integrated planning and management process, that coordinates the needs and effects of all sectors, is desired, and when conducting cost-benefit analysis, the "real costs" should be included, i.e. there is a need for a better knowledge of "unvisibles" if large scale interventions are launched.

The concern over scarcity/competition of land is growing in the MRB, both as a consequence of population growth and because of the need for economic development. But the sector competition is not only present because of scarcity of land, water, and natural resources. There is also a less tangible competition over human resources. The number of persons with suitable education is generally low, and those persons are often needed for multiple tasks. For example may a person with education within water resource management be offered jobs both in biodiversity conservation and in hydropower development. The problem is that he can only take one of the jobs.

8.2.2 Ecology and Modernization - the Value of Balance

It is clear that the MRB region is seeking the path of modernization, but is then ecological sustainability out of question? Is it possible to leap over the exploitation and the crisis stage (c.f. chapter 5)? The answer must be that it is a question of balance. However, combining modernization and economic growth with the upkeeping of ecological balance and social stability is not an easy task, it requires complete knowledge of the context of the development. For example in the case of forestry, this resource exploitation need not degrade the environment, *firstly*, if there are long intervals between cuts which secure the regeneration. *Secondly*, if well-planned extraction methods and roads are used in a way that minimizes the damage to forest soils, and *thirdly*, if the felling is done in the direction that causes least damage.

One way of preventing mining of natural resources is by developing a clear and secure land ownership, combined with appropriate education, laws and regulations regarding the natural resource utilization. If, for example, a farmer have a secure access to the land that he utilizes at the same time as he is aware of the damages caused by certain measures, it is most likely that he will choose the more sustainable option, in order to maintain the resource for his family's future needs. The same relation works on a communal level; could local communities be made more responsible for "their own" neighborhood they would probably protect the sustainability for forest as well as for fisheries and in other realms. In the case of larger operations, such as hydropower development, it is important to combine laws and regulations, like EIAs, with the polluters pay principle. *If* then a decision to build a dam is taken, the full environmental, economic, and social consequences will be neutralized (cf. 8.2).

Population growth is often mentioned as one of the main obstacles to modernization, and that the population growth has to be curbed before the poverty will vanish. It is true that poverty alleviation is a major, if not the main, issue in the MRB, and that the size of the population already is stressing the available resources in

some parts of the basin. However, much of the resource utilization is today done quite ineffectively, and a larger output should be possible by implementing new methods and by using the land for what it is suitable. In the case of, for example, agriculture, the yields are presently low, offering much room for future improvements, by sustainable irrigation, change to more suitable crops, or using ecologically safe fertilizers, etc. There is a constant battle between sustainable improvements and a fast increase in crop breeding.

Choosing a satisfying path of development is not an easy task facing the Governments of MRB. The Governments of especially Laos and Cambodia have limited control over the resource utilization and limited framework for a sustainable development. The aid donor community plays a significant role as "a referee", i.e. by helping the MRB countries with technical assistance, capacity building, and in which direction they throw their weight. Donors may also direct the development in the MRB, by setting up rules for the granting of funds. One example of such an action could be requirements for proper impact assessments before granting money for hydropower development.

In discussions about population growth and economic development in the MRB, there is an awareness of the limited availability of resources and that the resources have to be managed in a manner that prevents a resource crisis. However, there is also a future risk of a pollution crisis, i.e. when the renewable resources are destroyed by deforestation, industrial pollution, pesticides, irrigation, in the end leading to soil erosion, desertification, salinization, polluted water, etc. In this scenario the amount of usable land will shrink at the same time as the demand for land utilization for different uses grows. So again, the scope for development is certainly an act of balance, where Sustainability is a key word.

8.2.3 The Meaning of Development in Relation to Natural Resources Utilization in LMB - More is Less in a World of Scarcity.

> "Like a towering lighthouse guiding sailors towards the coast, 'development' stood as *the* idea which oriented emerging nations in their journey through post-war history. No matter whether democracies or dictatorships, the countries of the south proclaimed development as their primary aspiration, after they had been freed from colonial subordination. Four decades later, governments and citizens alike still have their eyes fixed on this light flashing just as far away as ever: every effort and every sacrifice is justified in reaching the goal, but the light keeps on receding into the dark." (Sachs 1992: 1, italics in original).

The Mekong Basin *as an arena for development* leads us to the well known large scale versus small scale debate as well as to the modern versus traditional development debate. The era of the large dams and the "White Elephants" is generally believed to be done away with. In a cash rich, hastily modernizing, private sector active and non-democratic East- and Southeast Asia this is not necessary the case. Public participation

is reasonably a significant component in this process of change. Actually, the concept of development takes on a new meaning in the light of the huge theoretical potential co-existing with the ecological sensitivities and the future scarcities (cf. chapter 3, 6 and 7). In the LMB, population pressure, heightened calls for economic growth and rapid modernization based on rapid natural resources extraction co-exist with increased need for ecological balance and sustainable development. Underlying this contradiction are different development philosophies heralded by different interests which we named "developers" and "conservationists" respectively in chapter one.

