Damming the Irrawaddy

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Kachin Development Networking Group (KDNG)
KDNG is a network of Kachin civil society groups and development organizations inside Kachin State and overseas that was set up in 2004. KDNG's purpose is to effectively work for sustainable development together with locally-based organizations in Kachin State. Its aim is to promote a civil society based on equality and justice for the local people in the struggle for social and political change in Burma.KDNG is a network of Kachin civil society groups and development organizations inside Kachin State and overseas that was set up in 2004. KDNG's purpose is to effectively work for sustainable development together with locally-based organizations in Kachin State. Its aim is to promote a civil society based on equality and justice for the local people in the struggle for social and political change in Burma. Kachin Environmental Organization (KEO) is a member of the KDNG and is the main author of this report.

Kachin Environmental Organization
The Kachin Environmental Organization (KEO) was formed in April 2004 by Kachin people concerned about environment issues inside Kachin State, especially the rapid loss of natural resources.

Note: Hka means river in Kachin language

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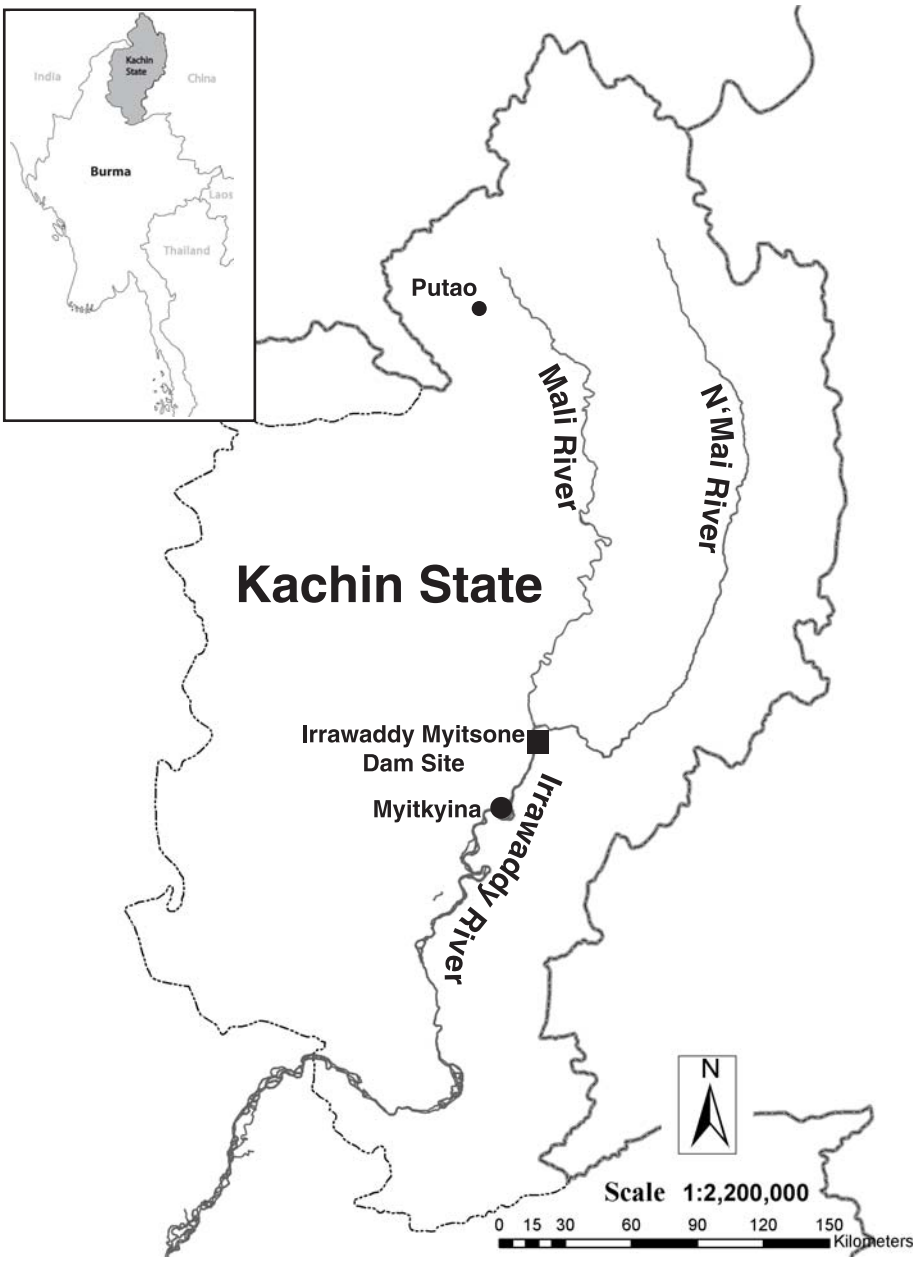


Executive Summary

The Irrawaddy, one of Asia's great river systems which flows through Burma's heartlands, is about to be dammed. Burma's military junta is allowing Chinese companies to build a giant 152-meter-tall hydropower dam and transmit the electricity back to China. The dam is one in a series that the junta has planned involving the export of power to neighboring countries. While the regime will gain new revenues, Burma's ordinary citizens, who have no say in the process, will bear the costs.

A project-launching ceremony for the dam at the confluence (or Myitsone in Burmese), where the Irrawaddy begins, was held in May 2007 in Burma's northernmost Kachin State. The dam will generate 3,600 MW of electricity, most of which will be transmitted to China, fitting into the Chinese Central Government's 'West to East Power Transmission Policy.' The power will be worth an estimated US$500 million per year. The Irrawaddy Myitsone dam is the first in a series of seven large Chinese dams to be built along this waterway.

Deeply concerned about the dam's potential impacts, elders, community leaders and villagers from across Kachin State have sent protest letters directly to Senior General Than Shwe and the military's Northern Commander to stop the project, but the objections have so far fallen on deaf ears.

An estimated 47 villages will be inundated in a region recognized as one of the world's eight "hottest hotspots of biodiversity." Approximately 10,000 people will be displaced, losing their livelihoods, and exacerbating the existing problems of unemployment, drug addiction and HIV/AIDS in the area. Roads that are the link between major towns in the remote state will be cut off by the floods impacting communication, transportation, and trade.

