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

Report of the Community-Based Environmental Studies in Northeastern Cambodia and in the Northern Thailand

February 2007

Written by Mekong Watch

Forward and Acknowledgements

This report comprises of the results of two field studies. The first part of the report is based on the follow-up study on the environmental changes along the Se San and the Stre Pok Rivers in the Northeastern Cambodia. The report was compiled and written by Ayumi Goto (Mekong Watch, Cambodia Program). The presentation materials in the report were provided by Dr. Makoto M.Watanabe (University of Tsukuba, Japan), Dr. Kaya (Tohoku University), Dr. Nohara and Dr. Fukushima (National Institute of Environmental Studies). The latter half of the report comes from the exploratory study on the recent ecosystem changes along the mainstream of the Mekong River in the Northern Thailand. The report was compiled and written by Kaori Ohsawa (Mekong Watch, China program). Both field studies were made possible by great contributions from the local partners of the Mekong Watch. Extensive collaboration with the Se San - Sre Pok - Se Kong Rivers Protection Network (3SPN) in Cambodia, the Towards the Ecological Recovery and Regional Alliances (TERRA) in Thailand and the Rak Chiang Kong Group in the Northern Thailand enriched the studies and their outcomes while the time we could spend in each village was so limited.

Mekong Watch
2F Maruko Bldg. 1-20-6 Higashi-ueno
Taito-ku, Tokyo, 110-0015 JAPAN
Tel:+81-3-3832-5034, Fax:+81-3-3832-5039
Emai: info@mekongwatch.org
HP: http://www.mekongwatch.org/

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Summary in Japanese （日本語要約）

特定非営利活動法人メコン･ウォッチ（以下、MW）は、独立行政法人国立環境研究所（以下、NIES）が中心になって進めているメコン河長期生態系モニタリングプロジェクト（以下、MeREM）が、流域国の特に農村部の人々が抱えている問題の解決につながるように、地域住民や現地で活動するNGO の視点を MeREM に反映させる調査を過去 3 年間 NIES からの請負として行ってきた。2004 年度の文献調査、国際会議への出席、及び流域国の NGO からの聞き取りをもとに、現時点でメコン河の越境的な環境問題が顕在化しつつある地域をとして、ベトナム中部からカンボジア北東部を流れるメコン河最大の支流群である『セサン・スレポック川流域』と、メコン河が中国からタイ・ラオスに流れる『上流域』を重点的な調査対象とした。2006 年度、MW は NIES とこの 2 つの地域への現地調査を行い、住民たちが抱える環境問題の実情に対して MeREM 研究者がどのような貢献をできるのか NGO や住民グループとともに検討した。

2006 年 8 月、MW 及び NIES を含む MeREM の日本人研究者は、カンボジアのラタナキリ州の NGO や住民組織の協力を得て、現地聞き取り調査とサンプリング調査を行った。セサン・スレポック川流域のうち、カンボジアのラタナキリ州のセサン川沿いでは過去 10 年間、乾季の異常な水位変動、河岸浸食、家畜の変死、皮膚病の発症などが起きている。また並行して流れるスレポック川沿いでもここ２、3 年同様の変化が確認されていることが明らかになった。一方、サンプリング調査の結果、ケイ酸による汚染はあったものの、有害金属による汚染は確認できなかった。また、砒素の濃度も低かった。更に、調査時期が水量の豊富な雨季だったため、住民が指摘する濁った泡などが検知されず、藻類など微生物の分析は実施できなかった。したがって、水位変動が起き、健康被害が生じやすい乾季に改めて調査を行うこと、長期的に調査を行える体制を整えること、また、再調査の際には、健康被害の実態を調査できる疫学の専門家とチームを組む必要があることが確認された。

2007 年 3 月、MW、NIES 研究者、及び MeREM に参加しているラオス国立大学理学部の研究者は、タイ北部のチェンライ県で地元の環境グループの協力を得て、メコン河本流沿いの 4 つの村、生鮮市場、漁民などから聞き取り調査を行った。その結果、全ての村で近年浸食が激しくなり河岸での農業が困難になっていること、村によって種に違いこそあれ主要な魚種の捕獲量が大幅に減少していること、魚の生息地域に変化が見られていること、川海苔の採取可能時期が以前より限られ収量が減っていることが指摘された。原因については、中国からタイ北部にかけて行われてきたメコン河の水運航路拡張のための大規模な浚渫工事とそれに合わせた中国のメコン河本流ダムからの人工的な放水を疑う声がほとんどだった。しかし、因果関係については中国側のデータが入手できないことから実証的な裏づけは困難である。今後については、NIES からは、GIS やリモートセンシングを活用した魚の生息地と環境の関係についての基礎的調査に関心が示された。また、上流の中国側やメコン河対岸のラオスで同様の調査を行うことも検討課題として挙げられた。

最後に、『セサン・スレポック川流域』と『上流域』の双方で、受け入れた現地 NGO や住民グループが、NIES を含む MeREM の研究者に対して信頼の気持ちを表していた。本請負調査の目的は、MeREM が現地の人々にとって意味があるものとなるにはどうしたらいいかを調査し提示することにあった。そのために最も重要だと考えていたのが信頼関係である。3 年間の請負調査を通じて培われた NEIS を含む MeREM 研究者への信頼を、いかに実のあるもとに育てるかは今後の具体的な共同調査の進展にかかっている。

Part 1:

Report of the Follow-up Visit for Ecosystem Monitoring in the Se San and Sre Pok Rivers in Ratanakiri Province, Cambodia

Background

In the Mekong River Basin, the severity of transboundary environmental problems is visibly worse each year. Since October 2004, Mekong Watch has been cooperating with the MeREM project in attempt to enable the project 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.

From the review of activities by civil society, four key areas were indicated that must be examined for the monitoring of hydrology, water quality, and biodiversity. Considering the severity of the changes in the ecosystem and potential roles of scientific data in order to address those concerns on the ground, two out of those four areas -- development of the Se San River basin between Vietnam and Northeastern Cambodia, and that of the upstream of the mainstream Lancang Mekong -- were chosen, to further examine the monitoring possibility. With the confirmation of local group's experience and interest in a community based monitoring project, Mekong Watch recommended MeREM to contact and collaborate with the groups in the Se San River Basin as a preparation for the development of future comprehensive monitoring system.

Se San River is one of the largest tributaries of the Mekong River, and flows across the border of Vietnam and Cambodia. Since the construction of Vietnam's Yali Falls Dam in 1993, which lies 80 kilometers upstream from Cambodia's border, the Se San River's ecosystem has not been the same. According to the survey report conducted in 2000, there were unprecedented tragedies in the downstream. Intense surges caused by water releases claimed villager's lives, and many people lost property in the fluctuating waters. The water no longer flows like a natural river nor ebbs with the seasons. Villagers claim drastic decline of fish catch in the river and serious health problems from the poor water quality.