The much abused modernization theory assumes that the countries in the LMB should go the same way as "the West". Increased access to energy, economic growth and modernization are the imperatives necessitating such things as the building of dams, increasing transport capacity and introducing the green revolution in agriculture. Other values become subordinated, and in the face of obvious unsustainabilities, economic growth is still needed in order to safeguard the resources in order to later take care of the social and ecological problems. Economic growth and increased export earnings are integrated parts of the nation building and to oppose this is similar to treachery. There is an inherited "good" in modernization.

The "conservationists" on the other hand make ecological balance, biodiversity and the safeguarding of the local communities their imperative. Major interventions are, it is argued, consistently done at odds with the local population's needs. The ecology is slaughtered for the sake of an abstract goal of economic growth which only benefits an elite in the cities, or, even worse, foreign enterprises. Nominally profitable projects - like major dams - are in reality increasing local poverty, creating social and ecological havoc when the resource base of the rural population is removed. Things like biodiversity, cultural heterogeneity and local handicraft skills are given no value in the cash-benefit analysis supporting large scale interventions. Moreover, people are not asked which development they prefer, but the power of the supporters of the modernization bulldoze any local preferences; public participation is not encouraged, and if it was, we should see an entire different development. Aid is destructive since it is an inroad to exploitation of natural resources.

This is broadly speaking the extreme positions in the LMB natural resource development debate. This is not unique to the LMB, but is highlighted here due to the very special situation of the LMB. There is a wide discrepancy between what could have been done would one not have had to take ecological and social limitations into account. Theoretically there is a large potential in, for instance, the hydropower sector, but what if all costs are included and if other sectors are considered? Similarly, extensive aquaculture has, for example, a great potential but not simultaneously as the potential of the hydropower is (attempted to be) realized. In the ecologically sensitive, poverty and conflict ridden (even rebellion prone if one takes an

historical perspective), and natural resource based economies of the LMB, insensitive rapid changes are bound to lead to undesired consequences.

In this surrounding it seems to us that small scale projects make more sense than large scale ones, and that involving the concerned communities is the only way of managing "change". For the latter there is a democracy, and even human rights, argument, but one do not have to go this far to find support for the argument. To "develop" against someone's will is bound to fail or resort to exploitation. Sustainability - widely accepted in rhetoric, but vaguely in practice - must reasonably be seen as a guiding principle going far beyond lip service. Sachs' rather provoking quote in the offset of this sub-chapter might be the result if applying a one-dimensional concept of development.

There is of course no right and wrong in the debate reviewed above. However, "development" clearly cannot, in the light of our findings in the LMB, be equalized with economic growth or any other one-dimensional modernist dogma. Even modest plans need wide knowledge and a true coordination with other sectors and actors. Here the role of the donors becomes crucial as a balancing factor (cf. chapter 8.3). The national governments are of course ultimately the decision makers, but the experience and the resources the donors possess (especially in relation to some countries' very limited financial resources) give them an extraordinary responsibility for what they do and sometimes for what they do not do. To find the best of two worlds - combining modernization and economic growth with the upkeeping of ecological balance and social stability - is not an easy task. It is, moreover, a task requiring thorough knowledge of the context of the development one tries to support.

8.3 Institutional Set-up

8.3.1 An Era of Change?

Triggered by the "outbreak of peace" and nurtured by increased FDIs, aid flow, and the changed regional dynamics of the LMB, the natural resource utilization has become internationalized. The interconnectedness between various actors and processes have increased and as a consequence a large number of institutions - old and new one - have engaged in the current "scramble for the Mekong" (cf. chapter 4). Who should do what, on whose mandate with which goals? Obviously, there is a need of, at least, coordination among the many new initiatives on the Mekong development.

UNDP, ESCAP, ASEAN, ADB and MRC are the obvious candidates for adopting a leading role. The two former are probably unwilling to take on such a large task (which also might be outside their primary mandate). Both ADB and ASEAN are increasing their involvement in both planning and financing mechanisms for Mekong development. Although the ADB has become the financial regional key player, it is important to note that it is a development bank and, in spite of its deep involvement in the development process of the sub-region, it might have difficulties to take on such a political role, beside the fact that it does not have a proper office in the LMB. ASEAN is, in this context, a political heavyweighter, but has little experience (and very little good experience) in conducting development activities. Remains then the MRC which is struggling to maintain its donor base and traditional niche in planning and coordination in the Mekong basin.

On the one hand, the MRC is still the only genuinely sub-regional organization which makes it the natural choice. It has, with the new MRC agreement been given a direct mandate to deal with a large number of sectors, and it has been working in the region for 40 years. On the other hand the Secretariat is built with a fairly narrow water focus, its work program deals with scattered projects and it has had problems with its authority throughout its history. Two different lines of argument can be discerned on its future role:

i) The MRC should decisively step out of its limited role and take an overall responsibility for the natural resource utilization in the LMB. It has the mandate and there is a need.

ii) The MRC has its expertise with the Mekong River and should stay in water management.