Recent dam breaks in nearby rivers in 2006 have swept away houses and bridges, causing fatalities and destroying power stations and dam structures beyond repair. Northern Burma is earthquake-prone, and the Irrawaddy Myitsone dam site is less than 100 km from the major Sagaing fault line. Dam breakage or unnatural flood surges would be disastrous for Myitkyina, the capital city of Kachin State that lies only 40 kilometers downstream of the dam.

The well-documented negative impacts of large dams on fisheries, flood plain farming and river bank cultivation will impact the millions that rely on the Irrawaddy. Health concerns that include an increase in malaria and the release of toxic methyl-mercury from the dam's reservoir will endanger Burma's people,

further burdening a healthcare system that is ranked as one of the worst in the world. The critically endangered Irrawaddy dolphin may become extinct in its namesake river.

Human rights abuses by the military have been extensively reported, including the junta's use of troops and landmines to secure large development projects, resulting in forced labor, land confiscation and threats to life. There is no reason to expect that the communities living at the Irrawaddy Myitsone dam site will not suffer the same consequences. Women are particularly susceptible to sexual violence by troops. In addition to these risks, women face pressures to participate in the sex trade once construction sites are set up and livelihoods are lost, and are increasingly vulnerable to human trafficking.

For centuries, the Myitsone has been the source of songs, poems and legends which are not only the heritage of the Kachin but all the people of Burma. If this dam were to go ahead, a national cultural landmark would be permanently submerged and lost to future generations.

The Kachin Development Networking Group (KDNG) joins those who have already spoken out to call for an end to the Irrawaddy Myitsone dam project. The ruling military junta is promoting mega-development that places all the costs and risks on disenfranchised peoples while fortifying military control. Small-scale alternatives that recognize the rights of local communities and empower them to participate and manage resources are possible. China is an important neighbor that can be a positive influence in the region. KDNG calls on China to abide at least by its own standards when operating in Burma and to heed the voices of affected peoples.

Photo: tab

A tributary stream of the Mali River near the Myitsone

Part I: Background

Burma became an independent country in 1948. In 1962 the military took power from the democratic government and the military has ruled the country since. In 1990 free and fair elections were held for the first time in almost 30 years. The National League for Democracy (NLD) won an overwhelming majority of votes but the military did not recognize the election results. The military still holds power today under the State Peace and Development Council (SPDC) and Burma is notorious for its human rights record. The military is currently trying to legitimize its governing role through a controversial constitutional drafting process.

Kachin State is the northernmost part of Burma. It is bordered by China to the north and east, Shan State to the south and Sagaing Division and India to the west. The population of Kachin State is over 1.2 million. The inhabitants are Kachin (Jingpaw, Rawang, Lisu, Zaiwa, Longwo, Lachit), Shan, Burman, Chinese and Indian. The capital city is Myitkyina with a estimated population of 140,000.

Kachin State is home to the highest mountain in Southeast Asia (Mount Hkakabo Razi at 5,881 meters). The icy mountains in the north are where the headwaters of the Irrawaddy originate. Kachin State is abundant in natural resources and biodiversity; there are 800 species of orchids alone in the state and several rare species of wildlife including the leaf deer and dwindling numbers of tigers. The renowned botanist F. Kingdon Ward said of Kachin State "it is one of the most interesting botanical and zoological natural sanctuaries in Southeast Asia."

Photo: tab

An armed soldier at the Myitkina airport

Militarism and development in Kachin State

After years of sustained civil war and abuse by Burma's military towards the people of Kachin State, a ceasefire agreement between the military regime and the Kachin Independence Organization was reached in 1994. Since the ceasefire, Kachin State has witnessed a drastic expansion of Burma Army troops together with destructive development projects that have resulted in what some local leaders are calling an economic, environmental and social crisis. Thousands of acres of farm land and homes have been confiscated by military authorities and associated businesses. Several reports have documented the loss of rich forests and biodiversity to rampant logging, the contamination of waterways by destructive mining processes, and the escalation of drug addiction, HIV/AIDS, and human trafficking. These problems have been devastating for communities; in addition, the problems of HIV and drug addiction are crossing the border into neighboring China.

The post-ceasefire expansion of the military to ethnic border areas has gone hand in hand with a Border Area Development program that has involved the selling of the country's natural resources to the highest bidders. Neighboring countries hungry for Burma's natural gas, gems, and teak have made deals with the junta despite widespread condemnation of its human rights record. In Kachin State, the junta has been profiting from allowing businesses to extract gold in wildlife sanctuaries and along rivers.[1] After international criticism of the unsustainable logging of teak and other hardwoods, much of it shipped directly to China, the junta decreed that the log trade should be centralized through Rangoon to international buyers, thus ensuring that they would profit more directly from the trade.

The regime has also made long-term natural gas sales agreements with Thailand and China and is negotiating with India. These involve large foreign investments to pay for international pipeline construction. The contracts are usually signed for a 25-30 year period so that the neighboring country or foreign company can earn enough profit to repay their initial investment. In this case, the investor has a stake in the stability or survival of the regime with which they have signed the deal. Therefore these energy sales by the regime are a type of "resource diplomacy" through which they gain political as well as financial capital.

Senior General Maung Aye makes a speech at the opening ceremony of the Paunglaung dam while Chinese investors look on

Hydropower in Burma

According to official statistics, Burma had a total of over 1,775 MW of installed generating capacity of electric power as of September 2006[2] but new hydropower stations are coming on line. It is estimated that hydroelectric power accounts for approximately 30-35% of that capacity.

The identified realizable hydropower generation potential of the country, however, is currently put at 38,000 MW, far surpassing any other mainland Southeast Asian country.[3] The SPDC is eager to realize this potential and in recent years there has been a rash of Memoranda of Understanding with investors to develop identified sites.

