

A River, Its Fish and Its People:

Local Knowledge of the Natural Environment at the Mouth of the Mun River

Mekong Watch

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1. INTRODUCTION

1.1 Purpose of Survey

It is estimated that more than 1000 diverse species of fish make their habitats in the watershed of the Mekong River. It is also said that approximately 60% of the protein consumed on a daily basis by people living in the region comes from fish. Thus, there is a close relationship between people's livelihood and fish. In spite of this fact, there is surprisingly little scientific data about the fish in the Mekong River and their habitats. On the other hand, villagers who make their living from fishing every day in the Mekong Basin have a lot of knowledge not only about the fish and their behavior, but also about the relationship between fish migration and changes in water level. This knowledge comes from generations of experience and observations.

Many river development projects have already been completed in the Mekong River basin, while others are now under way. Dams and other human-made structures have brought about changes in the flow and water level of the river. This has had an impact on all life in the river, particularly on fish and their habitats. The existence of artificial structures themselves are obstacles to fish migration. It is, of course, difficult to predict the precise impacts a project will have on fish species and their habitats due to the complex net of factors that influence each other. If more efforts were made to collect knowledge that local people possess, however, many of the negative impacts of river development projects could be predicted much more accurately than they have been in the past.

With the above in mind, this survey was an effort to collect such local wisdom. This study recorded knowledge and experiences of local people who make their living from fishing on the Mun River, a tributary of the Mekong River. With hopes that this report will contribute to conservation of biodiversity in this region, the report aims to draw the attention of developers to the possible damage that can result from development projects. A chapter on "Fish and People" has also been included in order to highlight information on fish migration that has become known as a result of the close relationship between fish and people's livelihoods. Information on the use of fish has also been included. It is believed that one reason for villagers' detailed observations of fish is the important role fish play as a natural resource in people's daily lives.

1.2 Methodology

A focus group of fishers from the Pak Mun basin was formed, and their discussions were central in documentation of information for this survey. The members of the group were both men and women who fish on a daily basis as a means of livelihood. Since the survey activities were done during breaks in the workday, focus group members were sometimes unable to attend, but they would send a family member or fellow fisher to participate instead. So while the group was made of about 10 members, each time it met there was some fluctuation in the composition of the group. During each group discussion, sessions began with the condition of fishing during that month, and then flowed to free exchange of opinions. From May 2003 to January 2004, the group met once a month for a total of 9 times. Individual interviews in villages and at fish markets were also conducted regarding changes in the water level of the Mun River and its relation to the timing of fish

migration.

When asking questions regarding specific species of fish, interviewers sometimes referred to photos and information in a report jointly prepared by the Forum of the Poor and the Southeast Asia Rivers Network (SEARIN), entitled "Mun River and the return of fishers: Results of survey and Knowledgebase of fish by the people of the Pak Mun: Local People's Survey" ("*Mae Mun, kan klap ma khong khon haa plaa: bot sarup lae khwam ru ruang pla khong khon Pak Mun, Ngarn WicaiThai Baan*" in Thai).

1.3 Overview of Project Site

The Mun River flows through Thailand's northeast, and the area of its basin is the largest of all Mekong tributaries in Thailand. The source of this 750 kilometer long river is Nakhon Ratchasima Province, and it flows into the Mekong River at the Thai border with Laos in Ubon Ratchathani Province. The riverbed in the downstream region of the Mun River is a complex formation of rapids created by erosion of rocks, and these formations continue upstream for 30 kilometers from the mouth of the river. Migration of many freshwater fish can be observed on the Mun River, which is said to be habitat to more than 200 species¹.



Pak Mun Dam

With these rich aquatic resources, fishing became the main source of livelihood for villages located in the downstream region of the Mun River. In 1994, however, the construction of the Pak Mun Hydropower Dam at a location 5 kilometers from the river's mouth blocked fish migration and has had severe impacts on local fishing². As a result, villagers continued their protests against the dam even after the dam's operations began. In 1999, the movement calling for opening of the dam's sluice gates gained strong momentum, and in 2001, the Thai government announced an experimental opening of the gates. The sluice gates were open from June 2001 to November 2002, and during this period, and the partial revival of plants on the banks of the river during dry season and the return of migrating fish was observed, signaling the potential to restore the environment to the way it was before construction of the dam. Unfortunately, the Thai government decided that the sluice gates should be open only 4 months of the year and closed for 8 months (open July 1 and closed at the end of October). In 2002, hydropower generating operations were resumed. Many fishers are dissatisfied with this decision, however, since they feel that it is insufficient to restore the riverine resources necessary for their livelihoods.

