Mekong Watch

The natural wealth and blessings of the Mekong River, one of Asia's largest international rivers, support life and the livelihoods of people living in its watershed. In order to protect people's livelihoods that are deeply rooted in the Mekong River Basin's natural environment, we strive to ensure their rights to continue sustainable use of natural resources and to prevent further destruction of the natural environment. To achieve this, we conduct research to understand the intricate connection between livelihoods in the Mekong River Basin and the natural environment, as well as advocate for reform of policies and development plans that impact the environment and the livelihoods of local people.

Information Packet

Nature and Our Future: The Mekong Basin and Japan

Contents

Foreword

Why the Mekong River?

The Mekong basin is one of the richest regions in the world in terms of biodiversity. In particular, the diversity of its fish species is second only to that of the Amazon River. Except for the highest reaches in the mountains, the Mekong River and its tributaries flowing through continental Southeast Asia are not isolated from human influence; on the contrary, they play a very intimate role in human livelihoods. The richness of the rivers' fish resources has provided a reason for many villages in the basin to develop fishing industries. People's lives are also supported by the seasonal inundation and exposure of the riverbanks, resulting from the influence of the monsoons and dry season. When riverbanks are exposed, people can gather plants and raise crops or release livestock to pasture on the riverbanks. In addition, wild edible plants, mushrooms, tree sap, etc., that can be collected in the forests of the basin provide food, fuel and medicine for the people. Products from these resources also provide the means for generating important cash income for the basin's farming communities. Towns and cities are also scattered along the lower reaches of the rivers. These urban areas use water from the Mekong basin in their municipal water supplies, and they flourish by relying on the rivers as the basis of their existence through fishing and tourism industries. The Mekong Delta, at the river's very lowest reaches, is one of the world's prime rice producing regions. The Mekong River brings benefits to a population of as many as 60 million people living near it.

The various countries of the Mekong basin have flourished through trade with Japan from long ago, and even now, they provide an important production base for Japan's manufacturing industries, with Thailand as a representative example. Also, as can be seen from the keen interest in Burma (Myanmar) recently, the region is also attracting attention as a frontier for investment, and Japan has developed strong economic ties with it. Historically, Japan once invaded the Mekong basin, using military might to obtain its resources.

The Mekong basin's rich natural environment is of universal value to the world, and it has also played a significant role in Japan's history and economy.

Differing Perspectives on the Mekong River's Natural Environment

After the long-continued Indochina war ended and peace was achieved in Cambodia in the early 1990s, private companies, various national governments and international aid organizations began developing the region, which they saw as being "behind." Economic growth strategies are now the norm among policy-makers of this region, stressing economic growth through large-scale infrastructure projects, typically hydroelectric dams, in order to reduce poverty in the Mekong basin. The forests and rivers of the region started out in good condition, having narrowly escaped the war's devastation, but now they are being endangered by development. Meanwhile, there is growing concern among the basin's inhabitants regarding environmental destruction and human rights, and they have become strongly aware of the negative impacts of large-scale infrastructure development.

Since the year 2000, development has been progressing rapidly, with newly developing nations such as China, South Korea, Vietnam and Thailand participating. Each of the basin countries is experiencing lively economic growth, and they appear to be booming, but on the other hand, degradation and disappearance of the ecological resources of the rivers and forests progresses. In farming villages where the people's lives are dependent on natural resources, the quality of life is worsening due to the destruction of the natural environment. Large hydroelectric facilities are being built one after another in order to supply electricity to cities and industrial areas, and the contrast of benefits to the cities and harm to the rural villages is engendering a sense of injustice. There are signs of political disorder occurring in various areas, such as has been seen in Thailand in recent years.

In addition, the Mekong is an international river, spanning six countries. Development of dams on the mainstream or tributaries results in clashes of interests among these countries, and no framework has been developed to involve the region's local people in the river's management. There is a big gap in perceptions

on natural resources between the region's inhabitants who utilize the natural resources and governments and private corporations that aim for economic development through large-scale development. This has had impacts on the environment and society that transcend international boundaries and has created a societal structure with complexly intertwining rivalries among the governments of the Mekong basin; between governments or corporations and local people; and between local people who feel they benefit from development and those who suffer the negative impacts.

Japan and the Mekong Basin—Past, Present and Future

As mentioned above, the connection between Japan and the Mekong basin is deep. Around the time of the Second World War, as part of Japan's efforts to secure natural resources, it advanced militarily into various countries of Southeast Asia, including those of the Mekong basin. After Japan was defeated in WWII, however, it maintained strong economic ties with the region. In the Mekong basin, Nippon Koei Co., Ltd., a private Japanese company, drew up plans in the 1950s for development of a series of hydroelectric dams on tributaries of the Mekong River, and in the 1960s and 70s, Official Development Assistance (ODA) from the Japanese government was implemented based on these plans. Thus, Japan has had both economic and social impacts on the region. With the exception of Thailand, dam development in the basin halted with the Indochina war. Since the war ended, development has accelerated, with the main players being the governments of China, South Korea, Thailand and Vietnam along with private companies of the basin. It must not be forgotten, however, that many of the hydroelectric development projects currently advancing on the Mekong River arose from plans from Japan.

After Japan went through a period of being criticized for its ODA and economic activities, there might be recent changes in the way civil society in the Mekong basin perceives Japan. This can be seen, for example, in regard to plans to build the Xayaburi Dam on the Mekong's mainstream. People would not oppose the Japanese government to provide funding for additional investigation into the collective environmental and social impacts of all dam plans for the Mekong's mainstream as long as certain conditions are met. Japan might be perceived as an important actor who can play a more positive role in the future of the Mekong River.

Prior to its period of high economic growth, most of Japan's population lived in rural villages called *satoyama*. These were areas where people lived in harmony with the natural environment, and where use of nearby secondary forests supported their livelihood. With the advancement of industrialization, *satoyama* have almost disappeared, so it is nearly impossible to find places in Japan where people's livelihoods both depend upon and contribute to the natural environment in the way that rural communities still do in the Mekong basin. Even in Japan, however, there are attempts to restore ecosystems and preserve biodiversity. The climate change crisis has given rise to a new perspective on sustainable resource use that reduces energy burden, leading to the rediscovery of *satoyama*. It is not a major trend yet, but excessive development is being remediated and hydroelectric facilities have begun to be dismantled in order to restore the environment. We hope that by informing the countries of the Mekong basin about natural resource restoration underway in Japan, we can provide them with an incentive to recognize once more the value of their own traditional ways of living.

Similarly, Japanese society has much to learn from people of the Mekong River Basin. For Japan's future, Japanese need to learn how natural resources of the Mekong basin are used sustainably. This will help us to rediscover *satoyama*, to remember how the natural and social environment once was in Japan, and to restore the connection between nature and humans that used to exist. We can learn from each other.

The Aim of this Information Packet

In order to achieve sustainable resource utilization, we think it is important to make use of the experience and wisdom of local people. In order to achieve this in the Mekong basin, it will be necessary first to exchange basic information across international boundaries on the diverse natural environments of the Mekong basin and how they are used. There is also a need currently to share information with the citizens of China and South Korea,

who exert a big influence on development of the Mekong River. We are translating this information packet into a number of languages to convey this information to as many people as possible.

The information packet consists of two parts. The first part consists of Briefing Papers (BP) that sum up the Mekong River's environment and natural resources, the impacts of development, people's resource utilization, alternative local initiatives, and experiences in Japan, where the damage from excessive development has already been acknowledged and new efforts are being made. Each BP is independent of the others, containing facts and data that form the basis for each theme, and a sincere effort has been made to keep the descriptions as simple as possible. We think that readers of the BPs can gain knowledge of basic facts and perspectives for considering the future of the Mekong River. Many of the BPs have been written with information from experience gained by Mekong Watch through its activities. For that reason, they do not cover the complete picture of environmental and development problems in the Mekong basin. We have provided references in each BP which we think will compensate for what we have not been able to cover.

The second part of the information packet is a collection of video programs. In order to visualize the natural environment valued by the people living in the Mekong basin and their livelihoods—which are difficult to reflect in economic indices—we gathered visual images of the ways people use natural resources in rural villages in the Mekong basin, the effects of development, and people's initiatives. We made videos ranging from 10 to 20 minutes, introducing, 1) the forests' biodiversity, people's use of resources and the impact of development in Laos; 2) efforts in Vietnam to conserve the diversity of agricultural products of the hilly regions with the aim of making agriculture sustainable; 3) examples in Thailand where the impacts of dam development and people's use of rivers can be seen; and 4) methods of raising fish in rice paddies devised by ethnic minority groups in Laos. Much of the video content is also in the BPs, but we hope a video presentation will provide a more vivid sense of the reality of local conditions.

In addition to this information packet, there are also resources available on Mekong Watch's website. For example, NGOs, researchers and journalists from Japan, the Mekong basin and East Asia were invited to an international workshop in Tokyo in December 2012 entitled, "Mekong's Future, Our Future—Strengthening East-Asia Civil Society Network to Monitor Mekong River Basin Development." Citizen policy proposals were produced at this international workshop, all of which can be seen on Mekong Watch's website (http://www.mekongwatch.org/). We hope you will have a look at this too.

Acknowledgements

We would like to thank all of the people of the Mekong basin who taught us many things in the field, and who gave us their understanding and cooperation in the filming of the videos. Their support made it possible to complete this information packet. We regret that we cannot list all their names here. In Japan, we are grateful to Ms. Shoko Tsuru, Vice-Chair of Kumamoto Nature Interpreter's Association, who shared her depth of knowledge about the background and current status of the dismantling of the Arase Dam.

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1. Diversity and Natural Abundance in the Mekong Basin

1-1. The Mekong River's Natural Environment

The Natural Environment in the Mekong Basin

The Mekong River is an international waterway that begins in the Tibetan Plateaus and flows through the Mekong Delta into the South China Sea, and it is second only to the Amazon in aquatic biodiversity (Peterson and Middleton 2010). Along with 850 species of fish, there are 20,000 species of plants, 430 animal species, 1,200 bird species, and 800 reptile and amphibian species that live there (Thompson 2008). The entire river basin is 795,000 km^2 and has a length of 4,909 km (MRC 2000: 5).

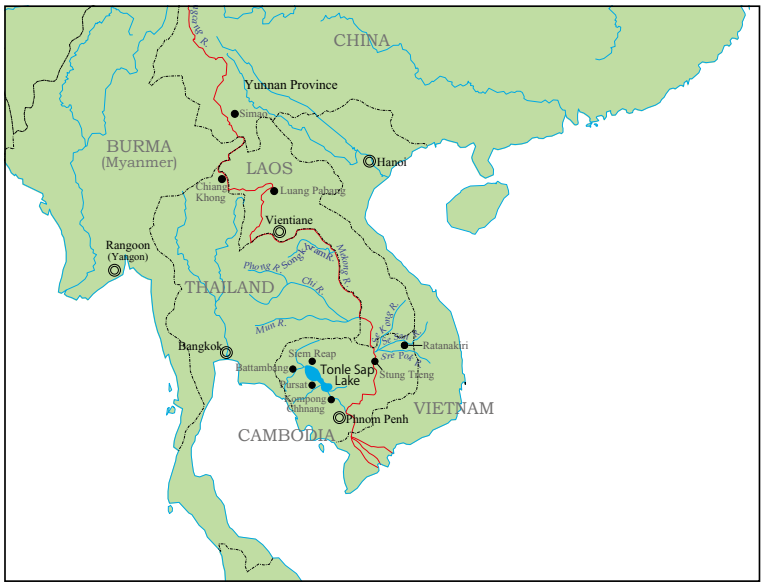

Figure 1: Mekong River

The distance between the source of rivers and the deltas in Japan is relatively short, and in comparison, the Mekong flows a very long distance (Tone River Management Office of the Ministry of Land, Infrastructure, Transport, and Tourism, Kanto Regional Development Bureau). One of the Mekong's unique characteristics is that in spite of its length, there is not much difference in altitude between the upstream (not including the river's source) and the delta.

The Mekong River passes through the 6 countries of China (Qinghai and Yunnan Provinces), Burma/ Myanmar[1], Laos, Thailand, Cambodia, and Vietnam, and then flows into the sea. In upstream China, the headstreams of three of the world's great rivers, the Yangtze, Mekong, and Salween flow in close proximity, and this geography is known as the "Three Parallel Rivers." The Mekong River then enters Laos, flows along the border of Burma and Laos, and then after flowing along the Thai-Lao border, enters Cambodia where it connects with the Tonle Sap Lake, a symbol of Cambodia. It then enters Vietnam, where it is known as "Nine Dragons River." The Mekong Delta in Vietnam is one of the world's largest rice production areas, and from there, the Mekong flows into the South China Sea.

The Mekong originates with melting snow from the Himalayas. Water from the river's catchment area in China makes 16% of the river's flow, and Burma 2%, Laos 35%, Thailand 18%, Cambodia 18%, and Vietnam 11% (MRC 2005).

	China	Burma	Lao PDR	Thailand	Cambodia	Vietnam	Entire Region
Catchment area (km^2)	165,000	24,000	202,000	184,000	155,000	65,000	795,000
Catchment (% of entire watershed)	21	3	25	23	20	8	100
Volume (% of entire watershed)	16	2	35	18	18	11	100

Table: Comparison of 6 Countries in the Mekong River's Catchment Area (MRC 2005:1).

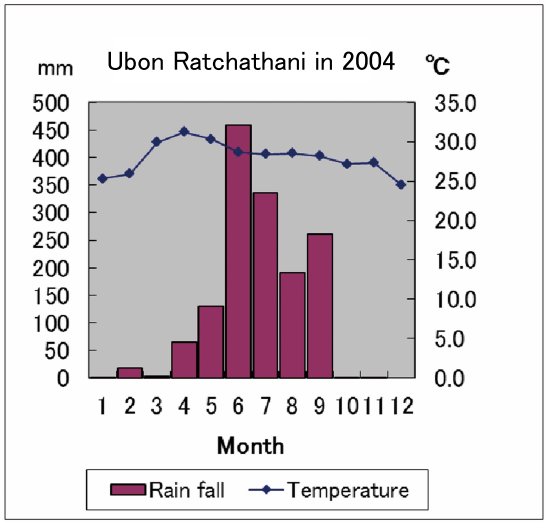

Figure 2: Temperature and Rainfall in Ubon Ratchathani Prefecture (Thai Meteorological Department of Ubon Ratchathani 2004)

The Mekong River Basin has a tropical monsoon climate. From mid-May to October, the southwest monsoon brings the rainy season. From November to mid-March, the region is affected by the northeast monsoon to bring the dry season (MRC 2010: 14). The dry season continues until April, and then again in May the rains fall signalling the beginning of the wet season. Aside from the area in China, the hottest time of year is around April.

Annual rainfall in northeast Thailand's Ubon Ratchathani Province is 1,500 mm. This is approximately the same as Tokyo, but as one can see from Figure 2, rainfall is concentrated between May and September. From October, there is almost no rainfall until May the following year when the wet season begins. The Mun River, which flows through Ubon Ratchathani, is influenced by this rain pattern, so water levels rise in May to peak in October. Then from November to April, the water levels again gradually decrease.

References

Mekong River Commission (MRC). 2005. *Overview of the Hydrology of the Mekong Basin.*
http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf
Mekong River Commission (MRC). 2010. *State of the Basin Report 2010.*
http://www.mrcmekong.org/assets/Publications/basin-reports/MRC-SOB-report-2010full-report.pdf
Peterson, B., and C. Middleton. 2010. *Feeding Southeast Asia: Mekong River Fisheries and Regional Food Security.*
Berkeley, California: International Rivers (IR).
http://www.internationalrivers.org/files/attached-files/intrivers_mekongfoodsecurity_jan10.pdf
Thompson, C. 2008. *First Contact in the Grater Mekong.* World Wildlife Fund (WWF) Greater Mekong Programme.
http://awsassets.panda.org/downloads/first_contact_final_report.pdf
Tone River Management Office of the Ministry of Land, Infrastructure, Transport, and Tourism, Kanto Regional Development Bureau. *What are the Unique Characteristics of Japan's Rivers?* (in Japanese).
http://www.ktr.mlit.go.jp/tonedamu/tonedamu00082.html (Last accessed on September 30, 2012)

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1. Through the remainder of this Briefing Paper (BP), simply "Burma" will be used.

1-2. Non-Timber Forest Product Use and Food Security: The Lao Case

The Importance of Non-Timber Forest Products (NTFPs)

People living in agricultural villages in Laos are self sufficient, growing crops and collecting and consuming food from forests and rivers. Approximately 70% of people live in mountainous regions and practice shifting cultivation as one of a variety of agricultural practices (NAFRI et al. 2005). Non-timber forest products (NTFPs) have a very important significance for their livelihood[1].

NTFPs are taken from the mosaic of forest and fallow lands created by swidden agriculture (NAFRI et al. 2005), and the amount consumed is second only to the staple of rice (Foppes and Ketphanh 2004).

In agricultural communities in Laos, because farming depends on the natural environment, it is difficult to maintain a steady level of food production. The role that edible NTFPs play is therefore very important. In addition, less than 1/4 of a household's total income is cash, of which income from NTFPs is 40-50% (Foppes and Ketphanh 2004; NAFRI et al. 2005). There is a tendency for households with lesser cash income to depend more heavily on NTFPs (Greijmans et al. 2007; Rosales et al. 2003).

NTFPs can be directly consumed as food, and they also support livelihood by being sold in domestic markets or exported internationally. When people do not have enough rice, selling NTFPs enables them to purchase rice, so NTFPs are especially important for people living in areas where rice production is limited (Foppes and Ketphanh 2004). It can be said that the traditionally sustainable agricultural practices of Lao agricultural communities have actually conserved the rich natural environment, because the way they have managed and venerated forests ensures that NTFPs are not exhausted.

The importance of NTFPs in Laos can be summarized in the following categories: (1) food security; (2) cash or non-cash income; (3) agricultural community small-scale businesses; (4) construction materials for houses, building tools; (5) medicine; and (6) conservation of biodiversity in wild animals and wild and cultivated plants (NAFRI et al. 2005).

Use of NTFPs

It has become known that up to now, 700 varieties of NTFPs have been used in Lao agricultural villages (See Table). There are many different types of NTFPs, and it is clear that biodiversity has been made use of in agricultural life. For people living in agricultural villages, aquatic animals (fish, frogs, shrimp, snails, shellfish, etc.) and land animals (birds, rodents) are also forest products. These are important sources of protein in the daily diet (Foppes and Ketphanh 2004).

There are about 25 varieties of NTFPs that are for commercial use, and NTFPs are important sources of income for agricultural communities. Edible products are bought and sold in domestic markets, and medicinal plants and spices are often exported to neighboring countries like Thailand, China, and Vietnam. Benzoin is used for perfumes and exported to France, and aromatic trees are exported to Japan and Arab countries (NAFRI et al. 2005).

Category	**# of products**	**Examples**
fruit, seeds	87	sugar palm fruits, *Baccaurea* berries, *Irvingia* nuts
leaves	86	*Barringtonia, Lasia, Azadirachta, Centella*
shoots (spouts, stems)	23	bamboo shoots, rattan shoots, palm hearts
tubers, roots	22	yam tubers (*Dioscorea*), galangal roots
mushrooms	16	ear mushrooms, *shiitake* mushrooms, termite mushrooms
flowers	4	*Sesbania, Butea*
all plants (subtotal)	**238**	
fish	300	*Cyprinidae (Cypriniformes), Pangasiidae, Siluridae (Siluriformes), Notopteridae*
birds	63	doves (*Columbindae*), partridges (*Phasianidae*), pheasants (*Phasianidae*), bulbuls (*Pycnonotidae*), estrildas (*Passerinae*)
mammals	54	squirrel, wild boar, rats, civets, mouse deer
reptiles and amphibians	41	frogs, monitor lizards, snakes, turtles
mollusks	7	freshwater shrimp, crabs, snails, shells
insects	5	red ant eggs, bamboo grub, dung beetles
All animals (subtotal)	**470**	
Total	**708**	

Table: NTFPs used in Laos (based on Foppes and Ketphanh 2004)[2]

The Lao government understands the importance of NTFPs. However, because it decided to increase the percentage of forest cover to 70% by 2020 (Lao PDR 2005), local governments tend to look only at this numerical target. Afforestation projects are being emphasized in order to increase forest cover, but some of these projects are implemented after logging natural forests first, so increasing forest cover does not necessarily mean conservation of biodiversity, or villagers' stable access to NFTPs.

References

Foppes, J., and S. Ketphanh. 2004. *NTFP Use and Household Food Security in Lao PDR.* Forest Research Centre (FRC) and SNV Netherlands Development Organization. http://www.mekonginfo.org/mrc_en/doclib.nsf/0/BC0D1629438B4CAB472571420024AC37/$FILE/FULLTEXT.pdf

Greijmans, M., P. Phonnachith, P. Thongda, S. Ponpakdy, and N. Chantavong. 2007. *Selected NTFPs for Development in Phoukoun, Xieng Nguen, Ngoi, and Phakxeng Districts, Luang Prabang.* Luang Prabang, Lao PDR: World Vision.

Lao People's Democratic Republic (PDR). 2005. *Forestry Strategy to Year 2020 of Lao PDR.*

National Agriculture and Forestry Research Institute (NAFRI), National Agriculture and Forestry Extension Service (NAFES), and National University of Lao PDR (NUOL). 2005. *Improving Livelihoods in the Uplands of the Lao PDR, Volume 2: Options and Opportunities.* Vientiane, Lao PDR: NAFRI. http://www.nafri.org.la/03_information/sourcebook/Volume2.htm

Nonaka, Kenichi et al. 2008. Rice Paddies that Nurture Living Creatures and their Use. In Kenichi Nonaka (ed.) *Vientiane Plains Life: Diverse Uses of Environment in Rice Farming Villages.* Tokyo, Japan: Mekong.

Rosales, R. M. P., M. F. Kallesoe, P. Gerrard, P. Muangchanh, S. Phomtavong, and S. Khamsomphou. 2003. *The Economic Returns from Conserving Natural Forests in Sekong, Lao PDR*. Vientiane, Lao PDR: International Union of Conservation of Nature (IUCN) and World Wildlife Fund (WWF).

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1. There are various definitions of NTFP, but here we will define it as materials from the forest that people use and that are not made of wood.
2. According to one Japanese survey, there are 17 insect species, including stink bugs (*Pentatomoidea*), scarabs, cicadae, and earth-boring scarab beetles (Nonaka et al., 2008).

1-3. Fish Diversity in the Mekong Basin

Fish and other freshwater aquatic species are the main source of protein for people who live in rural areas of the Lower Mekong Basin (the four countries of the Lower Basin, not including China and Burma). With the exception of Vietnam's Mekong delta, which is adjacent to the sea, the consumption rate of freshwater fish is extremely high in almost all areas of the basin. This paper is an overview of the use of Mekong River fish by people of the region from *The Fisheries Baseline Assessment Working Paper* of the Mekong River Commission's Strategic Environmental Assessment (ICEM 2010).

The Diversity of Fish Species in the Mekong Basin

The Fisheries Baseline Assessment Working Paper estimates the diversity of fish species in the Mekong River from data registered in *the FishBase* database of fish inhabiting 204 rivers and 32 lakes worldwide. According to data registered as of 2009, it has been confirmed that the 781 fish species found in the Mekong River is second only to the 1,271 species of the Amazon River, showing that the Mekong River is the second river in the world for fish diversity. According to a report by the World Wildlife Fund (WWF), the Mekong River basin is a biodiversity hotspot where more than 279 new species of fish have been discovered in the last decade. It was previously estimated that there were around 1,200 species of fish in the Mekong River, but at present it is thought that there are 850 freshwater species, and that around 1,100 species inhabit the river if marine fish that make temporary incursions into the Mekong River delta are also included. Furthermore, 197 fish species are registered in *the FishBase* for the Cambodian lake Thonle Sap, indicating that this lake is fourth in the world for fish species diversity (Japan's Lake Biwa is sixth, with 69 species).