A recent article in the industry magazine *Hydropower and Dams* listed 29 projects "currently under implementation of planning in Myanmar." This list did not include any projects planned in Kachin State.[4] The ever-expanding list together with the recent announcements indicates a veritable frenzy on the part of the regime to realize its hydropower potential and the foreign dollars it can generate. An official from the Ministry of Electric Power told a local newspaper that the government intends to shift the country's reliance on gas to hydropower, making

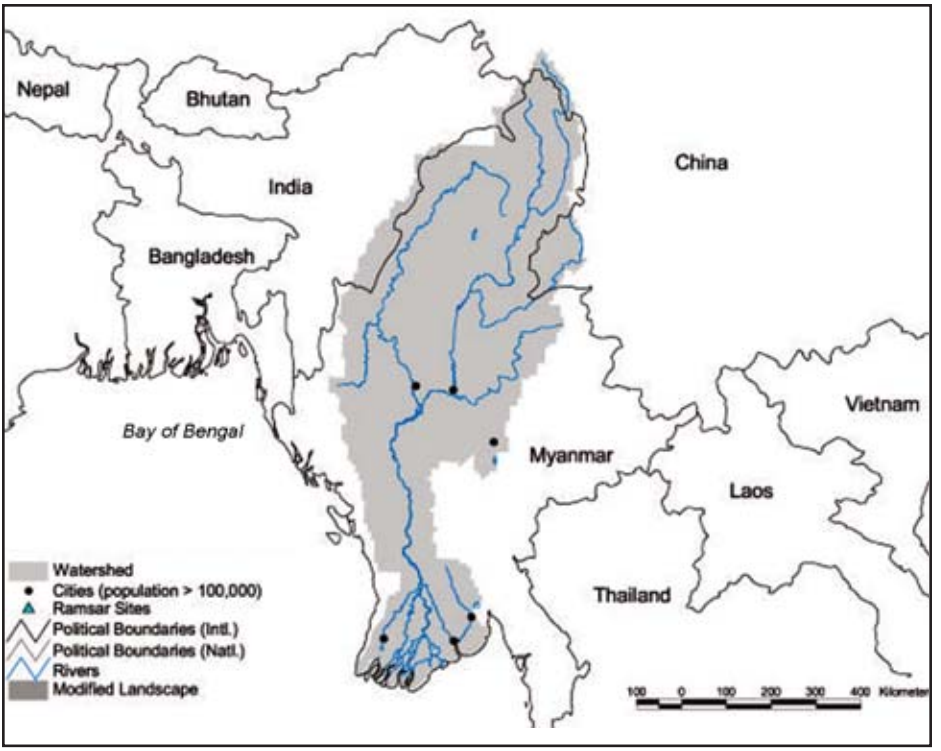
it the sole source of electricity by 2030.[5] It is still not clear, however, how much of the electricity generated from planned hydropower projects will remain in Burma.

For Burma's neighbors hungry for electricity - Thailand, India, Bangladesh, and China - building dams inside the reclusive state offers an opportunity to acquire cheap electricity while leaving the negative economic, social and environmental impacts of those dams on the Burmese side of the border. Strong anti-dam movements in Thailand make building dams in Burma particularly attractive.

In 1998 the World Bank and World Conservation Union established the World Commission on Dams (WCD) to review the effectiveness of and establish criteria for building large dams. After two years the study found that "in too many cases an unacceptable and often unnecessary price has been paid to secure the benefits" of large dams.[6] The underestimated costs and over-hyped benefits of large hydropower dams are becoming well known across the world[7] since the WCD report and many dams are being de-commissioned. Despite this, China has been building an ever-increasing number of large dams domestically and overseas, and has become the leader in developing hydropower schemes in Burma.

The increasing need to supply power to China's growing cities in the east is driving the Chinese central government's West-to-East Power Transmission Policy. Dam building in western China and neighboring Burma fits into this policy. Chinese investment in the hydropower sector in Burma is also just one aspect of the closer economic and political relationship between the two nations. An energy industry magazine recently noted that "while western countries are staying out of Myanmar due to its poor human rights record, the Chinese government continues to pour money into it."[8]

***Map:* The Irrawaddy Basin**



The Irrawaddy River

The United Nations Environment Programme's World Conservation Monitoring Centre lists the Irrawaddy as one of the world's top thirty high priority river basins due to both its support of high biodiversity and high vulnerability to future pressures.[9] The river is home to 79 known fish species[10] and as of 2002 there were four known endemic bird areas in the basin.[11] The biodiversity of the river is still not well studied; a new species of hill stream catfish was discovered as recently as 2005 not far from the Myitsone.[12] The Irrawaddy is the fifth most heavily silted river in the world.

The Irrawaddy River flows through the heartlands of Burma. The river's basin is 413,674 square kilometers, covering a remarkable 61% of Burma's total area.[13] At approximately 2,170 kilometers long, it is Burma's most important commercial waterway.

The name Irrawaddy is believed to have derived from the Sanskrit name *Iravati*, a sacred river and minor goddess in Indian mythology.

Myitsone (The Confluence)

Song of praise for the Kachin confluence

Memorable ever pleasant Kachin homeland

Mali hka and Nmai hka flow there with beautiful and colorful surroundings

Local residents enjoy their lives

This is the lovely natural homeland of the Kachin people

Dear loving brothers and sisters

Will you forget it due to long loss of contact?

Will you be looking forward to my return?

On the river banks of Mali hka and Nmai hka

The singer's song spreads

The fascinating environment of Kachin homeland

Impressed my heart and nostalgia is felt

I will keep the music of my soul in my heart for you brothers and sisters

- Sung by L. Hkun Yi

Photo: tab

The Irrawaddy originates at the confluence of the Mali Hka and N'Mai Hka rivers in Kachin State. The headwaters of both rivers originate in the southeastern Himalayas. The N'Mai rises in the Languela Glacier north of Putao. The confluence is 28 miles (45 km) north of the Kachin State capital of Myitkyina. The river flows south through Burma's central heartland, and the country's second largest city of Mandalay.

Downstream, the delta of the Irrawaddy consists of a large and fertile plain that is 290 km long and 240 km wide. The lower part of the delta is a fragile and intricate ecosystem of mangrove swamps and tidal estuaries.[14] The delta supports a population of over three million people and provides nearly 60% of Burma's total rice production. However, many people in the delta suffer from extreme poverty caused in part by the heavy levying of taxes by the regime and a lack of land rights.[15] Private prawn farms and deforestation have destroyed the environment to such an extent that the World Wildlife Fund called the future survival of wildlife in the Irrawaddy freshwater swamp forest ecoregion "bleak."[16]

"In Burma our natural heritage includes the famous Pukpwa and Zwekabin mountains and the Mali-N'Mai confluence. If one of these treasures is destroyed, it is just as if all could be destroyed."
- Kachin pastor (Interview 30)

The confluence of the Mali and N'Mai rivers - the Myitsone

Myitsone and its cultural significance to the Kachin

The original homeland of the Kachin people is either the mountains at the source of the Irrawaddy or as far north as Tibet. According to oral tradition, the Kachin people migrated down from the mountains along the Mali and N'mai rivers. Many consider the triangle area between the two rivers as the heartland of the Kachin. Kachin take pride in this area as it is the birthplace of the Irrawaddy. Lyricists and poets have written many songs and poems about the confluence.