¹ T. R. Roberts, *Just another dammed river? Negative impacts of Pak Mun dam on fishes of the Mekong basin*. 1993. World Commission on Dams, *WCD case study: Pak Mun Dam Mekong River Basin Thailand*, 2000.

² Pak Mun dam's affected people in Assembly of the Poor and Southeast Asia Rivers Network, *Mae Mun: Kaan klap ma khong khon ha pla*, 2002 (in Thai)

2. SURVEY FINDINGS

For the period prior to dam construction on the Mun River and during the experimental opening of the sluice gates, fishers in the downstream region share a common understanding of the relationship between the rise and fall of water levels of the Mekong River, the turbidity of the river, and the migration of fish to its tributaries. Also, villagers observed the regular migration of many species of fish from the Mekong River to the Mun River during these periods.

2.1 Villagers' Categorization of Mun River Topography

People making their living from fishing on the Mun River have detailed categories for the different topographical features of its riverbed³.

- ***Kaeng, Kan* (rapids)**

Kaeng and kan are generally what are thought of in English as rapids. Large slabs of rock on the riverbed have been eroded into complex shapes, and it is a very good place for fish habitat. During the dry season, parts of the rocks are exposed above the surface of the water. *Kan* are similar to *kaeng*, but the rocks that make up *kan* do not protrude above the surface of the water, even in dry season. Here, a cylindrical fish trap made of bamboo and a casting net are being used.



Kaeng



Kan

³ According to the study, "The Return of Pak Mun Fisher: A Participatory (Thai Baan) Research on Resource Management in Fishing Communities of the Mun River, Northeast Thailand," fishers have 21 separate categories for the various geological formations in the river. (The title of the study in Thai is, *Mae Mun, kan klap ma khong khon haa plaa:bot sarup lae khwam ru ruang pla khong khon Pak Mun.*)

- **Tham (caves)**

Tham are large crevices in layers of flat rock that make up the *kaeng*. Fish like to spend time in these caves. When the *tham* are on land, they can become shelters for fishers from rain or for overnight stays.



Tham

- **Wang, Khum (deep pools)**

These are located in deep waters. Rapids and deep pools appear alternately in the river. *Wang* and *khum* are important fishing areas, and certain fishing equipment such as gill nets are primarily used there. *Khum* are deeper than *wang*.

- **Paew (Channels)**

These are areas where ditch-like channels have been eroded into the rocks of the *kaeng*. Sometimes they have names such as "March *Paew*" and "April *Paew*." This is the dry season during which the water level is low, and the names indicate until what month boats can navigate these channels.

2.2 Fish

It is estimated that approximately 200 species of fish inhabited the Mun River prior to the construction of the dam. According to a survey done in 2001 by researchers at Ubon Ratchathani University, 184 species from 44 families were found, while villagers documented 156 species (counted according to the number of local names for the fish). A Mekong Watch survey documented 108 species from 26 families.

2.2.1 Villagers' Categorization of Fish

Villagers first categorize fish according to whether or not they have scales. Fish without scales are called "skin fish" or *pa nang*. Most fish with scales are of the carp family. Fish without scales include *Pangasius* and *Mystus*. These fish are large and prey on smaller fish and insects. Fish without scales tend to be priced higher in the market because they are tasty, large, and are easy to eat because they are not bony (see table for details on fish species and how they are used).



Pa Nang ("skin fish")

***Pangasius larnaudiei* Local name: Pa Pung**

2.2.2 Fish Migration

It is believed that the Mekong River is habitat to more than 1000 species of fish, and because of the large difference in the conditions of the river during the dry and rainy seasons, many fish migrate between the Mekong's mainstream and its tributaries.

According to villagers surveyed, migration of fish can be observed every month, with the exception of January, though there were variations in fish species and direction upstream or downstream. The first peak migration season is through March and April, when small fish swim up the Mekong and into tributaries such as the Mun River. The next season is May and June, when carnivorous migratory fish swim upstream the Mekong, and also enter tributaries and flood plains.

