Report on Mekong River Basin
Environmental and Social Issues
Survey Project for MeREM

Transboundary Environmental Issues in the Mekong River Basin: Perspectives from Civil Society & Recommendations for MeREM

February 2005

Written by Mekong Watch

Mekong Watch

Forward

Mekong Watch was commissioned by the National Institute for Environmental Studies (NIES) to conduct a survey of the activities of civil society in the Mekong River basin in regard to environmental and social issues, and to report to the MeREM project about the issues seen as priority to civil society in the region. Mekong Watch hired a program coordinator to make contacts with civil society organizations, and she attended international conferences as well as conducted individual interviews with activists, academics, and government officials. This report was compiled by Kaori Osawa, the program coordinator and edited by Satoru Matsumoto (Mekong Watch, Representative Director) and Madoka Onizuka (Mekong Watch). Contributions on Cambodia and Thailand were also made by other Mekong Watch staff—Ayumi Goto, Yuka Kiguchi, and Rena Sugita. The map of the Mekong Region was made by Shinji Yamada, Mekong Watch intern.

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MAP OF MEKONG RIVER BASIN

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Chapter 1 Introduction and Background Information

1.1 Background

The National Institute of Environmental Studies (NIES) has initiated a three-year pilot project for monitoring the ecosystem in the Mekong River basin called the Mekong River Ecosystem Monitoring (MeREM) project. This is an important initiative not only due to the need for scientific data on ecosystems in the Mekong River basin, but particularly because NIES has stated that it wants to ensure that its research will be of practical use to "practitioners" who are working to conserve the environmental integrity of the Mekong Region.

Mekong Watch has been working with local people and civil society in the Mekong River basin since 1992. We have been concerned about the negative impacts that large development projects are having on people in the Mekong region, particularly those communities who have lived traditional livelihoods rooted in the integrity of their natural environments. More often than not, development projects have neglected the needs of local people who have sustained and depended upon healthy ecosystems for their livelihoods.

Mekong Watch welcomes the MeREM project as an initiative with the potential to contribute greatly not only to the scientific knowledge base of the natural environment in the Mekong River basin, but to the efforts of practitioners in the region who are working to address transboundary environmental issues. These practitioners include both local people and the civil society organizations who support them. Many villagers living near rivers in the Mekong region, both the mainstream and the tributaries, have increasingly been reporting various changes in their natural environments. Fish catches are diminishing, river water used for generations is now causing severe skin diseases, sudden surges in water levels wash away fishing gear, flood riverside gardens, and in some cases even erode the riverbank so drastically that chunks of land and the houses upon it disappear. Rivers, which have long been at the foundations of villagers' livelihoods, are now behaving strangely, and people are asking, "why?"

In looking for answers to this question, "why?" people have learned about development projects such as dams and navigation projects in areas upstream to where they live. People are voicing concerns and looking for information, but information is not always forthcoming. They are expressing increasing conviction that the causes of the changes they are seeing are results of development projects, but actually proving that there is a

causal relationship between certain projects and damage to the natural environment is one of the biggest challenges they face. This is especially true when the development projects they believe to be the source of environmental impacts are located in a neighboring country. Another challenge is to convince decision-makers with political and economic interests in these projects to take villagers' concerns seriously. While we do not necessarily expect MeREM to fulfill an advocacy role, we do believe that increased sensitivity to the problems perceived by local communities could enhance the relevance of MeREM's research to civil society, and thus to maintaining the integrity of the environment in the Mekong River basin.

1.2 Objectives

In examining issues of hydrology, biodiversity and water quality in the Mekong River basin, the core of MeREM's work is understandably heavily weighted towards the natural sciences. The objective of Mekong Watch's involvement in the MeREM project is to provide input for MeREM regarding activities being conducted by civil society groups in the Mekong River basin in regard to transboundary environmental issues—to inject a social science perspective. We do this in order to facilitate a better understanding within MeREM of the situation of local people and civil society so that MeREM's work accurately reflects the realities of environmental and social struggles people in the Mekong region are experiencing.

1.3 Mekong Watch Activities in Fiscal Year 2004

As the first step in accomplishing the above objective, Mekong Watch carried out the following activities during fiscal year 2004 (October 2004-February 2005)

1) Reviewed existing social science reports compiled by researchers and NGOs in the past several years. Focus was placed on research related to water quality, hydrology and biodiversity.
2) Interviewed NGO staff, researchers and community organizers to collect information about their current and planned activities related to addressing negative impacts of development in the Mekong region. Focus was placed on activities related to hydrology, water quality and biodiversity (in particular, aquatic plants and fish).
3) Summarized our findings into this report in order (a) to inform MeREM of the concerns and activities of civil society in the Mekong region, and (b) to provide recommendations for monitoring hydrology, water quality and biodiversity in the Mekong River basin.

1.4 Organization of this report

The following chapters introduce the results of our activities for MeREM, provide basis for recommendations, and list recommendations for MeREM's ecosystem monitoring in the Mekong River basin. Chapter 2 introduces the key transboundary environmental issues identified by local people and civil society. Chapter 3 organizes the issues introduced in Chapter 2 into categories of hydrology, water quality and biodiversity, to explain these issues within the MeREM framework. And finally, Chapter 4 contains recommendations for MeREM's monitoring activities in the Mekong River basin.

Chapter 2 Key Transboundary Issues in the Mekong River Basin

2.1 Focal Areas of Concern Among Civil Society Groups on Transboundary Environmental Issues

The planning and implementation of large-scale development projects in the Mekong River basin have brought the transboundary nature of the impacts of development to the forefront of activism and development discourse. Whether projects are done for domestic or regional purposes, the impacts are clearly crossing borders. While the transboundary impacts of development in the Mekong region have been recognized as an issue of importance for many years, the past few years have seen an increase in activity by many stakeholders in this regard.

One example of the active interest in transboundary issues took the form of a large international conference, the "International Conference on Natural Resource Management and Cooperation Mechanism in the Mekong Region." This conference was hosted by the Thai Senate, the United Nations, and a Thai NGO called Towards Ecological Recovery and Regional Alliance (TERRA), and was held in Bangkok in November 2004. NGOs from around the Mekong region gathered and at the end, presented a People's Declaration to riparian governments and developers, including major actors and aid agencies such as the Mekong River Commission (MRC), World Bank, and Asian Development Bank (ADB). In the declaration, the NGOs demanded that a practical mechanism be established to guarantee that local people and NGOs play an integral part in decision-making processes in development of the region. (See Appendix 4)

Meetings and events of smaller scale have also taken place to address the transboundary impacts of development. At around the same time as the international conference mentioned above, a group of Thai and international organizations organized an event called the "Mekong Fair." At this event, the first half was dedicated to listening to the voices of villagers and the results of their *Thai baan* research ("Villagers'" research—explained in more detail in Section 2.2.2(b), which documents the changes they are seeing in the Mekong River and how these changes affect various aspects of their livelihood as well as the integrity of the river's ecosystems. During the second half of the event, there was much discussion on the impacts caused by China's mainstream dams and blasting of rapids for a commercial navigation project. Appeals were made through the mass media by the conference participants to call for a

stop to such destructive development.

Transboundary issues are not limited to the mainstream of the Mekong River. In February 2005, a "Northeast Cambodia Fishery Regional Forum" was held in Stung Treng Province, Cambodia. At this forum organized primarily by five Cambodian NGOs, more than 100 people gathered to discuss the downstream impacts being felt in Cambodia as a result of the many hydropower projects upstream in Vietnam and Laos on the Se San, Sre Pok and Se Kong Rivers. There were also discussions on the impacts of development on the Tonle Sap Lake. This forum was one example of the activities being done in Cambodia to empower local people with information and bridge the gap in understanding between project affected communities and decision-makers regarding the transboundary impacts of development projects.

A review of activities by civil society regarding transboundary environmental issues in the Mekong River basin indicates that there are four key areas that must be examined in order for MeREM to respond to civil society's main concerns. These can be categorized as:

(1) upstream development on the Mekong River's mainstream,
(2) development on tributaries of the Mekong River that cross international boundaries,
(3) development on tributaries of the Mekong river that do not cross international boundaries, and
(4) Tonle Sap Lake.

Details of each key issue are described in this Chapter.

2.2 Upstream Development on the Lancang-Mekong's Mainstream

Changes made to the upstream of the Mekong River, called the Lancang[1] in China, can be expected to have far-reaching impacts on countries downstream through which the river flows. Though the Mekong River is massive, the contribution of the Lancang to the annual flow of the Mekong in countries downstream is significant. NGOs are quoting figures saying that water originating in China's Lancang contributes 15-20% of the total annual flow in Vietnam and 45% of the flow in Cambodia in April (Blake,

[1] In this report, "Lancang," the Chinese name for the section of the upper Mekong River in China, will be used to indicate the portion of the river that is in China, while "Mekong" will be used for the entire stretch of the river downstream of China. The entire stretch of the river, from source to its mouth, will be referred to as the Lancang-Mekong.

2001)[2]. Approximately half of the sediment load is also said to originate in China (Blake, 2001). Development projects on the Lancang-Mekong are now disrupting the river's flow, and we believe that this is also disrupting the livelihoods of people dependent upon this river and its ecosystems.

After a brief description of the two main categories of development projects on the upstream of the Lancang-Mekong River, this section will introduce the related work by civil society and other actors.

2.2.1 Mainstream dams and commercial navigation

There are two main types of development projects on the upstream of the Mekong River. One is dam construction. There is a plan to build a cascade of eight dams on the mainstream of the Lancang River in Yunnan Province, China. The other type is promotion of commercial navigation. This involves dredging the Lancang-Mekong River and blasting its rapids to enable larger ship transportation and further stimulate trade between China and other countries of mainland Southeast Asia.

Though incomplete, local people and NGOs downstream are already expressing urgent concern about what they see to be the impacts of dam construction and blasting of rapids on the Lancang-Mekong River. They expect impacts to intensify as the projects proceed. It is difficult, however, for downstream communities to prove the causal relationship between these environmental changes downstream to the development projects upstream. In efforts to raise awareness and call for a halt to this destructive development, NGOs and villagers are documenting the changes they are seeing in the Mekong River.

2.2.1(a) Mainstream dams

In regard to the eight cascade dams planned by the Chinese government, two dams have already been completed, and two more are under construction. The first to be completed was the Manwan Dam, finished in 1993. The second dam was the Dachaoshan Dam, completed in 2003. The dams currently under construction are the Jinghong and Xiaowan dams.

[2] While quoted in several NGO reports, these figures are initially quoted by David Blake, attributing them to a technical report by Halcrow Engineer Peter Adamson. We have not been able to access the original technical report.

Generally speaking, it is well known that dams affect many aspects of river ecosystems, including water quality, water levels and biodiversity. China's geographical location far upstream on the Lancang-Mekong River makes its activities on this river particularly controversial, as impacts may be felt as far as the mouth of the river in Vietnam and all riparian countries in between.

At present, while the Chinese government does provide some hydrological information to the Mekong River Commission (MRC), there is a general dearth of public information on the operations of the Manwan and Dachaoshan Dams, so it is very difficult to concretely prove how the operations are related to the environmental changes downstream. Civil society is indeed very concerned about how the dams on the upstream of the Mekong River will affect the communities living along the river as well as the environment of the whole Mekong River basin. In 2003, a joint study by NGOs and researchers was conducted on the impacts of the Manwan Dam. More details on this study will be explained below.

2.2.1(b) Commercial navigation project

In April 2000, China, Laos, Burma and Thailand signed an agreement on commercial navigation on the Lancang-Mekong River, under which they agreed to promote cooperation to maintain and improve the navigability of the river, and to institute measures to increase safety for navigation. Ships from any of the contracting countries would be entitled to sail freely between Simao in China and Luang Pabang in Laos.

As of August 2003, between Simao and Luang Pabang, ships up to 100 tons could navigate the river. The aim of the commercial navigation project is to make this approximately 885 km stretch of the Lancang-Mekong River navigable by 4 lanes of 500 ton ships in both the rainy and dry seasons. This will require the blasting of many rapids in the river and dredging of the riverbed in order to create the depth necessary for these large ships. Needless to say, the environmental and social impacts of physical changes of this scale are expected to be immense.

2.2.2 Civil Society's Documentation of Upstream Development Impacts

The full implementation of the dam projects and commercial navigation plans are, of course, expected to wreak havoc on ecosystems and thus upset the livelihoods of people throughout the region. Below is a brief overview of some of the work being done by civil society and academics, to document some of the changes they are seeing on the Lancang-Mekong River.

2.2.2(a) Study on local impacts of Manwan Dam

The dams on the upstream of the Mekong affect not only downstream, but also local communities in Yunnan Province. Studies were done in relation to the local impacts of the Manwan Dam by a team of scientists and academics who came together as the Study Group of the Impacts of Lancang River Manwan Power Plant (hereafter, the Study Group). This Study Group was associated with the University of Yunnan's Asian International Centre for Rivers, and funded by Oxfam Hong Kong. The findings of this Study Group were summarized in a report released in December 2002 entitled, "Study on the Social, Economic and Environmental Impacts of Manwan Power Plant."