Tang Hpre village, located at the crossroads of the confluence, has a boat station where people transfer from Myitkyina to travel to more remote areas upstream. A main historical mission center of the Roman Catholic Church in Kachin State is in Tang Hpre as well as some other historical churches.

A Kachin legend says that the Great Spirit of the world poured water from a gold cup held in each hand, and Mali Kha (Irrawaddy) which flowed from his right is the male river; it is wide, shallow, and swift-flowing. The N'Mai Kha, poured from the left, is his sister. She has hidden depths shadowed with high cliffs and tall thick jungles. She is silent, mysterious, and dangerous. This explains the geography of both rivers today. Born as they were from gold cups, both rivers give up gold in powder or nugget form. Gold panners for a long time have sought riches from the rivers, staking out claims on the sandy banks, sleeping in small makeshift huts, living off the abundant fish and wild shoots and vegetables from the forests.[17]

The confluence of the rivers is also known as the traditional homeland of the legendary orphan brothers Hkrai Gam and Hkrai Naw. According to the legend, Hkrai Naw, the younger brother, is credited as saving the Kachin people when he bravely shot down with his bow and arrow an evil eagle that was stealing babies. He is still honored in celebration today.

"The mineral water from the deep Nam Sani Ta pool among the rocks near the confluence is regarded as part of traditional Kachin medicine. Local people and those from far away alike know about this pool." (Interview 30)

Part II: The Irrawaddy Myitsone Dam Project

The SPDC, in conjunction with Chinese partners, is planning to build a giant dam – the first on the mainstream Irrawaddy River – which will irrevocably change the nature of the river. Even though the regime has not informed local residents of the dam or publicly released any details about it, KDNG has been able to obtain various documents that demonstrate the nature and scope of the project. A document titled *Irrawaddy Myitsone Dam Multipurpose Water Utilizing Project* prepared by the Myanmar Electrical Power Enterprise and the Agriculture and Irrigation Ministry dated February 2002 (see image) provides the initial specifications of the project which are listed in the Summary box above. Recent media and publications from some of the Chinese companies involved in the project provide further detail. A timeline of the project and list of partners involved are provided on the following pages.

Summary of dam details

Concrete face rock–fill dam	
Height of dam	152 meters
Reservoir level at full capacity	290 meters
Length of dam	152 meters
Installed power	3,200 Megawatts

What will the dam be used for?

According to the main project partner, the Yunnan Power Grid Company will transmit electricity generated by the project to China via the Yunnan power network.[18] China is aggressively pursuing its options for supplying power to the Greater Mekong Subregion (GMS) power grid[19] as well as its own "west-to-east power transmission" program. The program, an important component of China's "Developing the West" strategy, aims to transmit cheap electric power from western China to energy-hungry eastern coastal areas.[20]

Speaking about the dams in Kachin State and the Shweli dam in Shan State, a Bangkok-based energy analyst commented that: "It seems unlikely that Burma has the grid distribution or infrastructure to handle so much [electricity], especially

in a remote area like Kachin State. So there is every likelihood that most of it will be delivered across the border to China."[21]

If some of the electricity *is* provided domestically, given the regime's history of electricity production and provision, it is unlikely that the local population will have access to affordable power. For example, the Lawpita hydropower station in Karenni State sends electricity to Rangoon and Mandalay, leaving local villagers in the dark. In Kachin State, the Ching Hkrang dam that was finished in 1993 provided electricity mostly to nearby military camps (see page 36).

How much money will it cost?

Engineers generally estimate that it costs US$1 million per megawatt of installed capacity to build a hydropower dam. This figure can be less if the site is a very good one or more if the project runs into unexpected problems. Using this general rule of thumb, the investment into the Irrawaddy Myitsone dam could reach approximately US$3.6 billion.

Estimated revenue from the sale of electricity

The estimated average electricity production for the Irrawaddy Myitsone Dam, according to the project's engineers, will be 16,634 million kilowatt hr (kWh) per year. It is common for engineers to put forward optimistic figures for total annual electric production of a hydropower project in order to make a project appear attractive to investors. The World Commission on Dams found that more than half of the hydropower dams reviewed generated less power than projected. Furthermore, in the context of climate change, hydropower projects face increasingly uncertain rainfall patterns that will leave some projects facing water shortages. Understanding these limitations, it is still possible to estimate the potential revenue of the project using the projected production figure and a regional example of electricity sales.

The price of electricity sold to Thailand from Laos is at present in the range of 1.22 Baht/ kWh (peak time electricity) and 1.14 Baht/ kWh (off-peak time electricity).[22] Therefore, assuming a similar sales arrangement is adopted between Burma and China, the potential *revenue* generated by the Irrawaddy Myitsone dam project from electricity sales could range between US$558 million and US$597 million per year.[23]

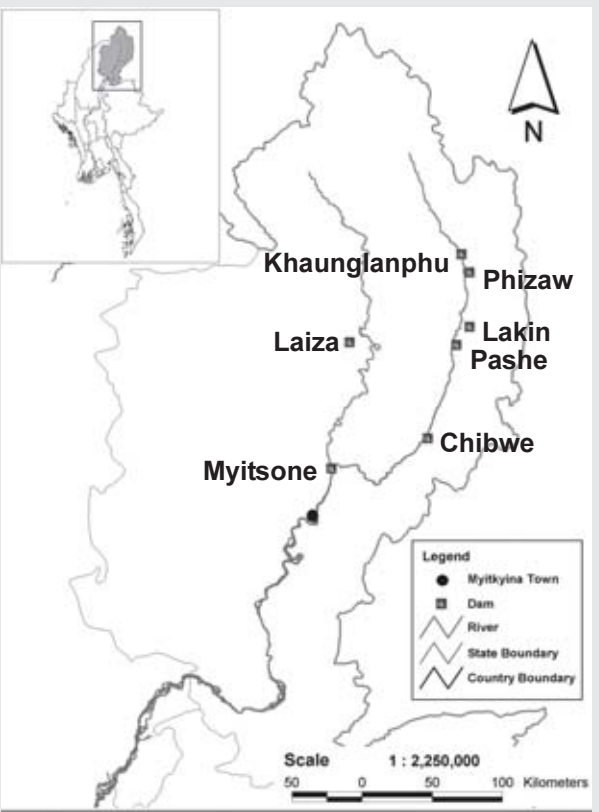
It is more difficult to calculate the profit – and the regime's share of that profit – likely to be generated by the project once debt service, operations, and maintenance have been paid for. This would depend on whether the regime will be a shareholder in the project, what payments are made under the concession agreements, water user charges, and taxes collected.