In October, fish that migrated upstream begin to return downstream into the Mekong's mainstream. This continues until December.

(a) Dry Season Migration

"In the third month of the lunar calendar, owls that usually say 'hooo hooo' change their cries to 'korororororo.' This is probably their mating call. Within 2 or 3 days of hearing this cry, we always saw fish migrating upstream. Old people say that when the owl cries, the fish come. (repeated by many fishers from various villages in the region)

"When clouds shaped like fish scales appeared, that's when the fish enter the Mun River" (Fisher from Woen Buk Village)

The Asian Barred Owlet (*Glaucidium cuculoides*⁴), called *nok hkaw maew* by local people, begins its mating season in February and changes its cry. People have used this as a sign of the beginning of dry season fish migration. They say that within 2 or 3 days of hearing this cry, schools of fish make their way upstream. Some people use this cry as a signal for when they should begin preparing their fishing gear.



Nok Hkaw Maew

Each school of fish is comprised of the same species. Fish take 1-3 days to move upstream, but there is a 3-7 day lapse before the next school of fish comes. It is said by many villagers that the first kind of fish to make its way into the Mun River is a fish they call *hak kuay* (meaning banana root), or the *Acantopsis*. Next is the *Botia*, locally called *kaew kai* or *moo thork*, and then fish in the carp family follow. These fish are small, growing not more than 20 centimeters in length, and most feed on vegetation. Then there are those that say fish begin migration upstream when the altocumulus clouds appear. The schools of fish which migrate early do so regardless of the amount of rainfall or

⁴ B. Lekagul and P. D. Round, *A guide to the birds of Thailand*.

the water level of the river. While there is no causal relationship between the owl's mating season and the upstream migration of fish, it does seem that certain weather conditions or other related factors bring about these two phenomena at around the same time.

Primary fish found migrating upstream the Mun River during the Dry Season:

Local name (scientific name)

- pa kaew kai (*Botia modesta*, *Botia lecontei*, *Bota eos*)
- pa moo thork (*Botia helodes*)
- pa kom nai taeng (scientific name unknown)
- pa soy hualaem (*Crossocheilus siamensis*)
- pa soy (maybe *Osteochilus microcephalus*)
- pa khuilarm (*Dangila lineate* or *Labiobarbus lineatus*)
- pa dok niew (*Cyclocheilichthys apogon*, *Thynnichthys thynnoides*)
- pa hak kuay (*Acantopsis* sp.)
- pa sa'ee (*Mekongina erythrospila*) *⁵
- pa waa (*Labelo dyocheilus*) *
- pa phorn (*Cirrhinus migrala*) *

Long ago, it was believed that like people, fish also went to worship at the pagoda in the third month of the lunar calendar. They probably thought fish who repeated the same behavior every year also had some sort of tradition. (Fisher from Dan Mai Village)

The general term that villagers living in the Mun River basin use for fish that migrate upstream during the dry season is "Third Month Fish" or "Pilgrim Fish" (*pa wai thart*). In northeast Thailand and in Laos, the lunar calendar⁶ is still used to time important dates and religious ceremonies. Because the upstream migration season corresponds to the third month of the lunar calendar, these fish are called "Third Month Fish." Also, since people in Nakhong Panom Province traditionally went to worship at a famous pagoda during the dry season, they believed that fish were also pious and were going to pray. This is where the name "Pilgrim Fish" came from.

(b) Fish Migration during the Rainy Season

"When the river turns red after the rains begin, all the fish move upstream" (Fisher from Phosri Village)

"Fish come into the Mun River when the water rises and the flow of the river gets faster (*nam laak*) and the water becomes cloudy (*nam daeng*). (Fisher from Huay Mark Tai Village)

"In order for upstream migration to start, the rains must fall and the water must get cloudy." (Fisher from Dan Kaw Village)

⁵ The asterisk indicates that more information is available from Ubonratchathani University, *Project to study approaches to restoration of the ecology, livelihood, and communities receiving impacts from construction of Pak Mun dam.*

⁶ Roughly speaking, months of the lunar calendar end about 2 weeks earlier than months of the solar calendar, and once in a certain number of years, the eighth month is repeated to adjust the year.