With this background, in February 2006, a community workshop was organized in Ratanakiri province of Cambodia with a local NGO called Se San, Sre Pok, Se Kong Protection Network

(3SPN) and the villagers in the Se San and Sre Pok River basin[1]. Dr. Watanabe, a leading member of the MeREM project participated to explore possible future collaboration. In the workshop, understanding of the seriousness of the social impact related to changes in the river ecosystem was deepened, followed by field trips to Se San and Sre Pok Rivers. Likely flaws in the past monitoring activities were examined through which, possible points for future contribution by MeREM became clear.

The concrete outcomes of the workshop were that (1) Villagers, NGOs (in Cambodia and Japan) and MeREM scientist will continue to work on this issue, (2) Training or demonstration for sampling and pretreatment for water quality monitoring will be held in Ratanakiri in the middle of 2006, and based on the training or demonstration, villagers will decide if they will start a community based ecosystem monitoring project, and (3) MeREM will help to finance the establishment of water level monitoring points along the two rivers if they can get official approval.

The follow up visit was then made in August 2006 joined by other three MeREM scientists who are specialized in water quality, wetland ecology, and fish. The purpose was to further gain insights from each specialist and to identify feasible monitoring system, adding to what has been proposed by Dr. Watanabe in February 2006. Possible collaboration was also explored with Resource Development International (RDI)-Cambodia, an NGO with a laboratory in Phnom Penh. This report was prepared and submitted by Mekong Watch for MeREM in order to record the presentations, findings, and the challenges identified to continue with the monitoring in the two rivers in Cambodia.

[1] Sre Pok River is another major tributary of the Mekong River running parallel to the Se San River and people here are experiencing the same tragedy.

The Follow-up Visit for Conducting Ecosystem Monitoring in the Se San and Sre Pok Rivers

Objective

1. MeREM scientists, who are specialized in water quality, wetland ecology, and fish will understand the seriousness of social impacts related to water flow and water quality in the two rivers.
2. Obtain useful information adding to what has been identified in the community workshop in February 2006, to make concrete plans such as working protocols, division of work and financial allocation for conducting ecosystem monitoring.

Date

Aug 1-7, 2006 (6 days)

Schedule

Day 1 (Aug 1)	Visit Resource Development International (RDI) -Cambodia in Phnom Penh
Day 2 (Aug 2)	Arrival in Ratanaikiri Meeting with 3S Protection Network (3SPN)
Day 3 (Aug 3)	Field visit to Se San River, and meeting with the villagers in Vuen Sai District
Day 4 (Aug 4)	Field visit to Sre Pok River, and meeting with the villagers in Lumphat District
Day 5 (Aug 6)	Feed back from the MeREM scientists and discussion with 3SPN and the focal persons
Day 6 (Aug 7)	Departure for Phnom Penh

Participants

Dr. Makoto Watanabe, University of Tsukuba, Japan

Dr. Hiromitsu Kaya, Tohoku University, Japan

Dr. Seiichi Nohara, National Institute for Environmental Studies of Japan

Dr. Michio Fukushima, National Institute for Environmental Studies of Japan

Mr. Kim Sangha, 3SPN

Mr. Mien, 3SPN

Mr. Heang Sarem, 3SPN

Ms. Noi, 3SPN

Ms. Ame Trandem, 3SPN

Ms. Ayumi Goto, Mekong Watch

Day 1-2: Discussion with Resource Development International (RDI) Cambodia in Phnom Penh and 3SPN in Banlung, Ratanakiri

RDI-Cambodia is an NGO in Cambodia with a strong scientific knowledge on water health and education. It has implemented various projects such as water purification, arsenic testing, rainwater harvesting, pumps and latrines that are designed to provide clean water to rural villagers of Cambodia. RDI Cambodia also has a strong research background and is equipped with a scientific laboratory. RDI has been conducting tests of surface and well water in Cambodia since 1998 and over 10,500 wells have been tested. In addition to the arsenic testing, the RDI labs also conduct various microbiological and viruses tests. In addition to arsenic research and data collection, the RDI laboratory is also involved in river and wetlands research, sewer research, rainfall and weather pattern research, and drinking water quality indexes.

MeREM researchers and Mekong Watch has visited RDI-Cambodia on August 1st 2006 to explore possible collaboration in conducting ecosystem monitoring in the Se San and Sre Pok Rivers. Listening to the necessity and urgency of conducting monitoring on water quality and water volume in the Se San and Sre Pok rivers, Dr. Mickey Sampson, the representative of RDI-Cambodia, encouraged the initiative and offered a support in letting the initiative use the laboratory in the near future. This will enable water samples collected from the Se San and Sre Pok rivers to be tested within Cambodia, which is financially and time-wise preferable, as initial idea was to send the samples to the laboratory in Bangkok.

After going over the Se San River by a propeller plane, the team arrived at the provincial town Banlung in Ratanakiri province.

Se San River

In a meeting with 3SPN, current situation of villagers' livelihoods along the Se San and Sre Pok Rivers, including social and environmental problems caused by changes in the river ecosystem and current and future dam plans upstream was explained by the 3SPN. The content of the presentation was the same as that presented at the community workshop in February 2006. Past and current monitoring activities related to river ecosystem changes was also explained. It was then also reported by the 3SPN that they have gained positive response from the provincial government for conducting water quality and water volume monitoring in the Se San and Sre Pok Rivers.

Prior to this meeting, MeREM scientists have also gained general knowledge from the reports written by the civil society groups such as *Se San River Fisheries Monitoring in Ratanakiri Province, Northeast Cambodia* (Baird and Meach, 2005), and *Livelihoods in the Sre Pok River Basin in Camboida: A Baseline Survey* (Swift, 2006).

Meeting with 3SPN at the office in Banlung

Day 3: Field Visit to Se San River

The participants visited the Se San River to observe the river condition including surface water, riverbed, speed of the water flow, river depth, vegetation, and erosion of river banks by directly sampling and measuring river water as well as by getting on a boat.

Dr. Watanabe and Dr. Fukushima on a boat

Equipment to measure river depth

Dr. Nohara collecting water sample from the Se San River

There was also an opportunity to talk with the villagers in Fang village in Vuen Sai District along the Se San River. The villagers identified the problems they face in their livelihoods such as skin problems and diarrhea from using and drinking river water, the difficulties in coping with now unpredictable floods and the fluctuation of water level, and drastic decrease of fish catch in recent years which is affecting the food security of many of the households in the village.