Another dividing issue of its future role is as to whether:

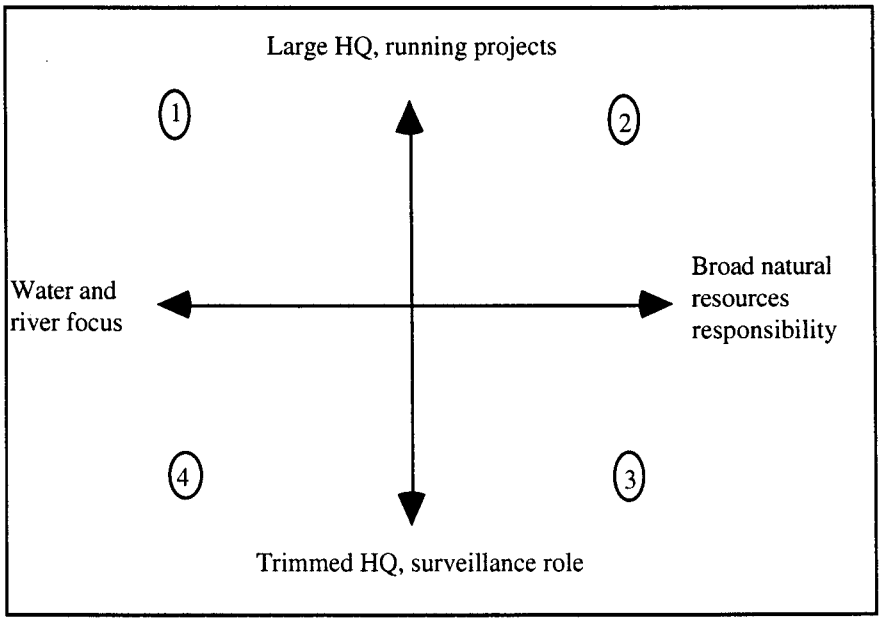
i) the secretariat should run project in a major scale, or,

ii) whether it should be a slim lined coordinating and standard setting agency "policing" the sub-regional development with regard to the MRC-Agreement and directing research so that the agreement can be kept up in the future.

Agreeing that these two are the major dividing lines for the future role of the MRC(S), we arrive at four different possible scenarios (see figure 8-2). Position 1) is closest to the old role of the (I)MC, but a position which the new agreement pushes to the right, towards 2). On the other hand good arguments can be found for a secretariat with a surveillance role and with beefed up National Mekong Committees, thus approaching

position number 3. Finally, position 4) is perhaps the most likely scenario (albeit not necessarily the most wanted) in the short run given the Secretariat's tradition and its present staff.

Figure 8-1: Future strategic options for the MRC



With the latter it is a risk that no organization takes on the coordinating role and that coordination remains undone with overlapping programs, increased international friction, and inefficient aid as a consequence. If no organization feels an overall responsibility there is of course a risk that crucial tasks will be addressed sector by sector or, project by project. One of the most concrete messages coming out of this study is that the LMB is a system that is interrelated ecologically, politically and soon economically, and an institutional solution which atomize this seamless quilt will neither foster regional cooperation nor sustainable development.

The MRC has been in focus throughout this study due to its mandate to deal with a wide range of activities in the LMB and its traditionally and regionally accepted role of being the primary agency for doing that. The report has perhaps given MRC too much attention, given the realities on the ground. Whether we view resource flows, political commitment or institutional offensiveness, the MRC seems to, in spite of the newly concluded agreement, be growing less important. For instance, the meetings on MRC are rarely attracting the top political figures while the conferences on the ADB-sponsored GMS projects virtually never fails to attract all over minister level presence. The resources commanded by the ADB in its Greater Mekong Sub-region program vastly surpasses the ones under the MRC. The situation is apparently in flux. In the Cold War era

and its immediate aftermath, the Indochina countries were largely off-limit for the private sector and the large financial and aid flows. The then MC (or IMC) could rest comfortably in its "monopoly" situation in regard to Mekong River Basin Development issues. Now, however, the situation is changing and an extremely dynamic situation is emerging where competition for initiative is evident, and not only from the aid machinery. In the opinion of these authors, the MRCS need to reflect, in concert with the participating countries and the donors, on which institutional role the MRCS should have vis-a-vis other interests.

8.4 Knowledge Gaps

Time and again throughout the report we have noted that we have had difficulties to find solid knowledge about fields directly related to the very complex processes that this report deals with. The knowledge gaps encountered are of basically three kinds: i) marginally researched fields, ii) imprecise statistics, and, iii) confusing or even contradicting development plans.

i) On many areas in focus in this report, it exists very little "hard" knowledge.[85] We lack comprehensive knowledge on complicated ecological relations, social dynamics as well as the potential economic value of hitherto marginally observed activities. How do fish migrate in the Mekong Rivers system? How much do dams impeded the fishes' natural behavior? How do a reduction in siltation flow change the water regime? Why is Tonle Sap clogging up? Is Tonle Sap clogging up? Will water get warmer when the Chinese dams are built, and what if it does? How will the rural population be involved in the proposed development? Where are the rural population living exactly? What do the affected communities think of the proposed plans? How can local handicrafts be marketed? Which is the potential for eco-tourism? And even: what are people in the potentially affected areas living of? The latter question is perhaps the most basic question one can think of in the light of major structural change of the resource base. As far as we understand, and it should surprise us if we were wrong on this point, for the major part of the LMB (and perhaps even MRB) there is no comprehensive knowledge about this.

ii) Statistics are lacking and imprecise. This is most pronounced in Cambodia, Laos, and Vietnam, in that order of emphasis. Legacies of war, socialist "normative statistics", weak state administration, and little regard for "soft" sectors have - in different combinations - created this situation. Sometimes the "original" source for many figures are taken from consultancy reports which have, in the first place, been based on rough

[85] To be fair we must mention that there exist exceptions. The facts around the hydraulic regime of the river - such as discharge, river flow, run-off, and to some extent siltation and salinization - is well documented by the MRCS since a long time. This does, however, not mean that the complex long term consequences of changing this regime are clear.