The studies are particularly significant because they were the first to look beyond superficial impacts of dams in China. They provide information on the impacts of construction as well as social and economic impacts, including the effects on agricultural production and economic returns. The studies do not hesitate to point out the negative impacts of the dam, and attribute the reduction and loss of land, forests, pastures and water resources to the dam's construction.

In examining the social aspects of the construction of the Manwan Dam, the Study Group went beyond numbers of people resettled and superficial treatment of the resettlement plans to examine the actual conditions people faced after resettlement and the problems they were facing in establishing new livelihoods. They found that people's loss of means of livelihood led to poverty and hunger. Although resettlement plans had been designed, the houses provided were unstable and deteriorated rapidly.

Studies of water quality in the reservoir of the Manwan Dam revealed pollution coming from factories upstream. Mines and paper factories in the upstream towns of Lanping and Erbin respectively, are sources of pollution. Garbage and wastewater from cities have also been identified as causes of pollution in the dam's reservoir. The Study Group also found that various social, cultural and psychological impacts can be seen as a result of changes in the ecosystem as well as the failure of resettlement plans.

Another important finding of this research is regarding the rapid erosion and siltation in the Manwan Dam's reservoir. The dam was completed in 1993, and in only three years of operation, so much soil and sediments from upstream collected in the reservoir that the capacity situation reached that of the 15th year. The gross siltation rate reached the design standard for the 5th year. With rates such as these, several times faster than expected, it is questionable not only how long the dam will last, but the

spill-over effects this will have downstream are a concern.

The Study Group then wrote recommendations for the Chinese Government, including recommendations to make decision-making in such development projects more participatory.

The Manwan Dam is often a topic of discussion of transboundary impacts of development. The studies done by the Study Group show, however, that the impacts at the local level are also very significant. Some local impacts, such as pollution in the Manwan Dam's reservoir, could have more far-reaching effects, while other problems are more limited. Regardless, studies such as these are very useful for understanding the impacts of the Manwan Dam both in Yunnan Province and in the Mekong River basin as a whole.

The Manwan Dam was the first of the eight cascade dams to be built on the Mekong River, and it was said that its impacts would be few. As can be seen from the above study, however, the local impacts, in addition to the more widely addressed transboundary impacts, are far from insignificant and should be monitored

2.2.2(b) *Thai Baan* Research on Recent Downstream Impacts in Northern Thailand

While the word "researcher" is often associated with universities and prestigious institutions, villagers in Thailand have given the word a new twist. Fed up with having to suffer impacts of development because official environmental impact assessments failed miserably to incorporate their concerns, Thai villagers have developed their own methods of research which they call *Thai baan* research, or "villagers' research." *Thai baan* research is participatory and involves in-depth discussions and interviews. Validation of data is done by local experts. The results of their research have become widely recognized among academic, NGO and government circles as sources of valuable information.

Thai baan research first began in relation to the Pak Mun Dam on the Mun River (see Section 2.4.4) and is now being practiced in other parts of Thailand. After it became known that China would begin blasting the rapids in the upstream of the Mekong River, villagers living along the river in Chiang Khong became very concerned about the impacts this could have on their livelihoods. A total of 146 villagers from 13 communities living along the Mekong River began their *Thai baan* research to examine 6 focal areas: (1) fisheries, (2) river ecosystems, (3) plants and vegetables, (4) traditional fishing gear, (5) dry-season riverbank vegetable gardens, and (6) social, economic and

cultural issues (Chiang Khong, 2004).

While the *Thai baan* research in Chiang Khong may not provide conclusive scientific evidence of a causal relationship between the construction of dams on the Lancang and blasting of the rapids for the commercial navigation project with changes in the Mekong River, the research provides important base-line information. Some of the research does, however, indicate that there is indeed a relationship between upstream development and recent changes in the Mekong River.

Villagers in Northern Thailand, for example, have reported witnessing strangely drastic fluctuations in water levels since China began implementation of the commercial navigation project in the dry season of 2001. Riverbank erosion has also been documented. During the rainy seasons of 2002 and 2003, four households living in Pak Ing Village lost an entire bank of land to the river because of the unnaturally turbulent flow of the river. More severely, the land and homes of 113 families in Baan Don Sawan Village (a Lao village on the opposite side of the river from Pak Ing) were also swept away by the Mekong River (International Rivers Network et al., 2003).

The Chiang Khong *Thai baan* research documents that unusual fluctuations in water level and erosion of riverbanks have also led to destruction of riverine ecosystems which are habitats to approximately 100 fish species, 88 of which are native species. They also found that fish catches have declined by 50% since 2001 (Chiang Khong, 2004). Sightings of the famous Mekong catfish have also become rare. Before 1994 and prior to the construction of the Lancang dams, around 40 giant catfish were caught annually. Between 2000 and 2003, however, not a single giant catfish was caught (International Rivers Network et al., 2003).

Changes in the river ecosystem have also made *Kai* (*chlorophyta spirogyra*), more difficult to find. *Kai* is a type of freshwater weed rich in protein and is an important part of the local diet as well as an important source of food for fish in the Mekong River. Unusual river fluctuations also resulted in the flooding and destruction of people's gardens on the sand beaches and sandbars which appear in the dry season. Not only fluctuation, but deepening of the river in the dry season itself is a problem. With the deeper water, sufficient sunlight will not penetrate the river, thus preventing the growth of freshwater plants that usually appear in the dry season. Such changes will disrupt the aquatic food chain (Chiang Khong, 2004).

The above findings of the *Thai baan* research in Chiang Khong were presented at an event held during a field trip to Chiang Khong immediately after the November

international conference in Bangkok. During this field trip, many people from Cambodia showed great interest in the findings by the *Thai baan* researchers regarding the impacts upstream development on migratory fish in Northern Thailand. One participant, Mr. Touch Seang Tana, Cambodia's Secretary of State, commented that many people in Cambodia are very concerned about the impacts upstream development in China may be having on fisheries in Cambodia. He believed that more studies were necessary to determine the precise impacts.

2.2.2(c) Rak Chiang Khong findings on changes in fish reproductivity

A Thai people's organization called *Rak Chiang Khong* participated in the Bangkok International Conference held in November 2004. Mr. Somkiat Khuenchiangsa, a representative of the organization, gave a presentation there and explained that changes in hydrology were having an impact on reproduction of migratory fish. He explained that because water from the Mekong River has sped up, water from the tributaries drains into the Mekong more rapidly as well, also causing a faster drop in water levels in the tributaries. This means that migratory fish are also returning to the Mekong River earlier. Because fish mature in the tributaries, their early return to the Mekong River means that they are not as big, and therefore do not produce as many eggs as they would if they grew to full maturity in the tributary.

2.2.3 Other surveys and findings

While local people and civil society have done significant research and made informative findings, there is other information documented by researchers and government officials that we felt would be useful to include here to facilitate our understanding of transboundary concerns in the Mekong region.

2.2.3 (a) Change in water discharge from the Lancang to the Mekong

The purpose of the commercial navigation project is to enable large ships to navigate the Mekong River in the dry season. To be successful, this will require a significant increase in the volume of water. This "extra" water is to come from release of water from the reservoirs upstream. According to a study done by E.C. Chapman and He Daming that examines the prospective impacts of increases in dry-season flow, the dry season (November-April) discharge near the Yunnan-Lao border was 698m^3/sec during the 30-year period between 1953-1982. Chapman and Daming say that the construction of the Manwan and Dachaoshan Dams would have negligible impact on the dry season discharge, but that the Xiawan Dam is expected to increase mean discharge

to 968m^3/sec, and completion of the Nuozhadu Dam to 1868 m^3/sec (an increase of 171%) (Chapman).

There is also some information about mean minimum discharge which, unlike dry season discharge, seems to have declined. Mr. Weerawut Pornrattanaphan, a hydrologist from the Water Resource Department of Thailand has reported that the minimum discharge of the Mekong River at Chiang Sean station has decreased by approximately 25% as a result of the dams on the Lancang. Before the Manwan dam's construction, data taken from 1962 to 1992 shows that the mean minimum discharge was 752m^3/sec. During 1993 to 2003, after the construction of the first dam on the mainstream of the Mekong River, the mean minimum discharge dropped to only 569m^3/sec.

Both of the abovementioned changes are issues of concern, as they are changes in the hydrological regime of the Mekong River. A reduction in annual mean discharge, as well as the general increase in discharge in the dry season, will have serious repercussions on fish and other aquatic life, and thus also on the livelihoods of local people. While some experts welcome the changes in the river as reduction of flooding and additional water for irrigation that will enable a second rice harvest, we believe that this optimism overlooks the integrated nature of people's livelihoods with their current environments and that the negative impacts outweigh most positive impacts.

2.2.3(b) Commercial impacts

While the purpose of the commercial navigation project is to improve cargo transport by ship, it is not clear how well this itself will succeed, since abnormal river fluctuations have commercial impacts too. In April 2004 (dry season), water levels of the Mekong River dropped so low that cargo transportation between China and Thailand came to a near halt (Xinhua, 2004). Causes of this extraordinarily low level were debated. Some claimed that the upstream dams were responsible for the lack of water. Others claimed that it was because there was lack of rain. It is likely, however, that it was a result of a combination of factors, as explained by the Director of the Environmental Protection Office in Xishuangbana Prefecture. He was quoted in an article as saying the reasons for the low level of the river were 1) the fact that it was the dry season, 2) unusually little rain fall and not enough water melting from glaciers to the north, and 3) storage of water in the dam reservoir (Xinhua, 2004).

2.2.3(c) Sedimentation

Construction of dams on the Lancang may actually have sedimentation-related impacts as far away as Tonle Sap Lake in Cambodia. The Finnish Government is sponsoring a research project complementary to the MRC's Water Utilization Project. This project, MRCS/WUP-FIN, will monitor Tonle Sap Lake for a period of 5 years to understand its physical, chemical and biological processes in Tonle Sap Lake. The first stated objective of this project is indeed, to provide "an enhanced knowledge base and analytical tools, that are based on an improved understanding of the interaction between the physical and biological features of the lake and of the changes that may occur due to human activities." Human activities include development projects on the Mekong River.

The project began in 2001, and completed Phase 1 in June 2003. Phase 2 began in May 2004, and is to continue until October 2006. A report issued in May 2003 called, "Modelling Tonle Sap for Environmental Impact Assessment and Management Support" looks at sedimentation and models two scenarios of sedimentation in the Tonle Sap Lake—one without dams on the Lancang, and one assuming that sediment flow will be reduced to 50% with the dams. The difference in these two scenarios is significant. What impacts that will have on the integrity of Tonle Sap Lake, however, is uncertain. This study explains that currently, Tonle Sap Lake retains approximately 80% of the sediments it receives from the Mekong River. Sediments from the Mekong make up about 70% of all sediments that flow into the Lake. According to this study, the Lake is not, however, filling up with sediments, which indicates that the sediments are utilized in ecosystem processes. With a reduction of inflow of sediments from the Mekong River of 50%, what that will do to the ecosystem processes now using the sediment is uncertain. The study suggests, however, that it could impact nutrition and oxygen, as the sediments are hypothesized to be a source of important nutrients. Oxygen conditions could also change, as oxygen conditions tend to be better in areas with higher rates of sedimentation. (MRCS/WUP-FIN, 2003).

2.3 International Tributaries and Transboundary Issues

2.3.1 Recognizing the importance of international tributaries of the Mekong River

Among the many tributaries flowing into the Mekong River, most are domestic rivers originating and flowing within the same country. The exceptional "international tributaries," tributaries that cross national boundaries, are the Se Kong, Se San and Sre Pok Rivers. The sources of the Se San and Sre Pok are located in the Central Highlands

of Vietnam. The Se San and Sre Pok rivers converge at a point about 50km east of the town of Stung Treng in Cambodia, and then are joined by the Se Kong River, which originates in the southern part of Laos. These three rivers join to flow into the Mekong River, and contribute 16.7 percent of the Mekong's flow at the town of Stung Treng (Kawai, 1993 in Hori, 1996).

These rivers had never received much international attention until one survey report was published in May 2000. This survey report, "A Study of the Downstream Impacts of the Yali Falls Dam in the Se San River basin in Ratanakiri Province, Northeast Cambodia" (hereafter, Ratanakiri Report), was prepared by The Fisheries Office of Ratanakiri Province and a local NGO called The Non-Timber Forest Products Project (The Fisheries Office, 2000). The Ratanakiri Report revealed the unprecedented tragedy in Northeast Cambodia caused by the Yali Falls Dam, a dam project upstream on the Vietnam-side of the Se San River, one of these international Mekong tributaries. The survey found that at least 32 people had drowned in Ratanakiri Province of northeastern Cambodia due to irregular fluctuation of water levels, including unusual dry season flooding, incurred by water released from Vietnam's Yali Falls Dam.