Talking with the villagers in Fang village along the Se San River

On the way back to Banlung, the team stopped over at the Se San Knowledge Center and looked at the fishing gears that have been used in the region for generations and the pictures of various fish species living in the Se San River.

Se San Information Center

Day 4: Field Visit to the Sre Pok River

The participants visited the Sre Pok River the next day to observe again the river condition. The equipment called Hydrolab, rented from the RDI-Cambodia Laboratory, was used to measure the river depth. The team has also attempted to catch fish samples, but failed as the water level was too high for fishing.

Measuring water depth in the Sre Pok River

Dr. Watanabe with the Hydrolab

The team has also visited the Day Lo village in Lumphat District, to hear the story of the villagers who have begun to experience the same problems that have been seen in the villages along the Se

San River.

Talking with the villagers in Day Lo village in Lumphat District near the Sre Pok River. Dr. Kaya and Dr. Watanabe examining the water samples collected by the villagers.

The villagers were waiting with water samples in plastic bottles. The villagers had collected water from the Sre Pok River for the scientists to examine. Dr. Kaya and Dr. Watanabe have tentatively examined those water samples.

Listening to the explanation from Dr. Watanabe, on the purpose of the visit of the MeREM scientists, villagers responded by showing strong willingness to conduct water quality and water volume monitoring together with the scientists. The villagers have shared their concern over the changes in the Sre Pok River and its influence on their livelihoods, and expressed expectations for the future monitoring project. By talking to the villagers, it became clear that precise documentation of the river changes, such as dates of sudden floods and water fluctuations, is needed.

3SPN has offered to support such activity.

Another attempt was made, to find fish in the Sre Pok River. Together with the villagers on a boat, Dr. Fukuashima and Dr. Nohara went out to catch fish samples. Unfortunately, no fish was found. Villagers said that fishing should be done early in the morning but due to the time constraint, the team had to leave the Sre Pok River.

Trying to catch fish from the Sre Pok River

Day 5: Feedback from the MeREM scientists and discussion with 3SPN and the focal persons

Based on the observations of the two rivers and the information given from the villagers and 3SPN, MeREM scientists presented their findings and proposed future monitoring activities to the village focal persons and to 3SPN. The content was basically the same as that presented at the community workshop in February, but with additional information on water quality, fishery, and land cover changes.

The presentation identified the types of studies that are urgently needed to verify the assumption made by the MeREM scientists for ecosystem changes in Se San and Sre Pok Rivers. There were four necessary studies identified. First is on major factors causing health problems and livestock death. Water and brown bubbles from Se San River should be collected in the dry season to analyze harmful chemicals and toxic bacteria. Second is the monitoring of fish diversity and abundance. Quantitative and statistical analysis of fish abundance and diversity, and food web analysis was suggested. The latter is to see whether fish has been affected by dam operation as those fish may have less complex web structure. Third is the monitoring of water quality and hydrological changes. Automatic data logging and water sampling was suggested to see whether fluctuation of water is due to rainfall of dam operation. The last is the monitoring of geomorphological and land cover changes. This is to see the changes in bank erosion, sand deposition and riparian vegetation. Aerial photographs and satellite pictures could be used for such purposes.

Following is the detail of the presentation.

Summary

Inspection of Se San & Srepok rivers in rainy season

Sandiness of Riverbed

Based on inspection of Se San river in the dry season by MMW and testimony of many villagers at the last and present meetings with villagers, most of river beds were covered by sand but they had been sandy and rocky before dam construction and operation.

The sandiness may be caused by both the increased downstream soil erosion due to the large size of surface water surges and the release of bottom water with huge amounts of sediment from dam reservoir.

Reduction of fish catch and diversity

1. Diversity loss from 500 species to 100 species
2. Reduction of fish catch
3. Diminishing large fish

We suppose the Se San River Ecosystem Structure as follows:

Riverbeds was mostly sandy
Rocks and stones were hardly seen in riverbed

↓

Lost of habitats of benthic algae

↓

Decrease of algae — Decrease of primary production

↓

Decrease of aquatic insects; Decrease of herbivorous fishes

↓

Decrease of carnivorous and omnivorous fishes

↓

Little fish in Se San River

Water Quality of Se San River Ecosystem

According to testimony of villagers and report of fisheries office, after dam construction, there are

- Many bubbles with various sizes floating at the surface of river water : detection of *Nocardia* from bubbles (after Micky, RDI)
- Muddy water with bad smell when water level is rising
- Domestic animal death (reason unknown)
- Skin rash and eye irritation of some villagers after bathing and swimming in the river (most common when water is coming up in dry season)

We suppose :
- **Water in dam reservoir is heavily polluted, resulting in human and animal health problems in lower basins.**

Present state of Srepok River Ecosystem

First visit on February
Riverbed: sandy and rocky
Bentic algae and aquatic insects were observed

According to testimony of villagers in the meeting of 4 Aug., there are:
- Shallowness of deep water pool by increased sedimentation
- 7 0% decrease of fish catch during the last three years
- Illegal fishing

Water quality of Srepok River

According to testimony of villagers at the meeting of 4 August, there are:
- Frequent fluctuation of water level, especially in dry season.
- Water color changes (brown, red, or dark)
- Sudden decrease of water level during dry season in 2006, at which water was muddy and skin rash and diarrhea occurred in some villagers

We suppose:

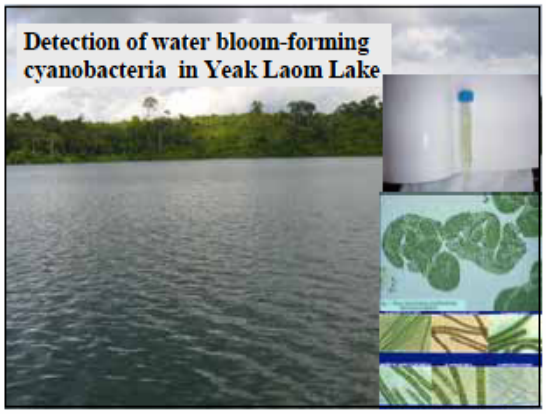
1. It is highly probable that dam is operating in the upstream of Srepok river
2. It seems that the environment of Srepok river is changing toward the state similar to that of Se San river

What researches are urgently needed to verify our supposition for ecosystem changes in Se San and Srepok rivers?