"guesstimates" and/or "researched" in extremely little time and with no particular expertise of the region/country.

iii) There are many different ideas, plans and prioritizations for the coming development of the LMB. Given the size of the plans and the limited resources of the concerned countries this development is to a large extent depending on the donors. This results in a complicated pattern of plans and ambitions. The governments have a plan, the consultants producing another and the donors - dictated by a dynamic not only relating to the situation in the receiving country - might have a third. In addition the countries themselves might have rivaling prioritizations from different ministries. The latter is neither unusual nor alarming in itself, but it is pronounced in the light of lack of communication between the ministries. A firmer role from the side of the national governments would certainly be appreciated by most donors.

iv) As a fourth aspect of deficiencies in the information base we take note of the lack of debate on these issues. Academically, surprisingly little has been written about Mekong development. Popularly, little is done to encourage a debate on this issue and major actors in the drama are more or less avoiding/shutting each other out. For instance, the reputation of the MRCS in the NGO community is often worse than what it deserves[86] (and vice versa) partly because information do not get around and/or are not publicly aired. In the interview situation, when giving various parties "the other's" argument, we expected animosity, but found, in substance, more common ground than what we had expected.

All these gaps risk twisting the development approach. Especially the first is of a basic nature. How can we know where to engage if we are only aware of the pros and cons of the easiest and most obvious approach? This lack of solid knowledge and how to overcome it has to a large extent formed this report. It is our hope that these knowledge gaps will not mark the development of the Lower Mekong River Basin in a similar fashion.

8.5 Resolving the Mystery - a Few Guiding Principles

The Terms of Reference for this study does not explicitly ask us to deliver any "recommendations". We will, however, offer some brief "guiding principles" for the development process in the LMB.

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[86] For instance, the MRCS has a substantial library, but the NGO community believes that they are barred from going there.

Communication at all levels, going beyond courtesy meetings and formal exchange of notes, are utterly important. The sub-region will face some changes in the future and some of these changes will be difficult ones for the affected people. In order to accommodate these changes a dialogue between central decision makers and the affected communities, between the countries in the basin, between the private sector and the states, and between the states and various actors in the development community need to be kept-up. This takes time and costs money, but it is still small amounts compared to what drawn out conflicts costs, not to speak of failed development projects. Increased communication serves, moreover, to reduce "demonizing". To be effective it must be structured to give voice to all stakeholders and not only the "traditional" ones of finance, technical experts, and politicians, but also those with weak institutional positions, e.g. women's groups, environmentalists, etc.

Public participation should be encouraged: If there is a local resistance to a project this has to be dealt with and not just given a blind eye. If there is a solid and non-bridgeable resistance, this is a "real" factor in the same way as, for instance, water quantity and stream flows, and should be treated such. Public participation must be viewed as an asset, not an obstacle, in preparing interventions. Decentralization of decision making/management should be encouraged.[87] Local communities are often prepared to resume a responsibility for their neighborhood if they are given a reasonable chance.

Sustainability is well endorsed, although sometimes used as a popular phrase without deeper intentions. More often than not it is regarded as an obstacle that one has to get around, instead of seeing an instrument for improving project quality. In addition, sustainability should have a wider scope than just its environmental application. Seeing the rapid modernization process in the LMB, *social* and *political* sustainability need to be given due weight.

Primary production and primary producers must not be viewed as something "outdated", "uninteresting" or "hopeless". After all this is the base for the vast majority of people in the basin. Albeit it shows low productivity in dollar terms, it carries an immense socio-economic/distributive and cultural value and perhaps (we do not know) a high economic potential as well.

As with all regional programs, and especially shared river basins, *regional politics* have to be viewed carefully. This is unusually important in LMB due to the little time span that has passed since armed conflict

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[87] In Cambodia an interesting and initially successful "experiment in decentralized planning" is carried out by the UNDP in the CARERE project. A deep study of approaches and consequences of this would be of great interest.

were conducted in the region.[88] Before any long term commitment is given, a thorough analysis of the long term incentives, intentions and political will from the side of the regional parties should be carried out.

The role of the private enterprises and their relation to laws and regulations. On the one hand private capital is needed to develop the infrastructure of the LMB, and should be encouraged to take part. On the other, the huge interest from the very forceful business community, in combination with the unfavorable position and weak state structures of, at least, some of the LMB countries makes the situation volatile. The working out of regulatory framework and technical assistance in enforcing these rules in a wide variety of sectors could prove to be a most valuable assistance.