This incident triggered many activities and consecutive surveys by NGOs and social scientists. Therefore, this section focuses on this revealing Ratanakiri Report and a series of follow-up activities and research conducted by NGOs working in Cambodia.

2.3.2 Downstream Impacts of the Yali Falls Dam

The 720MW Yali Falls Dam was constructed on a tributary of the Se San River in Vietnam—the Krong Poko—approximately 70km from the border with Cambodia (CRES, 2001). The construction work started in 1993 with loans from the Ukraine and Russian governments, and financial aid from the Swedish aid agency SIDA. The Dam was completed in 2001. According to the Ratanakiri Report, irregular water fluctuation had begun to be observed by Cambodian downstream communities since the dam gates were closed in order to begin filling the reservoir in 1996.

NGOs working in Cambodia recognized this problem for the first time on 4 March 2000 when AFP reported that three Cambodians died in Ratanakiri Province due to the dam in Vietnam. A few NGO staff working in Ratanakiri Province visited the affected area and issued a short report confirming the fact (TERRA, 2000). Following that, the detailed field survey was initiated by The Fisheries Office of Ratanakiri Province in April to May 2000. This report was a product of cooperation by various groups. Several concerned local governmental sections participated in the survey, and OXFAM and a

Swedish consultant company provided funding for it. The Non-Timber Forest Products (NTFP) Project, an NGO working on natural resource management in Ratanakiri Province, helped facilitate the research. Since the field survey covered a very wide area of 57 villages in the four districts along the Se San River, plus four additional villages located along its major tributaries where 9 ethnic groups live, it was carefully designed in terms of diverse ethnic languages, gender and suitable methods for interviewing indigenous peoples.

The major findings of the field survey are as follows:

1. Lives lost: At least 32 people and large numbers of livestock drowned due to sudden flushing of water from the dam. The interviewed people experienced irregular water fluctuations both during the rainy and dry seasons with rapid changes in water levels, including massive surges of water over two meters high.
2. Flooding: Rainy season flooding damaged agricultural crops and inundated some villages along the Se San River. The report concludes that the extent of flooding in the upper parts was much less severe than that in the lower basin. Due to flooding, riverbanks were eroded extensively and dry season vegetable gardens were submerged. Gold panning during the dry season for additional income was disrupted.
3. Water quality: The interviewed people claimed serious health problems including itchiness, rashes and eye irrigation after bathing in the river, probably due to changes in the Se San River's water quality. Although it is not yet clearly proven, there is reason to believe these health problems were caused by contamination of the Yali Falls Dam's reservoir with toxic blue green algae or other contaminants. Villagers found wild animals dead near the Se San River and they believe that the death of domestic animals could be attributed to contaminated water from the Yali Falls Dam.
4. Fisheries: The interviewed villagers claimed that fish catches in the Se San River drastically declined. Since their sources of protein and income are highly dependent upon fish, decreases in fish induced great impacts on their livelihoods. Villagers believe that the causes are related to changes in the hydrological regime and water quality after closure of the Yali Falls Dam. Water fluctuations also washed away many fish gear and boats.

2.3.3 Se San Network and Further Research

NTFP, in cooperation with the local government and NGOs in Phnom Penh, followed up on the problems. In July 2001, one year after their field survey, they conducted a

follow-up field study and found that the negative impacts had continued although the damage had become less serious. Since they recognized that it was necessary for both local government and NGOs to continue impact monitoring and to propose concrete solutions to restore the river to its original safe and affluent state, they established a network called the Se San Protection Network (Baird, 2001).

The Se San Protection Network consists of various stakeholders who are concerned about the consecutive problems related to the Yali Falls Dam and the future cumulative impacts by a series of planned dams on the Se San River. The Network includes local authorities and NGOs such as NTFP in Ratanakiri Province, as well as relevant government departments, the Culture and Environment Preservation Association (CEPA) and NGO Forum on Cambodia in Phnom Penh. The Network has worked with affected people including indigenous groups for monitoring and advocacy to stop further dam projects along the Se San River.

The first research activity of the Network was a study of impacts on communities in Strung Treng Province further downstream. The study took place from December 2001 to January 2002. It covered the villages not only along the Se San River but also the Sre Pok and Se Kong Rivers which meet with the Se San River before flowing into the Mekong River. They interviewed nearly 2000 people and found similar negative impacts after closure of the dam at Yali Falls in 1996, although the impacts were less severe than those in Ratanakiri Province. A series of field studies helped to raise awareness of villagers and local authorities regarding the possible causal relationship between dam construction far upstream in Vietnam and the changes they were seeing in the river's level and water quality.

2.3.4 More dams, more challenges

Although villagers living along the Se San River in Cambodia have petitioned the government and international institutions such as the MRC and SIDA to stop the construction of hydropower projects on the Se San river and restore the natural flow destroyed by the Yali Falls Dam, three more dams are being built on the Vietnam-side—the 260 MW Se San 3 (20km downstream of Yali Falls), 108MW Se San 3A and 330MW Se San 4 (8km from the Cambodian border). No impacts have yet to be officially communicated to downstream communities. Furthermore many dams on the Lao-side of the Se Kong and the Vietnam-side of the Sre Pok rivers are also slated for construction.

Such dam development initiatives have prompted NGOs in Cambodia to collect baseline

data on livelihoods in the downstream areas of the three rivers in order to monitor the impacts of these dams. Foreign social scientists have also become more interested in studying the Yali Falls incident in the context of transboundary environmental governance of international rivers (e.g. Badenoch, 2002; Ojendal et al., 2002). In fact, there are quite a few studies on multi-stakeholder governance and the physical changes in livelihoods in Cambodia that are "probably" caused by upstream development in Vietnam. However, questions remain about the role of natural scientific information needed to find solutions to the problems and support the affected people. NGOs working on this issue in Cambodia complain that most hydrological data is confidential, and even when disclosed, the Vietnamese authorities reject the data's robustness or causal relationship with water released from dams in Vietnam. It is also difficult for villagers and Cambodian NGOs to prove the causal relationship between health problems and water quality. In our interviews with NGOs in Cambodia, they expressed strong frustration with their difficulty in making purely scientific research useful in supporting villagers, and such criticism should be incorporated into the design of the MeREM Project. More detailed recommendations will be discussed in Chapter 4.

2.4 Domestic large tributaries and case studies in Thailand

In the lower Mekong River basin, excluding China and Burma, there are 24 major tributaries flowing into the mainstream of the Mekong River (Kawai, 1993 in Hori, 1996). The massive Mekong River cannot continue to exist without water from its tributaries. The following list shows the contribution of the main tributaries to the Mekong's flow at their points of entry into the Mekong River and the proportion they comprise in the basin as a whole.

Major tributaries	Contribution of the Mekong's flow at river mouth	Contribution in the basin
Se San/Se Kong/Sre Pok	16.7%	9.4%
Tonle Sap Lake/River	6.4%	10.7%
Chi/Mun	6.0%	15.0%
Nam Theun	5.2%	1.8%
Nam Ngum	4.5%	2.1%
Xe Bang Hien	4.0%	2.5%
Nam Ou	2.9%	3.3%
Xe Bang Fai	2.5%	1.2%
Nam Songkram	1.8%	1.7%

This list is made by authors based on the Hori 1996, Chart 1.9, p29.

While the Se San, Se Kong and Sre Pok Rivers have already been analyzed as international tributaries, and the Tonle Sap Lake/River will be covered later in this chapter, we focus on "domestic tributaries" in this section. Although the contribution of each tributary to the Mekong mainstream is limited, their cumulative importance should not be underestimated, and this necessitates examining some key domestic tributaries in order to develop a full understanding of the impacts of development in the Mekong region. Unfortunately, when governments or private companies in the Mekong region develop dam projects, it is rare for them to conduct cumulative impact studies.

In regard to biodiversity, one of crucial characteristics of biodiversity in the Mekong River basin is the complicated and little-understood migration of fish. Fish move between upstream and downstream, tributaries and mainstream, and migrate country to country. In terms of fish ecology in the Mekong, it is impossible for us to ignore the ecosystems of tributaries. This is another reason why it is important for us to review the NGO activities along the domestic tributaries in the context of transboundary issues.

In this section, two rivers in Northeast Thailand are analyzed. One is the Chi-Mun River, and the other is the Songkhram River. As found in the table above, the Chi-Mun River holds the largest share of water in the whole Mekong River catchment area. This river has been the source of many bitter development battles in the past few decades, in particular the huge impacts by Thailand's most controversial dam, the Pak Mun Dam constructed in the early 1990's. Meanwhile, the Nam Songkhram river has been protected from destructive development projects due to a strong civil society movement, which has been able to hold off quite a few plans to construct irrigation dams or other infrastructure. Though free flowing and an important river for fish biodiversity, villagers along the river are still struggling to address issues of pollution from agricultural run-off and destruction of swamp forests.

2.4.1 Rivers and civil society in relation to Mekong tributaries in Thailand

In Thailand, environmental NGOs are active advocates for improving policy. Local NGOs are also taking the initiative to provide information to communities about development projects and environmental problems.

Since dam construction in Northeast Thailand began in the 1960's, there have been many changes in the environment of river systems and accompanying social impacts. As the Pak Mun Dam has come to represent, there have also been serious conflicts between villagers and the government, due to problems around development. As a

result, many studies about environmental problems in relation to rivers by interested NGOs and social scientists in Thailand are being done in relation to problems surrounding dams.

In particular, the Pak Mun Dam on the Mun River's downstream and the Rasi Salai Dam built mid-stream of the same river have been subjects of great interest. There were also plans for a dam at the mouth of the Songkhram River, but NGOs and local people who knew of the severe damage the Pak Mun had on fish protested strongly to prevent the same from happening again, and the plan has been brought to a standstill.

2.4.2 Chi-Mun River and the environment

The Mun River is Thailand's largest tributary of the Mekong River in terms of the area of the river basin. The source of the Mun River is in Nakhon Ratchasima Province, and it flows into the Mekong at the border with Laos in Ubon Ratchathani Province. In the downstream area, the riverbed is a complex structure of eroded rockbed, and these formations continue for more than 30 kilometers from the mouth of the Mun River. Many fish from the Mekong River migrate into the Mun River, and it is said that more than 200 species make up the diverse fish fauna (Roberts, 2000). The middle region of the Mun River, however, is largely flatland that spreads out as a large floodplain. Here, there is a type of forest called *Paa boong Paa taam,* a deciduous forest of small trees and thorny bushes that can withstand long periods of floods. In the upstream area, the surrounding hilly area is the source of most of the Mun River's tributaries.

Urbanization is proceeding at a more rapid pace in the upstream areas near the capital, rather than in downstream regions. For this reason, the deterioration of water quality upstream has become very serious (*Sarn Mae Mun,* 2002*).* Also, much industrial wastewater continues to be dumped into the Phong River, a tributary of the Mun River that flows through Khon Kaen Province, since 1992. The pollution has spread as far as the Mun River's main tributary, the Chi (Chee) River (Phoenix, 1998).

2.4.3 Rasi Salai Dam

The Rasi Salai Dam was completed in 1993, and its construction resulted in the flooding of a wide area of swamp forest (Committee for Mun River, 1998). The livelihoods of local people who had used the swamp forest for agriculture or sources of food were harshly impacted, and this led to a people's movement against this dam. During construction, explanations were made to local people that a rubber weir would be built, but what was actually built was a large, concrete dam, and this simply led to even

stronger protests. In addition, the dam's reservoir led to the spread of damage from salination. As a result of the strong protests as well as the problems with salination, the Thai government has opened the gates of the Rasi Salai Dam and is now conducting studies. This dam has brought on other serious problems. After the natural vegetation was wiped out by the dam's reservoir, an alien plant species called *mai yaa raap yak* in Thai (*Mimosa pigra)* came in and has obstructed the recovery of biodiversity in the swamp forest. This plant is on an IUCN list of plants that move from their initial natural environments to other areas and cause harm to the environments in those new areas. This species can grow after floating along a river, so this problem is in fact spreading through the entire Mekong River basin. These problems are currently being studied by local communities and an NGO who came together to form a Mun River wetlands project. The results of the studies are expected to be released as they become known.

2.4.4 Pak Mun Dam and Migratory Fish

In 1994, the Pak Mun Dam was constructed at a point approximately 5 kilometers from the mouth of the Mun River. The dam obstructed the migration of fish from the Mekong River, and this had a devastating impact on the villagers whose livelihoods depended on fishing. The people's movement against this dam project continued even after the dam began operation, and in 1999, the call to open the dam's floodgates gained momentum. In 2001, there was an initial trial period of 1.5 years in which the gates were opened (from June 2001 to November 2002). During this time, a partial recovery of the natural environment to the state prior to the dam's construction was seen in fish migration and the reappearance of some dry-season local vegetation (Assembly of the Poor, 2003). After that, however, the Thai Government decided that the gates should be open for only 4 months of the year and closed for 8 months[3]. Then hydropower generation was resumed.