1. Major factors causing health problems and livestock death
   - We collected water and the small size of bubble from Se San river to analyze the harmful chemicals and toxic bacteria
2. Monitoring fish diversity and abundance
3. Monitoring water quality and hydrological changes
4. Monitoring geomorphological and land cover changes

Survey on main factors causing health problems and livestock death

1. We collected water and the small size of bubble from Se San river to analyze the harmful chemicals and toxic bacteria
2. Based on the results obtained, future plan of survey will be made.
3. Large balled-bubble partly with yellow or red color should be collected in dry season and analyzed for harmful bacteria



Fish Data (Se San & Srepok)

Catch data (long-term, weekly or monthly)

- Species composition by weight
- Sampling effort (no. of fisherman, boat, net, etc.)
- Individual fish size (weight) if possible
- Survey as many villages as possible (3 from each river?)

Tissue samples

- 10 individuals from each fish species per each sampling
- Preserve in a vial with 99% ethanol
- Label with date of capture and species name (common name)

Objectives
1) Quantitative statistical analysis of fish abundance and diversity
2) Food web analysis (fish assemblages affected by dams may be less complex in food web structure)

Hydrological Data

Automatic data logging

1) Water levels, water temperature, air pressure, rainfall (hourly at 2 sites in each river)

Water sampling (by villagers)

1) Sample in plastic bottles (weekly at 2 sites in each river)
2) Preserve samples with 3 % formaldehyde solution
3) Take photos of the bottles and the sampling site

Objectives
1) Water level fluctuation due to rainfall or dam control?
2) Time series data of water quality data (SS, ions, heavy metals, etc.)

Remote Sensing Data

Aerial photographs

- Existing photos taken by US Army during the Viet Nam War
- Launch flights along the two rivers for the present data acquisition (?)

Satellite images

- Synthesized Aperture Radar (SAR) (?)

Objectives
1) Geomorphological changes (channel width, bank erosion, sand deposition, etc.)
2) Land cover changes (farm land, rice field, riparian vegetation)

Result of the test on water samples from Se San and Sre Pok Rivers

Water samples collected from Se San and Sre Pok Rivers were subsequently tested by Dr. Kaya and Dr. Watanabe in Japan. Below is the result of the testing of those samples.

ICAP-61E-TRACE 測定
ICP-No.06062
西川 (彼谷) サンプル (ベトナムの川の水　2本)
単位 (ppm ; μg/ml)

元素	Al(H)	Ca(H)	Cd	Co	Cr	Cu	Fe(H)	Mg(H)	Mn	Ni	Zn	(K)	(Na)	P
波長(ｵﾝｸﾞｽﾄﾛ	1670	3968	2288*2	2388*2	2677	3247	2599	2852	2576	2316*2	2062	7665	5889	1782*2
定量下限値 (μ	0.0100	0.0100	0.0050	0.0100	0.0100	0.0100	0.0100	0.0050	0.0050	0.0100	0.0100			0.0700
STD-BLK	-0.0002	-0.0001	0.0003	-0.0002	-0.0002	-0.0003	-0.0002	-0.0001	-0.0001	-0.0004	0.0001	0.0003	0.0002	0.0015
ｾｻﾝ川	1.4281	1.5773	0.0002	0.0003	0.0012	0.0009	0.6742	0.6349	0.0030	0.0009	0.0461	1.0705	2.3158	0.0112
ｽﾚﾎﾟｯｸ川	2.9996	3.3534	0.0001	0.0008	0.0039	0.0017	1.7555	1.6703	0.0074	0.0046	0.0648	1.1998	3.3702	0.0289

干渉
Ca-100(1.1100)

元素	S	Sr	As	B	Se	Ti	V	Ba	Be	La	Mo	Pb	Sc	Si	Y
波長(ｵﾝｸﾞｽﾄﾛ	1807*2	4215	1890*2	2496*2	1960*1,2	3349	2924	4554	3130	4086	2020*2	2203*1,2	4246	2881	3710
定量下限値 (μ	0.2000	0.0050	0.0300	0.0300	0.0500	0.0050	0.0100	0.0050	0.0050	0.0100	0.0100	0.0300	0.0050	0.0500	0.0050
STD-BLK	0.0015	0.0000	0.0022	0.0003	-0.0053	-0.0001	-0.0005	0.0000	0.0000	-0.0001	-0.0003	0.0012	-0.0001	0.0001	-0.0001
ｾｻﾝ川	0.1887	0.0149	0.0010	0.0474	-0.0022	0.0513	0.0014	0.1309	-0.0001	0.0000	-0.0003	-0.0002	0.0001	6.5670	0.0002
ｽﾚﾎﾟｯｸ川	0.3818	0.0307	0.0003	0.0414	-0.0006	0.1400	0.0040	0.1621	-0.0001	0.0003	-0.0002	0.0003	0.0005	8.8645	0.0004

It was concluded by Dr. Watanabe that data shows no high metal contamination in the river water, but contamination of silicic acid was found. Arsenic contamination was low. Microorganism could not be analyzed, as there were no bubbles collected from the river due to seasonal reasons. All the scientists suggested that another visit should be made in the dry season in order to gain better samples. To predict anything at this stage was not relevant, as there are no sufficient data available.

Conclusion

The follow-up visits concluded that monitoring on water quality and water level are still urgently needed. Initially it was expected that clearer observation will be made based on the result of the water samples test and fish samples studies. Unfortunately however, no sufficient samples were collected nor enough observation made because of the timing of the visit in the rainy season.

It was agreed that the scientists come back in the dry season again to collect more samples. Also, it was decided that while the Japanese team secures financial feasibility, concrete plans including working protocols, division of work, equipments, and financial allocation for conducting environmental monitoring of Se San and Sre Pok rivers be discussed among all the participants. It is expected that final decisions on concrete plans will be made during the visit of the scientist in the dry season in 2007.

Finally, it was again reconfirmed that the monitoring should aim to identify possible causes of health problems and the fish decline, and their correlation with water fluctuation in the two rivers. The identification of the causes of these problems would in turn give ideas to the civil society for ways to restore the ecosystem of the two rivers, and the livelihoods of the villagers in the river basins of Se San and Sre Pok.

Part 2:

Report of the Field Survey on The impact of ecological change of the Mekong River at Chiang Kong and Chiang Saen District, Thailand

1. Background

Since 2004, Mekong Watch has been cooperating with MeREM project or Mekong River Ecosystem Monitoring, which is organized by National Institute for Environmental Studies in Japan. The MeREM project consists by natural scientists, whose expertise are on fish, river plants, water quality and hydrology from 5 basin countries including Thailand, Laos, Cambodia, Laos and China and also scientists from Japan.