The number of fish species in 20 locations in the river basin (including tributary river sub-basins) is shown in the following table:

Location	**Species**	**Families**	**Endemic**
China-headwater	24	3	4
China-upper reach	34	4	4
China-middle reach	48	8	7
China-lower reach	122	21	15
Northern Laos	140	30	26
Nam Ou	72	15	29
Nam Ngum	156	27	43
Nam Mang	57	19	17
Nam Kadinh	99	21	38
Songkhram	216	40	39
Xe Bang Fai	157	31	51
Xe Bang Hiang	160	33	47
Mun/Chi	270	38	49
Downstream of the Khone Falls	168	34	25
Stung Treng-Kratie	204	37	33

Sekong	214	33	63
Sesan	133	26	24
Srepok	204	32	38
Thonle Sap	284	45	31
Mekong Delta	486	73	28

Table: Species richness in 20 locations of the Mekong Basin (ICEM 2010:11)

It can be seen from the table that even excluding the Mekong River delta, where marine fish also contribute to the diversity of fish species, the Mekong River and its tributaries are very rich in aquatic life. There are especially abundant numbers of fish species in Thailand's Songkhram River basin and Mun/Chi basin, as well as in the Mekong mainstream between Stung Treng and Kratie, and Cambodia's Sekong and Srepok basins.

References

International Center for Environmental Management (ICEM). 2010.
Mekong River Commission (MRC) Strategic Environmental Assessment (SEA) for Hydropower on the Mekong Mainstream: Fisheries Baseline Assessment Working Paper. Vientiane, Lao PDR: MRC.
http://www.mrcmekong.org/about-the-mrc/programmes/initiative-on-sustainable-hydropower/strategic-environmental-assessment-of-mainstream-dams/

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1-4. The Mekong River: The World's Largest Freshwater Fishery

Consumption of Freshwater Fish in the Mekong Basin

According to Food and Agriculture Organization (FAO) statistics, 750,000 tons of freshwater fish are caught every year in the four countries of the Lower Mekong. Field surveys, however, estimate around 2.1 million tons per year, equivalent to 18% of the global freshwater fish catch. Calculating from the FAO statistics, the annual consumption of freshwater fish per person in the Lower Mekong is 13.8 kg, while the global average is a mere 2.3 kg. The annual consumption in Cambodia is 19.4 kg, the highest in the world. Summarizing further 20 freshwater fish surveys, the average annual consumption per person leaps to 32.3 kg for Cambodia, 24.5 kg for Laos, 24.9 kg for Thailand, and 34.5 kg for Vietnam.

According to FAO data for 2000 to 2003, of the animal protein consumed per day, the proportion supplied by freshwater fish was 49.8% in Cambodia, 38.31% in Laos, 16.19% in Thailand, and 12.87% in Vietnam, which can be seen to be extremely high when compared with the global average of 5.78%. Cambodia and Laos are especially conspicuous in this regard.

Mekong River Fisheries

Recent data show that catches in Mekong basin fisheries are estimated to have an annual economic value of between USD 2.1 billion and USD 3.8 billion, and between USD 4.2 billion and USD 7.6 billion at retail prices (ICEM 2010).

In the vicinity of the Khone Falls in southern Laos, the Mekong River mainstream fishing industry supports more than 65,000 households. The average household in this area is thought to catch an annual average of 355 kg of fish, and consume 249 kg of fish. The total catch in the area close to the Khone Falls is estimated at 4,000 tons, worth between USD 450,000 and USD 1 million (Baran, Jantunen, and Chong 2008).

Some sources estimate that the freshwater fish production in Cambodia, including fish farming, accounts for between 11.7% to 16% of the GDP, while another source estimates between 8% to 12%. While these figures are all estimates, and it is difficult to obtain accurate statistics for small-scale fisher-folks, the importance of the Mekong River fisheries can be understood from these approximate data (ICEM 2010).

Fish Support Daily Life and Culture

At present, fish from the Mekong River Basin are being distributed across international borders due to the development of refrigeration facilities and transportation networks. In fact, fish were an important item of exchange in the barter that took place before the establishment of the current distribution system.

Until about 50 years ago, the exchange of fish and rice took place over an extensive region, including southern Laos and northeastern Thailand. In the era when a subsistence lifestyle was virtually universal, people spent much of their time gathering in order to secure food. In villages where the main vocation was farming, it was difficult to find time to obtain supplementary foods (to eat with rice) during the busy farming seasons of rice seedling transplantation and rice harvesting. At the same time, in riverside villages where fish were available in abundance, fish were caught and processed into fermented or dried foods, which the villagers then actively exchanged for the goods they needed. Food was thus distributed across the region by barter.

These exchanges not only had practical aspects, but also social and cultural significance. A northeastern Thai woman in her 70s relates that in her youth she would make large amounts of dried and fermented foods, load them onto an ox cart and often set off together with a friend without first deciding on a destination. She would then negotiate with people she met along the way to exchange the fish products she had brought with her for rice and other agricultural products. There was no fixed exchange rate for rice and fish, so when she had a surplus she would give more to the other person, and if she was in short supply she would negotiate with the other person to obtain larger amounts of rice. It was explained that what was important in these negotiations was to be openhanded.

At the time, neither rice nor fish were distributed through the market, and so it was not possible to turn them into cash. It can therefore be supposed that the people felt that there was no point in having a fixed numerical exchange rate. Moreover, since rice and fish cannot be preserved for long periods of time, rather than hoarding large amounts and then see it rot and go to waste, the social circumstances were such that the best way to prepare for the unexpected was to give generously to others, thus heightening one's reputation and strengthening interpersonal relations. We also learned from the interviews that setting off to an unknown village, engaging in exchanges, and making new friends with the people there was considered something enjoyable to be looked forward to. People who became friends through such exchanges called each other *siaow* (meaning something like "a close friend") and frequently exchanged visits with each other. After a while, a marriage might take place between the two families, thereby strengthening the social link through a transformation from friend to relative.

Now that fish can easily be sold for cash, many elderly people lament the days when fish could be shared through exchange, but even today, when fish catches are good in southern Laos the fish are given out to friends and relatives. In the villages of northeastern Thailand, when the fish catch is small and the cost of the gasoline to take the fish to market cannot be recouped, the fish are sold in the village at a very low price. The fish of the Mekong Basin even now play an important role in strengthening social relations, and support the food security of people who have limited opportunities to gain cash income.

References

Baran, Eric, Jantunen Teemu, and Chiew Kieok Chong, 2008. *Value of Inland Fisheries in the Mekong River Basin, Tropical River Fisheries Valuation: Background Paper to Global Synthesis* 227-290.

International Center for Environmental Management (ICEM). 2010. *Mekong River Commission (MRC) Strategic Environmental Assessment (SEA) for Hydropower on the Mekong Mainstream: Fisheries Baseline Assessment Working Paper.* Vientiane, Lao PDR: MRC.
http://www.mrcmekong.org/about-the-mrc/programmes/initiative-on-sustainable-hydropower/strategic-environmental-assessment-of-mainstream-dams/

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1-5. The Mekong River and People's Livelihoods

People and the River

The population of the Mekong River Basin exceeds 60 million. The population of the basin area in respective countries is 5.2 million people in Laos, 23.1 million in Thailand, 13 million in Cambodia, and 18.7 million in Vietnam[1]. Approximately 85% are agricultural communities (MRC 2010: 31-32). Agriculture, fishing, and collection of aquatic life and vegetation are the main economic activities of the people in the basin, and about 62.6% of the working population in the region make their living primarily from water resource related work (MRC 2010: 48).

The Mekong River not only supplies water for the region's urban areas, it is also the source of water for daily use in agricultural communities during the dry season. In villages along the river, almost all drinking water, water for daily use, and water for agriculture depend on the river. The river is also very important as a place for children to play.

When the water levels decrease in the dry season, the region becomes very dry, and the river banks become important places for farming. In addition, an important source of protein for agricultural communities is freshwater fish that are caught in both the mainstream and tributaries, as well as the wetlands and channels connected to them. At present there are about 850 species of fish identified in the Mekong River Basin, and most can be eaten. Aquatic life forms, including fish and frogs, are people's main source of protein, and are also an important source of income. If seasonal labor and side businesses are included, 40 million people in the region are involved in the Mekong River water system's fishing industry. About 40% of the population of Cambodia depends on the Tonle Sap Lake and the surrounding flood plain (MRC 2010: 49).

Rivers are also important transportation routes. It is not uncommon for people from multiple villages on both sides of the river to be distant relatives. Previously, in Thailand's Ubon Ratchathani Province, people living on the Thai side would do their swidden farming in the mountains of Laos. For them, the river was not a national border so much as simply something to cross.

Spiritual Beliefs and Rivers

The Mekong River and other rivers in the region have a special spiritual significance for people as well. In Thailand, Laos and Cambodia, Buddhist temples and monasteries, which are central to people's faith, are often constructed along riverbanks. During field studies, there are frequent opportunities to hear many folktales. For example, in southern Laos it is said that there is a *naga* (a deity taking the form of a snake) palace at the bottom of the Mekong River. It is believed that strong spirits live in rivers and at other special places, so it would be dangerous to launch fishing boats or to walk past certain locations without offering prayers[2]. Along the Dom Noi River in Thailand, which is a tributary of the Mun River, which itself is a tributary of the Mekong, people ask the spirits for permission before fishing. Also, in Thailand and Laos it is widely said that rivers are vestiges of fights between *naga*.

Spirits are also said to reside in fish. In spite of its enormous size, very little is known about the life of the *pla buk,* the Mekong giant catfish, the world's largest freshwater fish with adults weighing up to 300kg. It is believed by Thai fishing communities, however, that the giant catfish lives according to the Buddhist precepts and is holy because only moss and other vegetation have ever been found in its stomach. In northeast Thailand's Ubon Ratchathani Province, it is believed that when this fish is caught in one's net, it is very inauspicious. These fish can now be sold for a lot of money, but because there is fear of losing one's life for committing the sin of killing this fish of merit, the fishers carry out a formal Buddhist memorial service after selling giant catfish.

The river is also a place of festivals. Every year, there is a boat race on the Mekong River and its tributaries around the time the rainy season ends. Also in April, the Thai and Lao New Year, people celebrate along the riverbanks by building sand towers in the shape of Buddhist stupas. The ceremonies carried out in the World Heritage Site of Luang Prabang are well known, but similar customs are also observed in lesser-known areas like the Mun River, a Mekong tributary in northeastern Thailand, and the Sekong River of Cambodia.

New River Uses

On the Bolaven Plateau of Laos, there is increasing use of small-scale hydropower generation using small Chinese electric generators. These generators are sold at local markets, and the villagers themselves can set up this simple and convenient apparatus if several households invest together about USD200-300. A drop of 2 meters is sufficient to generate electricity. Thus, even without external aid, villagers can use their own resources to attain and maintain electric power. In non-electrified villages in Laos, some residents have set up battery charging businesses, giving birth to small-scale business.

References

Mekong River Commission (MRC). 2010. *State of the Basin Report 2010.*
http://www.mrcmekong.org/assets/Publications/basin-reports/MRC-SOB-report-2010full-report.pdf

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1. The population of the Chinese portion of the basin is unknown.
2. For example, the mouth of the Pak Kading River in Laos's Khammouan Province.

1-6. Another Type of Diversity: Languages in the Mekong Basin

A Mon temple in Ratchaburi Province, western Thailand (September 2012).

A total of 398 languages are spoken in 5 of the Mekong countries (Burma, Lao PDR, Thailand, Cambodia, and Vietnam). This is equivalent to 5.8% of all the 6,909 languages in the world listed in *Ethnologue*. On the other hand, the number of speakers in these 5 countries is only 3.2% of the world's population, so this means 3.2% of speakers speak 5.8% of the world's languages. This falls short of the Pacific (0.1% of speakers, 18.1% of languages) and the North and South American continents (0.8% of speakers, 14.4% of languages), but in comparison to Europe (26.1% of speakers, 3.4% of languages) or Asia as a whole (60.8% of speakers, 33.6% of languages), it can be said that there is a wide diversity of languages in proportion to the population in the Mekong region[1].

Country	**# of speakers**	**# of languages**	**# of Languages with fewer than 10,000 speakers**	**Examples of minority languages**
Cambodia	13,511,970	23	12	Brao, Samre, Sa'och
Lao PDR	5,349,894	84	47	Aheu, Arem, Chut
Burma	47,319,800	111	35	Anu, Tawr Chin, Hpon
Thailand	51,668,997	74	28	Bisu, Chong, Plang
Vietnam	75,650,099	106	42	Arem, Chut, En
Total (5 countries)	193,500,760	398	164	
World total	5,959,511,717	6,909	3,524	
Percentage	3.2%	5.8%		

Table: Language diversity in 5 countries of the Mekong Basin

Minority Languages Support Diversity

Of the 398 languages spoken in the 5 countries of the Mekong basin, 164 (41.2%) have fewer than 10 thousand speakers[2]. While a language's survival is not solely determined by the number of speakers (Nettle and Romaine 2000), after calculations from comparative examinations, Crystal (2000) estimates that 50% of the world's languages will disappear in the next 100 years, and the percentage of languages that have fewer than 10 thousand speakers is precisely 51.0% (3,524 languages). Therefore, there is a possibility that 164 languages spoken by ethnic and indigenous peoples in the Mekong Region will disappear during the 21st century. This calculates to a disappearance of 1 or 2 languages each year in the 5 countries of the Mekong Region alone. Languages have continually gone extinct and evolved throughout human history, but the rate of extinction has increased tremendously over the past 500 years and is a concern (Nettle and Romaine 2000).

What are the Threats to Minority Languages?

The biggest factor threatening minority languages in the Mekong Region is the rapid proliferation of predominant languages like national and official languages. In particular, public education encourages or even requires use and acquisition of predominant languages. While children of minority groups need to learn national and official languages and have the right to do so, it is a problem that teachers and parents overtly or covertly try to impede the use of minority languages. This leads children to question the value of their birth and upbringing. As a result, minority languages are not used at school, and not even at home, so the language is not passed to the next generation. In addition, predominant languages expand and exercise influence through television, radio, newspapers and other mass media, as well as pop culture in movies and music. In addition, with the Association of Southeast Asian Nations (ASEAN) integration coming up in 2015, the already predominant "international" language of English is positioning itself as the predominant means of communication in the Mekong Region, making it all that much more difficult to bring attention to the value of minority languages.

Kmhmu women in Pak Beng District, Oudomxay Province in northern Lao PDR.

Conflict and civil wars, natural disasters, epidemics, and (forced) relocation due to large-scale development such as dam construction are also threats to the survival of minority languages. Speakers of Moken, a minority language used by indigenous people living in southern Burma and Thailand, were hard hit by the earthquake and tsunami of December 2004. Before that, they were already economically and socially disadvantaged, but Moken speakers, particularly those living along the coast who lost their essential boats and homes to the tsunami, are facing a crisis (Skehan 2012). Also, villages of speakers of Ugong—a language in the Sino-Tibetan language family—living in western Thailand were forced to resettle for the construction of a dam by the Electricity Generating Authority of Thailand (EGAT). As a result, the cohesiveness of the local community was weakened, creating more obstacles to maintaining language and identity (Bradley 1989).

Nyaheun women in the Xekong River Basin, southern Lao PDR.

The languages of indigenous and minority peoples are filled with wisdom and knowledge accumulated through generations of traditional lifestyles and surviving in nature. Some researchers say people are born with a right to language and culture (McCarty et al. 2007). With the disappearance of a language, the wisdom it contains is lost, and there is the danger of denying people their rights to their culture. We are facing a crisis not only of biological diversity, but also of language diversity.

References

Bradley, David. 1989. The Disappearance of the Ugong in Thailand. In Nancy Dorian (ed.)
Investigating Obsolescence: Studies in Language Contraction and Death.
Cambridge, UK: Cambridge University Press 33-40.
Crystal, David. 2000. *Language Death.* Cambridge, UK: Cambridge University Press.
Lewis, M. Paul (ed.) 2009. *Ethnologue: Languages of the World, 16th Edition.* Dallas, Texas: SIL International.
http://www.ethnologue.com/
McCarty, Teresa L., Tove Skutnabb-Kangas, and Ole Henrik Magga. 2007. Education for Speakers of Endangered Languages.
In *Handbook of Educational Linguistics.* Oxford, UK: Oxford University Press 297-311.
Nettle, Daniel. 1999. *Linguistic Diversity.* Oxford, UK: Oxford University Press.
Nettle, Daniel, and Suzanne Romaine. 2000.
Vanishing Voices: The Extinction of the World's Languages. Oxford: UK, Oxford University Press.
Skehan, Craig. 2012. Time Running out for Moken Way of Life. *Bangkok Post* May 13, 2012.
http://www.bangkokpost.com/news/investigation/293059/time-running-out-for-moken-way-of-life

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1. In Africa, 12.2% of the world's speakers use 30.5% of the world's languages.
2. Nettle (1999) reported that the percentage of languages with fewer than 10,000 speakers is 92.8% in Australia/Oceania, 76.5% in South America, 77.8% in North America, 36.4% in Central America, 32.6% in Africa, and 30.2% in Europe.The global average is 59.4%, and the average in Asia is 52.8%.

2. The Changing Mekong Environment and the Impacts on People's Livelihoods

2-1. The Mekong River Mainstream: Looking back on Hydropower Dam Development

Changes in the International Framework for Mekong River Water Resources Management

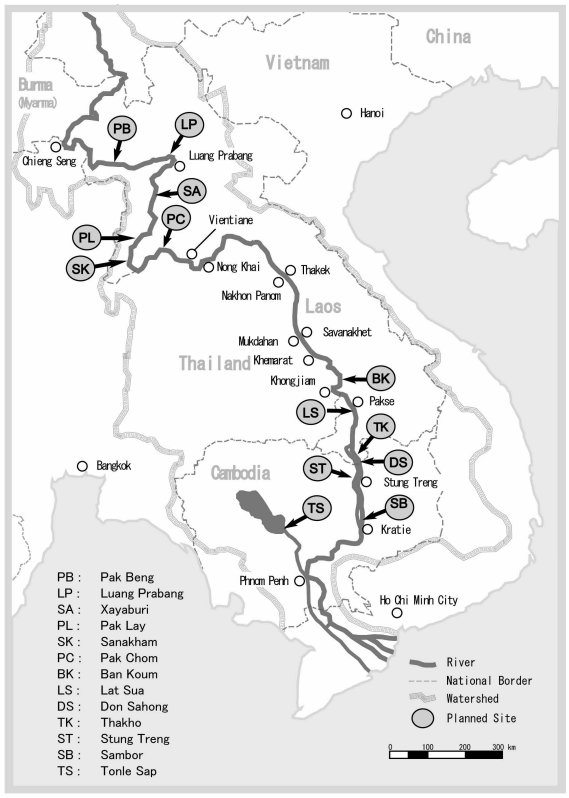
The development of mainstream dams in the Mekong River has been proceeding with alacrity since the year 2000. The history of these development plans goes back a long way to 1957. In that year, Japan, the United States, France and other countries proposed an aid package for a Mekong River Development Project at the Annual Meeting of the United Nations Economic Commission for Asia and the Far East (ECAFE—now ESCAP, the Economic and Social Commission for Asia and the Pacific)[1]. The Committee for Coordination of Investigations of the Lower Mekong Basin (generally known as the Mekong Committee) was established on the basis of a recommendation of this meeting. The Mekong Committee was set up as an interstate mediatory body for the consolidation of Mekong River hydropower and irrigation facilities, affiliated countries at the time being the four countries of the Lower Mekong River Basin, Thailand, Laos, Cambodia and Vietnam.

After the First Indochina War broke out (1946-1954), however, the Lower Mekong River Basin was engulfed in war, and in 1975 Laos, Cambodia, and Vietnam became socialist countries. With Cambodia isolated by civil war, the three other countries continued activities as the Interim Mekong Committee from 1978, but this did not lead to a movement toward cooperative development of the Mekong River. After peace was once again established in Cambodia, the four countries reached an understanding on the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (generally known as the Mekong Agreement) in 1995, and the Interim Mekong Committee was reformed to become the current Mekong River Commission (MRC).

The work of the MRC is to carry out mediation concerning water resource-related development, use, management and conservation in the Mekong basin. It is involved in a number of sectors including irrigation maintenance and improvement with anti-drought measures, navigation, hydropower, flood control, fisheries, basin development management, environment, and tourism. China and Burma became "dialogue partners" under a cooperative framework in 1996, but both countries have yet to become formally affiliated with the MRC (as of August 2013).

The MRC consists of three permanent organizations; the Council, the Joint Committee, and the Secretariat. Cabinet ministers and high-level government officials of the affiliated countries participate in the Council and the Joint Committee, respectively. Each of the four affiliated countries has established a National Mekong Committee (NMC). The MRC also holds an annual meeting to provide the Donor Consultative Group—consisting of Japan and Western donor countries and international agencies—with a forum to express opinions concerning the activities of the MRC.

Mainstream Dam Development



Map: Mainstream Dam

From the latter half of the 1950s, the Mekong Committee conducted surveys to identify construction sites in order to push forward with the hydropower and irrigation dam project in the Lower Mekong River Basin. By the 1960s, the Committee had prepared plans for seven large-scale multipurpose cascade dams in the Lower Mekong River Basin. These dams, proposed in the 1970 Water Resources Development Plan, were intended to fulfill the purposes of hydropower, flood control, irrigation and improvements in navigation. The proposed dams had a combined power generating capacity of 23,300 megawatts (MW) and would hold more than one third of the Mekong River's total annual flow. These projects, however, never came to fruition due to fears of social and environmental impacts, funding difficulties, and the conflicts in Indochina. In order to reduce the number of relocated residents, the Mekong Committee subsequently proposed a large number of smaller mainstream dams in the Revised Water Resources Development Plan of 1987.

Before disbanding in 1994, the Secretariat of the Interim Mekong Committee produced a report for the construction of a maximum of eleven dams in the Lower Mekong basin. According to the plan proposed in the report, a series of dams, from 30 to 60 m in height, would be constructed consecutively, and the reservoirs would stretch over more than a total of 600 km along the length of the basin. This was to be accompanied by the relocation of an estimated 57,000 residents. The report also proposed an order of priority for nine dams that would have a combined capacity of 13,350 MW.

At present, in addition to the dam projects on the Mekong mainstream in China, there are plans for 12 mainstream dams on the Mekong River, including a project put forward by a private Thai company. Of these, construction of the Lao Xayaburi Dam is now well underway.

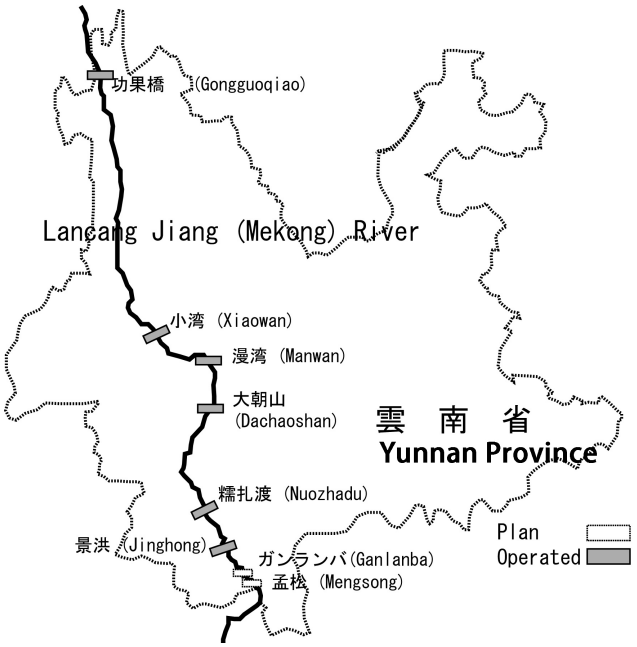
Project name (Location)	Capacity	Main purpose	Project body or company and home country
Pak Beng (Northern Laos)	1,230MW	Sale of power to Thailand	Datang International Power Generation Co. Ltd., China
Xayaburi (Northern Laos)	1,260MW	Sale of power to Thailand	Ch. Karnchang Public Co. Ltd., Thailand
Pak Lay (Northern Laos)	1,320MW	Sale of power to Thailand	Sinohydro and China National Electronics Imports and Exports Cooperation, China
Luang Prabang (Northern Laos)	1,500MW	Sale of power to Vietnam	Petrovietnam Power Engineering Consulting Joint Stock Company, Vietnam
Pak Chom (Thai-Lao border)	1,079MW		Thai Ministry of Energy and Lao Ministry of Energy and Mines (Study commissioned)
Sanakham (Northern Laos)	700MW	Sale of power to Thailand	Datang International Power Generation Co., Ltd. and Datang Overseas Investment Co. Ltd., China

Ban Koum (Thai-Lao border)	2,175MW	Sale of power to Thailand	Thai Ministry of Energy (Study commissioned)
Lat Sua (Central Laos)	686MW	Sale of power to Thailand	Charoen Energy and Water Asia Co. Ltd., Thailand
Don Sahong (Southern Laos)	240MW	Sale of power to Thailand, Cambodia, and Vietnam	Mega First Corporation Bhd., Malaysia
Thakho (Southern Laos)	50MW	Laos domestic power supply	Compagnie Nationale du Rhone, France and Electricité du Laos
Stung Treng (Cambodia)	978MW and 591 MW	Sale of power to Vietnam	Open Joint Stock Co. Bureyagessttroy, Russia
Sambor (Cambodia)	3,300MW and 2,600MW	Sale of power to Thailand and Vietnam	China Southern Power Grid, China

Table: Project Names and Outline of Lower Mekong River Mainstream Dams

Upstream Development by China

Inside China's borders, the Mekong River is known as the Lancang Jiang. In 2001, the Chinese government approved the implementation of the "Xidian Dongsong" project (West-East Electricity Transmission Project) in its 10th Five-Year Plan. This is a project to distribute the power generated using the abundant water resources of China's western regions to eastern regions such as Guangdong and Shanghai, which have chronic power shortages. The basin of the Lancang Jiang in Yunnan Province is believed to have the greatest potential for hydropower. In 2009, the utilization rate of the Lancang Jiang water resources was around 7%, but if all eight planned dams begin operation by 2020 the utilization rate is predicted to rise to 58%.