Environmental studies of the Mun River can be dated back to the initial environmental impact assessment for the Pak Mun Dam. There were two studies done in the first half of the 1980's[4]. These first studies were completely lacking in ecological perspective. Of particular significance in one study was that an ichthyologist for the Interim Mekong Committee used a very narrow definition of migratory fish, as fish that migrate between

[3] The decision was to open the gates on July 1 and close them at the end of October each year. As a result of strong demands by local people in 2004, however, the gates were open in mid June, and then closed in mid-October. Then in 2005, the gates are to be opened on may1st and closed on October 31st.
[4] These were the Environmental and Ecological Investigation of PAK MUN Project (Vol. 1-3) done in 1982 and the Selected Environmental and Ecological Investigation of Pak Mun Project (Vol. 1-3) done in 1984. Both studies were done by Team Consulting Engineers Co., Ltd.

the ocean and rivers. This led him to conclude that there were no "truly migratory species" in the Mun River (Roberts, 2000). In subsequent environmental impact assessments as well, the existence of migratory fish was completely ignored. As a result, there is no scientific baseline data available documenting how many fish species made their habitat in the Mun River prior to construction of the dam. This is a point of contention between local people and NGOs on the one hand and the Thai government on the other. In a case study of the Pak Mun Dam (Amornsakchai, 2000) done in 2000 for the World Commission on Dams, it became clear that the dam brought negative impacts on local fisheries and the numbers of people forcibly resettled was actually many times more than reported to the World Bank by agency that implemented the project. The Electricity Generating Authority of Thailand (EGAT), the agency that implemented the Pak Mun Dam project, has refused to acknowledge the WCD report's conclusions.

In recent studies, it has become clear that the previous studies done on fish species were inadequate. In some of the studies on fish species done for the Pak Mun Dam's construction, it is written that in the Mun River as a whole, there are between 51 to 115 species (Department of Fisheries, 1993). According to a survey done by Ubonratchathani University about the impacts of the opening of the floodgates, however, 184 species from 44 families of fish were documented in the downstream area alone (Ubonratchatani, 2001).

Also, villagers who have been struggling against the dam have cooperated with NGOs to conduct their own studies, and these studies have also shown that the knowledge possessed by local people is much more sophisticated and detailed than any "scientific" studies conducted to date. The term "*Thai Baan* research" has been coined for such studies by villagers, and the villagers are declaring that they themselves are "researchers," the ones knowledgeable about the region, while supporting NGOs and academics are actually the "assistants" who simply help to write things down. In the background leading up to these studies is the fact that in many of the feasibility studies and environmental impact assessments conducted by experts, the use of natural resources by local people and the regions ecosystems were ignored, and this is a critique that the local people have of these studies. In the *Thai baan* research on the Mun River, when villagers documented the fish they found in the river after the dam gates were opened in 2001, they found 129 species of fish[5], according to an indigenous categorization of fish by local people (Assembly, 2004). Of these, 80% are reported to be migratory fish from the Mekong River. This is in contrast to the 45 species of fish they were able to find after the Pak Mun Dam was built and the gates were closed.

[5] In the original Thai language version published in 2002, it says 156 species were found.

Also, prior to construction of the Pak Mun Dam, while 75 different types of fishing gear were used, it was found that 30 were no longer used after the dam was built. Then again, after the dam gates were opened and there was partial recovery of the environment, it was found that those 30 types of fishing gear were being used again.

In addition, between March 1999 and March 2000, a study of biodiversity in the downstream area of the Mun River was conducted by Ubonratchatani University (Faculty of Agriculture, 2000), and this was probably the first such study to be done.

Taking into consideration that progress has been made in the methods to categorize species, one cannot simply compare the numbers. But there are a few other reasons why the scientific studies done by experts did not meet the number of species that villagers have documented in their study. Technical studies done for the construction of the dam were politically motivated, and seasonal changes—fish migration in particular—were not reflected in the studies. With this past experience, local people and NGOs are now very skeptical about the integrity of technical studies.

2.4.5 Nam Songkhram – free and natural flow

The Songkhram River flows through Udonthani, Sakon Nakhon, and Nongkhai Provinces of Northeastern Thailand to merge with the Mekong River in Nakhon Phanom Province. In addition to having many tributaries, the river meanders widely near the river's mouth, so the downstream area is rich in lakes, marshes and wetlands. *Paa boong Paa taam* of Northeastern Thailand, the deciduous forests described earlier, are also widespread (Mekong Watch, 2001). There had been a plan to build a dam at the river's mouth, but it has been put to a halt since the EIA was rejected by the National Environment Board in 1992 (Fishtales, 1996).

Like the Mun River, the Songkhram River is also a destination for many migratory fish from the Mekong River. Fish begin to enter the Songkhram around May when the water level rises and spreads into the floodplain. They return to the Mekong River around the beginning of October when the waters begin to recede.

In this region, a seminar entitled "The culture of *Pla dek* (fermented fish)" was held in 1998. This seminar was an endeavor to examine livelihoods based on a combination of agriculture and fisheries in Northeastern Thailand from a cultural perspective (Srisak, 1998). It also contained an element of information dissemination as part of the movement against the plan to construct a dam at the mouth of the river. At this

seminar, a book entitled *Watthanatham Pla dek* was released, and in this book, the close connection between people's livelihoods, culture and fish is documented by explaining the background and history of *Pla dek*, a type of fermented fish.

In 2003, people's organizations active in the Songkhram River basin and NGO networks organized a joint seminar with a public agency (*Mahakam,* 2003). The Songkhram river basin is facing various problems such as destruction of the swamp forest, reduction in the number of fish species, pollution from agricultural run-off wastewater and chemical fertilizers and pesticides, and insufficient water supply for agricultural use. Because of this, there is now cooperation among local people and NGOs to try natural resource management methods in efforts to restore the natural environment. Groups active in this region include (1) Club to Restore and Conserve the Songkhram River, (2) Foundation for Ecological Recovery, (3) Sakon Nakhon and Ratjabhat Universities, and (4) Northeastern Thailand Resource and Environment Network. In this context, it is being recommended that participation by local people is absolutely essential to ensure that the importance of the health of rivers and their environments, and the traditional forms of natural resource management are respected.

The Songkhram River is considered to be a very important spawning place for fish in the Mekong River. There is not a single fish species, however, whose full life cycle is known. In addition, the relationship between vegetation and the animals that use the vegetation, for example how fish species use the swamp forest, is not well understood. Also, most documentation that exists about the Songkhram River is in Thai. Most of this information comes from minutes of seminars and masters theses about cultural anthropology and agrarian sociology from the local university. Very little information is available in English.

2.5 Tonle Sap Lake

2.5.1 Importance of Tonle Sap Lake to Cambodia and to the region

The hydrology and ecology of Tonle Sap Lake, the largest freshwater lake in Southeast Asia, is of great significance not only for Cambodia but for the whole Mekong Region.

The Lake is known for its unique water regime with vast differences in the water volume and water level between wet and dry seasons. When the water rises in the Mekong River in the wet season, the Tonle Sap River reverses its flow into Tonle Sap Lake. The Lake absorbs the reversed water and expands its surface area from approximately 2500 square kilometers to about 16,000 square kilometers. At the same

time, the water level deepens from 1-2 meters up to 10-12 meters. This phenomenon creates the floodplains around the Lake consisting of flooded forests and shrubs, resulting in rich biodiversity of fish, mammals, reptiles, insects and plants. The Lake is said to be one of the most fish abundant freshwater lakes in the world, and supplies Cambodia's population with approximately 75% of its animal protein intake. It is said that the contribution of fish to Cambodia's national food security is the highest of all countries in the world. (Gum 2000, p.40 in Keskinen 2003)

There are about 1.2 million people living on and around the Lake, a quarter of whom are living on the Lake's shoreline. Fisheries are the basis of livelihood for most people living in floating villages, and they depend solely on natural resources in the Lake for their survival.

In terms of regional significance, the flooded forest in the Lake's floodplain acts as a breeding ground and shelter for fish that migrate to the Mekong River and to many tributaries along the way. It is said that the fish migration from Tonle Sap Lake supports restocking of fisheries in the Mekong River and in the tributaries up to China's Yunnan Province (ADB, 2004). The Lake also helps to maintain ecological stability in the downstream region of the Mekong River basin by absorbing the reverse flow of Tonle Sap River in the wet season, thus easing floods in the Mekong Region. It also drains water in the dry season, and the out-flow controls the salinity intrusion in the Mekong Delta.

2.5.2 The problems faced by the floating villages

The natural resources of Tonle Sap Lake are being seriously degraded and access to resources is very unequal. There is increasingly severe poverty around the Lake.

In 2003, a field survey was conducted by the Fisheries Action Coalition Team (FACT), an NGO in Cambodia working on the Tonle Sap Lake. The results were summarized in a report called "*The Water Voice of the Tonle Sap Lake: Fishing, Drinking, Bathing and Eating on the Water; A Story of People's Dependency on Water in Tonle Sap Lake, Cambodia*" (Sithirith, 2003). The survey was conducted by interviewing 26 villagers living in the four provinces around the lake, namely Kompong Thom, Kompong Chhnang, Battambang, and Pursat. The field survey has identified problems and changes in water quality, water level fluctuations, flooded forest and fisheries as main concerns faced by villagers living on the Tonle Sap Lake today.

The major findings of the field surveys done by FACT are as follows:

a. Water pollution: All of the interviewed villagers spoke about degradation in water quality. The villagers state that in the beginning of the rainy season, water starts flowing from the Mekong River into the Tonle Sap River and into Tonle Sap Lake. At this time in May or June, the water is highly polluted. Much waste is dumped into rivers feeding the Lake and flows with the current. This continues until the water stops flowing and after that the water begins to clear. In October when the fishing season starts, water becomes turbid again due to increased boat activity and highly destructive illegal fishing practices. Migration of people into the Lake for seasonal work and fishing also contributes to water quality problems. When the water flows from the Lake towards the Tonle Sap River, the Lake has a high degree of pollution. Around the floating villages, the water becomes black and dirty as water levels drop.

Apart from the increase in waste from households due to increase in population, the main causes of water pollution that villagers have identified are the water discharges from the provincial towns, industries (in Kompong Chhnang and Pursat Provinces), mining sites along the Sangke River (Battambang Province), and agricultural pesticide use (Kompong Chhnang Province).

Since the use of water for villagers' daily lives depends totally on water from Tonle Sap Lake, diarrhea, malaria, and related diseases are widespread. There seems to be no regulation of water discharged from industries or mining sites. Pesticide use is increasing, but again without regulation. When agricultural lands in the floodplain are submerged in the wet season, there is a high possibility of water pollution from the dissolved pesticides.

Some villagers have resorted to the use of illegal fishing gear in order to secure enough fish for their livelihood. Various pressures, such as over-fishing by commercial fisheries, deforestation of flooded forests that are important fish habitats, as well as increases in population have contributed to the decline in fish catches. One commonly used illegal fishing gear is *samrah.* A *samrah* is made of many sticks of wood bound together to mock the flooded forest to attract fish. *Samrah* also catch waste and silt, however, worsening the quality of water in the Lake.

Descriptions of the water around floating villages and other places where people are active paint a picture of a heavily polluted Lake. A study done by the MRC Water Utilization Project, however, states that currently the general level of

pollution in the Lake is low, though it is recognized that some problems exists in and around the floating villages (Experience, 2004). It is thus necessary to keep in mind the situations people are in, as well as the context in which data is collected and monitoring sites chosen.

b. **Changes in water levels and ebb and flow of water between dry and wet season:** Villagers claim that the lake is becoming shallower every year, and that water recedes too late and arrives too early. This could be due to accumulation of silts that flow into the Lake due to deforestation of flooded forests. These changes could also be an example of the cumulative impacts of upstream development, as the dams on the Lancang River are thought to block a significant degree of sediment flow. In a study done as part of the MRCS/WUP-FIN project, for instance, running a "dam trapping" scenario of sediments being trapped after construction of the cascade of dams on the Lancang River showed a dramatic reduction in the net sedimentation in Tonle Sap Lake. If this were to actually happen, the supply of sediment-bound nutrients currently feeding the flood plain would be reduced, likely leading to a reduction in biological productivity as well (Sarkkula et. al., 2003).