Finally, the *knowledge gaps*, mentioned above, need to be filled. Again we face a dilemma. On the one hand, it seems highly irresponsible to go ahead (from the side of the donor community) with programs making major interventions (which even may prove to be irreversible) without having a sound knowledge base. On the other hand knowledge gathering is a dynamic process which can go on indefinitely. To these authors it seems like a general "knowledge boost" going far beyond individual consultancy reports would be in the interest of Sida (and other donors). Long term agreements could be struck with institutions within the research community dealing with these questions. For instance, systematic comparisons with other international river basins with similar conditions, or deep studies of various participatory development projects involving primary producers in the region, could be carried out.

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[88] As of writing these conclusions a violent power grab in Cambodia is taking place, putting cooperation formulas into doubt.

PART V

APPENDICES

Appendix I. Terms of Reference

The Mekong River Region: An Economic and Resource Geographic Study with a Perspective of (increasing) Competition for Resources and Surface Area (including Water Areas)

Background

The Mekong River region has for centuries been the focus for political interest (even long before the entry of European expansionism and economic activities and international trade. Powerful kingdoms like that of the old Khmer empire have had its base in the Mekong region.

Today Southeast Asia is one of the fastest growing regions of the world. Increased populations, growing popular demands for goods and service and thriving export industries implies a heavy pressure on resources and areal space. Competition for resources are felt both within the countries as well as between the states around the Mekong River. Exploitation of natural resources and industrial/urban pollution impacts the utilization of other resources and important eco-systems.

Efforts are being made to try to build up systems and cooperative frameworks to provide for the sustainable development of the region. One such framework is the Mekong River Commission. A number of programs are ongoing to build up knowledge about the region and its resources together with assessments of the potentials for economic development. Annex one lists some of these programs.

Objectives

The objective with the study is to produce an open and descriptive report on resources and sectors of (potential) importance for the development of the region (locally and basin wide) based on the descriptive part an elaboration on areas for (possible) conflict and competition over resources and space at local and regional level should be made. The analysis should include indications of present and possible "hot spots" in terms of environmental degradation.

Study on the available resources and perspectives of possible conflicts

Discussions have been held with Joakim Öjendahl at PADRIGU in Gothenburg to involve some (economic) geographers that also have been working with Southeast Asia to make a description of resources and economic activities of (potential) importance together with an assessment of areas of (possible) conflicts -sectorial and/or areal.

It is anticipated that the study should build upon material easily available in Sweden and at central institutions in the region.

Aspects/matters to be included in the study

The study should include but not necessarily be limited to, the following aspects and fields of economic activity:

The Mekong River region and historical patterns of settlement, migration, trade and economic activity.

The Mekong River region in its modern political setting.

The Geography of the Mekong River region.

The resources of the Mekong River region.

Urban settlements of the Mekong River region.

Present patterns of economic activities - location and outputs
-agriculture
-forestry
-fisheries
-hunting (wild life)
-aquaculture
-mangrove production
-agro-industries
-handicrafts
-trade
-transportation
-mining
-salt mining/salt extraction
-shipping
-ship building
-tourism

-power-generation
-modern industrial development
-etc.

Constraints to sustainable development
-conflicts over available resources
-conflicts resulting from negative impacts of other economic activities or infrastructure development.
-transboundary issues
-conflicts over space

Special concerns for sustainable development
-destruction of valuable habitats and ecosystems
-loss of biodiversity
-transboundary strategic issues

Identification of "hot spots" - present and emerging

Synthesis: political, social and environmental consequences at local, national and regional level.

List of References

Time schedule and reporting

The final study should be undertaken during the latter part of 1996 and the "final draft" should be presented in February 1997.

The "final draft" should contain both the descriptive and analytical parts of the study.

The final version will be published by Sida.

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III. Persons Consulted

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Andreasson, Lars, Chief Programme Coordination Unit, Mekong River Commission, Luang Prabang, 31/10

Ashwell, David, IUCN, Liasion Officer, Phnom Penh 23/11

Bergman, Göran, Swedish Embassy, Vientiane, 29/10

Bibo, Clem, Associate Economic Affairs Officer, Development Research and Policy Analysis Division, ESCAP, 27/11

Björlin, Anette, GIS-Expert, Environmental Unit, MRC Secretariat, 11/11

Blue, Richard N. Associate Director, Mekong Region Law Center, 28/11

By, Ola, Project Manager, Nordic Hydropower, Theun Hinboun Power Project, Vientiane, 2/11

Chakthep Senivongs, Executive Director, Mekong Region Law Center, 28/11

Chape, Stuart, IUCN, Vientiane, 30/10

Chea Sieng Hong, Cambodia National Mekong Committee (IRIC), Phnom Penh 23/11

Cook, James K. Assistant Director, Mekong Region Law Center, 28/11

Demaine, Harvey, Associate Research Professor, Aquaculture Outreach Programme 7/11

Eizenberg, David, Programme Officer, UNDP, Vientiane, 29/10,

Ertuna, Cengiz, Chief, Water Resources Section, ESCAP, 27/11

Fogde, Peter, Director, Burapha Group, Vientiane, 29/10

Forsythe, Lee, country Representative, Community Aid Abroad (OXFAM in Australia), Phnom Penh 21/11