Map: Lancang Jiang Dams

Of the eight dams, six (i.e., Xiaowan, Gongguoqiao, Jinghong, Dachaoshan, Manwan, and Nuozadu) have been completed and are in operation. Two further dams (i.e., Ganlanba and Mengsong) are in the planning stages. The Xiaowan Dam is a concrete arch dam 292 m in height, second only to the largest dam in China, the Three Gorges Dam. The Xiaowan Dam is a multipurpose dam for flood control and irrigation, sediment control, and water transport, but its main purpose is power generation. It has a generating capacity of 4,200 MW, roughly half of the power being distributed to Guangdong Province and other Chinese coastal provinces.

Sustainable Use of the Mekong Nowhere in Sight

As noted above, China is not yet officially affiliated to the MRC and has no forum for consultations with countries in the lower reaches concerning Mekong River development. The Chinese government holds to the perception that the downstream impact of the Lancang Jiang dam group is slight and has continued pushing forward with development as it would with other domestic rivers. In the lower river basin, Laos has gone ahead unilaterally with the construction of the Xayaburi Dam and the existence of the MRC as a mediatory body is being called into question. As can be seen from the fact that dam

development on tributaries has already caused severe damage[2], dam construction in the Mekong River basin destroys the natural environment and threatens the lives of the people that depend on it. At the time the Mekong Agreement came into effect in 1995, however, participation by major stakeholders (such as residents and citizens of the Mekong basin and researchers with specialized knowledge) in the decision-making process on the development of the Mekong River was not one of the premises of the Agreement. What is needed now is not Mekong River development that is premised on the construction of hydropower dams, but a detailed survey and forecasting of the accumulated impacts of development throughout the whole river basin. Based on such a survey, there should be mediation of the interests of all people involved. Discussion among governments and development organizations is not enough. To establish sustainable use of the Mekong River, there is a strong call for the creation of a new framework in which a wide range of stakeholders, including affected communities and the Mekong basin's citizens, can participate.

References

China Newspaper Network. China's Hydropower Base Moves West: Tibet, Qinghai, and Yunnan can be Bases (August 11, 2009).
http://energy.people.com.cn/GB/9833213.html
Mekong River Commission (MRC). *Organizational Structure.*
http://www.mrcmekong.org/about-the-mrc/organisational-structure/
(Last accessed on July 31, 2013)

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1. See the BP 2-2 *Mainstream Dam Development: Construction of the Xayaburi Dam Forges Ahead without Agreement* for details. Here we have summarized the history of hydropower dam developments in the Mekong River mainstream.
2. See BP 2-4 *Cross-Border Environmental Issues: The Sesan, Srepok, and Sekong (3S) Rivers Dam Developments* and BP 2-5 *Rapidly Advancing Mekong Tributary Development and its Environmental and Social Impacts: The Case of the Nam Theun 2 Hydropower Project in Laos.*

2-2. Mainstream Dam Development: Construction of the Xayaburi Dam Forges Ahead without Agreement

According to a strategic environmental impact assessment (SEA) commissioned by the Mekong River Commission (MRC), implementation of the 11 planned dam projects on the Lower Mekong River would deal a destructive blow to the region, as outlined below[1]:

1) 55% of the river basin would become stagnant reservoirs or experience sudden changes in flow due to dam discharge;
2) There would be a 26% to 42% decrease in the number of fish species, resulting in an annual loss of 50 million USD. Reservoir fisheries would only make up for one tenth of this loss;
3) Some 100 endemic and endangered species, such as the Irrawaddy dolphin and Mekong giant catfish could face extinction;
4) Agricultural damage due to submersion would reach an annual 5 million USD. There would be more than 50% reduction in sediment load, blocking nutrients and making more fertilizer use necessary, incurring additional annual expenses of 24 million USD. Losses in riverbank farming would result in a loss of more than 21 million USD. The effect of irrigation from the dams would only bring in about an annual 15 million USD;
5) Impacts would be felt on fertile flood plains and shores in places like Cambodia's Tonle Sap Lake and Vietnam's delta region. Agricultural production and fishing in inland waters and along the coast would suffer damage. In the delta region, there would be an acceleration of erosion on coastlines and in riverine systems; and
6) The livelihood and steady food supply for the approximately 30 million people who make their living from fishing would be threatened.

A lookout onto the Mekong River Koogkoo Rapids in northeastern Thailand's Loei Province. Chiang Khan District. Local people are concerned about the Xayaburi dam's impacts on the area (May 2010).

One challenge that the mainstream dams bring to light is the need for joint management and use of natural resources in the Mekong Region. This necessity can already be seen in the Sesan River Basin, where dam projects in Vietnam are having transboundary environmental impacts on downstream communities across the boarder in Cambodia, and effective solutions have yet to be implemented either by the governments involved or MRC[2]. In regard to mainstream development, Laos, Thailand, Cambodia, and Vietnam signed the Mekong Agreement in 1995. This agreement established procedures for negotiation among the signatories, giving MRC its mandate. The MRC's effectiveness is now being put to the test[3].

The Xayaburi Case: The Lao Government Makes Mockery of the MRC

The project progressing most rapidly in the middle and downstream regions of the Mekong River is the Xayaburi Dam project in northern Laos. In September 2010, the Lao government notified the MRC of the dam plans, and the negotiation procedures defined by the Mekong Agreement were used for the first time. Civil society—including local and international NGOs and community organizations that had already been voicing concerns and objections—and "development partners," i.e., governments of Japan, western nations and international financial institutions all became embroiled in the negotiation

procedures. Also, in addition to the aforementioned SEA, additional surveys on impacts on fisheries and cost effectiveness calculations were conducted. As negotiations progressed, the Vietnamese and Cambodian governments raised concerns, and Thai media revealed that the Lao government had already begun construction related to the dam before negotiations were complete. This resulted in even more criticism. The MRC, which civil society had been critiquing for its lack of transparency and failure to disclose sufficient information, held its annual Council meeting (ministerial meeting) in December 2011, and there it was decided to implement an additional survey on mainstream dam development to be funded by the Japanese and other governments. Prior to the Council meeting, the Lao government pledged to halt construction until an agreement was reached among member nations.

Attention shifted to whether the Lao government would hold to its promise to stop construction in accordance with the MRC Council agreement, and whether or not additional studies were being done with sufficient information disclosure and stakeholder participation. The Lao government, however, continued construction. Based on its own studies, it decided that the impacts of the Xayaburi Dam would be minimal and unilaterally claimed that the MRC negotiation process was complete. More recently, not only are the benefits of the Xayaburi Dam being trumpeted in the government public relations paper, *the Vientiane Times*, Laos is even beginning to launch projects such as the Pak Beng Dam in the north, and the Don Sahong Dam near the Cambodian boarder. While Laos is forcefully pressing forward with its Xayaburi Dam plans, the MRC and development partners have not been able to come up with an effective course of action, and the MRC in particular is finding that the Mekong Agreement, the foundation of its own existence, is falling apart.

The Xayaburi Dam under construction (July 2012 by International Rivers).

Evidence-Based Consultations are Needed

As mentioned in the beginning of this paper, the two main challenges posed by dam projects on the Mekong's mainstream are: 1) a wide range of environmental and social impacts threatening food security and the livelihoods of tens of millions of people living in the Mekong Basin; and 2) the need for an effective framework for joint resource management and use. The Lao government neglecting the Mekong Agreement procedures and forging ahead with the construction of the Xayaburi Dam are about the worst things that could happen in regard to these two challenges. Proponents of the Xayaburi Dam should objectively review the studies which have made the dam's negative impacts very clear, recognize the current problems from a broad and long-term perspective, immediately stop construction, and resume meaningful consultations with civil society. The MRC's development partners must provide financial and technical support to conduct supplementary studies to fill in the knowledge gaps (especially regarding transboundary impacts of the Xayaburi Dam) and make other such efforts to create an environment for discussion among member countries.

References

International Rivers (IR). 2011. *Key Findings of the MRC's Strategic Environmental Assessment on Mekong Mainstream Dams.* Berkeley, California: IR. http://www.internationalrivers.org/resources/foretelling-the-mekong-river-s-fate-2634

Mekong River Commission (MRC). *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin 5 April 1995.* http://www.mrcmekong.org/assets/Publications/agreements/agreement-Apr95.pdf

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1. Based on International Rivers (2010)
2. See BP 2-4 *Cross-Border Environmental Issues: The Sesan, Srepok, and Sekong (3S) Rivers Dam Developments.*
3. See BP 2-1 *The Mekong River Mainstream: Looking back on Hydropower Dam Development.*

2-3. Mainstream Dam Development and Regional Civil Society Cooperation

Civil society actions against the construction of the upper mainstream dams in front of the Chinese Embassy in Bangkok (April 2010).

The current plans for hydropower dams on the Mekong's mainstream date back to the 1950's. They were never implemented, however, due to the Indochina wars and financing difficulties. Upon entering the 1990s, China constructed the Manwan Dam on the mainstream of the Mekong within its own borders, leading to increased awareness of the problems[1].

China aims to use dams not only for irrigation and electricity, but also to stabilize the water level of the Mekong River so that large commercial ships can navigate the river throughout the year. With this aim, China began blasting and removing rapids on the mainstream in 2003 because the rapids inhibited navigation. This sparked much criticism from communities in downstream Thailand. When the Mekong River's water levels dropped drastically in 2008, communities in northern Thailand were central in criticizing China's mainstream dams. At this time, the Chinese government was unusually responsive by accepting a letter from Thai affected people through its embassy in Bangkok, but still no solutions have been reached. China has not officially joined the Mekong River Commission (MRC), and though it is a member country of the Asian Development Bank's (ADB) Greater Mekong Subregion (GMS) program, the program emphasizes economic cooperation, so there is no effective framework to include civil society in dialogue and problem-solving regarding transboundary environmental problems.

The Mekong mainstream dam projects of the central and downstream regions began to concretely move forward after 2000. Wars that had previously prevented development ended and rapid economic growth in emerging economies increased fund-raising capacities of companies not only in China, but also Thailand, Vietnam, Malaysia and other countries. Interest in hydropower has also been stimulated by the rapid increase in demand for electricity in Thailand and Vietnam, and from the perspective of preventing global warming some are looking to hydropower as an alternative to fossil fuels. On another front, involvement from western countries, Japan, and other traditional donor countries and aid agencies is far from absent. Through its GMS program, the ADB has made it easier for member countries and the private sector to enter the hydropower business and is actively providing funds for high voltage transmission lines. The Japanese private sector, such as Tokyo Electric (TEPCO), Mitsubishi Corporation, and J-Power, are also stimulating capital involvement in Thai electric companies. TEPCO bought stock in Electricity Generating Company (EGCO), and EGCO is in turn providing capital for the Xayaburi Power Co. Ltd., which is the developer of the Xayaburi dam.

Community representatives voice a clear "no" at a hearing on the Xayaburi Dam (February 2011 by Fukuoka NGO Forum on ADB).

Around 1990, anti-dam movements by local people to protect the environment and their communities became very active in Thailand. Then from 2000, a network was built based on this experience to protect the Mekong basin's environment and society as a whole, and international NGOs also cooperated. This flow of events led to the formation of the Save the Mekong Coalition in 2009, and

Thai fisher-folks displaying banners against the Xayaburi Dam to foreign delegates to the Asia-Europe Meeting (ASEM) held in Vientiane, Lao PDR (November 2012 by International Rivers).

it has become a central actor in protesting the dam plans for the Mekong's mainstream. The difference between this campaign and more traditional anti-dam movements is that it attempted to receive the understanding and support of Thailand's growing middle class, enabling photo exhibitions in downtown Bangkok and picture-postcard petitions. Petitions were sent to the MRC Secretariat and governments of member nations, and appeals were sent to domestic and international media. Save the Mekong is a very loosely connected movement, and many participating organizations are conducting their own separate activities. In this context, there are groups providing information to communities in the basin, sending information to development partners, lobbying, and organizing nonviolent demonstrations.

One noteworthy activity was that of Vietnamese NGOs approaching dedicated researchers with information. Due to this, information about the severe impacts of dams reached Vietnamese parliamentarians, and the Vietnamese government took a clear position against the Xayaburi Dam.

Activities in Thailand are more mixed. Thailand's relationship with the Xayaburi Dam is multifaceted, because construction of the dam is being done by a large Thai construction company, Ch. Karnchang Public Co. Ltd., and Thailand's Electricity Generating Authority is to buy most of the electricity it produces. Many local communities living in the north and northeast regions of Thailand, however, are to be negatively affected. In regard to purchase of electricity, a detailed study has shown that the Thai government's projections for electricity demand are exaggerated, and an alternative proposal has already been submitted for ways to make up the demand with various demand-side management measures and use of renewable energy (Greacen and Greacen 2012). A network of affected communities in Thailand's north and northeast provinces was formed, and in addition to holding assemblies in various localities, they filed a law suit in August 2012 at Thai's administrative court to confirm that the Thai government's electricity purchase agreement was invalid.

Save-the-Mekong Coalition co-hosted the Delta Forum held in southern Vietnam (August 2013).

While civil society movements such as these are watched for their ability to influence the direction of mainstream dam construction plans, they deserve more attention. Given the current political and economic trends towards regional integration that prioritizes economic goals, awareness of these issues is transcending borders, and transboundary civil society movements can be expected to take shape.

References

Greacen, Chuenchom, and Chris Greacen. 2012. *Proposed Power Development Plan (PDP) 2012 and a Framework for Improving Accountability and Performance of Power Sector Planning.* Bangkok, Thailand: Palang Thai.
http://www.palangthai.org/docs/PDP2012-Eng.pdf
Save the Mekong. http://www.savethemekong.org/ (Last accessed on August 20, 2013)

Toshiyuki Doi

1. See BP 2-1 *The Mekong River Mainstream: Looking back on Hydropower Dam Development.*

2-4. Cross-Border Environmental Issues: The Sesan, Srepok, and Sekong (3S) Rivers Dam Developments

Overview of the Sesan, Srepok, and Sekong Rivers

The Sesan, Srepok, and Sekong Rivers (collectively known as the 3S Rivers) comprise the largest water system made of Mekong River tributaries. The 3S are all international rivers that flow into northeastern Cambodia from their sources in the plateaus of central Vietnam and the Phu Luang mountain range in Laos. The downstream region is made up of Cambodia's northeastern provinces of Ratanakiri, Steung Treng, and Mondulkiri, where many indigenous and ethnic peoples live with differing livelihoods, languages and cultures. There are approximately 70,000 people living along the three rivers in some 127 villages, and their livelihoods depend on natural river resources. This region is also known for its rich natural resources and biodiversity, and about 40% of Cambodia's natural forests are in Ratanakiri and Mondulkiri Provinces. The natural resources of the 3S river basin are very important, not just from the perspective of environmental conservation, but for ensuring food security and livelihood for people living in the region who depend on natural resources.

Map: 3S River basin

Transboundary Hydropower Dam Impacts

Because the three rivers are international waterways, upstream development is having a large impact on nature and people in Cambodia. In 1993, construction of the Yali Falls Dam in Vietnam began as the first hydropower dam project in the Sesan River Basin, at a point just 80 km within the Cambodia-Vietnam border. In October 1996, there was flooding of Cambodian villages, the cause of which is attributed to a broken water diversion dam when the Yali Falls Dam was under construction. Since then, discharge of water from the Yali Falls Dam itself impacts people with frequent and unpredictable floods, deterioration of river water quality, decrease in fish catch, erosion of riverbanks, and impacts on riverbank farming. People who use the river for daily life and drinking water are suffering severe health impacts as well. According to an NGO survey conducted in 2000, 32 villagers drowned in floods over a four year period (Fisheries office and NTFP 2000). Since 2003, there has been increasing dam construction on the upstream Srepok River, and just as with the Sesan River, similar impacts are being seen downstream in Cambodia.


Hospital inundated by flooding of the Srepok River (2009).

People living in Cambodia have continued to voice their concerns related to the dams' impacts to their own government, to the Mekong River Commission (MRC), and to national and international aid agencies financing the dams, but development in Vietnam and Laos continues without consideration for what occurs downstream in Cambodia, and affected people in the river basins who are facing great difficulties are being neglected.

Insufficient Environmental Impact Assessment

In spite of unresolved issues of mitigation and compensation around the Yali Falls Dam, there are many dam projects planned for the 3S region. One way of predicting, preventing, mitigating and managing the negative impacts of large-scale infrastructure projects such as dams is to carry out an Environmental Impact Assessment (EIA), but the EIAs for these dams have been insufficient, and some construction is in progress even without an EIA.

The area examined in the EIA for the Yali Falls Dam covered only resettlement and electricity generation upstream of the dam, and a 6 km range downstream. While it would have been possible to predict the damages to water quantity, water quality, fishing and aquatic life, it was determined that the social and environmental impacts some 10s of kilometers downstream in Cambodia would be minimal, and no survey was conducted.

The Sesan 3 Dam was constructed about 15 km downstream of the Yali Falls Dam, and its EIA was conducted with technical support from the Asian Development Bank (ADB). The report was completed in 2000 but was not disclosed. In 2003, the EIA report was leaked, so its content became known. In the process of conducting the EIA, no surveys were done in Cambodia, but the EIA cited reports on the Yali Falls dam and other surveys, saying that the impacts of the Sesan 3 Dam construction on Cambodia would be "extensively destructive," and criticized the project for looking too lightly upon the impacts downstream. In spite of this, the construction of the Sesan 3 Dam went on without any mitigation or compensation measures for Cambodia.

Also, from 2005-2006, an environmental survey on how dam construction on the Sesan and Srepok Rivers impact the environment downstream in Cambodia was conducted. While there are problems with the surveys, such as impartiality, the post factum EIAs for the Srepok and Sesan Rivers in 2006 and 2007 respectively, recognized the claims being raised by villagers, and pointed out that future dam construction would lead to additional negative impacts. Also at the post factum EIA hearing in January 2007, a promise was made to build regulatory dams on both rivers to adjust the flow when water is released from dams upstream. As of 2012, however, those dams are being promoted as hydropower projects, so the promise of mitigation measures made to Cambodian villagers in the post factum EIA are not being implemented.

Grassroots Efforts

In 2000, NGOs active in Ratanakiri Province led efforts to begin surveying the abnormalities of the Sesan River and the damages suffered by people living nearby. Domestic and international NGOs also formed a loose network called the Sesan Working Group to monitor the situation in the basin. In February 2000, the Working Group surveyed all of the approximately (at the time) 90 villages located along the Sesan River in Cambodia. The Working Group wrote a report of the overall situation and problems facing the Sesan River.

After this report was released, MRC started an investigation in Ratanakiri Province in March the same year. It also heard reports from the Cambodian and Vietnamese governments about transboundary flood problems. As a result, the investigative team was able to confirm that there were indeed unnatural changes in water levels, and it was recognized at the government level that the discharge of water from the Yali Falls Dam was creating floods across the border.

Since then, the Cambodia-Vietnam Joint Committee for the Management of the Sesan River (which now also discusses management of the Srepok River) was established as a place for the two governments to negotiate. The Cambodian and Vietnamese governments also established a 5-point "solution" to prevent downstream damage from water discharged by the Yali Falls Dam. The joint committee, however, is largely controlled by the Vietnamese government, and participation by Cambodian affected people and NGOs is not allowed. The promised advance notification of water discharge is also actually being sent first to the MRC office in Vietnam, which then notifies the MRC in Cambodia, and the notification is thereafter relayed from the central government, to the province, the district, then the commune, and finally the village, so it is very rare for notification of the flood to reach villagers before the flood itself does. In reality, it is not working as a solution.

Even by 2001 the situation had not been resolved, so villagers along the Sesan River organized together to form the "Sesan Protection Network" (SPN) in order to more effectively notify the outside world of their concerns and their plight (The Sesan Working Group dissolved upon establishment of SPN). After that, people living not only along the Sesan, but also along the Srepok and Sekong Rivers began participating in SPN, and in 2005, it formed as an NGO of organized villagers in the region and they called themselves "Sesan-Srepok-Sekong Rivers Protection Network" (3SPN).

Protests by villagers against the dam construction.

Even after becoming 3SPN, the villagers' demands are still consistent. Their core demands are that the rivers' natural flow be restored, that no more dams be built without consent of villagers, and that compensation be made to villagers who suffered damage to their livelihood, crops, and livestock. Villagers have expanded their network, and have continued making their demands and concerns known to various other stakeholders. At the Northeast Cambodia Fishers Forum in 2005, approximately 180 fishers from Cambodia, Thailand and Laos gathered, in addition to officials from the Cambodian central and local governments, domestic and international NGOs. At this forum, it was reconfirmed that dam construction was a threat to the culture, agriculture and fishing of people who depend on the river and its ecosystem, and discussions were held about the challenges and efforts needed to protect them. The 3SPN villagers send a letter to Prime Minister Hun Sen demanding solutions to the problems, and a demand for the disclosure of the post factum EIA on the Sesan and Srepok was sent to Vietnam Electricity (EVN) and the Vietnam National Mekong Committee. They also made it into the public hearing on the Srepok post factum EIA, and made an appeal before the approximately 150 participants, who were representatives of the ministries of the Vietnamese and Cambodian governments, governors, villagers, and NGOs. They raised their concerns about the impacts of dam construction on the Srepok River, called for the temporary halt in construction, and demanded compensation. They also demanded an end to funding of EIAs that presume dam

construction and/or reject local participation.

Also, to collect evidence to back up their concerns and opinions, they did an impact survey, and are thus strengthening their own knowledge base. They are also getting on to radio programs to explain their situations, holding demonstrations against dam construction, and thus making their concerns about development projects known to a broader audience.

To Address Cross-Border Environmental Issues

It appears that the villagers' activities are leading to a widening recognition of the transboundary impacts of development. Still, in spite of continuously raising their concerns, the villagers have yet to be compensated for damages from the Yali Falls Dam and mitigation measures have not been implemented. And dam construction on the 3S Rivers continues.

In order to mitigate transboundary environmental impacts, the following improvements need to be made:

1) Governance of the two committees working for the joint management of the Mekong River—namely the MRC and the Cambodia-Vietnam Joint Committee for the Management of the Sesan River—must be strengthened;
2) Affected people in downstream Cambodia must be allowed to participate in decision making for development projects;
3) Especially in terms of local participation, all people who are involved in dam development of the 3S Rivers must recognize downstream affected people in Cambodia as project stakeholders, provide information and hold consultations prior to final decisions to implement projects, and listen to opinions of affected people when taking the environment into consideration;
4) Aid agencies and other funders should not finance projects for which local participation, accountability, and appropriate social and environmental consideration cannot be confirmed;
5) The need to include transboundary issues into EIAs is clear from surveys and reports done to date, and EIAs should be disclosed to all stakeholders in languages they understand; and
6) Affected people downstream in Cambodia must be compensated for the cumulative environmental impacts of existing dams and those currently under construction. They have been raising their concerns for years.