"Fish are usually active at night too, but they move upstream only during the afternoon." (Fisher from Dan Mai Village)

"Long ago, we used to wait two or three days for fish to swim into the Mun River. After that, the fish would rest at the rapids at Hua Heaw Village where the dam is now, and then took a month to get to Wang Saben. It was the 10th month of the lunar calendar when they would reach Tha Charng Village. (Fisher at Tana Rapids)

Migration of fish during the rainy season begins when the rains start and the river water becomes cloudy. Since there is much laterite soil, the earth is red. When this soil mixes with the river, the water clouds into a reddish brown.

On the Mun River, it is said that the first fish to swim upstream during the rainy season are the large fish in the carp family. After that, fish such as the *Pangasius* and *Mystus* enter and swim up the Mun River. As the fisher said, "all the fish swim upstream"—dozens of fish species migrate from the Mekong River into the Mun River. Villagers say that this happens during the afternoon, and not at night.

Many fishers working at the mouth of the Mun River say they have never seen fish spawning. However, when the waters cloud, almost all species of fish carry eggs, so it is thought that fish enter the Mun River in order to spawn. In fact, many young fish are caught in the Mun River during the rainy season. It is difficult to imagine small fish like these fighting the current of the Mekong River in the rainy season to swim into the Mun River, so it is quite certain that spawning occurs in the flood plain and rapids of the Mun. The reason for villagers having never seen fish spawning is because during this season, the river is so clouded that it is impossible to see into the water.

Also, it is said that fish do not swim all the way upstream at once, but take time to gradually migrate up the river.

Primary Fish that migrate up the Mun River during Rainy Season:

Local Name (Scientific Name)

- pa i'tow, pa i'kam⁷ (*Morulus chrysophekadion*, *Labero barbatulus*)
- pa bak barn (*Sikukia gudgeri*)
- pa jork (*Cyclocheilichthys enoplos*)
- pa yon (*Pangasius macronema*, *Pangasius pleurotaenia*)
- pa hoy (*Helicophagus leptorhynchus*, *Helicophagus waandersi*, *Pangasius conchophilus*)
- pa kha jaeng (*Mystus albolineatus*, *Mystus atrifasciatus*, *Mystus bocourti*)
- pa kee (*Bagarius yarrelli*)
- pa nang (*Micronema bleekeri*)
- pa pung (*Pangasius larnaudiei*)
- pa kot (*Mystus(Hrmibagrus) nemurus*)

⁷ Among villagers, some say i'tow and i'kam are the same kind of fish, while others say they are different. But among them, most agree that of the fish they call i'tow and i'kam, there are fish with reddish bodies and others that are black.

- pa khoeng (*Mystus wyckioides*)
- pa tom kai (*Chitala ornata*)
- pa tom lai (*Chitala blanci*)
- pa khop (*Belodontichthys truncates*)

(c) Fish Migration Downstream into the Mekong River

"Fish that return to the Mekong do not travel in schools. They go back separately. (Fisher from Huay Mak Tai Village)

"When migratory birds like the *nok yarng* (possibly a relative of the heron) come and the winds cool, the fish slowly make their way back to the Mekong." (group discussion)

"During the season when fish go downstream, they move without resisting the current." (group discussion)

"Even if it is the same species of fish, they are big when they come upstream, but small when they go back." (Villager from Dan Mai Village)

Fishers say that fish migrating upstream are larger than those that swim downstream. As explained earlier, this is probably because fish hatch in the Mun River and then swim downstream to the Mekong. Also, when fish migrate downstream, they do not move in schools of the same species as they do when going upstream. It is also said that the same fish that fight the current during the season to go upstream move with the current during this season. It is thought that the triggers for fish to migrate downstream have to do with temperature and the length of the days, but no notable phenomena as seen to trigger migration upstream have been cited.