Gloerfelt-Tarp, Thomas, Fisheries Specialist, Forestry and Natural Resources Division, Agriculture and Social Sectors Department, ADB, 14/11

Gwi-Yeop Son, Assistant Representative UNDP, Vientiane, 29/10

Hand, Taber R. Doctoral Research Fellow, Institute for Ecolocial Economics, the University of Maryland, USA, 28/11

Hussain, Zakir, Head, IUCN South and Southeast Asia, Regional Co-ordination Office, Bangkok, 12/11

Höstrup, Jesper R. Councellor, Economic and Commercial, Embassy of Sweden, 28/11

Jensen, Jörgen G. Chief Agriculture, Irrigation, Forestry, and Fisheries Unit MRC Secretariat. 26/11 1996

Johnson, Gordon, Senior Advisor Environment and Natural Resources, UNDP, Hanoi, 4/11

Kamp, Jan, Resident Representative UNDP, Jakarta, (Former Chief Executive Officer IMC), Luang Prabang, 31/10

Kanthien Koy, Programme Officer, UNDP, Phnom Penh 19/11

HE Dr. Kithong Vongsay, Chairman of the Lao National Mekong Committee, Luang Prabang, 31/10

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Laursen, Erik, Counsellor, Development Cooperation, Royal Danish Embassy 26/11

Le Huu Cat Dien, National Programme Officer, UNDP Hanoi, 4/11 1996

Le Huu Ti, Economic Affairs Officer, Water Resources Section, ESCAP, 12/11

Le Than Luu, Vice Director, Research Institute for Aquaculture No. 1, Ministry of Fisheries Vietnam. 7/11

Le Thi Liem, Deputy Director Economic Department, Ministry of Foreign Affairs, Hanoi, 6/11

Lecup, Jaques, Programme Coordinator, IUCN, Hanoi, 5/11

Maire, Henri, Regional Adviser, Mineral Resources Section. ESCAP, 27/11

McNaughton, Andrew, Resident Senior Program Officer, IDRC, Phnom Penh 21/11

Mortensen, Peter, Chief of Environmental Unit, MRC Secretariat, 11/11, 26/11

Natsuki Hiratsuka, Deputy Regional Representative, UNDP, Bangkok 28/11

Nguyen Nhan Quang, Deputy Secretary General, Vietnam National Mekong Committee, Hanoi, 6/11 .

Nilsson, Lars Y., Associate Professor, Kungliga Tekniska Högskolan, (Former Chief of the Environmental Section, IMC), Luang Prabang, 31/10

Pante, Filologo, JR. Head, Greater Mekong Subregional Unit, Programs Department (West), ADB, 14/11

Pham Van Ninh, Prof. Dr., Marine Hydrodynamics and Pollution, Center for Marine Environment Survey, Research and Consultation, CMESRC, 5/11

Prachoom Chomchai, Coordinator, Mekong Development Research Network, MDRN, Chulalongkorn University, 29/11

Prathes Sutabutr, Director General, Department of Energy Development and Promotion, National Mekong Committee Thailand, 28/11

Ms. Premrudee, Terra, Bangkok, 28/11

Radka, Mark P., Programme Officer, UNEP, Bangkok, 27/11

Ram S. Tiwaree, Environment Specialist, ESCAP, Bangkok 27/11

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Samran Chooduangngern, Advisor, Policy and Planning, MRC, Bangkok 26/11

Singha Ounniyom, Project Coordinator, Lao National Mekong Committee, Vientiane 2/11

Surendra Shrestha, Director, UNEP-EAP/AP, 12/11

Thevet Insisienmay, Director Technical Support Division, MRC, Bangkok 26/11

Tran Thi Thanh Phuong, Ministry of Science, Technology and Environment, Vietnam National Environment Agency, Hanoi 5/11

Tucker, Henry G. Economist (Environment) Programs Department (West), ADB, 15/11

Török, Steven J. Asian Gas Centre, Energy Resources Section, Environment and Natural Resources Management Division. ESCAP, 27/11

U Wai Lin, Environmental Affairs Officer, Environment and Natural Resources Management Division. ESCAP, 27/11 1996

Usuki, Mitsuo, Deputy Regional Representative, Regional Office for Asia and the Pacific, UNEP, 27/11

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Vu Ngoc Tien, Programme Assistant, FAO Hanoi, 4/11

Wartiovaara, Jyrki, Environment Specialist, Environment Division, Office of Environment and Social Development, ADB, 14/11

Yeung, Robert C.Y. Senior Cofinancing Officer, Office of Cofinancing Operations, ADB, 14/11

Yuka Makino, Programme Officer, UNDP, Phnom Penh, 19/11

Yukie Hori, Associate Social Affairs Officer, ESCAP, Bangkok 27/11

IV. The MRC-Agreement

Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (selected sections)

The Governments of The Kingdom of Cambodia, The Lao People's Democratic Republic, The Kingdom of Thailand, and The Socialist Republic of Viet Nam, being equally desirous of continuing to cooperate in a constructive and mutually beneficial manner for sustainable development, utilization, conservation and management of the Mekong River Basin water and related resources, have resolved to conclude this Agreement setting forth the framework for cooperation acceptable to all parties hereto to accomplish these ends, and for that purpose have appointed as their respective plenipotentiaries.