References

3S Rivers Protection Network (3SPN). *Community Demands*.
http://www.3spn.org/about-3s-region/community-demands/ (Last accessed on October 24, 2012)
Fisheries Office and Non-Timber Forest Products Project (NTFP). 2000.
A Study of Downstream Impacts of the Yali Falls Dam in the Sesan River Basin in Ratanakiri Province, Northeast Cambodia.
Ratanakiri, Cambodia: Cambodia Fisheries Office.
Halcrow and Partners. 1999. *Sekong-Se San and Nam Theun River Basins Hydropower Development Study, Final Report.*
Manila, the Philippines: Asian Development Bank (ADB).
Sugita Rena. 2008. *Voices from the Waters: Villagers' Lives and Livelihoods Threatened by Hydropower Development.*
Tokyo, Japan: Mekong Watch (in Japanese)
http://www.mekongwatch.org/PDF/watervoice_full.pdf
SWECO, Groner. 2006a. *Environmental Impact Assessment on the Cambodian Part of the Sesan River due to Hydropower Development in Vietnam.* Hanoi, Vietnam: EVN.
SWECO, Groner. 2006b. *Environmental Impact Assessment on the Cambodian Side of the Srepok River due to Hydropower Development in Vietnam.* Hanoi, Vietnam: EVN.

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2-5. Rapidly Advancing Mekong Tributary Development and its Environmental and Social Impacts: The Case of the Nam Theun 2 Hydropower Project in Laos

Hydropower Development on the Tributaries Threatening Environment of the Mekong

Experts say that 70% of fish inhabiting the Mekong River are migratory, coming and going with the seasons between the Mekong and its tributaries. Science has yet to elucidate many of the details related to the ecology of Mekong River fish, such as their migration and spawning patterns[1]. The current plans to build the Xayaburi Dam and the Don Sahong Dam, and their anticipated environmental and social impacts have triggered an international debate. Of course, if a dam is built on the mainstream, then certainly the migration of fish will be obstructed, changes in water volume will engender environmental impacts, and the resulting effects will have an immeasurable impact on the lives of people who depend on the natural resources of the river and its tributaries[2]. Even if further dam construction on the mainstream of the Mekong River were prevented, continued dam development on the tributaries would ultimately block their flow, inevitably leading to a dramatic decrease in Mekong River aquatic life. Dam construction on the Mekong's mainstream is of course an extremely important issue. The environmental and social impacts of development and dam building on the tributaries, however, should also be reconsidered and efforts need to be made to avoid impacts from new projects. As an aside, the attention being focused on the mainstream of the Mekong has led to development on the tributaries being pushed ahead at a fevered pitch, imperiling both the fish ecology of the Mekong River and its tributaries, as well as the livelihoods of people who depend on them.

Accelerated Hydropower Development in Laos

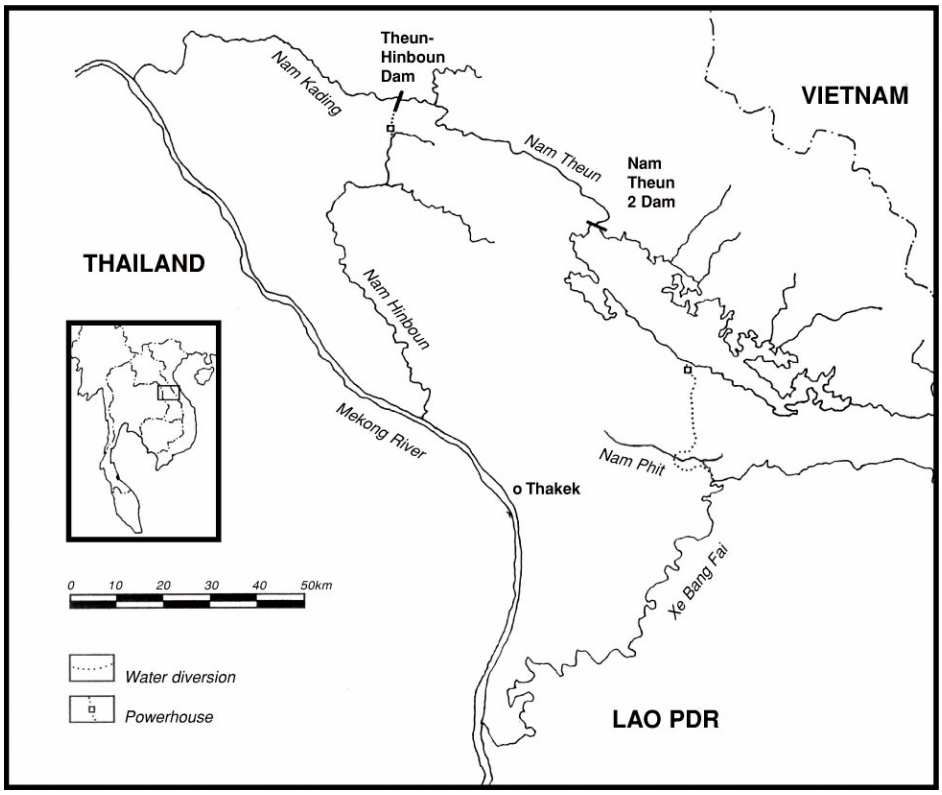
The Nam Theun 2 Hydropower Dam.

Of the amount of water that flows into the South China Sea from the Vietnam Mekong Delta, Laos accounts for the largest volume, some 35% of the total[3]. The Lao government has been striving to harness the massive hydro resources and forge them into the so-called "battery of Southeast Asia" to supply power to neighboring countries. According to the Lao government-issued power development plan (August 2012), of 86 projects in operation, the nation's power generation business includes 14 plants currently in operation and 12 under construction[4]. Of these, apart from the Hongsa lignite coal-fired power station slated to begin operation in 2015, all of the projects listed are hydropower projects.

What provided the initial impetus to hydropower development in Laos was the Nam Theun 2 Hydropower Project backed by both the World Bank and the Asian Development Bank (ADB). Of the Lao hydropower projects in the plan cited above, only 10 were already in motion prior to the Nam Theun 2 project launch in 2005, which triggered a spate of contracts for dam projects and feasibility study-related memorandums. Despite the World Bank and ADB support for the Nam Theun 2 project, which was billed as a "model of sustainable development," currently many environmental and social impacts have emerged. Here we will examine the environmental and social impacts of dam development through the lens of the Nam Theun 2 project.

Environmental and Social Impacts of the Nam Theun 2 Dam, a "Model of Sustainable Development"

The Nam Theun 2 dam was built in Khammouane Province in central Laos with the principal aim of securing foreign currency through the sale of power to neighboring Thailand (See the map below). The project called for the damming of the Nam Theun River, a tributary of the Mekong River, with a 48-meter-tall dam. The dam resulted in the submerging of an area of 450 km^2, equivalent to two-thirds the area of Singapore, and the relocation of 6,300 residents. In line with the primary objective of the project, 1,000 megawatts (MW) of the 1,075 MW output is being sold to Thailand to bring in foreign currency.



Map: The Nam Theun 2 Hydropower Project (Source: International Rivers)

The project is a private-sector-led initiative implemented by an independent power producer and financed using the BOOT (build–own–operate–transfer) method. The project is the largest public works project ever in Laos, costing approximately USD 1.45 billion.

The massive environmental and social impacts associated with the project fueled international debate for more than a decade before the World Bank and ADB decided to back it in 2005. Construction began in earnest in June of the same year. In April 2008, the relocation of residents was completed and water began to be fed into the reservoir. On March 15, 2010, the dam began operating at full capacity and exporting power to Thailand.

As a result, a 450 km^2 area was flooded and the valuable Nakai Plateau ecosystem, also known as the Galapagos of the East, has been seriously affected. At the same time, livelihood prospects have yet to materialize for the 6,300 displaced individuals. In addition, after the water is used to generate power

it is fed into the Xe Bang Fai River and its tributaries, and an estimated 120,000 to 130,000 people are being affected by inundation of agricultural fields, catastrophic fishing industry damage, and increases in the incidences of flooding.

Broken Promises of the Nam Theun 2

Flooded riverbank garden along the Xebang Fai River.

Several surveys were conducted in conjunction with the World Bank and ADB support of this project in light of concerns about potential serious environmental and social impacts resulting. Consequently, wide-ranging and elaborate plans were formulated to circumvent or mitigate potential negative impacts. However, the reservoir was filled and dam operation began even though the project's social development plan, the concession agreement with the Lao government, and conditions outlined in World Bank environmental and social safeguard policies had not been fulfilled. The environmental and social impacts that observers anticipated have arisen. Some of the most salient problems are briefly described below.

A two-year old girl suffering a rash after bathing in the Xe Bang Fai River, into which the Nam Theun 2 Dam discharges its reservoir water.

First, the reservoir area was flooded before the vegetation at the reservoir site was completely cleared. Failing to suitably clear the vegetation has damaged the water quality of the reservoir and the downstream Xe Bang Fai River, which may be a cause of emerging health problems.

Second, following the start of commercial operations, there have been instances in many villages along the Xe Bang Fai River of residents reporting skin problems after bathing or fishing in the river. Reasons why skin afflictions among river users occurred immediately after the dam started operation include a failure to notify local residents about the decline in river water quality, and the fact that many people have no choice but to use Xe Bang Fai River water for their household and daily needs because wells set up by the Nam Theun 2 Power Company (NTPC) break down and the well-water quality is poor.

Third, despite the World Bank safeguard policy stating that the expropriation of land and related assets should take place only after compensation has been paid, it was not until two years after relocation was completed that compensation for fields and fruit orchards began. Relocated residents have been put into a very difficult situation. They may not be able to file complaints in cases that they do not receive fair compensation in accordance with the stated policy because all their assets that would have been evidence to back up their claims have already been submerged.

In this way, despite billing this project as a "model for sustainable development" by conducting enormous environmental and social impact assessments and designing detailed plans to prevent and mitigate negative impacts, in practice, promises and requirements related to environmental and social safeguards have gone unfulfilled. Instead, commercial operation of the dam and economic profits have been prioritized.

Preventing Environmental and Social Impacts of Hydropower Development

If the World Bank seeks to prevent and mitigate further environmental and social impacts of the Nam Theun 2 Hydropower Project, then it is incumbent upon it to implement the following improvements. First, it must ensure compliance with safeguard policies. NTPC, as the corporation operating the business, has prioritized the pursuit of profits and failed to completely fulfill its obligations in terms of safeguard policies. The World Bank and ADB, as supporters of this project, clearly have a responsibility to ensure the company's compliance with these safeguard policies.

Second, a monitoring mechanism to gauge the long-term effects of the project is required. Under the initial plan, a livelihood-restoration program by the NTPC is to conclude in 2014, after which the responsibility for the program is to shift to the Lao government. However, whether the Lao government can adequately respond to affected people and the remaining issues is a big question and highly problematic. Monitoring long-term impacts and mitigating these impacts will ostensibly be major challenges. Furthermore, as a project with international backing, the project merits a long-term survey of how a dam constructed on a tributary impacts the basin ecosystem as a whole. These projects should be used to contribute new information to the store of knowledge on the cumulative effects of dams on the Mekong River ecosystem.

Third, the disclosure of information on environmental and social impacts is called for. In spite of requests from non-government organizations (NGOs), the companies conducting activities have not disclosed important information, including standard-of-living surveys, surveys on reservoir and downstream water quality, and monitoring reports of activities on livelihood recovery downstream. Knowing that NTPC-implemented surveys are problematic in that they are not disclosed, not only surveys by World Bank experts, but project monitoring conducted by NGOs should also be accepted. To monitor these projects more effectively, information pertaining to environmental and social impacts needs to be made available to the general public.

Fourth, the World Bank should call on the Lao government to comply with the environmental policies the Bank supported when the Nam Theun 2 project plans were being formulated. In laying the groundwork for the project, both the World Bank and the ADB contributed to the formulation and revision of a number of environmental policies adopted by Laos. The fact that Laos prepared and organized these environmental policies is commendable. However, Laos has placed priority on economic growth to the detriment of environmental and social considerations in this development project, and has not actively sought to improve environmental policy. When it comes to the actual operations, there are a number of issues that should be pointed out. The World Bank and ADB added momentum to hydropower projects in Laos by throwing their weight behind the Nam Theun 2 project. This then led to a subsequent spate of dam development projects with environmental and social components being insufficiently considered. As such, hydropower project operators cannot be expected to formulate and promote measures to prevent and mitigate environmental impacts on their own. Moreover, the current situation is one in which the Lao government is lacking in management capacity and accountability. In light of this, donors such as the World Bank and ADB—who have supported the improvement of environmental policy in Laos and promoted hydropower development by backing construction of the Nam Theun 2 Dam—have a responsibility to urge the Lao government to thoroughly comply with environmental policy and call on the government for greater transparency

and accountability in development projects.

Without overcoming these problems, this project cannot in good conscience be called a "model for sustainable development" and should not be used to foist dam development on Laos or other countries.

References

Asian Development Bank (ADB). 2004. *Summary Environmental and Social Impact Assessment: Nam Theun 2 Hydroelectric Project in Lao People's Democratic Republic.* Manila, the Philippines: ADB.

Goldman, M. 2005. *Imperial Nature: The World Bank and Struggles of Social Justice in the Age of Globalization.* New Haven, Connecticut: Yale University Press.

Imhof, Aviva, and Shannon Lawrence. 2005. *An Analysis of Nam Theun 2 Compliance with World Commission on Dams Strategic Priorities.* Berkeley, California: International Rivers Network (IRN). http://www.internationalrivers.org/resources/an-analysis-of-nam-theun-2-compliance-with-world-commission-on-dams-guidelines-4124

Higashi, Satomi. 2005. Why Did the Japanese Government Support the Nam Theun 2 Dam Project? A Report on the Ministry of Finance and NGO Regular Consultation Special Session. *Forum Mekong* Vol. 7 No. 1, 1-13 (in Japanese) http://www.mekongwatch.org/PDF/FM7_1.pdf

Higashi, Satomi. 2010. New Poverty Proliferation in the Guise of Poverty Eradication: The Laos Nam Theun 2 Hydropower Project. *Alternatives* November/December 2010 (in Japanese)

Kiguchi, Yuka. 2008. The Hoo Sahong Fish Corridor and People's Lives: Concerns on the Environment and Social Impact of the Don Sahong Dam. *Forum Mekong* Vol. 9 No.1, 16-19 (in Japanese) http://www.mekongwatch.org/PDF/FM9_1.pdf

Minutes of the Ministry of Finance and NGO Regular Consultation Special Session (April 12, 2005) (in Japanese) http://www.jacses.org/sdap/mof/gijiroku/mof28.pdf.pdf

Nam Theun 2 Power Company (NTPC). http://www.namtheun2.com

Nam Theun 2 Power Company (NTPC). 2005. *Social Development Plan.* Vientiane, Lao PDR: NTPC. http://www.namtheun2.com/reports/111.html

Shoemaker, Bruce, Ian G. Baird, and Monsiri Baird. 2002. *The People and Their River: A Survey of River-Based Livelihoods in the Xe Bang Fai River Basin in Central Lao PDR.* Vientiane, Lao PDR: Canada/Lao PDR Fund for Local Initiatives.

World Bank. *Nam Theun 2.* http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/LAOPRDEXTN/0,,contentMDK:21109109~pagePK:141137~piPK:141127~theSitePK:293684,00.html

World Bank. *Nam Theun 2 Blogs.* http://blogs.worldbank.org/eastasiapacific/category/tags/nt2

Mekong Watch

1. See BP 1-3 *Fish Diversity in the Mekong Basin* and BP 1-4 *The Mekong River: The World's Largest Freshwater Fishery.*
2. See BP 2-1 *The Mekong River Mainstream: Looking back on Hydropower Dam Development* and BP 2-2 *Mainstream Dam Development: Construction of the Xayaburi Dam Forges Ahead without Agreement.*
3. See BP 1-1 *The Mekong River's Natural Environment.*
4. The plan includes plants with a 1-megawatt (MW) capacity or greater.

2-6. Forests Disappearing from Mekong Watershed Countries

Forests Support People's Lives

"The forest is my home. I cannot live without my home." A farmer making his living in the mountains of Laos said these words. Life in rural districts of countries of the Mekong River watershed is supported even now by the natural resources nurtured by forests and rivers[1].

About 70 million people depend directly on the ecosystem for food, water, livelihood and other important services related to existence in the Greater Mekong Sub-Region (GMS), consisting of the five countries of Laos, Burma, Thailand, Cambodia, and Vietnam, and two Chinese provinces, Yunnan and the Guangxi Zhuang Autonomous Region (WWF 2013: 5).

People engaging in agriculture who depend on the natural environment supplement their unpredictable food production with forest products including bamboo shoots, mushrooms and wild animals[2]. The wood they use to build their dwellings and the thatch for their roofs are also obtained from the forests. In addition, they have inherited knowledge of a variety of medicinal plants used to treat diseases.

Moreover, the respect paid to forest spirits in this region of China's Yunnan Province, Laos, northeastern Thailand, and northwestern Vietnam, and the various traditional restrictions on forest misuse have deterred logging or excessive use of forest resources[3].

Minority peoples practice shifting cultivation in the hilly areas of the Mekong basin countries. They cut vegetation and set it ablaze to clear fields, cultivate crops in those fields for a short time, and leave the fields fallow after harvest to let the vegetation recover, after which they are used once again for growing crops. To the peoples practicing shifting agriculture, the forest and farmland are one and the same. In the secondary forests created by shifting agriculture, people can gather a variety of forest products. Some of these forest products only grow in these secondary forests, so people and forests have coexisted, providing mutual support, with the forests providing for people's livelihoods, and people ensuring the forests' biodiversity[4].

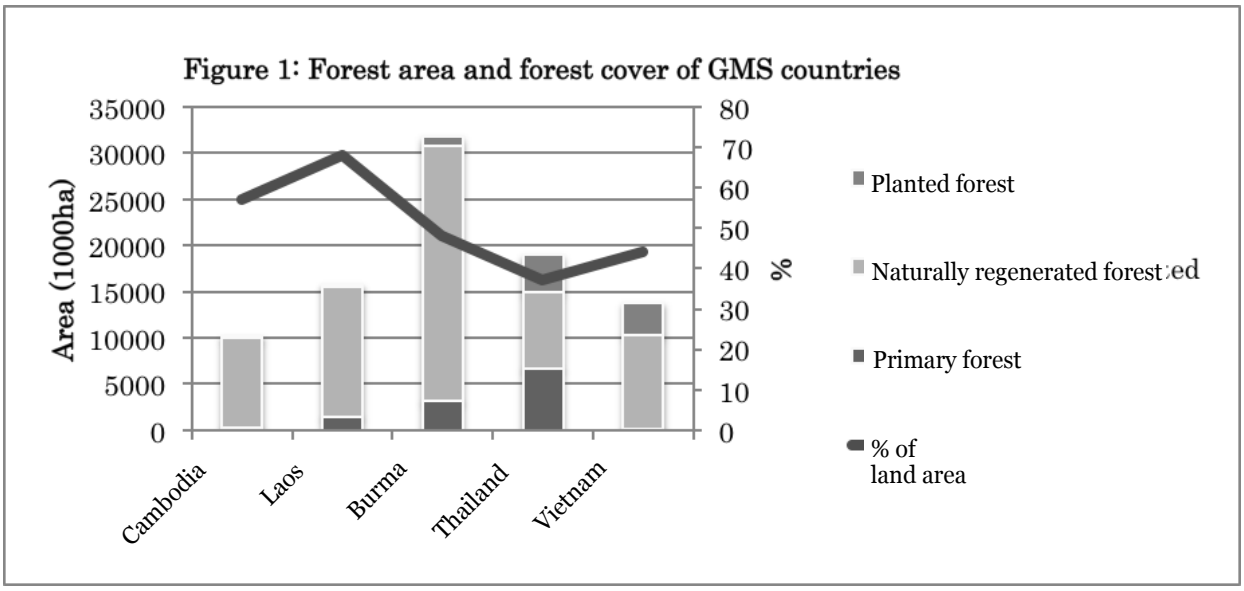
As the Laotian farmer quoted at the beginning of this report said, the people making their living in the farming areas of the Mekong watershed could not exist without the forests. The forests of this region, however, have been subject to rapid degradation during the past half century, threatening these people's existence.

Forest Losses in the Mekong Watershed

According to statistics compiled in 2010 by the United Nations Food and Agriculture Organization (FAO), there are 90 million hectares of forests currently remaining in these five countries, of which 13% is virgin forest, 10% is plantations and the remainder has been degraded but is natural forest that will regenerate naturally if left as it is (Figure 1). The forest cover ratio of each country is 57% for Cambodia, 68% for Laos, 48% for Burma, 37% for Thailand and 44% for Vietnam.

When broken down into forest types, Cambodia and Vietnam in particular have little virgin forest (322,000 ha in Cambodia, 80,000 ha in Vietnam), and compared to other countries, Thailand and

Vietnam have large areas occupied by plantations.



Based on FAO (2010)[5]

In 1973, the five countries of Laos, Burma, Thailand, Cambodia, and Vietnam combined had a total forested area of 140 million hectares (accounting for 73% of the total area of the five countries), but by 2009 this shrunk to about 100 million hectares (51% of the total area). This means that 31% of the forests had been lost (WWF 2013: 23). On an individual-country basis, since 1980 Cambodia has lost 22% of its forests compared to 1973, Laos and Burma have lost 24%, and Thailand and Vietnam have lost 43%. If unsustainable growth continues to degrade forests at this rate, there are warnings that by 2030, a further loss of about 34% of the forests could occur in the GMS region (not including China) (WWF 2013: 7).

Causes of Deforestation

Several factors have contributed to deforestation in the Mekong region. One is the long continued wars and internal strife. During the Vietnam-American War, the American military used napalm bombs and defoliants sprays which destroyed large areas of tropical rain forest. In skirmishes between communist guerillas and Thai government forces in the central hilly region from the late 1970s to the early 1980s, large areas of forest were burnt in attacks by the government forces (Kashio).

A second factor has been the promotion of agricultural development policies involving conversion of forest to farmland. Development of industrial rubber and eucalyptus plantations and farms for cultivating cash crops such as cassava and sugar cane have resulted in progressive conversion of forests into farmland. In Thailand and Vietnam, shrimp breeding operations have resulted in a devastating loss of mangrove forests. British NGO Global Witness has pointed out the problem of land resource exploitation in Cambodia and Vietnam for Vietnamese-funded rubber plantations. According to their report (Global Witness 2013), large Vietnamese corporations have close connections with the corrupt governmental and financial elite of those countries that allow them to lease vast land areas for rubber plantations, with dire effects on local society and the environment. The report also indicated that Deutsche Bank and the International Finance Corporation (IFC), a global banking group, have supported such activities by investing in these rubber plantation companies without considering

A fodder maize field. Mono-cropping has caused soil degradation and erosion (Oudomxay Province, northern Laos).

Land cleared for a rubber plantation (Attapeu Province, southern Laos).

the environment or human rights. The flow of foreign capital to such companies is also a cause of deforestation in this region.

A third factor is development of large-scale infrastructure such as mines and hydropower dams. The Nam Theun 2 hydropower project[6] in Laos, being constructed with aid from the World Bank and Asian Development Bank (ADB), has flooded 450 km^2 of forest so biologically diverse that it is also known as "the Galapagos of the East." In 1993 to 1994, prior to this dam's construction, a logging company affiliated with the Lao military cut down valuable trees such as Merkus pines and transported them to the neighboring countries of Thailand and Vietnam. Also, the Nam Theun 2 Power Company (NTPC), which executed the project, inundated the reservoir without sufficiently removing biomass, violating its own environmental and social policies. Dead trees can still be seen standing in the water of the reservoir. Even now, according to official government statistics, about 80% of the annual wood production in Laos comes from logging on land being developed for hydropower dams or mines.