   Villagers explained that it is difficult for them to use traditional fishing gear in the shallow lake, causing a decline in the fish catch per unit of effort. The changes in ebb and flow of water also influences villagers' agricultural practices, making it difficult for them to predict when to cultivate. The sudden rises in water also damage the crops on their agricultural land.

c. **Deforestation of flooded forest**: Villagers claim that the flooded forest is shrinking in size, and access to the forest has also been blocked by fishing lot owners. Every two years, fishing lots are auctioned off by the government. Each lot is supposed to maintain a certain amount of public space, but many lot owners do not respect this and prevent villagers from accessing the flooded forest in their lots. Due to growing population, collection of fuel wood is increasing and conversion of the flooded forest into agricultural land is expanding. Along with the increase in illegal fishing, flooded forest is also being destroyed in order to collect wood for making illegal fishing gear (*samrah*). Illegal traders also encroach upon the forest to catch highly valuable wild animals such as crocodiles, turtles, and snakes, and export them to other countries such as Vietnam, Hong Kong, Thailand, or Taiwan. Sedimentation is also occurring as a result of deforestation of flooded forests, as mentioned above.

d. **Decline in fish catches and loss of diversity in species:** Villagers state that the number of large fish is declining, and that they can catch only small fish (Trek Riel), and the fish catch per unit of effort is also falling. The villagers identified illegal fishing, the increasing number of fishers in fishing grounds, and over-fishing in fishing lots (allegedly due to inefficient management of the Lake's natural resources by the national government) as the causes of the decline in fish.

2.5.3 Fish migration and the importance of tributaries of both Tonle Sap Lake and mainstream Mekong River in Cambodia

The tributaries of both Tonle Sap Lake and of the mainstream Mekong River in Cambodia are extremely important for the reproduction of "white fish" stocks for the ecosystem of Tonle Sap Lake and the Mekong River. Whereas "black fish" are localized migrant fish that spawn in the flood plain of the Tonle Sap Lake, "white fish" are long distance migrants and comprise far more than 50% of fish species in Tonle Sap Lake (Welcomme, 1985). There are 4 types of "white fish" migrations. First is the egg and larvae drift. Second is refuge migration, or the migration of fish escaping from shallow water seeking deeper water. Third is spawning migration, and fourth is feeding migration (Poulsen et al, 2002). All 4 types of fish migration involve the tributaries of both Tonle Sap Lake and of the Mekong River in Cambodia, Laos, and Thailand (Degen and Swift, 2005).

Fish migration to and from the tributaries remains largely unexplored, but some aspects are known. When water levels recede, some fish from Tonle Sap Lake migrate up to the tributaries of the Tonle Sap Lake, including Stung Chinit, Stung Sen, Stung Stoung, Stung Siem Reap, Stung Sankae, and Stung Pursat Rivers. These fish spawn in the tributaries and associated habitats. Eggs and larvae drift back down the tributaries into the Lake where they grow and feed (Degen and Swift, 2005).

Likewise, some fish migrate from Tonle Sap Lake up the mainstream Mekong River. The determining factors for fish choosing different migration routes are largely unexplored. The brood stocks are known to spend the low water period in the mainstream Mekong around Kratie and Stung Treng Provinces until they can move onto the tributaries of theMekong River in Northeastern Cambodia, including the Se San, Srepok, and Se Kong Rivers, where they spawn. Migration routes from this point include to Laos, Thailand, and tributaries of the Mekong River downstream in Cambodia. Eventually these fish return to the Tonle Sap Lake (Poulsen et al, 2002. Baird, 2005).

There are now plans being prepared and implemented for hydropower and irrigation dams on the tributaries of the Tonle Sap Lake, as well as the tributaries of the Mekong River (see Section 2.3 of this Chapter). There is concern about the threats they pose to the well-being of not only the tributaries, but the ecosystems of Tonle Sap Lake and the Mekong River as a whole.

In February 2005, about 180 fishers from riparian communities in different regions of Cambodia (Se San, Sre Pok and Se Kong Rivers, Tonle Sap Lake, and the coastal areas), as well as from Laos and Thailand, gathered for the Northeast Fish Forum in Stung Treng Province in Cambodia. At the Forum, the fishers and other participants deliberated on the interconnectivity of the rivers and fisheries in the region. They also collectively sought possible solutions to protect and restore the rivers and their shared ecosystems from the threats they face.

The participants of the Forum agreed that the hydrological regime of the Mekong River and its tributaries has seen serious changes in the past few years, and identified hydropower projects as primary causes. Changes they raised included reduction in quantity and types of fish in the Mekong River basin, deterioration of water quality and unnatural fluctuations in water levels. They believe that these changes are a threat to the ecology, culture and customs of people living along the rivers in the region, as they also have negative impacts on agricultural production, fisheries and livelihood.

Chapter 3 Review of Transboundary Issues Based on MeREM's Monitoring Categories

In Chapter 2, we presented an overview of recent and on-going activities and research by civil society groups and social scientists on transboundary environmental issues in the Mekong River basin. The main geographical areas of focus in Chapter 2 are (1) the upstream of the Lancang-Mekong River in China and Thailand; (2) the Se San, Se Kong, and Sre Pok Rivers and their basins in Laos, Cambodia and Vietnam; (3) major Mekong tributaries in Thailand; and (4) the Tonle Sap Lake in Cambodia. One of the main objectives of this study is to provide recommendations for how the MeREM project can contribute to civil society initiatives. To effectively make these recommendations, we feel it is first necessary to put our findings from Chapter 2 into the framework of the MeREM project itself—namely the three monitoring categories of water quality, hydrology, and aquatic biodiversity.

In this Chapter, we categorize the major concerns of the civil society groups and social scientists in the Mekong Region within the context of MeREM's framework. In addition, we believe it is meaningful to consider additional categories which may become necessary to ensure that MeREM's research outcomes are relevant to practitioners working on transboundary environmental issues in the Mekong region.

3.1. Water quality

Water is, of course, indispensable to human life. Water is necessary not only for human consumption, but also for bathing, raising animals, operating fisheries, and agriculture. When people face difficulties related to water, so vital to life and livelihoods, it is natural for people to begin asking, "why" when things go wrong. Why are our children sick? Why have our animals died? Why are fish disappearing? Why do our plants not grow as well as before? For ordinary people in the rural areas of the Mekong River basin, scientific data on water quality would help to provide answers to these questions and identify the causes of the problems they face in their daily lives.

Based on the findings in Chapter 2, in this chapter we focus on issues for which villagers in the Mekong region are seeking solutions, as explained below.

3.1.1. Dam reservoirs

Cambodian villagers living downstream of the Yali Falls Dam in Vietnam on the Se San River have reported unusual health problems such as itchiness, bumps, rashes, and eye irritation after bathing in the river. These problems began appearing in 1996, after the Yali Falls dam closed its gates to fill its reservoir. Villagers found that their domestic animals were suffering from similar problems, and they spotted many wild animals dead in locations close to the Se San River. This river that had been respected as a source of life was becoming a source of grave concern.

The joint survey report prepared by NGOs and the local government in Cambodia's Ratanakiri Province concluded that the cause of these diseases was possibly due to toxic blue-green algae (The Fisheries Office, 2000).

Villagers living near the Mun River in Thailand reported suffering similar problems. One village had used the Mun River as a source of water for household purposes. After construction of the Pak Mun Dam, people began suffering from skin diseases and had to find another source of water (Kiguchi, 2003).

Since there are more reservoir plans along the Lancang-Mekong mainstream as well as the Se San, Se Kong and Sre Pok Rivers, water quality downstream of dam reservoirs should be carefully monitored, keeping in mind the relationship to transboundary impacts on health of both humans and animals, especially when dams are planned close to international borders.

3.1.2. Urbanization

People living on and around Tonle Sap Lake have pointed out recent changes in the Lake's water quality. They say that one of the major causes is wastewater and solid waste from increasing populous provincial towns, such as Siem Reap, a tourist destination for those going to Angkor Wat. Although the extent of urbanization is limited, nature-based livelihoods, particularly in fragile ecosystems, are very vulnerable to increases in waste.

On the other hand, the government of Cambodia and some foreign donors criticize the villagers living on Tonle Sap Lake as the "culprits" of water contamination, because villagers also empty their own household waste into the Lake. The Cambodian government and some donors say that it would be better to resettle villagers to

land-based lifestyles in order to save the environment of Tonle Sap Lake[6]. Thus, it is clear that any analysis of the causes of water pollution in Tonle Sap Lake is a very political matter.

The other case related to urbanization is water pollution on the Chi-Mun River in Thailand, a tributary to the Mekong. Chapter 2 introduces the case of pollution from industrial wastewater that is dumped into the Phong River spreading as far as the Chi River, the main tributary of the Mun River. In the case of the Chi-Mun River, the upstream is more urbanized than downstream, unlike the situation in Japan. Although NGOs in Thailand have conducted many studies on the impacts of the wastewater on the health of people who are using that water for agriculture, there has yet to be any research on the transboundary impacts.

3.1.3. Factories

On the upstream of the Lancang River, there are textile and paper factories in Erbin and mines in Lanping that are sources of pollution in the Heihui and Lancang Rivers. A result of this pollution is the deterioration of water quality and accumulation of heavy metals in the dam reservoirs. The large amount of garbage and wastewater containing nitrogen and phosphorus from the cities is also identified as a main source of pollution in the Lancang River.

On the Tonle Sap Lake, people living in floating villagers attributed recent changes in water quality partially to the water discharge from factories and mining sites, though they did not specify which ones. Chapter 2 also indicates that there is an absence of appropriate regulations to control industrial pollution in Cambodia as a main cause of this problem.

These problems mentioned here have not yet been monitored for their potential transboundary environmental impacts.

3.1.4. Other water quality issues

There are three other water quality issues raised in Chapter 2. These issues are

[6] Such attitudes by the Cambodian government and donors are particularly clear in plans for development projects, such as the "Chong Kneas Environmental Improvement Project," which included a large-scale resettlement plan of people living in the floating villages in conjunction with construction of a large harbor. Studies for this project were supported by the Asian Development Bank.

domestic issues, but due to their significance, we include them here.

The first issue is the use of pesticides and chemical fertilizers. Villagers around Tonle Sap Lake explained that they use pesticides when growing vegetables and the use of pesticides is increasing without proper regulations. In the case study of Nam Songkhram, chemical fertilizers and agricultural run-off are considered significant problems in addition to use of pesticides. Both in Thailand and Cambodia, the impacts of pesticides and chemical fertilizes are well monitored by civil society groups.

The second is a unique but illegal fishing gear called *samrah*, used on the Tonle Sap Lake. As explained in Chapter 2, *samrah* are bundles of sticks made to mimic flooded forests and attract fish. In addition to trapping fish, they also trap waste and silt, thus worsening the quality of the water in which they are placed.

The third issue is salination. This has been an issue of great importance in Northeast Thailand, whose lands are on a massive salt dome. The construction of the Rasi Salai Dam caused serious salination and damaged agriculture fields. Although the government of Thailand agreed to open the dam gate to restore the natural flow, it has not yet been possible to restore salinated soil to its previous level of fertility.

3.2. Hydrology

It is often said that drought and flooding are the two major water problems in the Mekong River basin. Some believe that it is better for water levels to be stable. But is this true? There are various studies that present opposing views, explaining that low water levels create new land along riverbanks useful for agriculture, and floods bring new fertile soil. The ebb and flow of the rivers have both positive and negative effects. It is important to learn what local people think. Are floods and droughts serious problems as some experts claim them to be, or is such analysis too simplistic? Careful consideration needs to be given to the perspective from which monitoring of hydrology should be carried out.

3.2.1. Seasonal fluctuation

There are unusual changes being seen in the ebbs and flows of water in the Mekong River, its tributaries in Northern Thailand, the Se San River and the Tonle Sap Lake. Many studies indicate that these are a result of human manipulation—i.e. the opening and closing of the dam gates on the Lancang River in China.

Such fluctuations have various negative impacts on villagers. First, the unusual flash floods on the Se San River, both in the dry and rainy seasons, killed at least 32 people in Ratanakiri Province of Cambodia. It is believed that the cause of this was the release of water from the Yali Falls dam in Vietnam. Second, increased water levels in the dry season have inundated riverbank vegetable gardens. Receding water levels in the dry season expose sand beaches and sandbars which people use as gardens and sources of income. These problems have been seen on both the Mekong River and the Se San River. Third, in contrast to flooding, record low water levels were documented on the Mekong River in Northern Thailand/Central Laos in March 2004. This affected navigation and fish catches.

Unusual fluctuations have also been reported by villagers living on the Tonle Sap Lake. The Tonle Sap's dry season ebb occurs later than previous years, while the increase of water level in the rainy season comes too soon. This has led to damage of agriculture production.

3.2.2. Daily fluctuation

The cause of unusual seasonal fluctuations in the Mekong River has been explained as results of climate change by the Chinese government. Thai NGOs, however, attribute the changes to dam operations in China (Bangkok Post, 5 March 2004). While proving cause and effect is difficult, when unusually drastic fluctuations occur within the same day or over the period of a few days, it is reasonable to assume that this is the result of manipulation of the river by dam operators. A Thai environmental NGO called the Southeast Asia Rivers Network (SEARIN) has monitored the water level of the Mekong River in Chiang Khong and Chiang Saen of Northern Thailand. It was found that in 2004, 20-centimeter fluctuations in the river's water level occurred within one day, while normally it takes 3-4 days in the dry season to see such changes (The Nation, 5 March 2004). Such short-term fluctuations disrupt fish habitats, and indeed, a dramatic drop in the daily catch has been observed.