As a result of reviewing various studies and opinions from local civil societies including NGOs and academics from the Mekong River basin countries, Mekong Watch has recommended MeREM research group to monitor 4 focal areas for their long term monitoring projects. The focal areas included upper reach of the Mekong River in Northern Thailand, the largest tributary of the Mekong River in eastern Thailand, the second largest and trans-boundary tributaries including Se San, Se Kong, Sre Pok rivers in Vietnam and Cambodia and Tonle Sap Lake in Cambodia.

In the following fiscal year of 2005, Mekong Watch visited Ratanakiri Province in Cambodia to investigate the local issues caused by the Yali Falls Dam build in the upper reach of Se San River in Vietnam and its impact on the down stream communities in Ratanakiri Province. Scientists from National Institute for Environmental Studies made investigation along the Se San and Sre Pok river as well as villages on water quality, water level, fish and its relationship with various problems happened in local communities. The trip was made 2 times in total and keeping on their investigation to solve the problems in this region.

In the fiscal year 2006, Mekong Watch recommended the MeREM team to made study in the upper reach of the Mekong River in Chiang Kong district in the Northern Thailand.

2. Issues in the Northern Thailand

Chiang Kong or Chiang Saen along the Upper Mekong river in Northern Thailand is the suitable place to know about various negative impacts caused by Chinese dams built and planned in the mainstream of the Mekong River, as well as growing number of big boat with accompanied by

rapid blasting for safe navigation during 2003, and local social issues brought by Free Trade Agreement (FTA) between China and Thailand which also partly depends on the navigation in the Mekong river. In local villages along the upper Mekong in Thailand have been experienced the decline of fish catch, riverbank soil erosion along the mainstream which was once significant places for their seasonal agriculture for vegetables. The disappearance of Kai and other riverweeds is also serious livelihood issues for local villagers. There is a complex social issues brought by FTA especially on to the communities in Chiang Saen, where the first Chiang Saen Port which completed in 2003 locates.

Local villagers in Chiang Kong claims the cause of those negative change of the Mekong River ecosystem is caused by the water fluctuation and big wave from the navigating boat or supposedly from the dams in China and rapid blasting.

3. Field study in Chiang Kong and Chiang Saen

Mekong Watch recommended to the Mekong researchers to visit Northern Thailand to know better about local activities related to the Mekong river ecosystem and exchange their experiences each other. Following is the detail of the investigation this time.

Objectives:

1) Visit problematic local place where we can understand the impact of development project (Kai, riverbank erosion, Gen, construction of port) etc
2) Discussion with local villagers.
3) Sampling of Kai and other river plants, lives in water, polluted water etc.. at the place impacted by development.
4) Share information on MeREM and feedback from local villagers/NGOs.

Date: 5th-7th March, 2007 (3days)

Place: Chiang Kong and Chiang Saen in the Northern Thailand

Schedule

5th March

13.00 – 18.00

- Boat trip upstream Mekong to Ban Maungkan village and have a meeting with villagers' representative and exploring impacts in Mekong River close to the village. Traveling back to Chiang Kong by boat.

20:00 – 21.00

- Meeting with Chiang Kong group related to their activities and local situation

6th March

09.00 – 17.00

- Small meeting with villagers' representative and exploring impacts in Mekong river close to the village in three villages; Ban Pak Ing village, Ban Huay Luk village, Ban Jam Pong village.
- Boat trip the whole day to explore the Mekong downstream from Chiang Kong to Pha Dai (the last point of the Mekong before it turn in to Laos)
- Traveling back to Chiang Kong by boat.

7th March

08.30 – 16.00

- Traveling to Chiang Saen by van.
- Small meeting with villagers' representative and exploring impacts in Mekong River close to the village at Ban Had Pai village and Ban Sop Kok village.
- Meeting with Chiang Saen group and exploring impacts in Mekong River (between Chiang Saen upstream to Golden triangle) from some factors such as rapid blasting, trade from China, port construction etc.
- Boat trip is possible in case of there is some need to explore in Mekong in Chiang Saen.
- Traveling from Chiang Saen to Chiang Rai airport around 04.00 pm.

Participants:

Dr. Seiichi Nohara (National Institute for Environmental Studies)

Dr. Somchanh Bounphanmy (National University of Laos)

Dr. Somkiat Phasy (National University of Laos)

Mr. Satoru Matsumoto (Mekong Watch)

Ms. Higashi Satomi (Mekong Watch)

Ms. Kaori Ohsawa (Mekong Watch)

Local Partners:

Mr. Montree Chantawong (Towards Ecological Recovery and Regional Alliance)

Mr. Thongkram Thongkhao (Rak Chiang Kong)

Mr. Viccha (Rak Chiang Kong)

Mr. Vu (Rak Chiang Kong)

Mr. Mithi（Rak Chiang Saen）

Villagers (Interviewees)

Mr. Nalonrit (Pak In Thail Village)

Mr. Pann（Pak In Thail Village）

Mr. Kheew (Huay Luek 村)