Logs cut and taken from the planned site of the Nam Theum 2 Dam in Laos (1996).

The Nam Theum 2 Dam reservoir. Poor plant removal left many dead trees standing（2009).

A fourth factor is the serious problem of illegal logging. Although there is no precise data in the Laos case, the amount of logging that is officially sanctioned is about half the amount estimated from the actual number of currently existing sawmills and their rates of operation, indicating rampant illegal logging. Since 2001, the Lao government has approved exports only of finished products with regard to wood from natural forests, but the domestic sawmill industry is not as competitive as that

in Vietnam, so exports of raw timber and primary processed products to Vietnam currently continue (Fujita 2012).

Large logs being trucked from southern Laos to Vietnam. The export of logs or unprocessed wood is prohibited, but illegal logging and trading have continued unabated.

Shifting cultivation has been traditionally practiced in the mountains of the Mekong basin. Due to increasing population pressures and development projects, however, farmlands are becoming scarcer in both relative and absolute terms, and cases of destructive land use are increasing.

In addition, the common perception of shifting cultivation, also called slash-and-burn, is that it is a cause of deforestation. It is a sustainable farming method, however, if fallow periods sufficient for vegetation to recover are maintained after harvest. But due to increases in population, infrastructure development projects, and the expansion of industrial plantations and cash crop cultivation, the land area that can be used for shifting cultivation is decreasing. As this has happened, fallow periods have shortened to the point that forests that have not sufficiently regenerated are being cultivated. Farmland that villagers once used in common is being privatized and enclosed for industrial plantations by companies or individuals, also causing the shifting cultivation cycle to be shortened, and in some cases putting increased pressure on the land (Barney 2010). In Laos, the government has promoted policies for relocating minority villagers, concentrating them along roadways, resulting in a relative shortage of farmland for them. The outcome of this has been also shorter fallow periods in shifting cultivation. Far from improving the situation, it has brought about destructive land use practices (Higashi 2010). When considering problems of deforestation due to shifting cultivation, it is necessary to look at background factors. As fallow periods are shortened like this, the ability of nature to recover is exceeded, in many cases leading to soil degradation.

Proposal: Prevent Loss and Deterioration of Forests

Reforestation projects are what usually comes to mind when it comes to measures to prevent forest degradation. Much of the reforestation in the Mekong basin, however, creates plantations of monocultures such as eucalyptus or oil palm which are unsuitable as habitat for wild animals. From the viewpoint of preserving biodiversity and ensuring food security for the region's inhabitants, these plantations have a large negative impact. In some cases, forests where local people were engaged in shifting cultivation or gathering forest products were deemed "degraded forests" and then enclosed and replaced with monoculture plantation projects. It should go without saying that when conducting plantation projects, consideration must be given not only to the type of soil and species of trees to plant, but it is also necessary to consider other environmental and social aspects.

Sustainable forest preservation cannot be achieved without the understanding and participation of local people who make their living in the forest and utilize its resources. In reality, however, in the countries of the Mekong basin, there is limited freedom for local communities to express their opinions on their country's policies or development projects, though the degree of suppression varies. In Laos, for example, citizens who appealed to the National Assembly about problems with industrial plantation projects by Vietnamese companies were detained. In addition to empowering local people in regard to forest preservation, it is important for affected communities and civil society to be able to participate meaningfully in decision-making on forest preservation systems.

In addition to improving forestry systems in each country, in order to prevent the loss or degradation of forests, stronger enforcement of the existing legal system is needed. In Laos and Cambodia, where illegal logging and destructive industrial plantation projects are rampant, laws to prevent these already exist to some degree. These laws are not being enforced properly, however, due to widespread corruption and lack of oversight, and that is leading to forest degradation. International institutions and civil society must closely monitor the situation and demand that necessary changes are reflected in policy. This is not easy, however, in countries with poor governance, where corruption prevails, public servants engage in jobbery and self-preservation is paramount. The aforementioned report from Global Witness shed light on the shady dealings of the rubber plantations run by Vietnamese companies with cozy relationships in the political and financial circles of Laos and Cambodia. The company, however, denies that the report reflects reality and the governments of both Laos and Cambodia are ignoring the report. Logging concession fees are a means of raising money in Vietnam and Laos, and in many cases the military plays a major role in logging (Matsumoto and Hirsch 2003: 135-137). In such cases, external monitoring and filing complaints become difficult.

Under such conditions, one possibility for stopping deforestation might be to cut off the flow of funding for corporate activities that exacerbate deforestation. Of course, improvements in the governance of each country are also required, but at the same time, oversight is needed so that investment funds from international institutions or other overseas sources do not flow into economic activities that lead to deforestation.

References

Barney, K. 2010. *Notes to a Research Visit to Ban Pak Veng, Hinboun District, Lao PDR, with Special Reference to the Theun Hinboun Hydropower Company Project and the Oji Lao Plantation Forestry Company Ltd., Project.* Canberra, Australia: Australian National University.

Food and Agriculture Organization (FAO). 2010. *Global Forest Resources Assessment 2010.* Rome, Italy: FAO.

Fujita, S. 2012. Forest Protection in Laos and Various Measures for Sustainable Resource Utilization. *Shinrin Gijutsu* (Forest Technology) No. 848 (November) 34-38 (in Japanese).

Global Witness. 2013. *Rubber Barons.* London, UK: Global Witness.

Higashi, Satomi. 2010. Forest Policies Leading to Deforestation and the Role of "Outsiders". In M. Ichikawa, D. Naito and F. Ubukata (eds.) *The People of Tropical Asia and Forest Management Systems: The Case for Governance on the Scene*. Tokyo: Japan: Jimbunshoin 66-84 (in Japanese).

Kashio, M. Causes of Deforestation in Southeast Asia and Countermeasures Promoted. Global Environmental Forum (in Japanese). http://www.gef.or.jp/forest/kashio.htm#BURN (Last accessed in July 2013)

Matsumoto, Satoru, and Phillip Hirsch. 2003. Forest Loss in Mekong Watershed Countries and its Causes. In M. Inoue (ed.) *Forest Loss and Conservation in Asia.* Tokyo, Japan: Chuo Hoki 132-148 (in Japanese).

Mekong Watch. *The Nam Theun 2 Dam* (in Japanese). http://www.mekongwatch.org/env/laos/nt2/ (Last accessed in July 2013)

World Wildlife Fund (WWF) Greater Mekong Programme. 2013. *Ecosystem in the Greater Mekong: Past Trends, Current Status, and Possible Futures.*

Mekong Watch

1. Mekong Watch compiled a video documentary in 2013 titled *Transition: Changing Forests Changes Lives in Laos* (http://www.youtube.com/watch?v=ac9OIxLWm2I). This video introduces the connections between the forest and Lao peoples' livelihoods and culture and the effects that policies and economic activities aimed at economic development in recent years are having on the rich biodiversity of the ecosystem and lifestyles respecting the forest.
2. For more details, see BP 1-2 *Non-Timber Forest Product Use and Food Security: The Lao Case.*
3. See BP 3-1 *Spirit Worship and Forest Conservation in the Mekong Basin.*
4. See BP 2-9 *Shifting Cultivation and Upland Life in Northern Laos.*
5. FAO defines "forest" as "land exceeding 0.5 ha in area, on which the crowns of the trees that have reached at least 5 m height cover a ratio of 10% or more of the area" (FAO 2010). Countries define "forest" variously, so figures announced by each government on forest area and forest coverage may differ. For example, the Laotian government defines "forest" as land with a crown coverage ratio of 20% or more, and the forest coverage ratio announced by the Laotian government for 2010 was 40.3%.
6. See BP 2-5 *Rapidly Advancing Mekong Tributary Development and its Environmental and Social Impacts: The Case of the Nam Theun 2 Hydropower Project in Laos.*

2-7. Livelihoods and Environmental Issues in Vietnam's Mekong River Delta[1]

Vietnam's Mekong River Delta

The Mekong River Delta is a huge tropical wetland that plays an important role in conserving the biodiversity of the Mekong River, an international waterway. The Mekong Delta is spread out over an area of 36,000 km^2. Of this, two million hectares (20,000 km^2) are farmland, the main crop being rice, the staple food of Southeast Asia.

The people of the Mekong Delta live on land lying less than 10 m above sea level, making this an area extremely vulnerable to climate change. If the sea level should rise one meter, 25% of the current land area of the Mekong Delta, home to 3.5 to 5 million people, would be lost.

The delta plays a crucial role in Vietnam's domestic food supply and exports, supplying 53% of rice and other grain production, 80% of the fish harvest, and 75% of fruit production.

The delta area consists of 12 districts, with Can Tho as the central city. The present population of the delta is 18.6 million, 26% of the total population of Vietnam. Historically, the people of the delta have made their livelihoods by settling densely along the banks of the river and the canals that branch off on either side. Separating the socioeconomic development of the delta from the water resource regime is totally inconceivable.

Water Resource Issues in the Mekong Delta

There are five limiting factors constraining agricultural production in the delta. Two of these, floods and the shortage of fresh water, concern water quantity. The remaining three factors of seawater intrusion, soil acidity and water pollution, concern water quality. In addition, water issues that transcend international borders, sea level rise due to climate change, and dam construction on the Mekong River mainstream are looming on the horizon as disturbing issues for the future. Each issue is discussed below.

Flooding: Floods occur in the Mekong Delta from August to October each year. The average discharge of the Mekong River in the wet season is about 39,000 m^3/sec. Roughly 1.2 to 1.9 million hectares of

the delta are inundated during this season, making agriculture impossible in the flooded areas. In the dry season, however, the average discharge of the Mekong River falls to between 1,700 and 2,500 m^3/sec. Moreover, not only does the water table drop two to three meters in the dry season, there is hardly any rainfall in the area during this period.

Seawater intrusion: Seawater (salinity) intrusion is caused by seawater flowing inland when insufficient freshwater is flowing through the estuaries. Sea tides also affect the delta's water regime. The mechanism of salinity intrusion in the Mekong Delta is very complex. At present, 1.7 to 2.1 million hectares (roughly 40 to 50% of the Mekong Delta) are affected by seawater intrusion.

Soil acidity: Extensive areas of the Long Xuyen Quadrangle, the Plain of Reeds, and other areas have surface soil acidity. The total area of this land amounts to about 1.6 million hectares, 40% of the total area of the Mekong Delta. It is known that artificial drainage of acid surface soil resulted in the acidification and accumulation of Fe^{2+} (iron ion) and Al^{3+} (sulfide ion) in canal water. Highly acidic water may be harmful to the health of humans, animals and plants.

Water pollution: Rapid population growth and the expansion of residential areas along the river banks are having adverse impacts on the water environment. Water quality parameters along the river and canals in the Mekong Delta are generally related to the use of fertilizers and pesticides in agriculture, nutrient-rich effluents from aquaculture and animal husbandry, and wastewater from industrial plants.

Climate change and sea level rise: According to the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report, in the last ten years climate change has become one of the world's most serious socioeconomic and environmental problems, and the Mekong basin is considered to be one of the areas of the world most acutely affected by climate change and sea level rise (IPCC 2007). A study on the future impacts of climate change on the Mekong delta by Can Tho University and Thailand's Chulalongkorn University have shown that the Mekong basin will experience severe impacts related to floods from the upper reaches and seawater intrusion in the lower reaches.

Transboundary environmental problems caused by the Mekong River mainstream dams: The Mekong region is now facing a new issue. China already has six operational dams[2] and another two dams[3] planned on the Mekong River. Further downstream in the Mekong, 12 dams are also now in the planning and construction stages[4]; eight in Laos[5], two on the Thai-Lao border[6] and two in Cambodia[7].

If these Mekong River mainstream hydropower dams are completed, thousands of people will lose their homes and will be relocated, the flow of the river will be altered, sediment loss and erosion will increase, river navigation will be disrupted, biodiversity will be reduced, fish resources will be lost, and further potential negative impacts, as yet unknown, are likely to occur.

Of all the dam plans for the Mekong mainstream, the Xayaburi Dam is the farthest advanced. If constructed, this will be the first hydropower dam on the lower reaches of the mainstream of the Mekong River. The governments of Cambodia and Vietnam, located downstream from the dam, have been requesting that the government of Laos, which is constructing the dam, carry out cross-border environmental impact assessments. The government of Laos, however, has not answered this request. If the mainstream of the Mekong is blocked, the flow of the river will be altered and the approximately

30 million people living in the lower Mekong River basin may be seriously affected by adverse transboundary impacts.

Concluding Remarks

The impacts of climate change and transboundary dam development will bring about both quantitative and qualitative changes in the flow of the Mekong River, threaten the livelihoods of the people and food production, and further exacerbate the environmental issues we are now facing.

The Mekong delta's economy depends upon natural resources. People's food security is supported by an economy that has rice production at its center, and is made possible by aquaculture, agriculture, and services that are tied to the Mekong River. These are all crucially affected by water, land and climate.

Sustainable development in the Mekong Delta is founded upon a stable social system built upon the premise of secure access to water, which is the basis of food security. Collapse of this system will undoubtedly result in severe impacts on social stability and Vietnam's economic growth. Cooperation among scientists, policymakers, government agencies, NGOs and local people will be necessary to build a strategy and action plan to resolve these enormously complex problems.

References

Intergovernmental Panel on Climate Change (IPCC). 2007. *IPCC Fourth Assessment Report: Climate Change 2007 (AR4).* http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1

Rported by Le Anh Tuan (Can Tho University) and Summarized by Mekong Watch

1. This article is a summary of a report given by Dr. Le Anh Tuan from the Research Institute for Climate Change (DRAGON Institute-Mekong), College of Environment and Natural Resources, Can Tho University (Vietnam) at the international workshop, *Establishing an East-Asian Civil Society Network to Discuss Sustainable Natural Resources Management in the Mekong River Basin* sponsored by Mekong Watch on December 12, 2012 in Tokyo, Japan.
2. Gongguoqiao, Xiaowan, Manwan, Dachaoshan, Nuozhadu, and Jinghong Dams
3. Ganlanba and Mengsong Dams
4. The number and status of the dams have been updated by Mekong Watch.
5. Pak Beng, Luang Prabang, Xayaburi (under construction), Pak Lay, Sanakham, Lat Sua, Thakho, and Don Sahong Dams
6. Pak Chom and Ban Koum Dams
7. Stung Treng and Sambor Dams

2-8. Riverside Agriculture in the Mekong Basin: An Uncertain Future for Environmentally Friendly Agriculture

Riverside Agriculture in the Mekong Region

Due to the impacts of monsoons in the Mekong basin, water levels of both the mainstream and the tributaries change drastically between rainy and dry seasons. During the dry season, farming expands to riverbanks (including sandbars and islets) that are exposed with dropping water levels. Beans, leafy vegetables, watermelon, chilies, various herbs, and many other varieties of vegetables are grown. In Blake (2004), it is reported that in a survey of 10 villages along the Mun and Songkram Rivers in northeast Thailand, a total of 47 kinds of herbs and vegetables were harvested. People cultivate these gardens primarily for their own consumption. Produce is bartered or sold cheaply within the same village, and other harvested produce that exceeds a certain quantity is sold in local markets.

Gardening on riverbanks begins in November when the river water levels drop. People plant crops suitable to the water level. Plants that require longer growth periods are planted in the upper areas of the bank, while morning glory and other water-loving plants with shorter growth periods are planted in lower areas. Around May when the rains begin, harvesting is completed, and the once-riverbank gardens are gradually submerged.

Rainy season.

Dry season.

Benefits of Riverbank Gardens

In the rainy season, soil containing organic materials flows downstream and is deposited on the surface layers of submerged riverbank inclines. In this way, the riverbank soil is renewed during the rainy season. Therefore, even with very little use of fertilizer, a certain quantity of crops can be cultivated, and there is little risk of replant failure. Also, because riverbanks are submerged in the wet season, weeds do not grow, and in the dry season, there is the benefit of having easy access to water. In addition, working in the riverbank gardens is easily combined with other daily tasks like washing clothes, bathing, and fishing. Most of these activities are done by women.

Such riverbank gardens have traditionally been subject to customary rights of usage and inheritance. If a household with usage rights decides not to exercise that right, it can lend the land to another household, and in some cases the right is sold (Blake 2004). In Savannakhet Province of Laos, there are also examples where village officials listen to the wishes of each household each year, and then discussions are held on how to distribute agricultural land.

Not only does riverside farming in the Mekong River Basin require little fertilizer and labor, its effective use of nature's cycles places very little burden on the environment.

Cash Crop Production by Local Communities

In places where wide sandbars emerge, such as in northeastern Thai provinces and in Bokeo Province of northern Laos, not only is subsistence farming done, but cash crops such as corn are also cultivated. Corn grown and harvested in Laos is sold in Thailand, and it is an important source of cash income for communities.

There are also examples where traditional production activities have led to new businesses. In Savannakhet Province of central Laos, due to the merging of multiple rivers on the upper Xe Ban Heing River, changes in water levels in the central basin in Champhone District are especially drastic. In this river, cotton and indigo have traditionally been widely grown in the dry season. Before, people used clothing dyed in this indigo for their work clothes, but with the mass introduction of cheap industrially produced clothing, this custom began to decline. However, natural dyes and cotton that is free of agricultural chemicals are again becoming appreciated in other countries, particularly in Japan, and new products are being developed with training by foreign technicians. Since about 10 years ago, such products have been found in the Lao capital of Vientiane and have also been exported to Japan. Handicraft production is increasing women's income.

Disappearing Riverbank Farms

Riverbank farming places little burden on the environment, requires little investment from communities, and is a valuable source of income, but the area available for farming has declined over the past 20 years in various parts of the Mekong basin. One cause for this decline is dam construction. Dams block the flow of water and create reservoirs. Therefore, even in dry season, water levels do not drop upstream of these dams, making riverbank farming impossible.

There is also a phenomenon called "hungry water," which causes severe erosion of downstream riverbanks. Because currents in reservoirs are very slow, sand that was previously stirred up in the river sinks when going through the reservoir. Thus, water flowing downstream of the dam does not contain much sedimentation. When this "hungry water" flows downstream, it "eats up" sediments in large quantities, causing severe eroding of riverbanks.

Also, because many of the dams constructed in the Mekong basin are hydropower dams, unnatural releases of water from reservoirs also causes much riverbank erosion both upstream and downstream of the dams. For such various reasons, there is a decline in riverbanks available for farming both upstream and downstream of rivers where dams have been constructed. Embankment reinforcement to prevent erosion is also contributing to the loss of agricultural land.

Reevaluating Riverbank Agriculture

In the past, people have not been compensated for loss of riverbank farms due to dam construction. Use of this land was customarily recognized at the village level, but not formally recognized at the national level. Communities, therefore, could not claim formal legal rights to use or own the land, and developers have ignored this issue.

Such work only became widely recognized as a livelihood when its importance was emphasized by affected people who unified in a movement against the Pak Mun Dam (construction of which began in 1991), and when NGOs and communities in Laos and Thailand conducted surveys and reported their findings (e.g., AOP and SEARIN 2002, Shoemaker, Baird, and Monsiri 2001).

The loss of riverbank agriculture was also a topic of controversy prior to the construction of the Nam Theun 2 Dam supported by the World Bank. In the case of the Nam Theun 2 Dam, water is diverted into the Xe Bang Fai River, and riverbank farms along this river are supposed to receive compensation. According to a Mekong Watch survey, however, it has become clear that such compensation has not actually been made (Mekong Watch 2010)[1].

Riverbank farming is also an important factor in the Mekong River basin's dry season landscape. In Laos's Luang Prabang, which is a World Heritage Site, many tourists come from around the world and take photos of the riverbanks in the dry season. Not only is riverbank farming a part of the lives of local communities, it is starting to be valued as a tourist resource.

In the context of development in the Mekong River basin, where hydropower is emphasized, a pressing challenge is to get dam developers to correctly understand the value of riverbank farming, including its economic value and contribution to food security.

References

Assembly of the Poor (AOP), and Southeast Asia Rivers Network (SEARIN). 2002.
Mae Mun: Kan Klap Ma Khong Khon Ha Pla (The Mun River: Return of People who Fish). Chiang Mai, Thailand: SEARIN (in Thai)
Blake, David. 2004. Riverbank Vegetable Cropping in the Mekong Basin:
A Sustainable Farming System Doomed to Oblivion? *Watershed* Vol. 10 No. 1 July-October 2004, 62-72.
Mekong Watch. 2010. *Report on field visit to the Nam Theun 2 Dam* (Nov 20-27, 2010). Tokyo. (in Japanese)
http://www.mekongwatch.org/PDF/nt2report2010.pdf
Shoemaker, B., I. G. Baird, and Monsiri Baird. 2001.
The People and Their River: A Survey of River-Based Means of Livelihood in the Xe Bang Fai River Basin in Central Lao PDR, Vientiane, Lao PDR: Canada/Lao PDR Fund for Local Initiatives.

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1. See BP 2-5 *Rapidly Advancing Mekong Tributary Development and its Environmental and Social Impacts: The Case of the Nam Theun 2 Hydropower Project in Laos.*

2-9. Shifting Cultivation and Upland Life in Northern Laos

Is Shifting Cultivation the Cause of Deforestation in Laos?

Shifting cultivation refers to a farming practice also known as "swidden" or "slash-and-burn agriculture." It refers to a short-term crop-growing method in which farmers clear a parcel of land by cutting down trees and shrubbery and burning it. Normally, the land is left fallow after a harvest long enough for vegetation to recover. It is then cleared and used again to grow crops. Due to its association with the clearing of land, felling of trees and use of fire, shifting cultivation has tended to be viewed as a cause of deforestation. However, shifting cultivation can be a sustainable method of agriculture if its harvest is followed by fallow periods that allow enough time for vegetation to sufficiently recover.

In recent years, however, implementation of land and forest policies not suited to traditional land use, population pressures, and land concessions for cash crops[1] has led to scarcity of agricultural land in both relative and absolute terms. As a result, land often cannot be left fallow long enough for the forest to recover, and destructive farming practices leading to land degradation and erosion is increasingly common.

Shifting Cultivation: the Foundation of People's Livelihoods

In Laos, 80% of the population lives in rural villages. According to statistics from the year 2000, 25% of the rural population, representing 150,000 households, is engaged in shifting cultivation. When fallow land is included, then more than 80% of the land used for agriculture is used for shifting cultivation (Roder 2001). With the current shifting cultivation policy of the Lao government, the number of households engaging in this type of agriculture is decreasing. Yet, shifting cultivation remains an important means of producing food for many people in Laos, particularly for minorities living in mountainous areas.


Corn harvested from shifting-cultivation fields.

Apart from upland rice, shifting cultivation is used for an array of crops, such as corn, root vegetables and beans. Post harvest, the land recovers as a secondary forest, from which bamboo shoots and mushrooms can be harvested, and the land serves as both a source of food and cash income, supporting people's lives.

In northern Laos, upland farmers typically start their new year by selecting land for farming around January. This task is primarily the responsibility of men. They look for land to farm that they think will offer a good harvest, selecting a site based on past experience, the soil, and the age of the forest. From February to March, they cut and clear the shrubbery, dry the land and vegetation, and then set it alight to clear the land. Seeds are planted at the beginning of the rainy season. At this point, the rice seeds best suited to the land, sunlight volume, and slope of the land are selected. The actual planting and decisions about what is planted are primarily the responsibility of women. Plants such as

corn, root vegetables and beans are planted. Until the harvest season, from September to December, weeding—the most labor-intensive phase of shifting cultivation—is carried out.

In addition, shifting cultivation is also deeply intertwined with the culture and beliefs of these people. For example in the villages of the Kmhmu people in Oudomxay Province of northern Laos, a ritual to pray to the spirits is conducted before selecting a farming location, clearing it, burning it, seeding the rice and the harvest. Then again, after the harvest and before a new farming season, a festival to celebrate the new year and pray for a plentiful harvest in the coming year is held.

The Wisdom of Shifting Cultivation

The planted glutinous rice is categorized into early-ripening (*khao-dor*), mid-season (*khao-kaang*) and late-growing varieties (*khao-pii*) and their seeds have been handed down within families, generation after generation. In one village in Oudomxay Province, at least three varieties of the early-ripening, three varieties of the mid-season, and more than 12 varieties of the late-growing varieties have been handed down over time. Planting rice with different or staggered harvest periods is a way to hedge against the risks of poor harvests, such as weather fluctuations.