In the case of the Yali Falls Dam, the survey report of The Fisheries Office in Ratanakiri Province of Cambodia documented unusual daily fluctuations. Rapid rises in water levels were occasional, and happened most often during the night or just before dawn, when people were asleep and unable to prepare for the flooding.

In both the Mekong and Se San cases, villagers downstream did not receive accurate information about the timing of the opening and closing of the dam gates.

3.2.3. Soil Erosion and Sedimentation

Soil erosion on the mainstream as well as the tributaries of the Mekong River is a serious problem. There is much speculation about the causes. Information indicates that there is a causal relationship between the hydrology of the river and the erosion. During the rainy seasons of 2002 and 2003, large portions of the riverbank eroded away very suddenly into the Mekong River at a point along the border between Thailand and Laos. Four households in Pak Ing, Thailand and the homes of 113 families in Ban Don Sawan, Laos were swept away with the flow (International Rivers Network et. al., 2003).

Sedimentation in reservoirs of upstream dams is also a big concern downstream. As described in Chapter 2, the rate of sedimentation at the Manwan dam is much faster than had been predicted. Some NGOs also believe that the reduction in the amount of sedimentation coming from the Lancang River could be a factor in the rapid erosion of riverbanks in northern Thailand. Also, as shown by a study by MRCS/WUP-FIN that modeled the changes to be expected in Tonle Sap Lake, the trapping of sediments by the dams will have an impact not only upstream, but will reach as far as Tonle Sap Lake.

3.3. Biodiversity

Most rural people living in the Mekong River basin are dependent upon natural resources from forests or rivers for their food, sources of income, and building materials for their homes. More than a few have enjoyed lives in a subsistence economy. Rivers provide fish, aquatic plants and animals. For rural peoples, aquatic biodiversity is not a topic of scientific importance, but is the basis for a sustainable and self-reliant livelihood. In other words, deterioration of biodiversity would threaten the foundation of their lives. The following aspects of aquatic biodiversity are recognized as indispensable but are now threatened.

3.3.1. Aquatic Plants

The *Thai baan* Research in Chiang Khong pointed out the importance of an aquatic weed found in the Mekong River known as *Kai* in Thailand. *Kai* grows on rapids and rocks during the dry season when water is clean and sunlight penetrates into the river every day. *Kai* fulfills various functions including food (for humans and fish) and income sources for the local people, especially for women. The ecosystem for *Kai,* however, is now being blasted away as rapids are removed in order to promote commercial navigation in the upstream of the Mekong River. Villagers and NGOs in

Northern Thailand are very concerned about the decrease in *Kai*.

Rapids are important not only for *Kai* in Northern Thailand but also for migratory fish in both the mainstream and in the tributaries of the Mekong River. The case of the Mun River is particularly well known, as was described in Chapter 2.

3.3.2. Fish

The importance of freshwater fish in the Mekong River basin is still insufficiently acknowledged by the developers and planning agencies of each riparian government. Due to lack of baseline data on fish catches and their market value, developers and planning agencies usually neglect the importance of fish-dependent livelihoods. This is why many of the activities and research conducted by civil society groups aim to identify existing fish spices in certain areas of each river where infrastructure development projects have been planned or have already been constructed. This lack of attention given to fish means that a complete fish inventory, in particular migratory fish, is still lacking in the mainstream and tributaries of the Mekong River.

Why do civil society groups need more complete information on the numbers, species, and life cycles of fish? Because this would provide scientific proof of the rich ecology of the river. Villagers are knowledgeable about the diversity of fish in the rivers, and know that these fish are important for their lives. Villagers are learning the hard way, however, how difficult it is to restore both the ecosystem and their own livelihoods once these ecosystems are destroyed by river infrastructure projects. Such struggles faced by villagers are clear in cases such as the Pak Mun Dam and Mekong upstream development as described in Chapter 2.

3.3.3. Importance of tributaries

This is closely linked with section 3.3.2 above. Migratory fish move between the mainstream of the Mekong River and its tributaries. It is normally recognized by villagers that migratory fish need the tributaries for spawning and maturing when they are fry, and the deep pools in the mainstream to live in the dry season (Mekong River Commission, 2002). Without healthy ecosystems in both the mainstream and tributaries, the impacts on the numbers of fish and fish species will be drastic.

While the integrity of ecosystems and fish habitats is recognized by civil society as an issue of great importance, the case of the Yali Falls Dam shows that significant transboundary impacts on fish ecology can occur within the same international

tributary. As explained in Chapter 2, after the construction of the Yali Falls Dam on the Se San River in Vietnam, wild animals were found dead near the river downstream in Cambodia. The Ratanakiri Study documents that not only were fish habitats upset by the drastic fluctuation of the river, there was an increase in fish diseases and a decrease in fish catches, probably due to the problems with water quality.

3.4. Further points to be considered

In addition to the three main monitoring categories, we find that the following issues are also significant and necessary in order for MeREM's research outcomes to be more useful for practitioners in civil society working on transboundary environmental issues in the Mekong River basin.

3.4.1 Interaction among monitoring categories

The three main monitoring categories—water quality, hydrology and biodiversity—are not necessarily completely separate entities. In examining recent changes in the natural environment in the Mekong River basin, civil society often attributes changes in one category to be the cause or effect of a change in another. In the case of the Tonle Sap Lake described in Chapter 2, for example, villagers living on the Lake said that lower water levels in the dry season made water quality worse. A scientific investigation may find that hydrology data indeed shows reduction in water levels. Studies of water quality may show contamination. How can the relationship between these two phenomena be interpreted? What is necessary to show that there is, or is not, a causal relationship?

A recently published report on Birds in the Se San River supported by the World Wide Fund for Nature emphasizes the need for research on how dam-related changes in water chemistry and turbidity levels have affected water quality (Claassen, 2004). Also, studies are needed on how changes in water quality have affected wildlife and human populations. Clear categorization of scientific data may not be able to explain the impacts people feel due to changes in each category. There is a need for the data to be interpreted conveyed in a way that villagers and civil society groups can use for livelihood protection and improvement. This would involve analysis to show how the three monitoring categories affect each other.

3.4.2. Fishing gear

In cases where rivers are destroyed or are being damaged prior to biodiversity studies,

it is difficult to evaluate the original richness of biodiversity and measure the degree of change resulting from destructive development projects. Two studies on the Mun River (Assembly of the Poor, 2004 and Ubonratchatani, 2001) and the *Thai baan* research in Chiang Khong suggest that it is useful to examine fishing gear to trace the history of changes in fish ecology. The type of fishing gear used by local people differ in regard to the size, type, and number of fish they want to catch, as well as the depth and nature of the body of water (lakes, rivers, etc.) in which they will fish.

For example, *Thai baan* research in Chiang Khong found that there are 71 traditional kinds of fishing gear used by local fisherfolk, but of those, 9 are no longer used. The 9 unused tools may tell us about the fish or other aquatic life that no longer exists or about other changes in the river which make the gear no longer useful.

3.4.3. Lack of Relevant Data

Sometimes it is difficult for civil society to access information, and some information simply is not disclosed. People's organizations in northern Thailand are very frustrated at the lack of information on the commercial navigation project and the operation of dams on the Lancang River and their hydrological impacts. There is actually an official project to establish an international rivers hydrology monitoring network in Yunnan Province, but there have been no explanations given about information disclosure, so it is still unclear whether or not concerned people downstream will have access to the information the monitoring network collects (Yunnan, 2004).

But other times, there is simply insufficient baseline data that is relevant to the needs of local people. In Cambodia, for example, the department of hydrology is responsible for regular maintenance of gauging stations, ensuring that databases are updated, measuring the amount of discharge, and flood prediction. On the Se San River, measurements of water levels were taken at 7am and 7pm. While this information may serve its own purposes, it likely underestimated the fluctuation in the river since measurements were taken only twice a day at times that were neither minimum nor peak levels.

China also gives data on rates of water discharge and water levels from Man'an and Yunjinghong Monitoring Stations at 8:30 am every day from June 15-October 15 to the MRC, but only during the rainy season. This data is not sufficient to explain the multiple fluctuations in water level in a single day, no data is provided for the dry season, and more detailed data is required.

Chapter 4: Recommendations for MeREM

4.1 Purpose of our recommendations

The purpose of this report is to provide input to MeREM about the activities being conducted by civil society groups in the Mekong River basin in regard to transboundary environmental issues. We have found that most civil society groups who are interested in transboundary environmental issues are very concerned about the impacts of development-induced environmental changes in the region, which have made the livelihoods of communities more difficult. We write recommendations in order to ensure that MeREM's studies will accurately reflect the realities being faced by communities living in the midst of development-induced and rapid environmental destruction.

In the Mekong River basin, the severity of transboundary environmental problems is visibly worse each year. Though concrete damage to the environment has been documented and confirmed, it is still very difficult to prove that these problems are a result of development projects in upstream areas, especially when there is an international borderline between the projects and the areas where impacts are being reported. Even when civil society groups are able to provide a degree of proof, the region is lacking in institutions that are willing or able to take up this information and use it to contribute to a processes to resolve these problems.

We submit the recommendations in this chapter, as we believe that MeREM's contribution to the region will be significantly enhanced if it is able to provide informational support to civil society active in environmental issues in the Mekong River basin.

4.2. Recommendations for MeREM Monitoring of Key Transboundary Issues

In this section, we provide recommendations for MeREM's research in the Mekong River basin, categorized in line with the four focal issues outlined in Chapter 2, i.e. the upstream of the Lancang-Mekong River, international tributaries to the Mekong River, domestic tributaries to the Mekong River, and Tonle Sap Lake.

4.2.1 Lancang-Mekong Upstream Region

As explained in Chapter 2, people's organizations and NGOs in Northern Thailand have witnessed many changes in the Mekong River. Unusual and drastic fluctuations in water level, rapid erosion of riverbanks, and a decline in fish catches are problems that local people are struggling against. People in northern Thailand are attributing these changes to impacts from the construction of dams and the blasting of rapids upstream, but as of yet, there is important information still lacking to understand completely the mechanisms behind the changes being observed. Some impacts of the Manwan Dam at the local level have begun to be documented by a Study Group comprised of academics from universities in Yunnan Province. More support will be required, however, to continue monitoring so that both local and transboundary impacts are understood.

In light of this situation, we recommend the following:

Recommendation 1: Monitor hydrology on the Lancang-Mekong River at a point between the Jinghong Dam and the commercial navigation project, taking into consideration the unusual fluctuations appearing downstream on the Mekong in northern Thailand.

Currently, the Chinese Ministry of Water Resources is providing information to the MRC on rainfall and water levels at Yunjinghong and Man'an hydrological stations every day at 8:30am during the rainy season (June 15-October 15)[7]. Considering that there are many hydrological and water level changes being observed downstream, particularly in northern Thailand, there is an urgent need for more detailed and accurate data. We recommend that monitoring should take place upstream of the commercial navigation project and downstream of the Jinghong Dam. Considering that unusual daily fluctuations are sometimes observed downstream in Northern Thailand, we recommend that monitoring take place so that fluctuations can be compared with those on the Mekong River in Northern Thailand.

Recommendation 2: Monitor aquatic plants and fish in the Mekong River in northern Thailand to examine the mechanism of the food chain in this region. In doing so, close consultation with organizations actively addressing transboundary environmental issues in this region should be considered an absolute requirement.

In northern Thailand, the rapids in the Mekong River are being blasted for the

[7] This reporting is scheduled to be done for the period from 2002 to 2006.

commercial navigation project. It has been found that these rapids are important habitats for fish and growth of aquatic plants. The people's movement in Thailand is very strong, and suspicion of research institutions is also strong. While this type of information on biodiversity in the Mekong River is essential to determine the nature of the river in its intact state, as well as to understand the impacts on the environment when altered by such human activity, it must be collected in close consultation with local organizations so that it will be welcomed and utilized by local people and the civil society organizations supporting them.

Recommendation 3: Monitor the water quality and sedimentation in the Manwan Dam Reservoir in consultation with local civil society organization.

It has already been found that the reservoir is polluted. Unexpectedly rapid rates of sedimentation have also been identified as a concern. In terms of developing a participatory way of doing such monitoring, a Chinese NGO called Green Watershed has developed an interesting program. Green Watershed works in Yunnan Province and has experience organizing local villagers to promote participatory watershed management in Northwest China. They work in the Lashi Watershed as well, important area that feeds into the Lancang and Yangze Rivers. Green Watershed established a participatory management committee, the "Lashi Watershed Management Committee" (LWMC) at the township level in May 2000 with collaboration from the local government, village communities, and international and domestic NGOs. For local people living near the dam, the environmental impacts of the dam are of serious concern, and frequent and detailed monitoring is possible.

4.2.2 International Tributaries—Se San/Se Kong/Sre Pok Rivers

The concerns related to these three international tributaries of the Mekong River among civil society groups in Cambodia are impacts caused by a dam upstream in Vietnam on their health, security, livelihood and nature. Although a coalition among local governmental agencies and NGOs was set up for monitoring impacts and doing advocacy to solve the problems, their concerns have not been heard enough to do so. One of the reasons is the lack of a mechanism to reflect local voices into bi-lateral dialogue on transboundary impacts of these tributaries. The other is lack of scientific data to identify the causes of physical impacts which villagers have experienced.