Damming the N'Mai River

In addition to the mainstream dam on the Irrawaddy, there are plans to build an additional six dams on the N'Mai and Mali rivers north of the confluence. According to a May 2007 article in the state-run newspaper *The New Light of Myanmar*:

"The Hydropower Project Implementation Department under the Ministry of Electric Power No 1 and China Power Investment Corporation (CPI) will build seven hydropower projects - a 3,600-MW-project on the Irrawaddy confluence, a 2,000-MW-project in Chibwe, a 1,600-MW-project in Pashe, a 1,400-MW-project in Lakin, a 1,500-MW project in Phizaw, a 1,700-MW- project in Khaunglanphu and a 1,560-MW-project in Laiza - in Kachin State. Upon completion, all projects are expected to generate 13,360 MW in total. This would make it the biggest hydropower venture in Burma, surpassing the power capacity of the country's biggest hydropower project, the 7,100 MW Tasang Dam in Shan State."[24]

Proposed dams on the N'Mai and Mali rivers



Sites according to place names announced in *New Light of Myanmar*

The large dams planned for the N'Mai River will irrevocably damage the ecosystem of this pristine river and inevitably affect the Irrawaddy as well. The impacts of the Irrawaddy Myitsone dam described in this report would be true of all the N'Mai dams. The scale of displacement is not yet known.

Ceremony of the MoU signing between CPI and MOEP

Marking the road to the dam site

Timeline

2002 The *Irrawaddy Myitsone Dam Multipurpose Water Utilizing Project* is prepared by the Myanmar Electrical Power Enterprise and the Agriculture and Irrigation Ministry. The Kansai Electric Power Company (KEPCO) of Japan builds a small weather station in Tang Hpre village at the confluence.

2003 A KEPCO survey team comes to the dam site twice.

Feb 2004 Villagers from Tang Hpre send letter of concern to leading Kachin organizations.

Oct 2005 Yunnan Machinery Export & Import Company (YMEC) and Kunming Hydropower Institute of Design, both of China, survey the dam site.

Nov 2005 YMEC and the Myanmar Ministry of Electricity sign a MoU for the N'mai River Basin Development Cooperation in Kunming.

Aug 2006 Suntac Technologies Co., Ltd., a Burmese company that specializes in mapping, sets up an office at a monastery in Tang Hpre village and surveys the dam site. They also set up a temporary camp at Washawng village in order to facilitate the transport of machinery from China used in the survey process. Suntac is working together with the Chinese company YMEC.

Oct 2006 Asia World Company of Burma builds a project implementation camp on a hilltop at the dam site (3 miles downstream of the confluence). Once the camp is finished, Chinese site inspectors stay there and survey the area for five months.

Dec 2006 The Ministry of Electric Power No.1 and personnel of China Power Investment Cooperation (CPI), one of China's biggest power producers, sign a MoU for the development of two dams. One is the 3,600 MW project at the Myitsone, the other is the 2,000 MW Chibwe project on the N'Mai. Asia World Company is also present at this signing ceremony (see photo).

Jan 2007 Changjiang Design Institute of China sends several groups of design personnel to carry out geological drilling, reservoir inspection, and hydrological measuring near the dam site.

April 2007 A ground breaking ceremony is held for a 65 MW power plant on Chibwe Creek that will supply power for the construction process of the Myitsone and Chibwe dams. The ceremony was opened with an address by the Northern Commander Major General Ohn Myint and the Minister for Electric Power No 1 Colonel Zaw Min.[25]

May 2007 The *New Light of Myanmar* reports that the Ministry of Electric Power No 1 and CPI will build a total of *seven* hydropower projects on the N'Mai and Irrawaddy rivers. The Chibwe plant will ostensibly supply power to the construction of all seven dams.

On May 1, an opening ceremony is held for the Supervisory Project Office of the "Maykha and Malikha Valley and Confluence Region Hydropower Projects and Chibwe Creek Hydropower Project" in Myitkyina. Representatives from the Ministry of Electric Power No. 1, the Northern Command, the Embassy of China, CPI, and Asia World Company are present.

On May 21, twelve Kachin respected elders and leaders from townships across Kachin State send an objection letter to Senior General Than Shwe.

Surveyors near the dam site

A Suntac survey truck parked near the sacred banyan tree at the confluence

***"They are testing the ground and building a road. We can see over one hundred workers and Chinese engineers at the dam site, and over ten trucks and machines."* (Interview 17)**

Recent developments at the site

Currently, China Power Investment Corporation and Asia World Company Limited are surveying and clearing the dam site, operating from their base camp nearby. About 24 local workers from Tang Hpre village cut down trees and cleared the ground for the camp; a Chinese group then moved in to survey the site.

There are now several cement markers, flags, and signboards left by survey groups from Asia World, Suntac, and the Changjiang Institute near the dam site. Boxes of core samples have also been spotted along the roadside. Local people are frightened and already altering their plans for the future.

Clockwise from top left: *A survey marker near the confluence; Suntac's survey team field manager has placed a flag at the dam site area between Seng Jau Bum and Grawm bum; core samples by the side of the road; Chinese survey camp near the confluence*

The players

SPDC agencies

Ministry of Electric Power (MOEP)

Minister Colonel Zaw Min

The Ministry of Electric Power has two ministries: MOEP 1 is responsible for generating power and MOEP 2 is responsible for distributing power. In addition, in February 2002 the Ministry created the Department of Hydroelectric Power (DOHP). The department has the mission of planning and implementing projects for hydropower to meet future power demand.[26] State-owned enterprises under the ministry are responsible for implementing power generation, transmission and distribution of electricity and can form joint ventures with foreign investors for these activities. It is MOEP 1 that has signed MOUs with Chinese companies for the development of the N'Mai and Mali rivers. Colonel Zaw Min became the Minister of MOEP 1 in May 2006.