Mr. Runnpenn（Huay Luek Village）

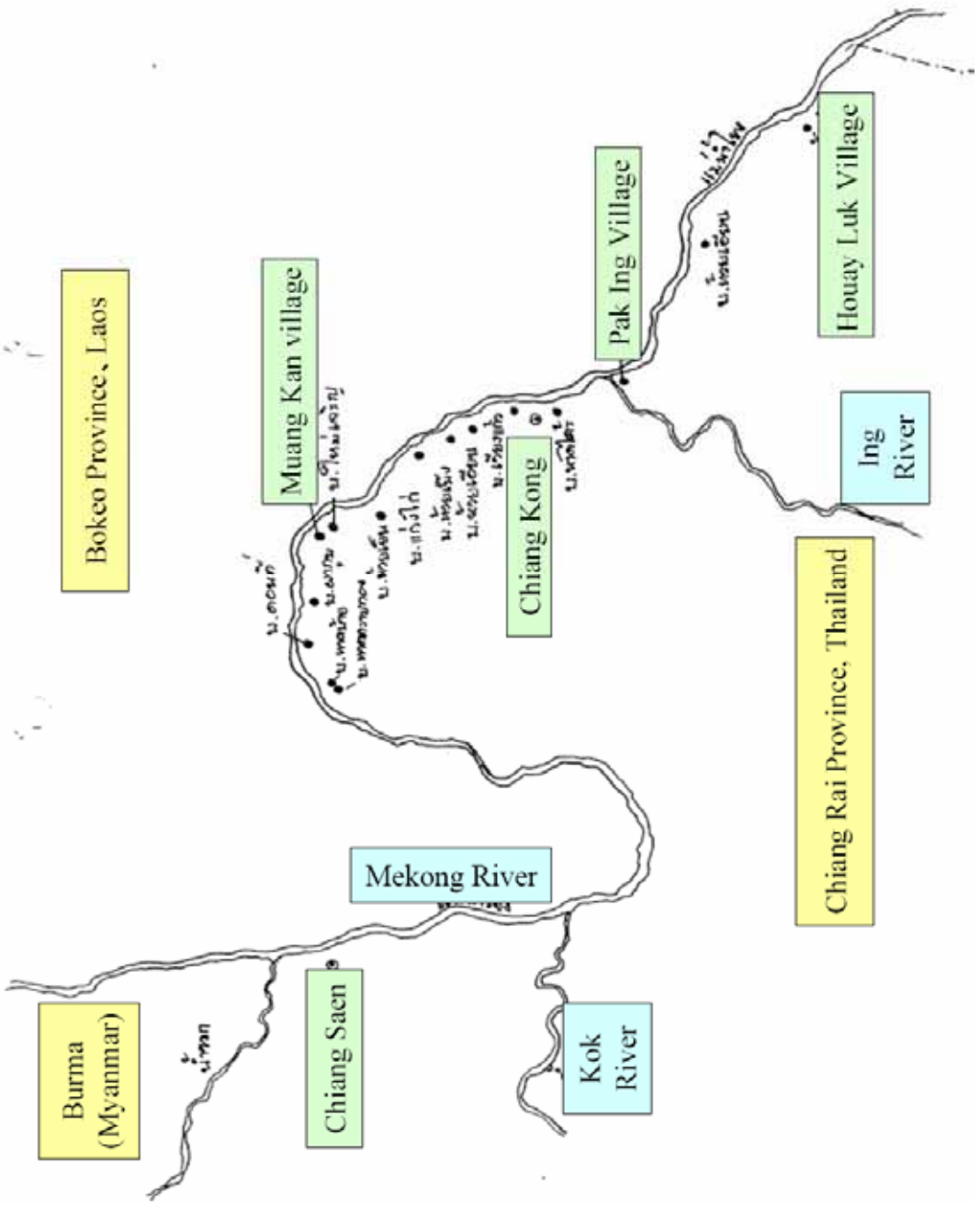
Mr. Suksam（Jam Pong Village）

Mr. Nalongrit (Pak In Thail Village)

Mr. Pann（Pak In Thail Village）

*The spellings of villagers' names are not necessarily accurate as it depends on oral communication in Thai local language.

Chiang Kong group coordinated with villagers and some resource persons while TERRA helped Mekong Watch to contact with Chiang Kong group.



A Map of the Northern Thailand and relevant villages along the Mekong River
(by Rak Chiang Kong Group)

4. Results of the Field Study

Day 1

■ Interview with villagers in the Muang Kan Village

- The character of villagers' livelihood in this village is that they cultivate soybeans and corn in rainy season, and then catch fish in dry or winter season.
- The change of the Mekong river ecosystem observed at the village of Muang Kan by local villagers is as follows.

Village informants

Mr.Tang（Muang Kan Village）

Mr.Winai（Muang Kan Village）

[As to fish catch and water fluctuation]

- The impact in the Ban Muang village, which was described by local villagers, was mainly following 3 points. As to Water level, fluctuation of the river occurs more frequently. In the morning, it lowers dramatically, especially during dry seasons.
- Villagers in this village collect Kai or riverweeds in the river along this village and in April the riverweed increase more. As to fish catch, they often catch rather small fish called Pla Soy, which is indispensable for villagers' livelihood. Normally, they catch 2 kg to 5kg a day, however, they couldn't catch the fish at all this year.
- They grow economic plant such as vegetables and soybeans in dry season. However, the cultivate land at the riverbank is decreasing in recent years. They consider the reason is because of Chinese dams in upstream.
- Those ecological changes, especially the irregular water level fluctuation of the Mekong River has begun since about 10 years ago.
- The revenue from the river has also declined along with the decline of fish catch. It became about one-third from original.
- They collect Kai mainly during February and March, which is equivalent with 5000 Baths
- As to other ecological changes Mekong River, they have different current of water flow in dry season. This is perhaps because of the blasting of the rocks there. Because of the water current change, 2 people died in the river.
- Many of the sedimentation around here would come from the mainstream and tributaries of the

Mekong River.

- In this village, they have low water level in the end of October. The color of the water changes depends on the watercolor at the river on the Chinese border. If the watercolor at the Chinese border turns red, their watercolor also became red. They sometimes have water with green color.
- They noticed the dramatic decline of fish catch about around 5-6 years ago, or the year 2000 to 2001. They assume this is because of the dam built on the Mekong mainstream at the upstream in China.
- Many of vegetable, including cabbages are imported from China by trade.
- Although the impact in the Laos side is yet to be cleared, but they must also have some impacts by the ecosystem change of the Mekong River. Before, Laotian people sold fish to Thailand, however, now they purchase fish from Thailand.
- Many of fish in Laos were declined assumedly by the blasting projects conducted by Chinese. [Exchange opinions on Chinese environmental NGOs who potentially can cooperate with Thai or Lao people to solve these problems related to the Mekong River development projects.]
- According to the data from Mekong River Commission, the sedimentation in the Manwan dam, which is the upstream dams built on Mekong mainstream in Chinese domain increased double compared with before the construction.

Plaa Soy recently reduced in catch

Meeting in Muang Kan village

Comments from Dr. Somchan:

- If the water increases in dry season, it put bad influences on fish catch as it is different from natural cycle of the river.

■ Meeting with Rak Chiang Kong

Informants:

Mr. Thongkram Thongkhao, Mr. Viccha and Mr. Vu

- About the activities of the Rak Chiang Kong. They began their activities since about 2002, when the blasting for navigation came up as a serious development project, which devastates the local livelihood along the Mekong River in Chiang Kong.
- Because of the lack of information for villagers in Thailand, they put their effort to provide trustworthy information for them related to the development projects including dams construction and blasting for navigation by China. Also, they analyzed the impact of those development projects.
- They also made appeal to their Thai government to disclose their information especially on the blasting projects of the Mekong River for navigation. In many occasions, Thai government are not so helpful for villagers, as they claim that they do not have much information to tell to villagers along the river because the fact the blasting projects were conducted depends on the international treaty.
- Partly because of their appeal to Thai government in the year of 2003, the government decided to conduct EIA for blasting. The EIA was finalized in 2006. They concluded that the blasting put no influence for those rapid including Con Pi Luang, which is the last rapid which remains not are blasted so far.
- Rak Chiang Kong is collecting the baseline data for the communities along the river, including on fish quantity, fish gear, and ecosystem of the river and plant species in the riverbank. After the research by villagers, they distributed their results to the related organizations. A human rights committee in the Thai Senators was interested in this report.
- They have just published the book named “Fish in the Mekong” in Thai in this year. They are going to distribute to many local elementary school as well as the schools in Laos. They also have a plan to be picked up by local Radio station.