Recommendation 1: To monitor daily fluctuation and water quality in the Se San River in Cambodia.

Recommendation 2: To help civil society groups in Cambodia to access information about water discharge from the Yali Falls dam into the downstream.

Because of the lessons learned from villagers living along the Se San River in Cambodia who were affected by the upstream Yali Falls Dam, people living downstream on the Se Kong and the Sre Pok Rivers in Cambodia are wondering if similar problems will happen due to construction of dams on the upstream of these two rivers.

Recommendation 3: To monitor water quality and hydrology in the Se Kong and the Sre Pok Rivers in Cambodia.

There is relatively strong coordination among villagers, local officials, civil society groups, scientists and international NGOs on the transboundary environmental issues in the Se San River in Cambodia, and it is going to expand its work to the Se Kong and Sre Pok Rivers.

Recommendation 4: To consult and work closely with the Se San Protection Network if MeREM involves in studies or monitoring along these three rivers in Cambodia

4.2.3 Recommendations for Monitoring on Domestic Tributaries

As mentioned in Chapter 2, villagers who have suffered the impacts of the Pak Mun Dam and the NGOs who have supported them, have continued to struggle to restore the environment and their livelihoods. Villagers living along the Mun River worked together with NGOs to develop their own "Villagers' Research," or *Thai baan* research, to document the changes in the Mun River when the gates of the Pak Mun Dam were open and closed and to record their own knowledge base. The people's movement in Thailand is strong, and due to conflicts between government and villagers in the past, there is a deeply imbedded mistrust by local people of official research institutions. In this context, extra sensitivity and effort will be required to establish a relationship with Thai civil society conducive to conducting useful research in this area. Our recommendations are as follows:

4.2.3(a) Overarching recommendations for research in the Chi-Mun River basin

As explained in Chapter 2, dams and urbanization have had large impacts on the environment in the Chi-Mun River basin. Dams have changed the hydrology of the Mun River, and urbanization has contributed to a decline in water quality due to

pollution. A plan to dam the Songkhram River was stopped, and its environment remains relatively intact, but fertilizer and pesticide runoff from surrounding agriculture is affecting the health of this river. The health of these rivers and their immediate environments are vital to the livelihoods of local people. In light of this, people's organizations and NGOs are particularly concerned about changes in hydrology and water quality as causes of changes in biodiversity, specifically the perceived reduction of fish and *Kai.*

We would like to make the following overarching recommendations for MeREM's monitoring activities in the Chi-Mun River basin.

Recommendation 1: Approach studies on water quality, hydrology and biodiversity from the perspective that they are closely related. It is believed that changes in hydrology and water quality (both natural and artificial) are closely related to the changes in biodiversity.

Examples of natural changes: Local fishers have explained that changes in water level, changes in water turbidity, and the first showers after the dry season trigger fish migration (Poulsen, 2000). Due to the turbid nature of rivers in Southeast Asia, sunlight does not penetrate very far. When water levels drop in the dry season, however, sunlight is able to penetrate to the riverbed, and various forms of moss and freshwater weeds grow on the rocks. These plants play a very important role in the river's food chain (Okino, 2002).

Examples of artificial changes: With the construction of dams and the commercial navigation project on the upstream of the Lancang-Mekong, it is expected that the Mekong River's level will be generally higher in the dry season to promote trade. This could upset migration patterns and lifecycles of fish, leading to a decline in numbers, as well as prevent the growth of mosses and freshwater weeds to severely upset the aquatic food chain.

Recommendation 2: Consider tributaries and the mainstream as a set, due to the migratory nature of some forms of aquatic life.

Local people have explained that fish are born in tributaries and live there as fry. When the waters receded in the dry season, however, they migrate to the mainstream where there are deeper pools. Because their life cycles are not limited to one place, a comprehensive understanding requires considering the tributaries and mainstream as a set.

Recommendation 3: Reflect the concerns and realities of local people in MeREM's monitoring. In this case, invite local NGOs and people's organizations to a seminar and introduce MeREM's work and findings. Provide opportunities for local people to critique and give feedback to the monitoring activities and reflect their comments in future work.

Thai villagers and civil society have a general suspicion of scientists and elite institutions because of a history of commissioned studies that were used or manipulated for political and economic purposes. Their cooperation, however, will be essential for accurate monitoring of hydrology, water quality and biodiversity in the Chi-Mun River basin. Ubonratchatani University, and NGOs such as TERRA and SEARIN, and people's organizations such as those active in *Thai baan* researchers and Lak Chiang Khong are important contacts.

4.2.3(b) Recommendations on monitoring hydrology, biodiversity and water quality

Keeping the above in mind, we recommend the following topics to be monitored.

Recommendation 1: Monitor daily water level fluctuations and changes in rates of discharge on the Mun River.

This should be done both upstream and downstream of the Pak Mun Dam in order to gauge the impact of the dam on the hydrology of the river.

Recommendation 2: Monitor water quality on the Mun River.

Consideration should be given to monitoring water quality near the mouth of the Chi River, considering that pollution from upstream has reached as far as the Chi River, it should be determined whether it is reaching as far as the Mun River.

Recommendation 3: Conduct biodiversity studies on the Mun River and Mekong River (as a "set" as explained above).

Studies should be done both upstream and downstream of the Pak Mun Dam, and must be coordinated with institutions that have close cooperative relationships with local people.

Recommendation 4: Conduct biodiversity studies, water quality and hydrology studies

on the Songkram River and the Mekong River (as a "set" as mentioned above).

Currently there is little baseline data for biodiversity on the Songkram River, though it is known to be rich in biodiversity and is the only major tributary of the Mekong River that does not have a large dam.

NOTE in regard to time and frequency of biodiversity studies: A study of fish by Ubonratchatani University (Ubonratchatani University, 2001) was done on the Mun River for 11 months at 25 locations, and done in close cooperation with local people. As a result, much valuable information was collected and documented. While the Ubonratchatani University study does not need to be replicated completely, its methods can be used as a reference. Due to the difficulty in predicting migration behavior of fish, it is essential to gain the cooperation of local fishers and reflect their knowledge in research methodology. Also, fish do not limit their migration to daylight hours. In order to gain a complete understanding, it is necessary to monitor not only during the day, but also during the night.

4.2.4 Tonle Sap Recommendations

Local people are voicing concerns about deteriorating water quality, reduction in fish catches, and changing patterns in the rise and fall of the Tonle Sap Lake. People attribute these changes to various causes, such as pollution flowing in from mining sites, use of pesticides, an inflow of domestic and industrial waste from provincial towns, illegal and over-fishing in the Lake, and sedimentation from soil and silt loosened by the degradation of flooded forests While different reasons are articulated by various people, clear causes have yet to be determined. In areas where many people are living on the Tonle Sap Lake in "floating villages," the Cambodian government and some donor agencies have blamed local people as the sources of pollution. Interestingly, a study by MRCS/WUP-FIN states that the overall level of Lake pollution is low, though it recognizes that there are problems with water quality in the areas where people live, such as the floating villages.

The Tonle Sap Lake is not only a natural wonder, acting as a pump in the Mekong River system, it also fulfills a vital role in supporting food security in Cambodia. Fish from Tonle Sap Lake are known to migrate not only to the Lake's tributaries, but also to the mainstream of the Mekong and to Mekong tributaries, such as the Se San and Sre Pok Rivers. The integrity of the Lake and its floodplain is, therefore, very important. In spite of this importance, the intensity of human activity in and around the Lake is increasing, and impacts are being felt. The precise mechanism behind some of the

impacts, however, is not clear. There seem to be distinct gaps in the reasons put forward by local people and other actors. In addition to the different understanding regarding causes of pollution as mentioned above, for example, there are also different explanations regarding sedimentation. Local people are saying that the Lake is getting shallower and they are seeing impacts of increased sedimentation. MRCS/WUP-FIN, however, has found that there has been minimal sedimentation because most sediments are deposited in the floodplain rather than in the Lake itself. In fact, MRCS/WUP-FIN has indicated concern that the dams built on the Lancang River in China will actually half the amount of sediments flowing into the Lake. (MRCS/WUP-FIN)

We do not believe that this is an issue of who is right and who is wrong, but these differences point to the complexity in determining what changes are actually taking place on Tone Sap Lake and the reasons for it.

Considering the above, we make the following recommendations for MeREM's study.

Recommendation 1: Communicate with the MRC when determining monitoring sites to avoid duplication of studies.

Recommendation 2: Monitor water quality of rivers flowing into the Tonle Sap from provincial towns or industrial and mining areas as one important indicator for monitoring water quality of the Lake, and for contributing to determination of the sources of pollution in the Lake.

Recommendation 3: Monitor hydrology (including sedimentation) in the Tonle Sap River.

There have already been studies on sedimentation in the Lake done by the MRCS/WUP-FIN. If MeREM chooses to monitor sedimentation upstream in the Lancang-Mekong, then monitoring of points close to the Tonle Sap River and in Tonle Sap Lake in addition would be valuable in determining any relationship between changes in sedimentation upstream and in Tonle Sap Lake. Continued monitoring would be crucial to examine how conditions change after construction of the remaining dams on the Lancang River. Monitoring points should be chosen to reflect this intension. Changes in hydrology may also disrupt fish migration patterns and hydrological data in relation to fish migration would therefore be important.

Recommendation 4: Monitor fish migration between Tonle Sap Lake and its tributaries and the Mekong River.

Considering the important function that fish fulfill in food security in Cambodia and in the Mekong region, an improved understanding of fish migration patterns would be helpful for designing measures to maintain fisheries in light of increasing numbers of development plans around Tonle Sap Lake and its floodplain.

Recommendation 5: If MeREM decides to conduct fish-related studies on Tonle Sap Lake, this should be done in close consultation with local NGOs who have knowledge about fisheries on Tonle Sap Land and experience working with local people.

Recommendation 6: Monitor water quality, changes in the level of the Lake and fish catches in the floating villages, particularly in and around areas that villagers report to be of importance.

4.3 Introducing the Reactions of Civil Society to the MeREM Project

During this period of study, Mekong Watch attended two major international conferences on transboundary environmental and development issues organized by NGOs in Thailand, the International Conference on Natural Resource Management and Cooperation Mechanism in the Mekong Region (Bangkok), and the Mekong Fair (Chiang Khong). At these conferences, we took the opportunity to introduce MeREM to some of the participants and discussed with them their thoughts on transboundary issues and their impressions of MeREM.

We also traveled to the region and interviewed activists and researchers in Thailand, Cambodia, and Yunnan Province specifically to introduce and get feedback regarding their opinions about MeREM. The responses came basically in line with the following five topics:

4.3.1 Review and Clarify Purpose of MeREM

Many questions were voiced regarding the intention behind the MeREM project. Particularly in Thailand and Cambodia, where redress for damages from development projects suffered by local people has not been forthcoming because they did not have baseline data, or existing data was misleading, there is caution before welcoming a research initiative. Staff from TERRA and Se San Protection Network were

particularly frank in their wish to learn more about the motivations behind the project before deciding whether or not it would be an initiative they welcome.

The Cambodian Secretary of State, Mr. Touch Sean Tana, who also attended the international conference in Bangkok, explained in an informal conversation that he also believed it was necessary to clarify the purpose of the MeREM study. This was due not so much to suspicion, but due to the abundance of various studies. He believed that research in the Mekong Region should come from a critical perspective, which required making the purpose behind research clear.

4.3.2 Feedback to local people

Many people we spoke to emphasized the need to feed information back to the local areas from which the information comes. There are many studies being done which extract information from the environment and local people living in it, but very little gets fed back in return. Instead, the information remains either within closed institutions or is simply difficult to access.

Lack of feedback to local levels has been one reason for the suspicion of local communities and NGOs towards research institutions. As a representative from Oxfam American commented, "the local people have been researched out." It is, therefore, important for MeREM to provide some assurance that the project will be fed back to the local level and benefit NGOs and local villagers. Mr. Somkiat of Rak Chiang Khong in Thailand also commented that very few researchers conduct studies that benefit local people, but only take data for their own studies. Were MeREM serious about a cooperative relationship with NGOs, however, he expressed willingness to discuss with people from the MeREM project about their plans and intentions. Ms. Emily Polak from the Se San Protection Network also commented that considering that information comes from local communities, the issue of ownership of information should also be considered.