2.2.3 Relationship between changes in water levels and fish migration

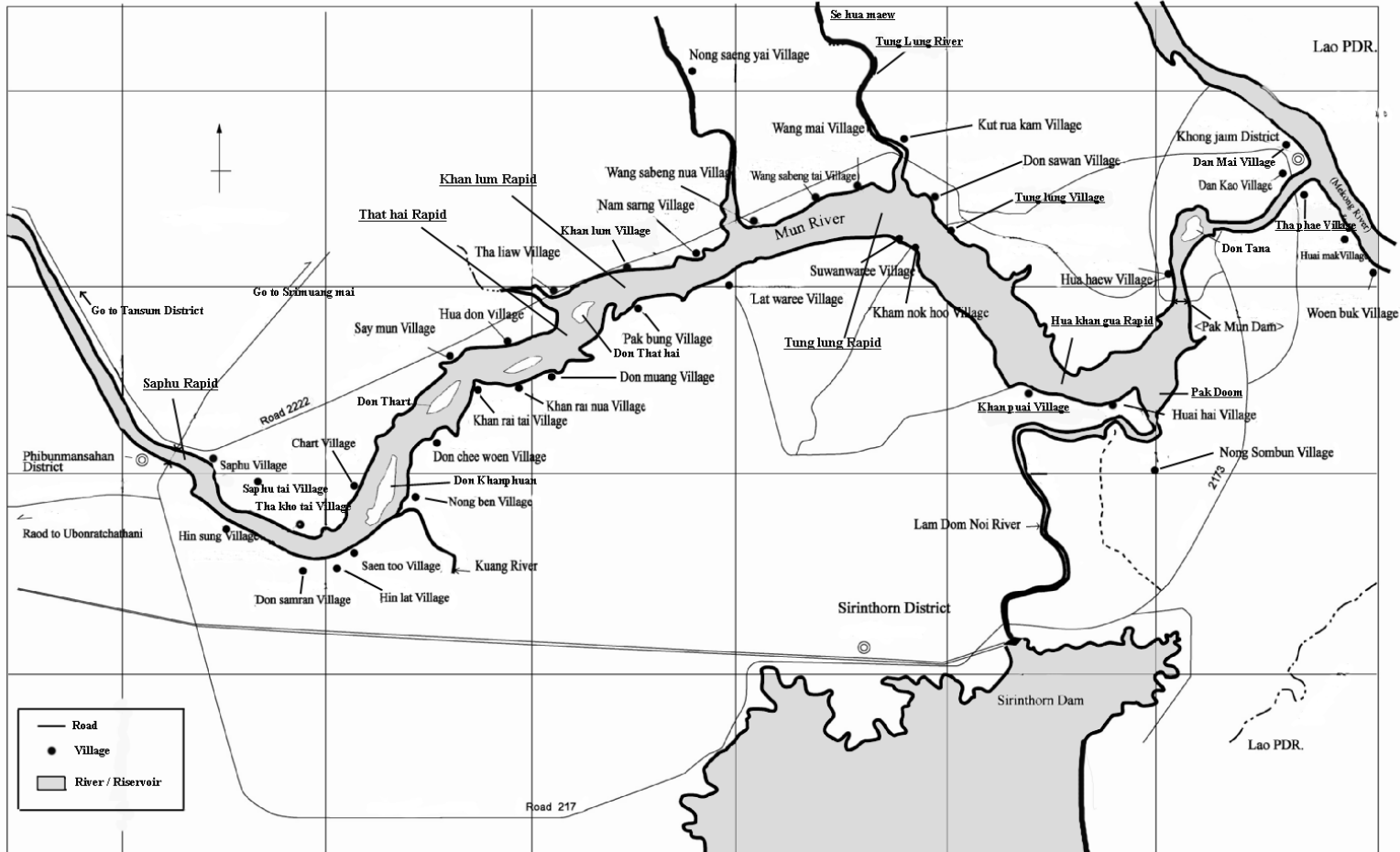
"Before, fishers used to greet each other during fishing season by asking, 'how far have the Mekong waters reached?' This was because when we saw the Mun River affected by the water from the Mekong, migratory fish would ride the current and then come upstream." (Fisher from Dan Mai Village)

During the rainy season, there is a time when the water from the Mekong River flows against and into the Mun River. When the water level of the Mekong River rises during the rainy season, the flow of the Mekong is stronger than that of its tributaries, so the tributaries can no longer flow into the Mekong's mainstream. According to observations by villagers, rainy season migratory fish flow with the Mekong current to swim into the Mun River. However, thoughts vary regarding how far the waters from the Mekong River actually reach. Few people dispute that the Mekong waters have an impact up to a point 20 kilometers from the mouth of the Mun River, where the Tun Lung River flows into the Mun. People say they judge how far the Mekong River has reached by looking at the color of the water and the stagnation of the current. They say that many of the rainy season migratory fish use the current of the Mekong to swim into the Mun River.