The Kingdom of Cambodia:
H.E. Mr. Ing Kieth
Deputy Prime Minister and Minister of Public Works and Transport

The Lao People's Democratic Republic:
H.E. Somsavat Lengsavad
Minister of Foreign Affairs

The Kingdom of Thailand:
H.E. Dr. Krasae Chanawongse
Minister of Foreign Affairs

The Socialist Republic of Viet Nam:
H.E. Mr. Nguyen Manh Cam
Minister of Foreign Affairs

Who, having communicated to each other their respective full powers and having found them in good and due form, have agreed to the following:

Chapter 1: Preamble

RECALLING the establishing of the Committee for the Coordination of Investigations of the Lower Mekong Basin on 17 September 1957 by the Governments of these countries by Statute endorsed by the United Nations

NOTING the unique spirit Of cooperation and mutual assistance that inspired the work of the Committee for the Coordination of Investigations of the Lower Mekong Basin and the many accomplishments that have been achieved through its efforts.

ACKNOWLEDGING the great political, economic and social changes that have taken place in these countries of the region during this period of time which necessitate these efforts to reassess, redefine, and establish the future framework for cooperation.

RECOGNIZING that the Mekong River Basin and the related natural resources and environment are natural assets of immense value to all the riparian countries for the economic and social well-being and living standards of their peoples.

REAFFIRMING the determination to continue to cooperate and promote in a constructive and mutually beneficial manner in the sustainable development, utilization, conservation and management of the Mekong River Basin water and related resources for navigational and non-navigational purposes, for social and economic development and the well-being of all riparian States, consistent with the needs to protect, preserve, enhance and manage the environmental and aquatic conditions and maintenance of the ecological balance exceptional to this river basin.

AFFIRMING to promote or assist in the promotion of interdependent subregional growth and cooperation among the community of Mekong nations, taking into account the regional benefits that could be derived and/or detriments that could be avoided or mitigated from activities within the Mekong River Basin undertaken by this framework of cooperation.

REALIZING the necessity to provide an adequate, efficient, and functional join organizational structure to implement this Agreement and the projects, programs and activities taken thereunder in cooperation and coordination with each member and the international community , and to address and resolve issues and problems that may arise from the use and development of the Mekong Rive Basin water and related resources in an amicable, timely and good neighborly manner.

PROCLAIMING further the following specific objectives, principles, institutional framework and ancillary provisions of conformity with the objectives and principles of the Charter of the United Nations and international law.

Chapter II: Definitions of Terms

For the purposes of this Agreement, it shall be understood that the following meanings to the underlined terms shall apply except where otherwise inconsistent with the context:

Agreement under Article 5: A decision of the Join Committee resulting from *prior consultation* and evaluation on any *proposed use* for inter-basin diversions during the wet season from the mainstream as well as for inter-basin use or inter-basin diversions of these waters during the dry season. The objective of this *agreement* is to achieve an optimum use and prevention of waste of the waters through a dynamic and practical consensus in conformity with the Rules for Water Utilization and Inter-Basin Diversions set forth in Article 26.

The acceptance minimum monthly natural flow: The acceptable minimum monthly natural flow during each month of the dry season.

Acceptable natural reverse flow: The wet season flow level in the Mekong River at Kratie that allows the reverse flow of the Tonle Sap to an agreed upon optimum level of the Great Lake.

Basin Development Plan: The general planning tool and process that the Join Committee would use as a blueprint to identify, categorize and prioritize the projects and programs to seek assistance for and to implement the plan at the basin level.

Environment: The conditions of water and land resources, air, flora and fauna that exists in a particular region.

Notification: Timely providing information by a riparian to the Join Committee on its *proposed use* of water according to the format, content and procedures set forth in the Rules for Water Utilization and Inter-Basin Diversions under Article 26.

Prior consultation: Timely *notification* plus additional data and information to the Joint Committee, as provided in the Rules for Water Utilization and Inter-Basin Diversion under Article 26, that would allow the other member riparians to discuss and evaluate the impact of the *proposed use* upon their uses of water and any other affects, which is the basis for arriving at an agreement. *Prior consultation* is neither a right to veto the sue nor unilateral right to use water by any riparian without taking into account other riparians' rights.

Proposed Use: Any proposal for a definite use of the waters of the Mekong River system by any riparian, excluding domestic and minor uses of water not having a significant impact on mainstream flows.

Chapter III: Objectives and Principles of Cooperation

The parties agree:

Article 1. Areas of Cooperation

To Cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin including, but not limited to irrigation, hydro-power, navigation, flood control, fisheries, timber floating, recreation and tourism, in a manner to optimize the multiple-use and mutual benefits of all riparians and to minimize the harmful effects that might result from natural occurrences and man-made activities.

Article 2. Projects, Programs and Planning

To promote, support, cooperate and coordinate in the development of the full potential of sustainable benefits to all riparian States and the prevention of wasteful use of Mekong River Basin waters, with emphasis and preference on joint and/or basin-wide development projects and basin programs through the formulation of a basin development plan, that would be used to identify, categorize and prioritize the projects and programs to seek assistance for and to implement at the basin level.