Day 2

■ Interview with villagers in the Pak Inn Tai Village

Village informants:

Mr.Nalonrit and Mr.Pann

- The Pak Inn Thai Village is located in the estuary of the Inn River, which is the tributary of the Mekong. About 200 meters to upstream from the estuary of the Inn River is the protection site for fish. Villagers decided to protect their fish in 6 years ago. Fish lay eggs between May and June in a year. Estuary is the important area for migration fish in the Mekong.
- About 6 to 7 years ago, they hardly could catch fish because of the over fishing before then. However, thanks to the protection activities, they can catch fish around this river at more than 20 points.
- About 20 years ago, there were plenty of fish in the Inn River, however, because of the over fishing and the decline of fish in the Mekong, they gradually became not to able to catch fish. They took 30 kg of Pla Kao. After flooding, they had ponds and fish spawn there.
- Villagers now depend both on agriculture and fishing. But before, they mainly depended on fishing and agriculture was subordinate way of livelihood. Fishing is easier to make cash. Before they have many kinds of fish species including Pla Pia, Pla Kong, Pla Soy etc…
- Before, the change of the Mekong River depends on seasonal natural change and fish migrate on the seasons.
- They collect seaweeds from the river, named Kai, but it became less than before.
- Since around 6-7 years ago, they had become experienced sudden water level change, especially in July and August. Compared with before then, the river current became stronger and they erode their riverbank.
- In recent years, water level became irregular and even in rainy season, they got dry river especially around November 2004.
- They consider the primary reason of the ecological change of the Mekong River is the development by China, which flush water from their constructed dams. They hope that China will not release water from dam as hard as it is now.
- They had riverbank erosion before, too, however, it was not as strong as it is now. The erosion still continues even now.
- They grow vegetables in riverbank during dry season before. But now they cannot do that.
- Because of the change of water current from Thailand to Lao to from Lao side to Thailand. Before they did not have any accumulation in the river.
- The river body of Inn River was changed very much because of the sand extraction for construction project, also, they have many bank corruption because of the water channel.
- They got the decline of fish catch because of decline of fish itself both in the Mekong and the

Inn River.

- The depth of the river is shallower than before. Before they had around 7 to 8 meters of depth but now it only have 4 meters of depth.

Meeting in Pak Ing Tai Village

Soil erosion in Pak Ing Tai Village

■ Interview with villagers in the Huay Luek village

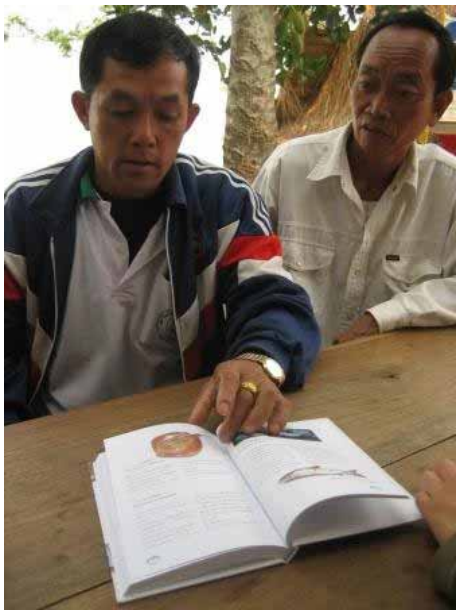
Village informants:

Mr. Kheew and Mr. Runnpenn

- The villagers in the Huay Luek village depend both on agriculture and fishery. They also cultivate Pamela.
- In recent 2 years, they got rapid and frequent water level changes. In the morning, they have water raise and in the afternoon, they have sudden decrease. The change is too big.
- Riverbank erosion was caused by water fluctuation and big wave made by big boat. The length of the riverbank erosion ranges 2 km long along the river.
- Fish migrate from February to May. In March they catch small fish including Pla soy.
- They feel that their fish catch declined almost 70 %, only 30% remains. Especially large species including Pla book disappeared dramatically.
- They think the cause of the fish decline is the water fluctuation in dry season.
- The color of water of the river still remains to be transparent.
- The production and consumption of this village is both depends much on fishery. The ratio between fishery and agriculture is about 7:3.

- In Lao side, they also have problems. Before they bought fish from Lao side, but because they seem not to catch fish as much as before they caught.
- They concern the decline of sedimentation, too. Before, the red soil from upstream laid on the rocks in the river, and became the bait for fishes. But now, In rainy season, red fish which were once affluent during November and December started to disappear. Villagers think this is because of the change of soil sedimentation caused by dam in upstream.
- The riverbank erosion has begun since around 6 years ago.
- The water current was strongest in between 2003 to 2004.

Houay Luek Village set up its own Fish Protection Area (300m downstream from the blue board on the bank)



Villagers explain the decreased fish spices by using the local fish catalog published by the NGO.

Day 3

■ Inteview with a villager in the Had Pai Village

Village informant: Mr.Suksan

- He depends his livelihood both on agriculture and fishery. It's common in this village.
- Around the year of 1997, they could catch fish about 8-10 kg a day without too much effort of looking around fishing sites. After 1997, water fluctuation often happens and fish catch started

to decline. Villagers think the water level fluctuation is the major cause of fish decline, as it changes the ecosystem of the river, which was once favorable for fish and Kai.

- Before they could catch 8-10 kg of fish in one point. But now they cannot catch fish unless work in a wider range and they use a lot of fish gear than before. They use fish gear especially in July, though they often use fish gear. Before they use fish net depends on the size of fish, but now, it became difficult to speculate what kinds of fish is hiding where. So they developed new type of fish gear as in picture below.
- They got 1-3kg in rainy season and 10 kg in dry season. But the water level change became unnatural year by year. Before it never happen during rainy season that water level decline so sharply as recent 2 or 3 days now.
- Only the amount of catch of Pla nay increased in recent years, while other fish species all declined. The cause must be unnatural water current change caused by upstream development.
- They feel it is impossible to get compensation from Chinese government. In a bigger picture, Thai people get more benefit from the trade with China.
- They want China to stop rapid blasting in Chiang Saen. It does affect their livelihood.
- Last month (February) this year, Chinese ship got accident because of the accumulation of the sand. It is because of the recent unnatural change of water current. Now nobody could really know the situation of river, as it is largely changed by natural river once it was.