How far impacts of the Mekong River can be seen on the Mun River

Map of Lower Mun River

Phibunmansahan District, Khongjiam District, Sirinthorn District, Ubonratchatani



- Waters from the Mekong only reach up to Tha Phae Village.
- Waters from the Mekong only reach Tha Phae, but the impact of this is felt up to Tung Lung Village.
- It reaches up to Hua Kan Gua. I can tell because the current slows down.
- The current flows backward only up to Hua Kan Wua, but the impact is felt up to Tung Lung Village.
- At most, the waters reach the Tung Lung Rapids, and the fish come along with the current.
- In June, the waters reach Tung Lung Village. I know because the water is a different color.
- It reaches Se Hua Maew (rapids on the Mun's tributary, the Tung Lung River).
- It reaches until the Thart Hay Rapids.
- It reaches to Kan Puay Village.
- It reaches the Kan Lum Rapids.
- It reaches the Thart Hay Rapids.
- It reaches the Sa Phu Rapids.
- In 2003, water from the Mekong reached Pak Dorm Noi.

3 . Fish and People

0.5 kilograms of fish can feed a family of four for three meals (Fisher from Hua Haew Village)

With my family of 5 children and 2 adults, I need 200 baht⁸ a day for school fees and food. If I can catch fish, I only need 100 baht. (Fisher/broker from Tha Phae Village Village)

When I catch fish, I skewer them and sell them around the village before taking them to the market. (Fisher/broker from Nong Pho Village)

Fish are a resource that sustains the diet and daily livelihood of people. As it is often difficult to earn cash in villages, the amount and quality of food people can eat is greatly influenced by how much food they are able to obtain without cash. Fish are used in barter trading and sold as various forms of fish products all around the Mun region.

3.1 Processing Fish

"My grandmother was famous for her *pa som*⁹, so any extra fish we had, she would make *pa som* and sell it in the village. We always sold out. (Broker from Dan Mai Village).

We processed any extra fish into *pa dek*. We made it for our own family's consumption, but we gave any extra to relatives and friends. (Fisher from Nong Pho Village)

During migration season, a large amount of fish is caught at once, though raw fish cannot be kept. To preserve the fish, people have developed techniques to process fish. *Pa dek* is consumed on a daily basis as a food and spice in northeast Thailand and in Laos. Fish, salt, rice, and chilies are mixed and packed together in an urn and fermented. It is ready to eat after about three months, and can be kept for more than one year.

Processing can also increase the value of fish on the market as a fish product. With fish products, people can profit more than they would from fresh fish in trading with other villagers or selling it at the local market. Villagers also dry and smoke fish.



Pa Dek



Pa Som



Dried fish being sold at a market

⁸ 1Baht is about 2.8 yen (2003).

3.2 Circulation of Fish

"I can sell fish that don't have scales fresh because they fetch a good price." (Fisher from Dan Mai Village)

"We don't sell fish like *pa dok niew*, *pa jork*, or *pa hualaem*, but consume them in the village. But we sell fish like *pa hoy*, *pa kha jaeng*, *pa kaew kae*, and *pa nang* at the market.

My wife sells fish we catch in the village and at the market. Where she sells it depends on how much we can catch. Fish that are worth more, we take to the market." (Fisher at Nong Pho Village)

"We prepare for fishing by exchanging information at the market. If you go to the market, you can see how far the migratory fish have gone." (group discussion)

"Brokers decide the price of fish. They decide the price based on the overall supply of fish. At Pibun Mansahan Market, one kilo of fish will cost 40 baht, at Khong Jiam is 35 baht per kilo, and so forth. If you go upstream to Nong Khar, then it is 50 baht per kilo. (group discussion).