Northern Regional CommanderMajor-General Ohn Myint

Northern Command

The Northern Regional Commander is responsible for military operations in Kachin State and part of Sagaing Division. Today there are 13 regional commanders in Burma; they sit on the ruling State Peace and Development Council. "Their influence on national policy pales beside that of the Yangon hierarchy, but in the regions they rule....Commanders vet business contracts, resource extraction, property development, schools, markets, and road- and bridge-building. They control police, security and intelligence operations; no one moves in their area without their nod."[27]

China Power Investment Corporation (CPI)

"Enthusiastic welcome" for inspection team

CPI is mentioned in *The New Light of Myanmar* as the partner of the Ministry of Electric Power in building seven hydropower dams on the confluence, and as the Project Manager of the "Confluence Region Hydropower Projects." Together with the Changjiang Design Institute (see below), CPI is involved in design outlines concerning a master

plan of the whole river basin and the construction of the Myitsone and Chibwe hydropower stations.

CPI was established from part of the constituent businesses of the former State Power Corporation of China (SP). With a registered capital of US$1.57 billion, CPI has been approved by the State Council to become a pilot state-authorized investment entity and state-owned holding corporation. It is one of China's biggest power producers.[28]

In early 2007 CPI Southern Branch set up a Myanmar Hydro Division, "highlighting the significance of Myanmar hydropower projects." The president of CPI visited the office of the Division in February 2007, "giving instructions in order to speed up progress of the Myanmar projects" that are "in compliance with the country's strategy on industry development."[29]

China Southern Power Grid (CSG)

On May 21, 2007, CPI signed a cooperation framework agreement on the co-development of hydropower projects in the "N'mai Hka River, Mali Hka River and Irrawaddy River Basins" with China Southern Power Grid Corporation, signaling that the two companies have become strategic partners on the project.[30]

CSG is a state company founded in December 2002, bringing together corporations from the five southern provinces of China. The company currently ranks 266 in the Fortune 500 Global List. CSG is in charge of the investment, construction and management of China's Southern Power Grid and the relevant transmission and distribution of power. CSG is also the executor of the Greater Mekong Sub-region power cooperation appointed by the State Council, and has been actively pushing the process of Greater Mekong Sub-region power cooperation.[31]

Photo: CPI publication

A forum on financing overseas hydropower projects hosted by CPI in March 2007

Investors

CPI has met with several banks and corporations to seek suggestions on the financing and risk management of CPI's investments abroad. These consultations included the China Exim Bank, the China Export Credit Insurance Corporation, the Industrial and Commercial Bank of China, the Construction Bank of China, Calyon Corporate and Investment Bank (French in origin), and Asia World Company.

Yunnan Machinery Equipment Import & Export Company Limited (YMEC)

Yunnan Machinery Equipment Import & Export Company Limited (YMEC) is one of the top 100 machinery and electrical products export enterprises of China. The company's total accumulated trade volume has exceeded US$700 million. YMEC has built 24 hydropower stations in Myanmar, Vietnam, and the USA.[32]

According to the *Yunnan Daily News*, YMEC and the Myanmar Ministry of Electric Power signed a Memorandum of Understanding for N'mai Hka River Basin Development Cooperation in Kunming on November 30, 2006.[33] The contents of the MoU have not been publicly disclosed and it is not clear what YMEC's role will be in relation to CPI.

Changjiang Institute of Surveying, Planning, Design and Research (CISPDR)

The Changjiang Design Institute conducts engineering surveys, planning, design, research, consultation, and supervision of "large and extra large" water conservancy and hydropower projects. It is the largest such institute in China. In addition to working on the famous Three Gorges Dam in China, CISPDR has projects in Belize, Ethiopia, Sudan, Columbia, Sri Lanka, Guinea, Fiji, Congo, and Afghanistan.

Project progress/项目动态 CPI

Changjiang Design Institute sent more people to Myanmar for field work

Since mid-March, Changjiang Design Institute has sent several group of design personnel to Myanmar for carrying out field works such as geological drilling, reservoir inspection, hydrological measuring and etc., through which the Institute has collected a great deal of first-hand information and materials for developing hydropower potentials in upper-stream Ayeyawady River Basin. What follows are some photographs illustrating their field work.

长江设计院增派设计工作人员赴缅甸项目现场工作

自三月中旬以来,长江设计院已增派多批设计工作人员赴缅甸项目现场开展地质勘探、库区调查、水文测量等工作,积累了大量有关开发伊洛瓦底江上游水电资源的第一手资料。请看现场工作相关照片。

Photo: CPI publication

Photos of CISPDR's field work in Kachin State

A team from a subsidiary of CISPDR recently finished a five month field visit to the Irrawaddy Myitsone dam site, conducting geological drilling, reservoir inspection, and taking hydrological measurements.[34] Some articles have also mentioned the involvement of the **Kunming Design Institute**, a company that does similar work to CISPDR.


Steven Law

Asia World Company, Limited

Asia World Company is one of the largest conglomerates in Burma, engaging in a broad range of business activities. Founded by the infamous opium druglord Lo Hsing Han in 1992, the company has its headquarters in Rangoon, the former capital.

Domestically, Asia World is involved in export trading, investment in infrastructure and manufacture, logistics and project contracting. Asia World is also involved in government businesses like construction contracting and material and equipment supply.[35] International businesses are mainly joint ventures.

Lo Hsing Han is currently the chairman of Asia World; his son Tun Myint Naing, aka Steven Law, is the managing director. Steven Law was refused a visa to the USA on suspicion of involvement in narcotics trafficking in 1996. The shady background of Asia World is not a hindrance to them doing business in Burma; on the contrary, the company has achieved unprecedented success under the current dictatorship.

In 1995 Steven Law married Singaporean Cecilia Ng, a business partner. Today it is estimated that more than half of Singapore's investment in Burma goes through partnerships with Asia World. Steven Law remains active in Singapore's business community, managing his father's overseas assets through three overseas branch companies of Asia World.[36]

Photo: tab


Asia World's base camp at the dam site

The exact role of Asia World in the Myitsone project has not been publicly stated, but given its past business dealings, KDNG speculates that in addition to survey work, their activities will include liaising between the Burmese generals and the Chinese companies, building roads, and supplying equipment. Asia World is also likely to benefit from resource extraction prior to the filling of the reservoir. Local villagers remark that Asia World has been testing the reservoir area for minerals and other gems in order to mine them before the flooding. Asia World has also had several logging concessions in the past and could step in to log out the reservoir area before the flood.