Rice seeds cannot be preserved for extended periods of time so each year all varieties of rice are planted and the seeds saved for the next year. Villagers say that the rice that grows the best one year will not necessarily be best for the next year's agricultural land or climate. Without a variety of rice seeds they run the risk of not being able to handle the varying conditions each year brings. In this way, the wealth of multiple generations of experience with shifting cultivation has taught people how to minimize risk and maximize the stability of crop production.

Biological Diversity of Secondary Forests

In the mountainous region of northern Laos, shifting cultivation is conducted in cycles of five to ten years. Villagers clear secondary forests, burn the land and till the fields. When the crops have been harvested, the field is left fallow for a few years. After a year, the field will be home to grass as tall as a person, until ultimately the field becomes a secondary forest producing forestry products such as bamboo shoots that can be harvested. Then later, several years after the initial harvest, when vegetation has regenerated to a sufficient degree, the field will be selected for use again.

Bamboo shoots harvested from secondary forests.

Depending on the location and the forest itself, secondary forests resulting from shifting cultivation are home to a variety of wild flora and fauna. Forestry products that can be obtained from secondary forests have helped to support the lives and livelihoods of villagers. They can sometimes serve as substitutes for rice and also can be used as a means of generating cash income. There are some plants that grow only in secondary forests. As such, these secondary forests are created by virtue of shifting-cultivation practices and support the lives of upland farmers. They could be referred to as *satoyama*,

a Japanese term denoting mountains, woodlands, and grasslands near or surrounding villages that support the livelihoods of residents.

These secondary forests are very important places for securing food for people. Secondary forests are home to many plants, from wild grasses and varieties of bamboo shoots and mushrooms to potatoes, which can be picked and gathered. Wild animals, from squirrels and mice to wild boar, can be hunted. When the staple food of rice falls into short supply, villagers have looked to the forest to collect food including bamboo shoots or potatoes to avoid hunger. In addition, the forest is also a trove of medicinal grasses such as those that help with headaches, stomachaches, nerve pain or toothaches. These secondary forests are often misunderstood by outside observers to be nothing more than overgrown or degraded forest land. However, these patches of forest growth actually host a wealth of biodiversity and support the lives of people living nearby.

The products of secondary forests are also a precious source of cash income for villagers. At the village market, in addition to vegetables harvested in the field, foodstuffs such as bamboo shoots, mushrooms, and banana flowers from the forests are sold as well. Moreover, they also sell secondary forests products that brokers come to buy, such as cardamom, wild *khaa* (a variety of ginger grown in Thailand), paper mulberry, which can be used to make paper, and tiger grass, which is used to make brooms.

Environmental Changes and Shifting Cultivation

Expanding rubber plantations.

Land erosion seen in fields growing corn for livestock.

Fields used in shifting cultivation are a crucial source of food production for many farmers. The Lao government has regarded shifting cultivation as a cause of deforestation and vowed to stamp it out, pursuing a number of policies toward that end. However, these efforts were not accompanied by an improvement of agricultural productivity or the creation of businesses to generate employment opportunities. The eradication of shifting cultivation was trumpeted as the goal and involved the forced relocation of villages among other things, and there were many instances of land and forest use disruption as well as people losing their livelihoods.

At the same time, in recent years, the scale of monoculture cash crops in Southeast Asia has been expanding. These include the following crops: rubber, eucalyptus and acacia for producing paper, oil palm for commercial plantations, and cassava, sugarcane, and corn for animal feed. Monocultures are used to increase productivity for commercial purposes, but repeated planting and harvesting of

a single crop has negative environmental consequences including soil depletion and can also risk harming the food security of local residents. In Laos, shifting-cultivation fields have been increasingly converted into common fields to grow cash crops. Consequently, areas are increasing where repeated harvesting of monoculture crops is depleting the soil, and the use of pesticides is on the rise.

Increases in population, government policy restricting shifting cultivation, and expansion of monoculture, are decreasing the area of land that can be used for shifting cultivation. Hence, areas left fallow must be used again for shifting cultivation before they have sufficiently regenerated. This places demands on nature that it cannot meet and cases of soil depletion are on the rise.

Climate Change and Shifting Cultivation

Shifting cultivation is an agricultural practice that by definition involves removing vegetation and tilling land. As such it results in the release of carbon dioxide (CO_2) into the atmosphere, which is regarded as a cause of global warming. In Laos, when international climate change policy schemes such as REDD (Reducing Emissions from Deforestation and Forest Degradation) have been debated, shifting cultivation has tended to be treated as one factor contributing to deforestation.

However, specialists and organizations well versed in this topic have pointed out that in Asia, the primary factor driving deforestation and CO_2 emissions is not the expansion of shifting cultivation, but rather the conversion of forest directly into industrial plantations or agricultural land (FAO et al. 2008). Also, in Laos, major causes of deforestation include the clearing of forest vegetation for large-scale hydropower dam construction, mine development and road construction.

In addition, research has also shown that when shifting cultivation is accompanied by an adequate fallow period, it absorbs far more CO_2 than industrial plantations or land on which the same crops are grown seasonally (Erni 2009).

If climate change schemes are introduced with no consideration given to local citizens' land use practices, then not only may this lead to impoverishment of local citizens, but it could also result in a loss of biodiversity in secondary forests and turn out to be more destructive.

The Future of Shifting Cultivation

Shifting cultivation, when practiced with a sufficient fallow period that allows adequate return of vegetation, has historically been a sustainable method that also works to protect forests and contribute to biodiversity. As such, shifting cultivation has played a significant role ensuring food security for residents of this region and fostered biodiversity in secondary forests, and should be reevaluated on these merits.

At the same time, land available for shifting cultivation has become scarcer in recent years in both absolute and relative terms, shortening cultivation cycles across the region. These developments are driven by both internal factors, such as population growth and a shift to cash-crop cultivation by more local residents, as well as by external factors, including village relocation projects, the Lao government's policy to restrict shifting cultivation, large-scale infrastructure development, and the creation of industrial plantations. When policies related to land and forest or the implementation of development projects by government or business are being considered, it is essential to also take into account local residents' land and forest use practices and to involve them in decision-making. Introduction of climate change schemes such as REDD must be

premised on consideration of land use by local residents, including shifting cultivation.

In addition, the Lao government has been promoting a shift to cash crop cultivation, especially among local communities engaged in shifting cultivation. Risk-related information such as fluctuations in market prices and environmental impacts, however, are not properly communicated to residents. Consequently, curbing shifting cultivation and encouraging cash-crop cultivation will cause a decline in food security and increase environmental destruction. What is of paramount importance, regardless of whether shifting cultivation is continued or other land use methods are adopted, is that residents themselves select the method of land use that they deem to be most suitable for their area.

References

Erni, C. 2009. *Shifting Cultivation and Climate Change.* Bangkok, Thailand: International Work Group for Indigenous Affairs (IWGIA).

Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP), and United Nations Environment Programme (UNEP). 2008. *UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD): Framework Document 20 June 2008.*
http://www.cbd.int/doc/meetings/tk/redd-ilc-01/other/redd-ilc-01-un-en.pdf

Roder, W. 2001. *Slash-and-Burn Rice Systems in the Hills of Northern Lao PDR: Description, Challenges, and Opportunities.* Vientiane, Lao PDR: International Rice Research Institute (IRRI).

Simana, S, and E. Preisig. 2003. *Kmhmu' Livelihood: Farming the Forest.* Vientiane, Lao PDR: Institute for Cultural Research.

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1. In these concessions, the government rents land to private companies, giving them the right to use an area of land for a long period of time (usually 20-50 years) for development and business purposes.

3. People, Natural Resource Management, and Conservation of Ecosystems

3-1. Spirit Worship and Forest Conservation in the Mekong Basin

Spirit Worship and Natural Resources Management

In China's Yunnan Province, Laos, northeastern Thailand, and northwestern Vietnam's Mekong River Basin area, the Dai, Hani, Lao and other ethnic groups still practice ceremonies for spirits that live in the forests. There are also various taboos that are still respected today when using the forests. Spirit worship has functioned to deter excessive forest use and logging.

Ethnic group	Locations	Description of Forest Spirit Worship	Source
Hani (Akha in northern Burma,Laos, and Thailand)	Southern Yunnan, China and along the northern borders of Burma, Laos, and Vietnam	The Hani believe that each spirit has its own abode (such as a wetland, pond, rock, and special tree). Many of these spirits reside in the forests. In such forests, it is taboo for Hani villagers to take forest products, hunt animals, or cut down trees.	Xu et al. (2005)
Dai	Southern Yunnan, eastern Burma, the mountain regions of Laos, northern Thailand, and northwestern Vietnam	The Dai have traditionally believed that forests, animals, and plants have natural powers with spiritual and religious meanings. Inciting the wrath of spirits inhabiting various natural phenomena with inappropriate behavior brings disaster or great misfortune to the village. Among the Dai people, it is encouraged to live in harmony with the environment that surrounds them.	Xu et al. (2005)
	Dien Bien Dong District of Vietnam's Lai Chau Province	Dai villages have sacred forests where ancestral spirits live, and their protection is very important to the villagers. Those who violate the sacred forests will have their souls stolen by angry spirits, and it is believed that they either go insane or die. To atone for the sins, the imposter is punished according to village rules, and a water buffalo or other animals may be sacrificed. On the other hand, these sacred forests are also the common property of the village, so when forest resources are sold, the income is put into a common community fund and is managed in accordance with certain rules.	Tran et al. (2007)
Lao	Northeastern Thailand	Among the Lao ethnic group in northeastern Thailand, villagers respect forests called *Don Phu Ta* in which spirits are said to reside. Even in northeastern Thailand where much logging takes place, *Don Phu Ta* have been left in good condition, and some of them are now classified as conservation forests or village common property, and are the targets of modern conservation efforts.	interviews by Mekong Watch (2012)

Table: Examples of Forest Spirit Worship in the Mekong Basin

Spirit Forests of Savannakhet Province, Laos

A forest called *Don Nathat Nong Lom* in That Ing-han Village of Kaisorn (formally Kantaburi) District of Savannakhet Province in central Laos has been kept in good condition. According to village records, this forest has an area of about 4,300 hectares, and is also an important regional water source. It is now publicly designated as a conservation forest (*Pa Saguan*), but this forest has also traditionally been respected by villagers because they believed that strong spirits reside there. These beliefs are still upheld today, and in Savannakhet Province, these forests are known as *Mahasaek* forests.

In the village, there is a Buddhist temple with a tower called *That Ing-han*, which is deeply respected among villagers. The taboos of the forest are now explained in Buddhist terms. The forest borders a marsh called *Nong Lom*, but this marsh is also seen to belong to spirits, and it is prohibited to send boats out to fish or to hunt certain animals that the Buddha is said to have forbidden eating (e.g., snakes and monkeys).

Spirit houses in Sisaket Province, northeastern Thailand.

Every year in March of the lunar calendar, ceremonies for the spirits are conducted, and offerings excluding meat and alcohol are offered. Villagers today still believe that taking timber products from the forest without the permission of the spirits, cutting trees, and neglecting ceremonies is taboo. If someone violates these rules, it is greatly feared that villagers will either fall ill or die. It is said that several decades ago, because Buddhist ceremonies had become more important in a certain village, the village elders stopped conducting ceremonies for the spirits. Then, in the midst of a Buddhist ceremony, a large storm ravaged only this village, so they realized they had to continue the ceremonies for the spirits. Also, if someone in the village violates the taboos, strange phenomena are said to occur, such as an invisible horse running around the village through the night. Therefore, if it becomes known that someone has violated the taboos, villagers discuss the matter and a ceremony is done to appease the spirits in order to prevent disaster from befalling the village.

Sustainable Use of Spirit Forests

While villagers hold the forest in awe, they also use it on a daily basis. Cutting trees is possible if permission is received. According to village officials, about 100 of the 360 households of That Ing-han Village are using the resources of the forest, but many households from 13 other villages in surrounding areas also come to the forest to take what they need. When it is mushroom collecting season, people from even further away come to collect them.

In this forest, villagers collect edible mushrooms, wild grasses, honey, and resin used as fuel. Because it recently became a conservation forest, it is prohibited to collect firewood. The explanation given for this change was that there were increasing numbers of people collecting firewood not for their own use, but to sell, so it was a necessary measure to protect the forest.

Also, forest products are a means of gaining cash income. In the dry season, villagers collect tree resin called *nam man yang*. This is used as fuel for torches called *kabong*. Electrification is spreading

in Laos, so these torches are not used for light, but are sold in the markets as fire starters for charcoal stoves. Some are even exported to Thailand. To collect the resin, people first dig a hole in the trunk of a tree. Then a fire is lit in the hole to remove the resin, but the trees do not die in this process. Every few years, the villagers will dig a hole in a different place, and the old hole is no longer used, so it fills up and recovers. The process is thus managed so that the tree does not die.

Traditionally, a dry dipterocarp tree will belong to one household that has the right to take resin from it. One household may have 7 or 8 trees, and at most 10. While it is permitted to take resin, there is no right to log. The right to take resin is handed down from generation to generation.

Crisis of Spirit Forests

In central Laos, some venerated forests thus became conservation forests. Examples of the deep connection between people's lives and the forest—as seen in *Don Natha Nong Lam* where villagers limited firewood collection of their own initiative—show the potential for effective resource management by villagers themselves.

Now, however, forests which were once protected by people's awe of spirits are now being threatened by expanding plantation forests like rubber, pulp, and sugarcane plantations, because these commercial activities often involve logging of natural forests. Laos is also rapidly modernizing, so there is a high demand for non-timber forest products, and there is great interest in dry dipterocarp as timber. As a policy, Laos is aiming to increase forest cover with commercial forests, but in the past, there have been many reports of afforestation projects being used as an excuse to log natural forests.

Effective forest conservation in the Mekong River Basin requires not only taking biodiversity and food security into consideration, but calls for respecting the value of forests that have been protected by villagers and spirits. It is important to implement forest management that is appropriate to the region and not overly obsessed with numerical targets.

References

Tran, C. T., X. Q. Le, and V. H. Vu. 2007. The Role of Indigenous Knowledge in Sustainable Development: A Case Study of the Vietnam Mountain Regions. In E. K. Boon and L. Hens (eds.) *Tribes and Tribals, Special Volume No. 1 Indigenous Knowledge Systems and Sustainable Development: Relevance for Africa.* Kamla-Raj Enterprises 215-224.

Xu, Jianchu, Erzi T. Ma, Duojie Tashi, Yongshou Fu, Zhi Lu, and David Melick. 2005. Integrating Sacred Knowledge for Conservation: Cultures and Landscapes in Southwest China. *Ecology and Society* Vol. 10 Issue 2:7.
http://www.ecologyandsociety.org/vol10/iss2/art7/

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3-2. Reviving Culture and Environment: The Challenge of the Chong People in Eastern Thailand

The Chong People and Language

The population of Chong people living in Thailand is said to be about 4,000. They live primarily near the Cambodian border in Khaokhichakhut and Phongnamron Districts of eastern Chantaburi Province. There are records indicating that they have lived there since the days of the Khmer Empire (Premsrirat 2007: 81). Chong language is the language of the Chong people, and it belongs to the Pearic sub-branch of the Mon-Khmer language family, which belongs to the Austroasiatic languages.

Chong meals. Chong villagers use fresh vegetables, plants, and herbs from the forest to cook Chong food, which is spicier than Thai food.

The Chong people previously made their living from hunting and gathering. Many households nowadays, however, grow durian, rambutan, mangosteen, and other fruit to sell and thus earn stable cash income. Aside from a few, hunting and gathering is no longer practiced, but the elderly among the Chong have a lot of knowledge about medicinal herbs and other non-timber forest products (NTFPs), and they grow herbs and trees around their homes for food and medicine. According to older Chong in their 60's and 70's, they did not encounter people other than Chong when they were growing up, and they all spoke Chong together. Then, Chinese businessmen and Cambodian laborers started coming and eventually settling. After the end of World War II, the Thai government began promoting the use of Thai as the National language, and sent Thai language teachers to Chong villages and began teaching Thai in the schools. Use of Chong language was prohibited in some schools, and even parents began to believe that use of Chong with their children at home would inhibit their learning. So Chong disappeared from homes, and the language was no longer handed down. At present, all Chong people can speak Thai. Only about 200 people can speak Chong fluently, and of them, it is said that no one is younger than 20 (Premsrirat 2007: 81).

Beginning of Chong Language Classes for Elementary School Children

At the end of 1990, linguists working at Thailand's Mahidol University approached leaders of the Chong community, requesting them to participate in a class where graduate students were being trained to document languages unknown to them. Eventually, the Chong leaders told the researchers that their language, culture and identity were in peril of extinction, and that they wanted to revitalize their language and culture. The researchers responded, and this is how the Chong Language Revitalization Project began.

The Chong writing system has been developed based on Thai script. This example reads *phasaa Chong* (the Chong language).

In 2000, a survey was conducted among the Chong, and it became clear that more than 95% wanted to see revitalization of their language and culture. The same year,

workshops were repeated in villages to begin developing a standardized writing system for Chong, which until then had no written language. It was agreed in the end that Thai script would be adapted with some modifications to capture linguistic differences between Thai and Chong. At the same time, there was success in attaining interest from local elementary schools, and a plan was made to formally teach Chong language to children. With cooperation from scholars, a Chong language curriculum was developed. With the use of this curriculum, in 2002 Chong language classes began to be offered twice a week to third graders at Wat Klong Phlu elementary school. Now it is also being taught to 4th to 6th graders three times a week at Wat Takianthong. Students who are not of Chong ethnicity also participate in the classes.

Protecting Language Protects Nature

In the higher grades at Wat Takianthong elementary school, Chong language classes are encouraged to be held outdoors, so children go to places like the nearby national park and experience nature as they learn. Also, herbalists are sometimes invited to come as guest teachers and they walk with the students in nearby areas, collecting edible and medicinal herbs, and students learn the names and properties of the plants in both Thai and Chong. The children see for themselves in their daily lives which plants can be collected, touching them with their own hands, sometimes tasting them, and in this way acquire Chong knowledge through Chong language acquisition. Another venue for environmental education is the community forest in Klong Phlu Village. In this community forest, anyone who belongs to the village can enter the forest and collect food and medicinal herbs. Cutting down trees, however, is prohibited unless absolutely necessary. In such cases, one must first perform a special ceremony to get permission from the spirits. In community forests, there are various efforts being made at forest protection, such as digging ditches to prevent spread of fires, tying colored ribbons around trees to alert people to their importance, and using solar energy to power intake and spray pumps. Children learn the wisdom that Chong people have of the forest, and they also assist in regenerating the forest by planting trees.

A Chong herb doctor (far right) has been invited to teach Chong plant names and uses to elementary school children. In Chong language class, children often go outside to study Chong language and tradition in natural settings (September 2011).

Will Chong be Revived?

The biggest achievement of the Chong Language Revitalization Project is that it has restored Chong confidence and their belief in themselves as a people. This point is recognized by elders, youth and even children. Teachers at the elementary schools and other non-Chong people have expressed similar opinions. The Chong Revitalization project has received attention from other ethnic groups in Thailand facing similar situations, such as the Kasong people of Trat Province and the Nyahkur people of northeast Chaiyaphum Province. While not in the same crisis situation, speakers of Northern Khmer from

Thai-Muslims from southern Thailand visit Chong villagers to learn about language and culture revitalization. Many Thai-Muslims in the south speak Pattani Malay at home (October 2007).

northeastern Surin Province and speakers of Pattani Malay, who are Islamic people living in southern provinces, visited Chong villages and learned about the Chong Language Revitalization Project. Now, all these ethnic groups have revitalization projects that have goals and structures appropriate for their languages, cultures, and ecosystems.

The initial goal of the Chong Language Revitalization Project was to have Chong language used again in the local community. For the time being, however, it does not appear to be used outside of schools. Elders in Kong Phlu Village have said that Chong is often not even spoken between spouses who are both Chong speakers[1]. A non-Chong teacher who supports the project has said, "Chong language will probably disappear, but it is important to record and remember that there was an ethnic group called the Chong." More than the initial goal, it may be of greater importance for the Chong that a tacit agreement seems to have been established within the local community regarding the value of Chong language and culture.

References

Doi, Toshiyuki. 2011. *Forest Revitalization, Language Revitalization: the Thai Chong People's Challenge to Restore Bio-cultural Diversity.* Tokyo: Mekong Watch (in Japanese).
http://www.mekongwatch.org/PDF/Chong_booklet.pdf

Malone, Denis. 2005. Where do We Go from Here? The Challenge and Prospects of Language Revitalization in South East Asia. In *Languages and Cultures for Rural Development*. Nakorn Pathom, Thailand: Institute of Language and Culture for Rural Development, Mahidol University at Salaya 202-220.

Premsrirat, Suwilai. 2007. Endangered Languages of Thailand. *International Journal of Sociology of Language* 186 75-93.

Toshiyuki Doi

1. Malone (2007: 214-216) makes the same observation and says that other challenges of the project include: 1) Not just a limited number of people, but the entire community needs to get involved; 2) A survey is needed on the extent that Chong language is used in homes, in particular by the elementary school children who have learned Chong at school; 3) Stable public support and funding need to be secured; and 4) It is necessary to survey the achievements of the individual activities such as the community learning center.

3-3. Outlook for the Alleviation of Issues and Risks Faced by the Poor in the Mekong River Delta: A Case Study of Ben Tre Province

Introduction

The Mekong River Delta, located in southern Vietnam, has led Vietnam's agricultural and economic development. In recent years, however, the daily lives of the people who live in the Mekong Delta have been threatened as never before. One of the reasons for this is the rise in sea level brought about by climate change.

A 2007 World Bank report (Dasgupta et al. 2007) states that Vietnam is one of the countries of the world that will be most affected by climate change. A one-meter rise in sea level is predicted to have impacts on roughly 10% of the population. In 2009, Vietnam's Ministry of Natural Resources and Environment prepared a report entitled *Climate Change, Sea Level Rise Scenarios for Vietnam* (Bo Tai Nguyen va Moi Truong 2009) and the various ministries have now begun to take specific countermeasures based on the scenarios, such as constructing dikes. According to the latest scenarios published in 2012, the impacts of climate change are classified into three levels. The impact of the median scenario, a one-meter rise in sea level, would result in 39% of the delta area being inundated by the sea. The worst-case scenario of a two-meter rise in sea level would result in more that 92% of the delta being immersed (Nguoi Lao Dong 2012).

It is also said that the water volume flow rate of the Mekong River as it flows through the delta could be reduced by 20 to 30% (VTV 2013). If the flow rate of the Mekong River decreases, seawater will inevitably flow inland from the river mouth, expanding the problems of salt damage. This article describes the issues currently faced by the poor who reside in the Mekong Delta and the outlook for the future. It is based on the results of an interview survey conducted recently at a rural development project implemented by the author in Binh Dai District, Ben Tre Province, as a case study of problems experienced in the midst of this changing environment.

Prawn Culture Blues

Ben Tre Province, located roughly 80 km southwest of Ho Chi Minh City, has a population of approximately 1.25 million people. Being surrounded by estuaries of the Mekong River, Ben Tre is said to be one of the provinces of Vietnam that will be most severely affected by sea level rise. Binh Dai District lies about 50 km east of the provincial capital of Ben Tre, and consists of 20 towns and villages with a total population of approximately 140,000 people. Facing the East China Sea, the people who live along the coastline make a living from salt farms and harvesting natural fish and shellfish. Those living inland mainly practice wet rice farming and coconut cultivation. Since the early 2000s, there has been an increasing shift toward high cash-value fruit and prawn aquaculture, and the cultivation of rice for export.

In Thanh Phuoc Commune (population 10,005) on the coast of Binh Dai District, many of the commune's residents formerly made a living from salt farms, harvesting natural prawns and fish, and wet rice cultivation. When the prawn aquaculture boom began in the beginning of the 2000s, large numbers of residents converted their wet rice fields and salt farms into aquaculture ponds. Profits were

made from prawn farming for only a few years, however, after which the prawns released in the ponds died from pollution of water sources due to excessive use of cash inputs such as industrial feed and pharmaceutical chemicals, leaving the commune residents burdened with debt.