Meeting with a fisherfolk in Had Pai Village

Villagers innovate a new net, which contains three different sizes of mesh to adapt the changes of habitats of the fish.

■ Observing the Chiang Saen Port and Interview with a leader of the local group called “Rak Chiang Saen”, Mr.Miti near the port.

- Introduction to international trades utilizing the Mekong River and road between China and Thailand, as well as the change of the Mekong river ecosystem.
- About the activities of the Rak Chiang Saen. In around 1997, they had a lot of trade in Chiang Saen city. They had a strong concern that if the current trend, which only focuses on trade between China and Thailand, they will lose their local culture. Therefore they started their activity such as learning local history in Chiang Saen. Back then, they had major two changes in their city, one is commercialization brought by trade with China and the other is a large project promoted by Thailand central government, which local people could not participate at all. The second Chiang Saen port is still remains to be a plan, but the construction will begin in two years to make the 400-500 t of ship can navigate.
- Their current activities are mainly four areas, 1) Young generation program, 2)Eco-tourism project, 3) local knowledge project, and 4) Artists projects. As to young generation program, they cooperate with students at the gift and talents exploring center. Students made appeal to prime minister by writing letters.
- Chiang Saen has declared that they have Green Zone. Thailand government should take of policy, which considers their people’s livelihood.
- Chiang Saen is located at the conjunction point on the road, which connects from Kunming, China to Singapore.
- Because of the Free Trade Agreement, local communities are suffered by influx of vegetables from China. Chinese vegetables are very cheap and it is about two baths per kg. Thai government has no measure to protect local farmers in Chiang Saen against those cheap vegetables coming from China. Thai government recommend farmers to change their way of livelihood, however, they have no idea on specific measures.
- They noticed the ecological change around in Chiang Saen in recent years. Especially because of the big commercial boat from China make waves and riverbank of the Lao side was erode severely. It also made an island in the river, which was not there before. Big boat also affect on small boat used by local fishermen. Small boats now cannot fish because it is dangerous.
- When the Mekong mainstream dries up, the tributaries are also dried up as well.
- They are turning their crop along the riverbank from vegetable into tobacco. People do not buy

local vegetables as it is no longer cheap compared with vegetables from China.

- If there are any groups in China, which will help us, we are willing to ask Chinese government about the project and people's livelihood in Thailand, although it has some difficulties when people in Thailand think they got fruit from FTA as a whole.

Chiang Saen Port along the Mekong River in Thailand

Mekong tourist boat between Jinghong in China and Chiang Saen in Thailand

5. Future activity plans from each participant

Feedbacks from each participant at the end of the field trip:

Dr. Seiichi Nohara (NIES, Japanese environmental specialist)

- It is important to have round table, which invite all the stakeholders and have the opportunity for fair and open discussion. There is a good example from the case in Japan.
- He would like to continue his natural scientific survey using some technical devices as MeREM in future.

Dr. Somcchan and Dr. Somkiat (National University of Laos)

- Thank you for providing this very good opportunity to look at and listen to the local issues directly. We were really interested in this issue and honored to cooperate with people in future.
- Despite we are sharing the same river, there is almost no study on the impacts of ecosystem changes of the Mekong river in Laos side. We hope that we can continue to investigate in Lao side, too. They are sharing one river with Thailand, so Lao must have some impacts by

ecological changes of the Mekong River.

Mr. Satoru Matsumoto (Mekong Watch, Representative Director)

- Staff from Mekong Watch based in different countries, I myself based in Tokyo, so as to Laos and China we would like to let each staff to speak their idea and feedbacks.
- If Thai groups take lead to ask for compensation for Chinese government, we do support this initiative from Thai groups.
- Also, if local group have any request or expectation to Mekong Watch, please share your suggestion on this issues.

Ms. Satomi Higashi (Mekong Watch, Laos program)

- It is meaningful to do any survey in Laos's side on the impact of ecological change of the Mekong river as Thailand already have many existing survey.
- I would like to seek the way to cooperate with local organizations including NUOL.

Ms. Kaori Ohsawa (Mekong Watch, China Program)

- Although Chiang Saen has very complex social issues by FTA, given other fishermen's comment in Chiang Kong that most of them consider the cause of Mekong river ecosystem change is on sudden water level change in recent years or unnatural current, it is significant to seek possibility to conduct observation in Jinghong city, Yunnan province, China related to water level of the Mekong river in cooperation with local groups.

Mr. Montree Chantawong (TERRA)

- I'm especially interested in surveys in Laos or in China as in Thailand, there already exist so many study on this issues not only by local villagers or NGOs but also by scientific surveys by academics.
- If other groups continue their efforts to work on the issues in Chiang Kong and Chiang Saen, we are willing to arrange and cooperate with that.

Mr. Mithi（Rak Chiang Saen）

- Thank you for get interested in this area, and happy to be shared and listen to people's idea.
- If some groups made help for us, it is largely appreciated.

Mr. Vu (Rak Chiang Kong)

- We are always willing to take you to show local situation. We are going to continue our survey by methods of local participation.
- We are always open for someone who are interested in this area and issues.

All the participants of this field study in the Northern Thailand, just in front of the flow of the Mekong River in Chiang Saen.

6. Conclusion

- Mekong Watch could update the local situation through this field trip both in Chiang Kong and Chiang Saen since our last visit after November 2004. We found that the local situation related to water fluctuation have not been improved since then, but not as severe as in 2003 when the blasting was been conducted.
- As to FTA, the social impact has become more apparent in recent years, however, these social issues are difficult to be accepted by people in Thailand who was outperformed by competition at the local level. But as Thai government accepted FTA as a whole country, there is some difficulty for local people to voice their concerns, though they made raised some concerns through various channels.
- As to the relation with MeREM survey, we made contribution in terms of providing opportunity to the researcher from MeREM team to understand general and specific pictures on local environmental and social issues, communities' activities including research on fish through this trip, and also could let them take the sample of various environmental materials (water, fish) in the region.
- A scientist from NIES had sincere attitude to listen to their testimony from local villagers through this field trip, however, it is still difficult to suggest anything directly useful or effective research by MeREM, which would lead to the solution of these local problems. The responsibility of NGOs including Mekong Watch remains to think of way to fill the gaps between the survey by natural scientists and local issues.
- Although we could set the opportunity to fill the gap between MeREM researchers and local issues, which was our original purpose to participated the MeREM project, the future achievement still depend on the effort by local groups in Thailand, Laos and China.
- MeREM did not take Mekong Watch's several suggestion into their consideration through the activities since 2004, however, it was meaningful for Mekong Watch that they could expand their network through this activities and also, at least had brought local issues on the part of MeREM's discussion table.