Suntac Technologies

Suntac's office in Myitkyina

Suntac Technologies is a subsidiary of the Suntac Group of Companies which was established in 1999 and is based in Rangoon. Suntac has been responsible for the National Spatial Database development; it also implements transportation-related engineering studies; highway and railways construction; and studies related to dams and irrigation systems.[37] Suntac is directly linked with SPDC ministries and also works for companies such as Asia World and Htoo Company, known for their corrupt involvement in illegal logging. Internationally, Suntac has worked with MDX of Thailand, involved in the controversial Salween dams, and Ivanhoe Mining, a Canadian company managing one of Burma's largest mines.

According to a CPI publication, Suntac Technologies is in charge of topographical aerial photography useful for survey maps of the dam site. From August-September 2006 Suntac transported equipment from YMEC to the dam site area and conducted surveys.

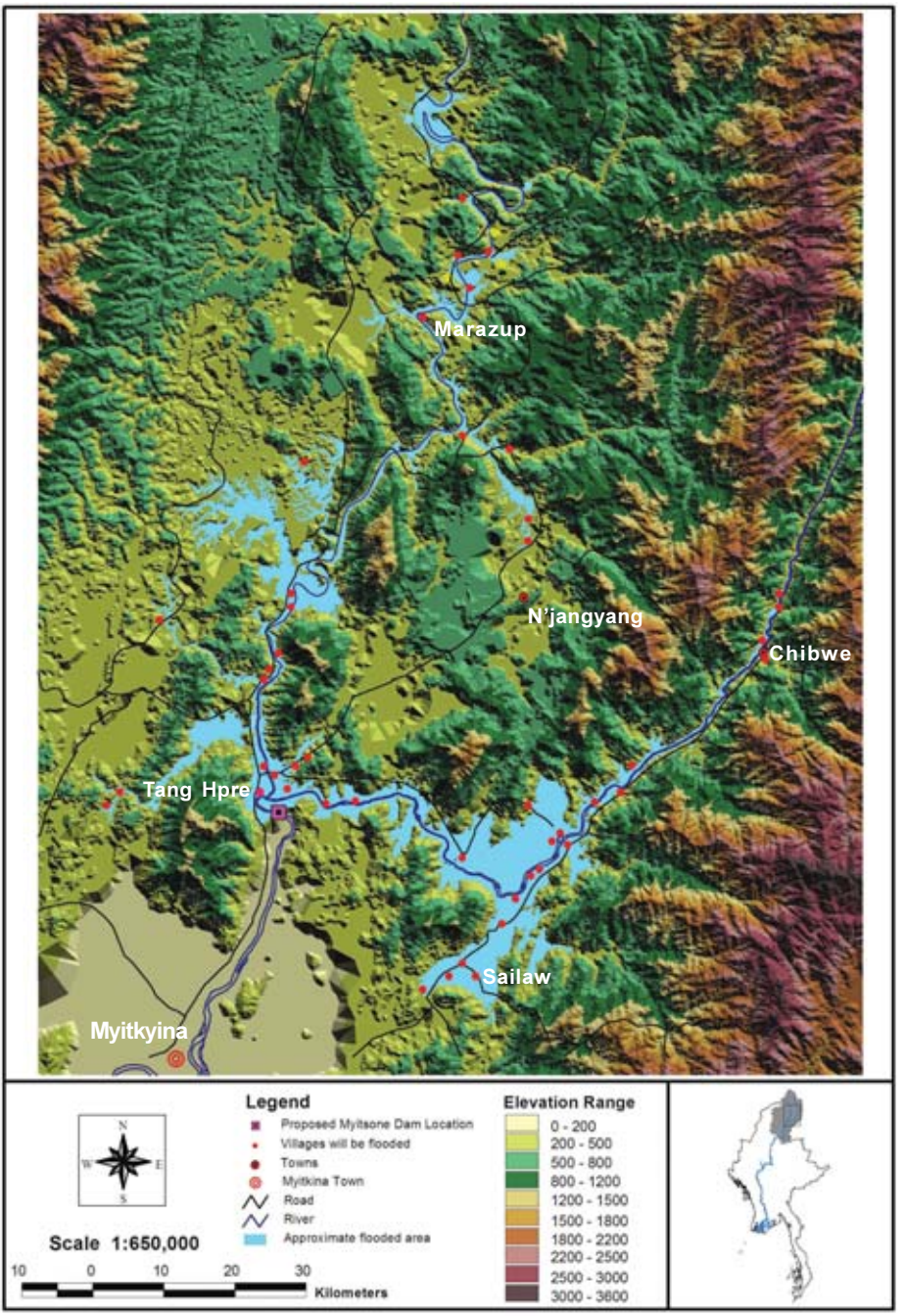
Kansai Electric Power Company, Incorporated (KEPCO)

Kansai Electric Power Company, Incorporated is one of the nine major investor-owned electric utility companies in Japan[38] and KEPCO provides technical assistance for developing several hydro-power plants in Burma. From 2003-2005, KEPCO was commissioned to study the feasibility of the Myitsone project.

In 2002 KEPCO built a small weather station in Tang Hpre village. According to a local resident: *"One villager is paid by the Myitkyina Township Weather Report Center to report from the station every month. The Kansai Company comes every year to check the station; they last came in October 2006. Kansai said if they finish their term they can sell the report to any company who will take responsibility for the next step to build the dam."* (Interview 1)

Kansai weather station in Tang Hpre

Projected flood area of the Irrawaddy Myitsone Dam



PART III: Impacts of the Irrawaddy Myitsone Dam

Once the dam is built and the reservoir begins filling, everyone living lower than the maximum water level of the reservoir will be forced to move. Their homes, farmlands, ancestral and sacred sites will go under water – they will lose their means of survival and way of life. Local livelihoods such as riverbank gardening and rice farming, non-timber forest product collecting, fishing, small-scale gold mining, and the historical tourism-related activities around the confluence will all be lost.