4.3.3 Information Disclosure

As mentioned in other parts of this report, civil society and local people have had difficult accessing information important for understanding the causes of the environmental impacts they are seeing. This is particularly the case for villagers living along the Mekong River in Northern Thailand and along the Se San River in Cambodia. People are not satisfied with the amount of information coming from the Chinese government regarding the operation of the Manwan and Dachaoshan Dam,

especially considering the severity of the impacts downstream. This has led to strong calls from civil society for information disclosure and easier access to relevant data. In regard to MeREM, Mr. Nordling of the Swedish NGO Center for Development Cooperation went so far as to suggest that TOR for information disclosure be concretely established. Mr. Brown from Oxfam America also commented that though useful studies have been conducted, those studies remain useless to civil society because they are closed up within the institutions that conducted them for internal use only. He stated that if MeREM were to make important information and data available to civil society, the initiative would indeed be very welcome.

4.3.4 Workshops with civil society

Several people suggested that in order for MeREM to clarify its purpose and overcome the doubts civil society has towards the usefulness of its work, workshops should be organized where the purpose and content of the project should be explained, and comments welcomed from civil society. If the opinions of civil society are taken seriously and incorporated into the project, then cooperation can be coordinated. People from TERRA, Rak Chiang Khong, and Green Watershed clearly expressed willingness to attend such a workshop or consult further with MeREM. Mr. Tana of the Cambodian government also encouraged MeREM to organize a workshop with scientists in the region.

4.3.5 Avoiding duplication

There are a number of studies being conducted in the Mekong Region, and concern was expressed that MeREM could potentially be a simple duplication of other work. Mr. Juha of the Tonle Sap Modelling Project (WUP-FIN) lamented the lack of coordination among various institutions. He said that the MeREM project sounded very similar to what the MRC is now doing on Tonle Sap. People from the Se San Protection network were also curious to know what kind of added value MeREM could bring to the MRC studies already being done in the region.

As is apparent from the comments above, civil society organizations in the Mekong River basin do not feel that they know enough about MeREM and its intentions to welcome it. In such situation, implementing the recommendations outlined in Section 4.2 of this chapter will be insufficient to ensure MeREM's usefulness and value to civil society. For this reason, we have added additional recommendations in the following section for MeREM's activities. These recommendations are made in consideration of the feedback we received from civil society organizations working on transboundary

environmental issues. With the following overarching recommendations to MeREM, we also hope to fulfill our objective of facilitating a better understanding within MeREM of the situation of local people and civil society in the Mekong River basin and ensuring that MeREM's work accurately reflects the realities of environmental struggles in the region.

4.4. Final Overarching Recommendations to make the MeREM project useful for civil society groups

As mentioned in Section 4.3, people from civil society groups working on transboundary environmental issues in the Mekong River basin have initial reservations about MeREM's plans. They caution against simply duplicating already existing research programs, and ask for further clarification of MeREM's intentions before voicing support. They are concerned about the transparency of processes and outcomes. To make a more significant contribution to research in the Mekong River basin will require going a step beyond selection of monitoring sites and monitoring items.

Recommendation 1: Organize workshops to introduce the progress of the MeREM project to civil society groups and discuss effective ways to improve it.

It seems that the MeREM project is not yet known among civil society groups in the Mekong region, since not only NIES but also its counterparts in the riparian countries have not made active efforts to communicate with civil society groups who are concerned about transboundary environmental issues. NIES should have consulted with them and incorporated their interests or concerns into the project design at the beginning of the MeREM project. It would still be helpful at this later stage, however, to organize workshops so that NIES can directly make contact with concerned civil society organizations, present the MeREM project and project findings to date, and receive feedback from civil society groups. This may help to alleviate some of the skepticism NGOs and people's organizations have towards the MeREM project and contribute towards the improvement of the project as a whole.

Recommendation 2: Help villagers affected by changes in the river and the civil society groups supporting them

Civil society groups who are concerned about the transboundary environmental issues in the Mekong River basin, as explained in this report, are often involved in supporting local communities who have been, or are likely to be, affected by upstream development. Civil society organizations can assist local people to gather information and data, and to

voice their concerns to decision-makers. There are a couple of additional ways support is needed.

(1) Participating in villager/civil society-centered monitoring work along tributaries and the mainstream of the Mekong River by providing technical and/or financial assistance.
(2) Establishing effective ways for civil society groups or villagers to access relevant information regarding water quality, hydrology and aquatic biodiversity which is already held by governments and other inter-governmental agencies, such as the MRC.

Recommendation 3: Establish an English website for MeREM to introduce the project and feedback monitoring results

As described in Chapter 2 and 3, a major reason for the suspicion among civil society groups about scientific data collected by governmental agencies is the agencies' failure to disclose or feed back data/information—i.e. the obstruction to access to necessary information. Although English is not commonly understood by local people, disclosure of MeREM's research in English through its website would be useful for NGOs who support villagers in the Lancang-Mekong River basin.

Recommendation 4: Review the MeREM's objectives in favor of activities of civil society groups

Although NIES expresses strong interest in making MeREM useful for practitioners, including civil society groups in the Mekong region, there is no clear objective mentioning collaboration or networking with civil society groups in its project documents. This only contributes to the suspicions of such practitioners that MeREM is just extracting information from the region, which relevant governments will then exploit in order to take control out of the hands of local people to tighten their own grip over natural resources. If MeREM fails to feedback the information it gains from the region, it will be an additional barrier to establishing understanding between NIES and civil society in regard to the MeREM project. We recommend that NIES reviews its objectives for MeREM so that they more clearly reflect its intention to work with civil society groups.

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APPENDIX 1 List of Interviews Conducted by Mekong Watch

During this period of study, Mekong Watch attended two major international conferences on transboundary environmental and development issues and traveled to the region to interview activists and researchers in Thailand, Cambodia and Yunnan Province for feedback regarding their work on transboundary environmental issues and impressions of MeREM. When people from the region visited Japan, we also took that opportunity to discuss MeREM with them. A list of the meetings and interviews is provided below.

Interviews in Cambodia (Phnom Penh). September 20, 2004

- Mr. Kim Sang Ha (Se San Protection Network, Project Coordinator)
- Mr. Tep Bunnarith (Culture and Environment Preservation Association)
- Ms. Kate Lazarus (Oxfam America, Regional Program Officer, Mekong River Basin Management Program)

Interview in Japan (Tokyo). October 8, 2004

- Dr. Yu Xiaogang (Green Watershed)

Interview in Thailand (Bangkok). November 10, 2004

- Ms. Premrudee Daoroung (Towards Ecological Recovery and Regional Alliance)

International Conference in Thailand (Bangkok) November 16-18, 2004

"International Conference on Natural Resource Management and Cooperation Mechanism in the Mekong Region." This conference was hosted by the Thai Senate, the United Nations and Towards Ecological Recovery and Regional Alliance (TERRA). Government representatives, international aid agencies, and civil society organizations from the Mekong Region attended this conference.

At this conference, interviews were conducted with the following:

- Dr. Gan Su/ Dr. Fu Yao (Asian International Resource Center, Yunnan University)
- Mr. Somkiat Khuenchiangsa, (Rak Chiang Kong)
- Mr. Kim San Ha (Se San Protection Network, Project Coordinator)
- Mr. Vann Piseth, Mr. Pen Raingsey (Fisheries Action Coalition Team, Program Manager, Field Coordinator)
- Dr. Nguyen Van Be, Head of Environmental Management Section, Department of Environment and Natural Resource Management(Chan Tho University College of Agriculture)
- Mr. Chim Saren (UNDP, Partnership for Local Governance, UN-Donor Support to

the Royal Government of Cambodia's Sila Program, Senior Provincial Program Adviser, Steung Treng Province)

- Mr. Warwick Brown（Oxfam America, Regional Programme Officer, Mekong River Basin Management Program）
- Mr. Anneli Nordling (Swedish NGO Center for Development Cooperation, Environmental Adviser)

Field Trip to Chiang Kong, Thailand. November 19-22, 2004

This field trip was for the Chinese participants to the above international conference in Bangkok. During the field trip, the following people were interviewed:

- Mr. Touch San Tana (Cambodian Department of Fisheries)
- Mr. Ngoun Kong, (Kingdom of Cambodia Ministry of Environment
- Mr. Hu Kangping (China Green Times, Director of Editorial Department)
- Ms. Lihong Shi (Wild China Film, Director/Producer)

Mekong Fair (Chiang Kong, Thailand). *November 26-27

The Mekong Fair was an international gathering of civil society organizations working on transboundary environmental issues in the Mekong River Basin organized by the Southeast Asian Rivers Network (SEARIN). Interviews were conducted with:

- Ms. Pianporn Deetes,(South East Asia Rivers Network, Campaigner)
- Mr. Kevin Lee, (International Rivers Network, Consultant)
- Mr. Sukthawee Suwannachairop (World Wild Fund, lower Mekong Programme)

Contacts were also made by E-mail to collect information and opinions.

December 1-28

- Ms. Emily Polak（Se San Protection Network, Cambodia） December 1-28

January 19-26

- Dr. Yu Xiaogang (Green Watershed, China)
- Ms. Yang Yunfeng (Green Watershed & Chiang Mai University, China)
- Mr. Li Dajun (Green Watershed, Lashihai Programme, China)
- Prof. He Daming（AIRC, China）

February 22

- Dr. Juha, Sarkkula, Tonle Sap Modelling Project (WUP-FIN, Cambodia)

APPENDIX 2 Photos from Cambodia and Thailand

Mekong River in Cambodia, Phnon Phenh September 2004

Villagers from Ratanakiri speak about damage to their health and livelihood by the Yali Falls Dam at the international conference at Bangkok, November 2004

Extraordinary water fluctuation of the Mekong River is believed to be the cause of bank erosion at villages in Chiang Khong, November 2004,

Fishers in Chiang Khong explain the reduction of their fish catch to participants of the Bangkok international conference from China and Cambodia, November 2004

APPENDIX 3 BANGKOK DECLARATION

Bangkok Declaration on the Occasion of the International Conference on Natural Resources Management and Cooperation Mechanisms in the Mekong Region*

United Nations Conference Centre
Bangkok, Thailand
16 – 18 November 2004

We, representatives of riparian communities and civil society organizations within the six-country Mekong region sharing the Lancang/Mekong and Nu/Salween Rivers, respectfully submit this statement to the government and international donor agencies affecting development within the region.

We support the principle of equal cooperation amongst the riparian countries of the Mekong region through the equal participation of its citizens.

We are not satisfied with the imbalanced approach to development adopted by governments and international donor agencies.

This approach has created serious conflict and undermined rural people's livelihoods, cultures, and ecosystems within the region by promoting destructive large-scale hydro development, river rapids blasting, inter-basin water transfer schemes, and commercial logging.

In the spirit of regional cooperation for sustainable development, we therefore propose the following principles and initiatives for consideration by the relevant government agencies, decision makers, and international financing institutions:

- Strengthen and promote the local community network and civil society solidarity within the Mekong region.

- Promote and recognize the rights of local communities to determine the use of natural resources and to implement sustainable management practices (i.e. through education, capacity building, technology transfer, etc.).

- Respect traditional cultures, identities, and ways of life.

- Natural resources within the Mekong region are part of one ecosystem belonging to all people within the region. Therefore, no one riparian state has the right to unilaterally decide on natural resources development that affects the ecosystem beyond national borders.

- Setup an independent research institute to generate research and analysis on issues affecting natural resources and sustainability such as energy development, biodiversity, and local wisdom and other aspects of natural resource use within the region, and recommend appropriate measures and solutions in a transparent and participatory manner.

People's participation

- Promote broader citizens' representation from all sectors of society in all countries in natural resources planning, decision-making, and management.

- Recognize the right of all people, especially young people, women, ethnic minorities, and disadvantaged groups in society to participate in decisions affecting the use of natural resources upon which we depend for our economic, social, and cultural well-being.

- Create parallel mechanisms for cooperation and public participation in natural resources management (i.e., Mekong Peoples Council), which can promote and adequately reflect the needs and concerns of citizens within the region.

- Reform existing planning and decision-making mechanisms of governments to reflect the regional citizens' priorities, rights, and aspirations for sustainable development.

Role of national governments

- National governments should pursue natural resource management and protection based on respect for the rights of the region's citizens and a spirit of solidarity which creates equitable benefits.

- National governments should rethink national sovereignty vis-à-vis regional and international good practices/norms for natural resource management, (particularly trans-boundary and upstream-downstream water resource issues, United Nations human rights conventions including indigenous peoples and ethnic communities).

Role of international agencies

- International agencies should conduct a comprehensive review of existing hydropower development plans and the regional power grid proposal for the Mekong region based on a more sustainable and equitable development perspective.

- International agencies should shift from financing destructive large-scale development projects to promoting investments in economical, renewable, small-scale, energy projects that benefit rural communities.

- International agencies should pay greater attention on monitoring project performance, project evaluation, and compliance with international norms and guidelines for social and environmental responsibility.

- International agencies should be held accountable for past destructive development projects, ensuring that timely and fair compensation is provided to all project affected people.

*** The conference organised by:**
The Standing Committee on Foreign Affairs (SCFA) of the Thai Senate
The Standing Committee on Social Development and Human Security (SCSH) of the Thai Senate
The National Human Rights Commission of Thailand (NHRC) and;
Towards Ecological Recovery and Regional Alliance (TERRA)