Faced with this situation, some of the residents have turned to extensive prawn cultivation, utilizing the rise and fall of the tide in the dry season, and in the wet season they cultivate traditional rice varieties that grow even in salty areas, releasing ducks into the rice fields so that the ducks and rice grow together. A resident, Mr. A, who shoulders a debt from prawn culture says, "I can get income at the market every day by selling crabs and prawns that come in from the water channels. Growing rice and raising ducks simultaneously gives us an abundant dinner table. I'm not going to do any more of that intensive prawn culture"[1].

Rice Culture Blues


Rice plants that have withered due to salt damage.

Chau Hung Commune (population 5,643), located roughly 25 km inland from the coast, suffered severe salt damage for the first time in 2013. Mr. B, a resident of this commune, makes a living by raising livestock on approximately 0.2 hectares of land. In 2011, hoping to expand the scale of his pig-raising business, Mr. B borrowed money from the government-operated Agribank, but the price of pork plummeted due to the outbreak of an infectious disease known as "blue-ear pig disease"[2], leaving Mr. B's business in the red. In 2012, he attempted to raise around 1,000 ducks, but 500 of them died due to the effect of agricultural chemicals. The price plunged again when he marketed the remaining 500 birds, increasing Mr. B's debt burden. At the end of 2012, in an attempt to resolve his deepening debt, Mr. B rented 2.7 hectares of farmland to grow rice, but suffered salt damage and the harvest was almost totally wiped out. Only the partially withered rice plants remained in the fields.

Mr. B is now working on raising ducks as he participates in the Seed to Table activities[3], of which the author is the representative. He has successfully raised 200 ducks from an original 25 birds he was able to borrow. Mr. B says, "I will continue to grow rice because I still have to pay off the remaining debt and the rent on the wet rice fields. As well as going to work in Ho Chi Minh City, I'll try to succeed raising ducks and somehow earn some cash."

In February 2013, nearly two months earlier than in average years, seawater began to seep into Chau Hung Commune's water channels. This affected one third of the wet rice field area and had a serious impact on the local people, who rely on the water channels for domestic water. In Binh Dai District, not only Chau Hung Commune, but many communes such as Phu Thanh and Thoi Lai Communes also suffered salt damage, with approximately 300 hectares becoming unusable. In Ben Tre Province, similar problems have also been seen in Ba Tri, Giong Trom, Thanh Phu, and other districts, and it is expected that the damage will continue to increase in the future[4].

Outlook for the Future

Based on "Scenarios" by the Ministry of Natural Resources and Environment, Ben Tre Province has already begun to construct dikes along its sea coast to prevent erosion of the coastline and floodgates to stem the intrusion of seawater inland. These projects have only just begun, however, and they may take a considerable amount of time to complete. In the meantime, the flow rate of the Mekong River will decline, the sea level will continue to rise, and salt damage will worsen, forcing the burden of early countermeasures on farmers.

Small-scale farmers carrying out duck farming and extensive prawn cultivation in Thanh Phuoc Commune.

It will be necessary for farmers living in areas which have previously had no experience with salt damage, such as Chau Hung Commune, to protect their livelihoods by reducing the number of rice harvests per year, planting hardy salt-tolerant crops during the dry season, practicing mixed farming such as integrated duck and rice farming, and devising methods to produce diverse agricultural commodities using methods that give high yields even on small areas of land. In communes located on the coast, such as Thanh Phuoc Commune, it may be necessary to implement low-risk agricultural methods that take advantage of local conditions, such as Mr. A's combination of extensive prawn culture and integrated duck and rice farming. In the meantime, the people of Binh Dai District, Ben Tre Province continue their trial-and-error adaptation to climate change.

References

Bo Tai Nguyen va Moi Truong. 2009. *Kich Ban Bien Doi Khi Hau, Nuoc Bien Dang cho Viet Nam (in Vietnamese)*.
http://upd.edu.vn/attachments/article/39/KichBanBienDoiKhiHauVietNam.pdf
Dasgupta, Susmita et al. 2007. *The Impact of Sea Level Rise on Developing Countries. A Comparative Analysis.*
World Bank Policy Research Working Paper 4136.
Nguoi Lao Dong Newspaper. July 1, 2012.
http://nld.com.vn/20120701101847398p0c1002/nuoc-bien-dang-doa-xoa-so-dbscl.htm
VTV News. March 21, 2013.
http://vtv.vn/thoi-su/thieu-hut-ngiem-trong-nguon-nuoc-o-dbscl/61125.vtv

Mayu Ino (NPO Seed to Table)

1. Based on an interview survey conducted in Thanh Phuoc Commune in March 2013
2. Porcine reproductive and respiratory syndrome virus (PRRSV)
3. For more information on Seed to Table, visit: http://seed-to-table.org/activities.html
4. Based on an interview survey conducted in Chau Hung Commune in March 2013 and VTC14 News on March 30, 2013

3-4. Toward Community-Based Forest Management: Working with Local People to Preserve Watershed Forests in Northern Laos

Forest Preservation Project of an Advocacy NGO

For most people, the words “forest preservation” typically conjure up images of forest-planting activities. In addition, many projects designed to protect forests also focus on decreasing local residents’ dependence on forestry resources by increasing their income from non-forest related activities. However, whether an initiative is an afforestation or non-forest income-enhancement project, negative consequences will ensue if the initiatives are not carried out in a manner respecting the natural environment and the intimate connection local livelihoods have with it. When residents in areas surrounded by forests are cast out of these areas, the connection between people's livelihoods and natural resources can be severed, sometimes leading to more destructive resource use and can also further impoverish local residents.

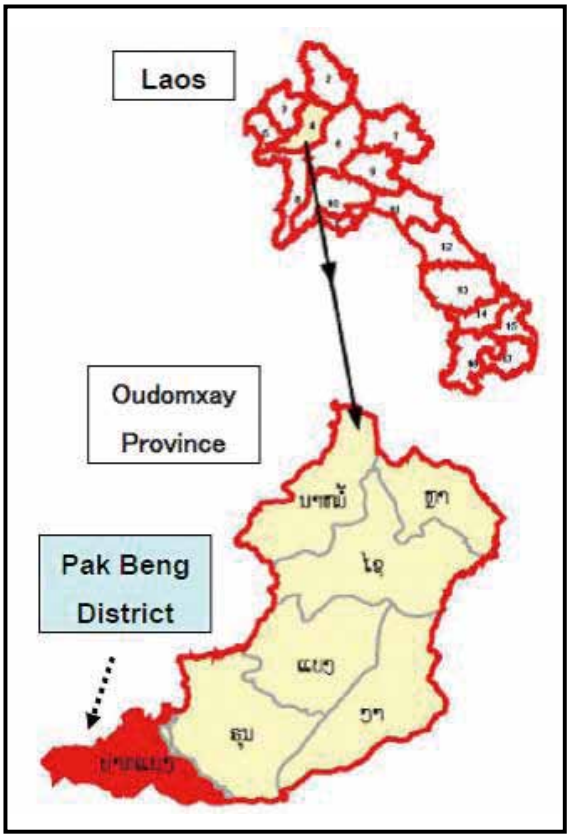

Figure 1: Location of the Project Site

Top-down land-use policy not aligned with the actual usage practices of residents in the Pak Beng District of Oudomxay Province in northern Laos has led to illegal forest use and brought hardships to the lives of residents. This has driven Mekong Watch to conduct activities to bridge the communication gap between regional government officials and local residents, and to bridge the policy implementation gap between policy formulated at the central-government level and at the local level. In the process, Mekong Watch has strived to achieve forest preservation with local residents as the central actors.

Land Use by Upland Farmers

For many residents in the mountainous Pak Beng District, upland shifting rice cultivation provides the primary means of living. Shifting cultivation is typically conducted in seven to nine year cycles. After a fallow period, when a secondary forest has recovered to a suitable level, it is cleared, burned, and upland rice is planted. After the harvest, the field is left fallow for several years. After vegetation returns to a suitable level several years after the harvest, the field will be selected again for farmland.

Each year in Pak Beng District, the village chief, village elders and others gather. Based on experience, they determine the number of years since an area of land was cleared, examine its soil quality and the size of trees on it, and decide which parcels of forest are suitable for that year’s crops. Once the village’s shifting cultivation sites have been decided, the village chief and elders allocate land to households based on their labor capacity. In this way, the households farm land that they do

not own, with plot suitability and selection being based on the size of trees and soil quality. This land use system, based on land allocations agreed upon by the village, has historically worked to secure as stable harvests as possible, and has been flexible in responding to changes in population and land use[1].

Problems Caused by Land and Forest Policy

In current-day Laos, various land and forest policies that ignore people's actual land-use patterns are having a significant impact on the lives of upland farmers.

The Lao government has implemented land and forest policies seeking to restrict the practice of shifting cultivation. Originally concocted with the aims of promoting forest preservation and reducing poverty, these misguided policies to curb shifting cultivation have not been accompanied by increases in agricultural productivity or an increase in alternative employment opportunities. Consequently, the curbing of shifting-cultivation practices has become an end in itself and, conversely, is resulting in destructive forest use practices and impoverishing local residents.

Apart from this, the government has implemented policies to relocate mountain villages to lowland and roadside locations for the purpose of curbing shifting agriculture, to help eradicate drugs, control ethnic minorities, and improve access to markets and development services. The result has been increasing concentrations of the population along roads, shortages of farmland and destructive forest use.

Case Study of Pak Beng District: Promotion of Damaging Forest Management Policies

Even in Pak Beng District, since 1996 the government has implemented land and forest zoning projects. The stated goals of these projects are preserving the natural environment, discouraging shifting cultivation, and promoting cash-crop farming among residents to increase the income of local people. Project activities take place such as the redrawing of village boundaries, allocating new farmland to people, and establishing forest-use zoning within villages.

In one village, much of the land used for shifting cultivation up until now was designated as a protected forest, leading villagers to suffer from a serious shortage of farmland. Within the village, people responded in a number of ways. Some rented land from neighboring villages, while others responded by moving to other villages. However, the rented land from neighboring villages did not suffice and most households have continued to conduct shifting cultivation in watershed forest areas. Under these government projects, the lines that have been drawn designating areas as forest or farmland make people's traditional agricultural practices "illegal".

In other villages, land shortages have driven residents to shorten the fallow period to around three years with some land being farmed in successive seasons. With fallow periods being too short, soil deterioration is progressing and harvests are decreasing.

Moreover, there are instances in which forests near streams or watershed forests that villagers

traditionally protected have been cleared. Making shifting cultivation in entire watershed forests "illegal" effectively erases the meaning people placed on conserving the smaller wooded areas within the watershed. So now, there are cases of villagers clearing land and engaging in shifting cultivation in areas near watershed forests that traditionally they would have revered.

Toward Community-Based Forest Management: Mekong Watch's Challenge

As evidenced in the case of Pak Beng District, land and forest policy implemented from the top down has confused the land use practices of local residents. That said, in light of the rapid expansion being witnessed in Laos that has included large-scale development, industrial plantations and cash-crop agriculture, a wholesale rejection of the government's land and forest zoning efforts and a simple return to the local residents' traditional style of land use would not solve the existing problems. To truly protect villagers' rights from being infringed upon by outside corporations and development projects, villagers' land and forest use rights need to be written into law.

Survey preparing for land and forest demarcation.

A workshop to discuss issues relating to land use in villages.

Since 2005, Mekong Watch has been working in conjunction with Laos National University's Forestry Department to implement a watershed forest management project in Pak Beng District. With the following goals, the project has undertaken surveys and put forth policy recommendations: 1) Achieving watershed forest management that reconciles and maintains both forest preservation and the livelihoods of local residents; 2) creating a mechanism for residents to participate in decision-making related to land- and forest-use issues; and 3) ensuring that on-site problems are realistically and fairly addressed in central policy measures.

In 2007, as a part of this initiative the Houay Kasaen River Watershed Management Committee was established. It is made up of representatives from eight villages with farmland in the watershed forest area and District administrative officers. The committee convenes before villagers decide where they will conduct shifting cultivation and again after harvest. At meetings, plans are formulated for land use and forest preservation and discussions are held to resolve existing issues. In addition, under the committee, a review of land use categories was undertaken with the aim of legally making villagers the central players in land management and securing farmland required for shifting cultivation cycles, including fallow land. This is being done in villages where actual land use patterns have been ignored and blind implementation of land use policy has resulted in problems.

The establishment of this committee and the review of land use categories have created a forum for

administrative officials and local residents to work together to resolve land use and forest preservation issues. This is clearly a significant and notable achievement. However, much work remains, including heightening local resident understanding and appreciation of forest use rules and watershed management activities as well as reflecting the Pak Beng District experience in policy. To improve the autonomy and the sustainability of the project, follow-up activities are being undertaken, such as environment workshops involving local residents, particularly women. At the same time, activities to share the Pak Beng District experience with other areas and the central government are also taking place.

References

Higashi, Satomi. 2006. Village Land and Forest Problems Resulting from Policy Implementation. *Forum Mekong* Vol. 8 No. 1, 7-10. http://www.mekongwatch.org/PDF/FM8_1.pdf

Higashi, Satomi. 2009. A Measure for Separating Forests and Agricultural Land: The Lives of Shifting-Cultivation Farmers and Assigning Responsibility for Land and Forest Management. In Mekong Watch (ed.) *'Measure' Impact on the Lives of Laotian Shifting-Cultivation Farmers*. Tokyo, Japan: Mekong Watch 29-64 (in Japanese).
http://www.mekongwatch.org/PDF/hakaru_PDF_Full.pdf

Higashi, Satomi. 2010. Forest Policy Causing Deforestation and the Role of "Outsiders": Case Study of Land and Forest Allocation Projects in Laos. In M. Ichikawa, F. Ubukata, and D. Naito (eds.) *The People of Tropical Asia and Forest Management Systems: Discussing Governance from the Frontlines*. Tokyo, Japan: Jimbun Shoin 66-84(in Japanese).

Satomi Higashi

1. For more information, see BP 2-9 *Shifting Cultivation and Upland Life in Northern Laos.*

4. Transformation of Nature in Japan and Initiatives for its Restoration

4-1. Japan: A Forest-Rich Nation Buying Up Global Timber

One of the World's Most-Forested Countries

Although Japan is often seen as an urbanized, industrial powerhouse, the nation in fact boasts an extremely high level of forest coverage. Of the nation's total area of 37.79 million hectares, 25.1 million hectares or 66.4% is covered by forest, making Japan the third most-forested developed country behind only Finland and Sweden (Forestry Agency 2012). Compared with the 30% global average forest coverage rate, Japan's forest coverage is clearly extremely high.

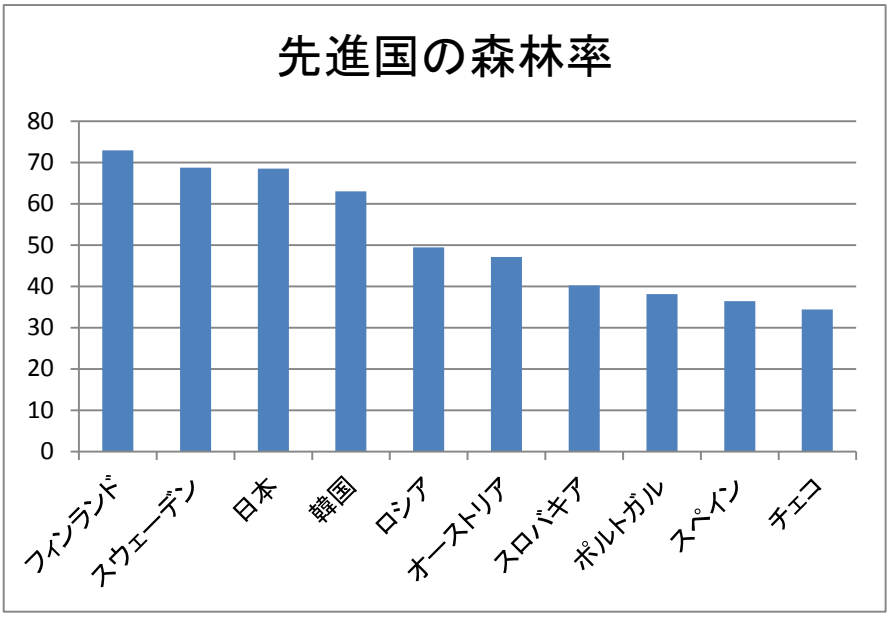

Figure 1: Forest Area Percentage among Industrialized Countries (based on FAO 2010) (left to right) Finland, Sweden, Japan, South Korea, Russia, Australia, Slovakia, Portugal, Spain, Czech Republic

An island nation surrounded by ocean, Japan is a mountainous land with steep terrain. Coupled with abundant rain and humidity, this results in conditions conducive to forest growth almost all around the nation. Japan is a narrow country running more than 4,000 km north to south with diverse climatic conditions. To the far south is Okinawa, near Taiwan with a subtropical climate; in the north is Hokkaido, near Siberia with a subarctic climate. As a result, natural forests in Japan range from subtropical forests including mangroves, to temperate evergreen broadleaf forests, cold temperate deciduous forests, and subarctic coniferous forests. Japan is host to very diverse natural vegetation, so much so that Japan is said to be a biodiversity hot spot. However, today 10 million hectares, or up to 40% of the nation's forest area, is made up of man-made conifer forests. This has been caused, as will be described later, by the planting of limited types of conifer species deemed to be of economic value and funded with the help of government subsidies.

A man-made forest on the left compared to a natural forest on the right.

Role of Local *Satoyama* in Supporting Agriculture and Livelihoods

In Japan, the mountains and hills that provide for agriculture and underpin people's lives in nearby communities are called *satoyama*. These *satoyama* have played an important role in Japanese agriculture and in supporting people's daily lives.

Although modernization has reached a fairly advanced stage in Japan, it was not uncommon even in recent years to see people, especially in agricultural areas, using various *satoyama* resources in agriculture and in their lives. For example, *satoyama* supplied many resources that helped in many areas: coal and wood used for cooking, heating bathwater, and heating homes; natural fertilizer for farming; food for farm animals; materials for agriculture and construction; a wealth of mountain vegetables and mushrooms; nuts and fruits including chestnuts, walnuts, and mountain grapes eaten as food; and herbs used for medicinal purposes. Wildlife and insects including boar, deer, pheasants, and bee larvae occupied very important positions as food sources in mountain villages. This way of using forests was common across Asia, and Japan was no exception until some 40 or 50 years ago. Trees from *satoyama* were consistently and sustainably used and this use was well planned. Some trees were selectively preserved, and new trees were planted as needed. As such, *satoyama* were more like secondary forests that were created in accordance and in harmony with the local climate, rather than virgin forests or monoculture plantations.

The role of *satoyama* began to change drastically in the 1960s, due to the modernization of agriculture and lifestyle as well as changes in fuel usage. People started to depend more on fossil fuels and commercial fertilizers imported from overseas for agriculture. Consequently, forests were used less as a source of natural resources. People's way of life changed also. Many farmers left their farms to join companies and work for wages. With fewer people using these *satoyama* forests as sources of natural resources for agriculture and to support them in their daily lives, the role of *satoyama* rapidly changed.

Rapid Proliferation of Man-Made Forests

In the 1960s, as *satoyama* lost their agricultural value, the Japanese government threw its weight behind policies to expand afforestation nationwide. At that time, there was a shortage of lumber due to the overharvesting of lumber during World War II. This scarcity drove up prices as demand surged in conjunction with the construction accompanying Japan's economic growth. Swathes of natural

forests filled with non-uniform trees deemed unsuitable for construction were cleared. In their place were planted more construction-friendly varieties of trees, such as conifer trees including cypress and cedar. The government also provided financial aid for planting these coniferous forests. During this period, the number of man-made forests increased by 30% in only 20 years, with their area reaching 10 million hectares. This was accompanied by a 15% drop in natural forest coverage area. In this way, *satoyama* that no longer fulfilled its original role of supporting local agriculture was replaced by the planting of cypress and cedar trees with expectations that these would have economic value in the future.

Domestic Timber Prices Fall and Forests are Devastated after Lifting the Ban on Foreign Timber Imports

To meet the high timber demand in Japan, the Japanese government lifted the ban on importing foreign timber in 1964 while at the same time using subsidies for conifer trees to promote its policy of increased afforestation. Massive quantities of foreign timber began to be imported into Japan as a stable yet low-cost resource, and domestic timber prices soared. Coupled with the rise in the value of the yen, Japan's timber self-sufficiency plunged to 31% in 1980 before falling to around 20% in 1990—all of this from a level of around 95% in 1955. The cheap imported materials kept lowering the prices of domestic timber from 1980 onward, and discouraged many owners of planted forests of Japanese cedar and cypress from managing and expanding their businesses.

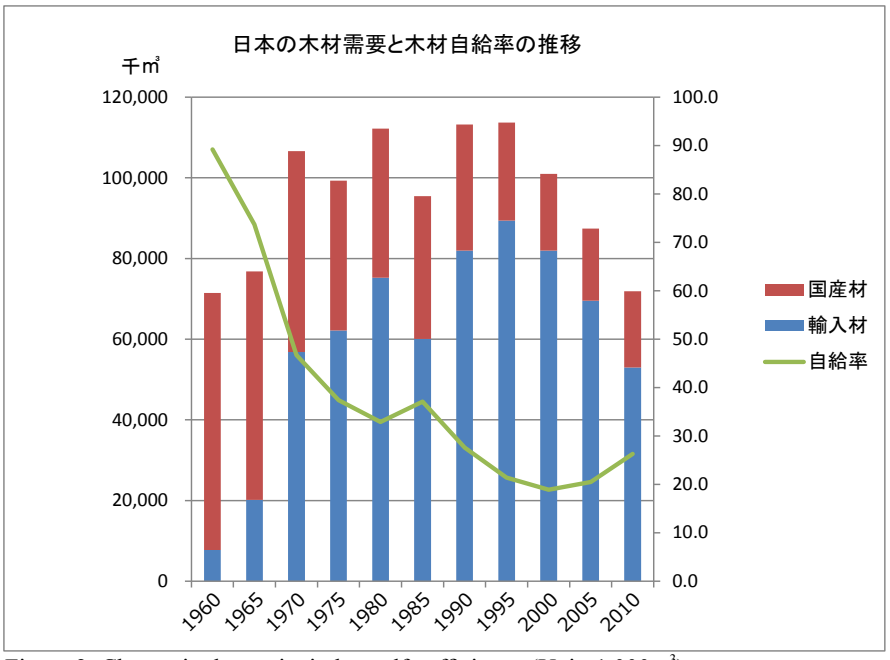

Figure 2: Change in domestic timber self-sufficiency (Unit: 1,000m^3)
Red: domestic lumber
Blue: imported lumber
Green: self-sufficiency ratio

Natural forests can be left unattended without falling out of balance. Planted man-made forests, however, require ongoing maintenance and management as brush needs to be cleared and branches cut, especially when the forests are high-density, monoculture forests. Owners of man-made forests who were discouraged by the depreciating value of their timber, generally neglected to care for their forests after receiving subsidies from the government for only the initial planting process. As a result, forest owners' eagerness to engage in forestry was sapped by slumping prices, and they planted

forests seeking subsidies. But because they failed to follow through and manage them, man-made forests have been abandoned nationwide. This situation created areas of densely packed thin trees of similar height, which further contributed to lower timber prices. In addition, these weaker trees were susceptible to volatile weather such as typhoons and heavy rains, contributing to disasters such as landslides and forest damage.

Bringing Back the Forgotten Roles of Mountains

Japan is a nation blessed with abundant rain and there is a proverb that says, “The fields and mountains will take care of themselves.” In a place like Japan with a wealth of precipitation, the climatic conditions are such that, left to their own devices, natural forests will sprout. Indeed, Japan is incredibly fortunate to have such a robust environment. Natural forests can grow and maintain themselves; they can also host a rich array of biodiversity. Fundamentally, the government lifting its ban on foreign timber coupled with its policy of forest expansion led to clearing of natural forests and increased the nationwide spread of planted monoculture conifer forests. This is what caused domestic timber prices to tank. As a result, many artificial, planted forests fell into a state of disrepair. They were ravaged by a lack of attention and contributed to natural disasters. Both the forest owners as well as the government, which invested in planting these forests, were left in debt. Until 1996, the government provided financial aid to forest owners to encourage the planting of conifer trees as part of its forest-development policy. These subsidies also promoted the planting of artificial forests in inappropriate areas such as on steep inclines and at high altitudes.