There are many stages in the circulation of fish among people. First, it is caught and consumed at home. Next, if there is extra, it is sold in the village. It is usually women and children who walk around the village and sell bamboo skewers of 2 or 3 fish for about 10 baht. If they catch the highly valued "skin fish," they will spend the necessary transportation fee to take it to the market. They can also sell fish to brokers. The market price for fish is largely determined by brokers. Brokers are often women who make most of their living from fishing. They mainly take the fish their families catch to the market and sell their own fish, but some buy fish at the piers. These women are well aware of how much fish has been caught in the villages, so they can estimate how much fish has reached the market. Knowing this, they decide the price.

Even at local markets, differences in prices can be seen depending on the number of buyers. There are more buyers at markets closer to cities, so the prices for fish there are higher. On the Mun River, one can see a trend of increasing prices as you go from Khong Jiam near the mouth of the Mun River to the market of Phibun Mangsahan where the district government office is, and even higher prices at Warin Chamrap District market, which is next to Muang District where the prefectural government office is.



Fish sold on Bamboo Skewers

⁹ A fermented mixture of salted fish and rice.

"We make our extra fish into *pa dek* and exchange it for rice with *ban khork* (hill villages). (Fisher from Don Phan Chart Village)

At villages along the downstream of the Mun River, there are many villages that do not have rice fields. Instead of being self sufficient in rice, they trade fish and fish products for rice with agricultural "hill villages" which are located away from the river. There is no decided exchange rate, so the amount exchanged may vary according to the relationship between the individuals or the amount caught and harvested that year.¹⁰



Women selling their fish at a local market

¹⁰ For details on the relationship between upland communities and villages along the river, see the *Thai Baan* study (also in footnote 3), "*Mae Mun, kan klap ma khong khon haa plaa:bot sarup lae khwam ru ruang pla khong khon Pak Mun, Ngarn Wicai Thai Baan*" in Thai.

4. The Significance of the Mun River to the People

The Mun River is like a miraculous rice field. In this field, thousands of people plant rice at the same time and then harvest it. On this river, even if many people fished at the same place, they could all catch fish, so there was never any need to stop anyone from doing anything. In addition, different from rice fields on land, those who would come first cannot claim possession. The river was everyone's asset. (Fisher from Woen Buk Village).

The rich fish resources of the Mun River supported the livelihoods of the people living in its basin. These resources were not dominated and controlled by any certain individual or group. Though customary fishing rights can be observed in regard to certain types of fishing equipment, no strict regulations over individual fishing have been found in regard to fishing gear most commonly used by the majority, such as casting nets and gill nets.

Villagers do share, however, a set of understood rules for fishing. For example, fishing grounds where gill nets are used are managed cooperatively. Every year, just before fishing begins, those wanting to use the fishing grounds pool their money together, and first remove sunken wood and other obstacles from the riverbed. Fishing rights are given out on a first come first serve basis, and all one has to do to get into line is to declare to everyone there, “it’s my turn after so-and-so,” and that order is respected. Also, fishing is not limited to those in the local community. As long as this rule is followed, anyone can use the fishing grounds. There are occasions when villagers lend their fishing boats to friends or relatives that come to fish from villages far away. Those who borrow boats are free to fish as much as their ability allows. On the other hand, the use of fishing equipment such as *lop* and *jan* requires traditional fishing rights, and in that case there is exclusive use of fishing grounds by one household.

Thus, the Mun River is deeply rooted in the livelihoods of its people as common property. In regard to the use of this common property, villagers speak as if there is completely open access to its use. But in fact, factors such as human relations among villagers and the rise in water level during the rainy season have restricted opportunities for fishing, and natural resource use has long been practiced in a way that is unique to this region.



Mun River

5 . Acknowledgements

Many thanks go to those who assisted with this survey. First, I would like to express sincere appreciation to the fishers from the Assembly of the Poor, who took time away from their work to respond to my interviews. I would also like to thank the Southeast Asia Rivers Network for distributing valuable information. Ms. Sompharn Khundee, who is active on the Mun River, was especially helpful in coordinating visits and running workshops. Professor Akihisa Iwata of Kyoto University's Asia and Africa Area Studies provided information on fish species and valuable advice for the survey in general.

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¹¹ The original title of this report in Thai is, *Mae Mun, kan klap ma khong khon haa plaa:bot sarup lae khwam ru ruang pla khong khon Pak Mun, kan wicai thai ban.*