Article 3. Protection of the Environment and Ecological Balance

To protect 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 4. Sovereign Equality and Territorial Integrity

To cooperate on the basis utilization of sovereign equality and territorial integrity in the utilization and protection of the water resources of the Mekong River Basin.

Article 5. Reasonable and Equitable Utilization

To the waters of the Mekong River system in a reasonable and equitable manner in their respective territories, pursuant to all relevant factor and circumstances, the Rules for Water Utilization and Inter-basin Diversion provided for under Article 26 and the provisions of A and B below:

A. On tributaries of the Mekong River, including Tonle Sap, intra-basin uses and inter-basin diversions shall be subjected to notification to the Joint Committee.

B. On the mainstream of the Mekong River:

1. During the wet season:

a) Intra-basin use shall be subject to notification to the Joint Committee

b) Inter-basin diversion shall be subject to prior consultation which aims at arriving at an agreement by the Joint Committee

2. During the dry season

a) Intra-basin use shall be subject to prior consultation which aims at arriving at an agreement by the Joint Committee.

b) Any inter-basin diversion project shall be agreed upon by the Joint Committee through a specific agreement for each project prior to any proposed diversion. However should there be a surplus quantity of water available in excess of the proposed uses of all parties in any dry season, verified and unanimously confirmed as such by the Joint Committee, an inter-basin diversion of the surplus could be made subject to prior consultation.

Article 6. Maintenance of Flow on the Mainstream

To cooperate in the maintenance of the flows on the mainstream form diversion, storage releases, or other actions of a permanent nature; except in the cases of historically severe droughts and/or floods:

A Of not less than the acceptable minimum monthly natural flow during each month of the dry season;

B. To enable the acceptable natural reverse flow of the Tonle Sap to take place during the wet season; and

C. To prevent average daily peak flows greater than what naturally occur on the average during the flood season.

The Join Committee shall adopt guidelines for the locations and levels of the flows, monitor and take action necessary for their maintenance as provided in Article 26.

Article 7. Prevention and Cessation of Harmful Effects

To make every effort to avoid, minimize and mitigate harmful effects that might occur to the environment, especially the water quantity and quality, the aquatic (ecosystem) conditions, and ecological balance of the river system, from the development and use of the Mekong River Basin water resources or discharge of wastes and return flows. Where one or more States is notified with proper and valid evidence that it is causing substantial damage to one or more riparians from the use of and/or discharge to water of the Mekong River, the State or States shall cease immediately the alleged cause of harm until such cause of harm is determined in accordance with Article 8.

Article 8. State Responsibility for Damages

Where harmful effects cause substantial damage to one or more riparians from the use of and/or discharge to waters of the Mekong River by any riparian State, the party(ies) concerned shall determine all relative factors, the cause, extent of damage, and responsibility for damages caused by that State in conformity with the principles of international law relating to state responsibility, and to address and resolve all issues, differences and disputes in an amicable and timely manner by peaceful means as provided in Articles 34 and 35 of this Agreement, and in conformity with the Charter of the United Nations.

Article 9. Freedom of Navigation

On the basis of equality of right, freedom of navigation shall be accorded throughout the mainstream of the Mekong River without regard to the territorial boundaries, for transportation and communication to promote regional cooperation and to satisfactorily implement projects under this Agreement. The Mekong River shall be kept free from obstructions, measures, conduct and actions that might directly or indirectly impair navigability, interfere with this right or permanently make it more difficult. Navigational uses are not assured any priority over other uses, but will be incorporated into any mainstream project. Riparians may issue regulations for the portions of the Mekong River within their territories, particularly in sanitary, customs and immigration matters, police and general security.

Article 10. Emergency Situations

Whenever a Party becomes aware of any special water quantity or quality problems constituting an emergency that requires an immediate response, it shall notify and consult directly with the party(ies) concerned and the Joint Committee without delay in order to take appropriate remedial action.

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Chapter IV: Institutional Framework

Article 26. Rules for Water Utilization and Inter-Basin Diversions

The Joint Committee shall prepare and propose for approval of the Council, inter alia, Rules for Water Utilization and Inter-Basin Diversions pursuant to Articles 5 and 6, including but not limited to 1) establishing the time frame for the wet and dry seasons; 2) establishing the location of hydrological stations, and determining and maintaining the flow level requirements at each station; 3) setting out criteria for determining surplus quantities of water during the dry season on the mainstream; 4) improving upon the mechanism to monitor intra-basin use; and 5) setting up a mechanism to monitor diversions from the mainstream.

Previous publications on Water Resources:

1. Water and Security in Southern Africa
   Leif Ohlsson, University of Gothenburg

3. Study of Water Resources in Zimbabwe
   Åke Nilsson and Amanda Hammer

4. A Liquid More Valuable Than Gold
   Pierre Frühling

5. Towards an Ecological Approach to Sanitation
   Uno Winblad

6. A Gender Perspective in the Water Resources Management Sector
   Helen Thomas, Johanna Schalkwyk and Beth Woroniuk

7. Most Worthwhile Use of Water
   Jan Lundqvist and Klas Sandström

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
S-105 25 Stockholm, Sweden
Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64
Homepage: http://www.sida.se
ISBN: 91-586-7716-X