In recent years, the value of forests has been revisited. Increasingly, they are valued not only in terms of their economic worth, but from many perspectives including disaster prevention and water regulation, biodiversity conservation and recreational usage. When it comes to assessing forest value across these many facets natural forests are generally highly regarded and man-made forests regarded as inferior. In short, the national afforestation efforts and the flood of imported foreign timber destroyed the economic value of Japanese forests and led to much land being replaced with artificial forests that have minimal value in terms of biodiversity.

Japan: A Leading Importer of Timber

When speaking with people from overseas, they sometimes ask why Japan does not harvest its own forests and if the reason Japan imports timber from other countries is to preserve its own forests. In reality, the Japanese government, in particular the Forestry Agency, would like to see greater use of domestic timber and has in fact been formulating strategies to encourage the use of domestic timber. However, most of the natural forests that would have been able to provide a significant volume of timber are now gone while the man-made forests that were planted at immense cost and effort are now largely abandoned and in a dilapidated and ruinous state. As the planted forests are predominantly cypress and cedar, the potential uses for timber from these forests are very limited. Also, the steep terrain of these forests makes it very costly to transport timber in Japan making it difficult for forest owners to turn a profit as timber prices continue to fall.

Industries such as the construction and furniture industries that use much timber already depend on imported foreign timber, as this offers greater choice at lower cost. Although Japan is a heavily forested country with a high ratio of planted forest, it can only satisfy just less than 30% of domestic timber demand with wood from domestic forests. This is certainly an improvement over past figures

of 20%, but it does not appear likely that Japan will be able to achieve the government's stated goal of 50% self-sufficiency any time soon. One thing that might help the situation is for Japan to adopt legislation akin to that in the European Union, United States and Australia that bans the import of illegally harvested timber. Getting rid of illegally harvested timber or even timber that is possibly illegally harvested could serve to increase domestic timber prices and support the domestic forestry industry. As a country that is a heavy importer of timber, this is an issue that needs to be addressed anyway. As both the government and the forestry industry are usually skeptical of new ideas, however, they are very slow to take action and implement legal and regulatory changes.

Toward Forestry and Forest Conservation Independent of Plantation Forests

In the definition expounded by the Food and Agriculture Organization (FAO), there is no distinction made between man-made planted forests and natural forests. According to the FAO, China's forested areas have increased in the recent years, but this is because of increased plantation forests. These new forests are often plantations mainly for paper manufacturing and timber. As such, they cannot be expected to yield much in terms of biodiversity. Since there is a vast difference in terms of both content and function when comparing planted and natural forests, the two should be regarded separately. Natural forests and planted forests are similar in some respects yet very different when it comes to ecology and use by residents. This is something that must not be forgotten. In addition, an increase in planted forests alone will be incapable of supporting existing ecosystems or even the diverse needs of people.

Along the Mekong River, many natural forests have been converted into rubber, eucalyptus and palm oil monoculture plantations. In Japan, 58% of the forests are privately owned with the rights retained by residents. However, most of the forests in Southeast Asia are owned by the state. Citizens' rights to use these natural forests are traditionally recognized, but these rights are often lost when policies outlining forest use rights are enacted and forests are transformed into plantations managed by corporations. This can ignite conflict between the local residents and the governments. It also exacerbates economic disparity as it further impoverishes the poor who depend on forest resources.

Although people tend to regard tropical forests as something far away, in Japan, we need to remember that the products grown and made from timber harvested from tropical plantations, including paper, palm oil and rubber, in fact support our comfortable lives. It is important that we remind ourselves that the everyday necessities upon which we depend come from finite resources, so that we do not waste them. In addition, it is important to actively maintain and effectively use the existing planted forests in Japan while searching for methods to minimize our dependence on and lessen the excessive burden we place upon the natural forests of the world, including tropical forests.

References

Food and Agriculture Organization (FAO). 2010. *Global Forest Resources Assessment 2010*. Rome, Italy: FAO.
http://www.fao.org/forestry/fra/fra2010/en/
Forestry Agency (2012) *Forestry White Paper*.
http://www.rinya.maff.go.jp/j/kikaku/hakusyo/23hakusyo/

Sayoko Iinuma (Global Environmental Forum)

4-2. Removal of the Arase Dam: Japan's First Attempt to Dismantle a Hydroelectric Dam and Restore the Original River Environment

Overview of Arase Dam


Arase Dam.

The Arase Dam, built exclusively for hydroelectric power generation, had an annual power output of 74.66 million kWh (kilowatt per hour). Completed in 1955, the dam is located about 15 km from the estuary of the Kuma River (mainstream length 115 km, watershed area 1,880 km^2) as it flows past Sakamoto Town (formerly Sakamoto Village), Yatsushiro City, in southern Kumamoto Prefecture. The Arase Dam is a concrete gravity dam consisting of eight gates, having a height of 25 m, a total length of 210.8 m, a total reservoir storage capacity of 10.14 million m^3, and a submerged area of 123 ha. It is the oldest of the prefecture-operated hydroelectric dams constructed according to Kumamoto Prefecture's Kuma River Comprehensive Development Plan.

The removal of the Arase Dam has been beset with twists and turns. The first decision for the removal was made by the Prefecture Council and the Prefectural Governor in 2003 due to lobbying from fisher-folks and local residents, only to have the decision frozen in 2008 when a new governor came into office. In 2010, however, when it became clear that the procedure to renew water rights could not be done without the agreement of the fishing co-op, the final decision to remove the dam was made and work to dismantle the dam began in 2012[1].

Changes in Environment and Lifestyle in the Kuma River Watershed Brought about by the Dam

Three dams have been constructed on the Kuma River mainstream, the construction of all three being pursued intensively over a period of a few years in the late 1950s. These are, in order from the estuary, the Arase Dam (completed in 1955), the Setoishi Dam (completed in 1958), and the Ichifusa Dam (completed in 1959). The construction of these dams had serious impacts on the Kuma River environment.

Prior to the construction of the Kuma River dams, catches of *ayu* fish (*Plecoglossus altivelis altivelis*) were extremely large. A river fish, the *ayu* is one of the most popular Japanese freshwater fish. The Kawabe River, a tributary of the Kuma River, was particularly well known for the "*shaku ayu*," a large *ayu* reaching over 30 cm in length, providing livelihoods for professional river fisher-folks and attracting large numbers of angling enthusiasts. The *ayu* made great contributions to the economy of the Kuma River watershed, including the inns and local restaurants that catered to the anglers. It is reported that at a time when the average salary for white collar workers in Japan was about 8,000 yen per month, 10,000 yen could be made in a day by catching and selling *ayu* fry.

At the construction site of the Arase Dam in Sakamoto Village, five to six tons of *ayu* could be harvested in the two months of the "*ochi ayu*"[2] season. This fishing was carried out by around 280 people in 30 households, but the number of people involved is reported to have fallen to just 16 in the five years following the completion of the Arase Dam, and to a mere two by 2000[3]. The *ayu* spawn in the river in the fall, and the eggs flow down the river to hatch in the vicinity of the estuary. The *ayu* fry then swim back up the river in the spring. Large structures that obstruct the flow of water, such as dams, become serious obstacles hindering the movement of the *ayu*.

In addition to *ayu*, eels, *donko* (a kind of fish, *Odontobutis obscura*) and *gane* (a kind of crab, *Eriocheir japonica*) could also be caught before the dam was constructed. The *donko* and *gane*, caught using handmade implements, were consumed by local families, and it is said that children would sell them to adults if they caught a lot of them[4]. It appears that these creatures also virtually disappeared within a few years following the construction of the dam.

Since the Kuma River is also the only major river flowing into the Yatsushiro Sea, the freshwater and nutrients from the river are vitally important for the ecology of this almost totally landlocked sea. The estuary of the Kuma River has tidal flats of about 1,000 hectares, and before the dam was constructed, the flats were so ecologically rich that even a child could fill a bucket with prawns[5].

After the construction of the dam, the biota of the flats changed. The return of the *ayu* to the upstream waters was obstructed, and the tidal flats became muddy and difficult to walk on due to a reduction in the amount of sand flowing down the river. Since the *ayu* were of significant importance to the local economy, the fishing co-op began a project to collect *ayu* fry taken from a fishway of a weir located in the lowest regions of the Kuma River, and then transported them by truck to release the fry in upstream areas. It cost them 50 million yen (approximately USD 500,000) per year to do this. While a fishway was constructed on the Arase Dam in 1998, only a very small number of *ayu* were able to pass it, and according to the observation of local fisher-folks, the dam reservoir at the top end of the fishway was almost completely still. Even if the *ayu* were able to swim up the fishway, they were not able to swim further upstream from there.

The dam also distressed local residents with its noises and vibrations, deterioration of water quality, and unpleasant smell. In the former Sakamoto Village, people were living in homes built close to the river to make it easy to fetch water for daily life. There were floods before the dam was built, but people coexisted with the floods by moving their household belongings to the upper floor before the floods arrived, and going out to catch *ayu* or collect river sand during flood times. However, the damage to these private houses was extremely severe after completion of the Arase Dam because the water level rose very rapidly when water was released. Silt that built up in the dam lake behind the dam flowed downstream when water was released. The houses that were flooded became inundated with silt, making it impossible for the people to coexist with the floods.

The Process up to the Decision to Remove the Dam

There were several twists and turns in the story up to the point when the final decision was made to remove the dam. In the former Sakamoto Village, where the dam is situated, the Sakamoto Village River Fisher-folks' Union began activities targeted at revitalization of the Kuma River in 2001, a couple years before the renewal of water rights was due in March 2003. An Association to Consider

the Arase Dam that encompassed a wider range of the local residents was established, thus giving organization to the calls for the removal of the dam as the consensus of the residents. In September 2002, the Sakamoto Village Council submitted a written opinion to Kumamoto Prefecture demanding suspension of the use of the dam. The prefecture then announced that it would limit the renewal of the water rights of the Arase Dam to seven years and begin the work of dismantling the dam in April 2010. This was the first time an official decision was made to dismantle a hydroelectric dam, not only in Japan but in the whole of Asia. The prefecture then continued deliberations on the methods and so on to be used to dismantle the dam by establishing an Arase Dam Measures Investigation Committee consisting of academic experts, related organizations and representatives of the local residents.

The process was proceeding smoothly until Governor Kabashima was inaugurated in 2008. It was announced that the plan to decommission the dam had been withdrawn for economic reasons, among which was the estimated 10 billion yen (approximately USD 100 million) cost to dismantle the dam. When in January 2010 it became clear that the procedure for the renewal of water rights, due to expire in March of that year, could not be completed on time[6], dam removal once again became the policy espoused by the prefecture. At the end of March 2010, power generation at the Arase Dam was terminated and all the gates were fully opened on April 1st.

The State of River Restoration in the First Year after Opening the Gates

A year and a half after the gates opened, the revival of the Kuma River had become apparent to the local people who had been continually observing the river. According to Ms. Shoko Tsuru, Vice Chairperson of the Kumamoto Nature Interpreter's Association, the changes seen thus far in the river can be described as follows:

1) Change in water quality: Water downstream from the dam that was turbid before the gates were opened, has shown a remarkable change, becoming clear and blue following the opening of the gates. Water turbidity after rain also clears more rapidly;
2) The appearance of rapids and pools: Before construction of the dam, there were rapids and pools in about 20 locations above and below the dam site, resulting in a self-purifying effect taking place through the creation of turbulence in the river flow. After the construction of the dam, these rapids and pools were lost due to inundation upstream and a reduction in the supply of earth and sand downstream. They have reappeared after the gates were opened;
3) Kuma River fish: It has not been possible to ascertain the state of restoration of fish thus far;
4) Kuma River estuary tidal flats: It is reported that after the gates were opened the amount of sand flowing down the river increased. The muddiness of the Yatsushiro Sea tidal flats was therefore reduced and they have become easier to walk on. The numbers of creatures that inhabit the sandy areas by digging holes in the sand, such as *anajako* (a kind of prawn, *Upogebia major*) and *hamaguri* (common orient clam, *Meretrix lusoria*), appear to have increased, but since the number of people collecting these has also increased it has not been possible to ascertain precise numbers;
5) Green laver (*aonori*) in the vicinity of the estuary: Although these grew to only about 50 cm in length before the gates were opened, they now extend to about two meters. The colors are now more vivid than before and fade less easily;
6) Fisheries in the Yatsushiro Sea: The seaweed bed in the vicinity of the Kuma River estuary has revived. Very soon after the gates were opened, large catches of the brachiopod *midorishamisengai* (*Lingula anatina*) became possible for the first time in 30 years, and veined rapa whelk (*akanishi*) and razor clam (*mategai*) have also increased. Eels, which no one had tried to catch for many years

due to their absence from the environment, reappeared after the gates were opened and found their way onto the market last year;

7) Removal of the dam and revival of the sea: Since the gates were opened, it appears that the water in the estuary and even the sea has become cleaner. The Kuma River has a great impact on the Yatsushiro Sea and removal of both the Arase and Setoishi dams will have a good effect on the revival of the sea and tidal flats environments. When a dam is present, accumulated silt flows downstream when water is released. Following the opening of the gates, the amount of wood flotsam and jetsam floating downstream increased, resulting in the negative impact of torn nets. This is probably because the mountain forests in the upstream areas are not being properly cared for. It is hoped that if the tidal flats are restored, more young people are able to make a living from fishing.

Toward a Revival of the Entire Watershed

As noted above, the decommissioning of the Arase Dam is the first case of its kind in Asia. The impacts of decommissioning on the Kuma River and the Yatsushiro Sea, however, will remain limited as long as the Setoishi Dam, located 10km upstream of the Arase Dam, continues operation. When both of these dams are removed, the Kuma River will become a Class A river with no large-scale dam all the way upstream to the Ichifusa Dam, close to the border with Miyazaki Prefecture, and a magnificent revival of the ecology and environment of the river and sea, as well as biological resources, is anticipated.

The 50-year term of the Setoishi Dam water rights will also expire in 2014. The local fishing co-op has refused to recognize the renewal of water rights and a resolution aimed at removal of the dam has made the dam's decommissioning a possibility. However, since the Setoishi Dam is located on the outskirts of both Ashikita Town and Kuma Village, there is no resident community that suffers direct damage from the dam, as in the former Sakamoto Village, and because 70% of the *ayu* caught downstream are released upstream of the Setoishi Dam, the number of *ayu* harvested from the river has been maintained. For these reasons, the intense activities by residents to demand the removal of the dam as seen at the Arase Dam have not occurred in the case of the Setoishi Dam. Nevertheless, up to now, when water was released from the Setoishi Dam, the Arase Dam played the role of a supplementary dam, adjusting the water volume. The Setoishi Dam has thus relied on the Arase Dam to some extent, creating a necessity for the operation of the Setoishi Dam to be reviewed when the Arase Dam is removed.

Even though the removal of the Setoishi Dam may not come about, if hydroelectric power generation is suspended and the gates opened, albeit temporarily, the flow will be restored and sand and earth will be supplied to the lower reaches. Thus it is said that by altering the operation of the Setoishi Dam to give increased consideration to ecology and nature, revival of the Kuma River and the Yatsushiro Sea can be enhanced[7]. From now onwards, the focus of the revival of the Kuma River and the Yatsushiro Sea will move to the Setoishi Dam and whether or not it is possible to remove the Setoishi Dam or alter its mode of operation.

Recommendations: Multifaceted Monitoring Should be Conducted

The removal of the Arase Dam is an extremely important case when considering methods for the future revival of the natural environment of Japan's rivers, on which a large number of dilapidated

dams exist. To really understand the environmental impacts of decommissioning the Arase Dam, it is necessary to carefully monitor the environment prior to, during, and after dismantling the dam. Precise monitoring also provides valuable information regarding necessary conditions to enable a smooth environmental revival. However, the Arase Dam is the property of Kumamoto Prefecture, and there is very little nationwide interest in its removal. Multifaceted monitoring surveys by specialists have not been carried out. Inquiries to the official responsible for biodiversity-related matters at the Ministry of the Environment revealed that the Ministry is simply not aware of the Arase Dam.

Kumamoto Prefecture has set up a Specialist Follow-up Committee on the Arase Dam Removal, which is proceeding with deliberations to "implement the dam removal safely and with consideration for the environment while evaluating and verifying the results of monitoring surveys on water control and the environment with respect to the removal of the Arase Dam." The scope of this committee however, is limited to monitoring in the Arase Dam removal impact assessment zone, downstream only as far as the Yohai Weir, which does not include the estuary tidal flats or the Yatsushiro Sea. If this situation remains unchanged, the only comprehensive survey will be the observations that have been continuously conducted by local citizens' organizations active in opposing the Kawabe River Dam and demanding the removal of the Arase Dam.

As noted above, the removal of the Arase Dam will have a huge impact on the ecology of the tidal flats and the Yatsushiro Sea, and the fisher-folks who depend on the marine resources. Considering the importance of the Arase Dam removal as a case of natural restoration and Asia's first dam removal, we feel strongly that a monitoring survey that includes the Yatsushiro Sea should be conducted and the results made public.

References

Corporate Agency of Kumamoto Prefecture. *Kumamoto Prefecture Specialist Follow-up Committee on the Arase Dam Removal* (in Japanese).
http://www.pref.kumamoto.jp/site/kigyoukyoku-hp/ (Last accessed on April 20, 2012)
Corporate Agency of Kumamoto Prefecture. *Removal of the Awase River Dam* (in Japanese).
http://www.arasedamtekkyo.hinokuni-net.jp/ (Last accessed on September 18, 2013)
Kimoto Seiko et al. 2011. *Revive! The Clear Flow of the Kuma River: The Struggle of Fisherfolk against the Kawabe River Dam and the Arase Dam* (in Japanese).

Sayoko Iinuma (Global Environmental Forum)

1. To view pictures of the project site, visit: http://www.arase-dam.jp/shinchoku/index.html
2. *Ayu* that swim downstream to spawn in the fall
3. According to the morning edition of *the Kumamoto Nichinichi Shimbun Newspaper* of October 27, 2002
4. From a hearing with Mr. Seiko Kimoto (Chairman of the Sakamoto Village River Fisher-folks' Union) conducted on October 23, 2011
5. From a hearing with Ms. Shoko Tsuru on October 23, 2011
6. Since water cannot be used for power generation unless the water rights are renewed, the continued existence of the dam became untenable.
7. From a hearing with Ms. Shoko Tsuru on October 23, 2011

4-3. The Past, Present and Future of Japan's River Development

Japan's Once Abundant Rivers

There was a time when Japan's rivers were as abundant as the Mekong River. Fisher-folks on the Kawabe River in Kumamoto Prefecture, for example, recall that in the season when migrating fish returned to the river, the surface of the water appeared to turn black with the heads of vast numbers of fish swimming upstream[1]. However, the ecology of Japanese rivers was dealt a devastating blow by the river pollution that accompanied Japan's rapid economic growth and industrialization beginning in the 1960s, and by the 3,000 or so dams constructed on rivers throughout the nation.

History and Changes in River Administration

Japan's River Act of 1896 was enacted for the purposes of water control, and the new River Act of 1964 was drawn up to regulate water control and use. The latter introduced uniform management of all small and medium rivers within each river system, placing Class A rivers[2] under national management and Class B rivers under the management of the local prefectures.

When the River Act was amended in 1997, it incorporated the standpoints of "environmental conservation" and "reflecting the views of local residents" due to the severity of environmental degradation and increasing awareness among residents of the need for river development that reflects the characteristics of the local region. However, citizen participation in river management was still very weak in Japan at the time.

Compared to other countries, Japan was slow to introduce an environmental assessment law, which was not enacted until 1997. Respect for the traditional lifestyles and special consideration for women and minorities are not required under this law. Since there is also no express provision for the protection of endangered species, it is not possible to use the law to regulate or restrict dam construction to prevent damage to habitats of rare animals. Furthermore, deliberations on river development plans, where most of the decisions are made, are gatherings of "knowledgeable persons," consisting mainly of university researchers designated by the Ministry of Land, Infrastructure, Transport and Tourism. This Ministry is also responsible for promoting dam construction. The current situation is thus that insufficient information is disclosed to the public and there are few forums where citizens are allowed to express their opinions.

Some Dams are Stopped, and Some are Not

While no large-scale hydropower stations have been constructed in the USA since around the year 2000, and the removal of existing dams for the sake of environmental restoration has already begun[3], the construction of large-scale dams for water control and other purposes is still continuing in Japan. Resistance by local residents is strong, however, and construction projects are often dogged by heated debates. The plan to build Hosogo-uchi Dam, scheduled for construction on the Naka River in Kito Village, Tokushima Prefecture on Shikoku Island, was blocked for 30 years due to an opposition campaign by local residents, and finally cancelled in 2000. The construction of the planned Kawabe River Dam in Kumamoto Prefecture's Kuma River basin in Kyushu was also similarly cancelled due to strong local opposition.

At the same time, the construction of other dams is proceeding. One example is the Yamba Dam in Gunma Prefecture. This dam, planned for the Agatsuma Ravine, renowned for its scenic beauty, is a 116m-tall gravity-type dam for the purposes of water control and clean water supply with a construction budget of 410 billion yen (approximately USD 4.1 billion) (increased from an original 211 billion yen, approximately USD 2.1 billion). One of the campaign promises of the Democratic Party of Japan, which wrested power from the Liberal Democratic Party in the general election of 2009, was to review the Yamba Dam plan, and hopes were high that its construction would be cancelled, but this is not what eventually occurred.

The dam project has a long history, beginning over 50 years ago when the plan was first proposed. The local residents, exhausted after decades of strong opposition spanning three generations since the original proposal, finally collapsed and approved the plan. As well as being the habitat of the giant salamander, one of Japan's national protected species, there is also concern about the deterioration of water quality and other problems in the local area due to the dam reservoir. Naturally, the immense cost of the project is also an important issue.

River Environment Protection Plans Aiming to Restore Ecosystems

Despite the facts that Japan has now entered a period of population decline, and the greater part of current public works were planned during the era of rapid economic growth, these projects remain scheduled for implementation with no appropriate review. Japan's accumulated public debt has now surpassed the 1,000 trillion yen (approximately USD 10 trillion) mark[4], but as we see with the Yamba Dam project, Japan is still attempting to proceed with this kind of enormously expensive development on the premise that the demand for water will continue to increase. The burden of costs for the construction and maintenance of these excessive facilities will fall on the shoulders of future generations.

On the other hand, public works that do not result in the building of new structures have also begun. A groundbreaking example of this is the removal of the Arase Dam, now being implemented in the lower reaches of the Kuma River basin in Kumamoto Prefecture[5]. This is the first attempt of its kind, not only in Japan, but in Asia as a whole. We are seeing a renewed appreciation for *satoyama*, and we are now looking forward to the promotion of river environment conservation plans that will help restore damaged ecosystems.

References

National Park Service, *Restoration of the Elwha River*
http://www.nps.gov/olym/naturescience/restorationoftheelwha.htm (Last accessed on September 10, 2013).
Teruyuki Shimazu, 2013, The Yamba Dam is a water source that no one will use, Videonews dot com, interview by Tetsuo Jimbo, http://www.youtube.com/watch?v=RpqqM-eN_JA&feature=youtu.be (Last accessed on September 1, 2013).
The Yamba Tomorrow Association, Problems of the Yamba Dam Project,
http://yamba-net.org/problem/meisou/futan/ (Last accessed on September 1, 2013).

Yuka Kiguchi

1. Report by Ms. Shoko Tsuru (Vice Chairperson of the Kumamoto Nature Interpreter's Association), December 15, 2012.
2. A river designated by government decree as having an especially important river system from the viewpoint of national land conservation or the nation's economy.
3. A well-known example is that of the Elwha River in the Olympic National Park, Washington State, in northwest USA.
4. Reported in the Nihon Keizai Shinbun (Japan Economic Newspaper), August 10, 2013.
5. For further details, see BP4-2 *Removal of the Arase Dam: Japan's First Attempt to Dismantle a Hydroelectric Dam and Restore the Original River Environment*.

Information Packet

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