According to the *Irrawaddy Myitsone Dam Multipurpose Water Utilizing Project* study, the maximum water level of the reservoir will be 290 meters. Based on contours derived from 90 meter Digital Elevation Model data from the CGIAR Consortium for Spatial Information database, KDNG has projected a flood zone of all areas with ground elevation below 290 meters. This projected flood zone is 766 square kilometers, an area bigger than Singapore. The water will inundate 47 villages, displacing an estimated 10,000 people (see Appendix 4 for full list of villages).

In addition to the villages that will be submerged, many others will be impacted by the reduced farm land available, loss of forests, the influx of those displaced by the flood, and submerged transportation routes. In particular, the main route from Mytkyina to Sumpra Bum and on to Putao will be cut off as well as the road from Myitkyina to Chibwe. Construction of new roads to replace those submerged may cause additional damage to biodiverse forests.

"According to documents that Kansai left behind, if the Irrawaddy Myitsone Dam is built our village will be under water. We worry that our village will disappear; this area is important for our history, communication and natural resources."
(Interview 15)

Displacement and its aftermath

The World Commission on Dams (WCD) estimates that 40-80 million people in the world have been displaced by dams, and that women and indigenous peoples have suffered disproportionately from displacement. According to the Commission, physical and livelihood displacement leads to "landlessness, joblessness, homelessness, marginalization, food insecurity, increased morbidity, loss of common resources, and loss of social and cultural resilience." Loss of economic power with the breakdown of complex livelihood systems results in an "often irreversible decline in living standards."

Those displaced by the Irrawaddy Myitsone dam will likely migrate to the city of Myitkyina, putting a strain on the job market and provision of social services there. Some may seek new farming lands in deeper forested areas, putting a strain on the environment. Others may migrate to mining areas seeking work, exacerbating the social problems of drug use, HIV, and gambling in those areas. Ultimately, the outflow of migrants from Kachin State to neighboring countries such as China and Thailand will increase due to the Myitsone project.

The WCD noted various problems hindering proper compensation and resettlement, providing adequate and timely compensation, suitable resettlement or mitigation, and a lack of legal recourse for dam affected peoples. These problems have been experienced in countries with a working rule of law; the likelihood of *any* compensation, resettlement or recourse is very slim in Burma where the military is above any law.

***The general impoverishment of communities and the social disruption, trauma and health impacts resulting from displacement have typically had more severe impacts on women.* - WCD**

Displaced children in Karenni State
Photo KDRG

Dam displacement in Burma

To get a sense of how displacement for a dam project happens in Burma, the country's first large hydropower project in Karenni State is a useful case study. Twelve thousand people were displaced by the Mobye dam's reservoir and the Lawpita hydropower stations in the state. Many did not know that they had to move until the flood waters reached their doorsteps. Villagers were ordered to move to military-run relocation sites that were overcrowded and unhealthy. Those that could left the sites and had to impose themselves on relatives or in live in the jungle.

The pittance offered as compensation was so insulting that most refused it in anger. Farm lands were confiscated without compensation to make way for associated infrastructure such as spillways and the plants. An estimated 18,000 landmines were planted around the power stations, endangering farmers going to nearby fields and killing domestic animals. Other restrictions were placed on farmers going to fields near the stations.[39]

Cultural sites that will be submerged

Several cultural sites will be flooded if the dam is built. These include historical churches and temples. A sacred banyan tree at the confluence area will also be submerged. Some people make offerings to Spirits or *Nat* that they believe live in the tree and in order to receive blessings.

Roman Catholic Church in Tang Hpre will be submerged

Dams not only physically displace people but also impact their cultural survival. The confluence area is integral to Kachin identity and history. If the area is inundated, a place that is celebrated will be lost to future generations.

> ***"Kachin people have a responsibility to step up and demand and end to the project. If they don't, they will have a huge historical debt to pay because the confluence area is an important part of Kachin heritage."*** **(Interview 30)**

Tradtional Kachin house in Tang Hpre that will be inundated

Producing traditional medicines in Gaw Nan Village. Rich forests that are home to important herbal medicines will be flooded by the Irrawaddy Myitsone dam.

Livelihoods that will be destroyed by the flood

Gathering of forest products

Local people have been producing their own traditional medicine from locally-collected herbs for centuries, passing on knowledge of the forest and seasons from generation to generation. Some families make a living by selling herbal plants to traditional herbal medicine factories such as Bum Masum in Myitkyina, one of the most famous in Burma.

According to traditional beliefs, herbs are collected during the appropriate season. *"We gather herbal plants from January to April because this time is a very good season to collect medicine. We believe the good spirits from the forest bless the herbal plants at that time of year....We take only branches, not from the trunk of the tree, to preserve the plants to use for our future generation."* (Interview 10)

In addition to herbal medicines, some women make a living by harvesting non-timber forest products like mushrooms, various vegetables and fruits from the forest. They sell the products in the local markets and in town and are able to buy the essential needs for their kitchens like salt and oil. In this way the forest is like a bank for the local people. If the Irrawaddy Myitsone Dam is built their forest will be under water and this will jeopardize their traditional ways of survival.

Providing boat rides and vending at the Myitsone

Due to Myitsone's natural beauty and importance in Kachin culture, many people visit the area and therefore tourism is significant for local income generation. Local food and traditional craft vendors – most of them women – rely on the daily influx of tourists from Myitkyina and beyond. Others make a living providing tourists with sight-seeing tours by boat. One transporter said *"Many tourists come and want to take a boat ride for fun. I charge 10,000 kyat for 30 minutes. Just look at the how beautiful the confluence is - you can easily see why they want to come."* (Interview 13)

Farming
Most people in the flood zone grow rice in the rainy season and vegetables in the dry season. Many make a living by gardening on the fertile river banks and small islands in the rivers. Paddy fields and river bank gardens will be inundated.

Fishing

The dam will block the migration routes of fish preventing them from reaching upstream spawning areas. The number and diversity of fish in the reservoir and downstream will decline. These are some of the fish species near the Myitsone that may disappear.








Fishing: A critical local livelihood will be affected for hundreds of kilometers downstream of the dam

Livelihoods that will be impacted downstream

> *"Substantial losses to downstream fishery production as a result of dam construction are reported from around the world."* - WCD

In addition to blocking migration routes so that fish cannot reach upstream areas to spawn, the downstream impacts of dams on fisheries are also severe. The number of fish species decline due to dams: for instance, according to the Southeast Asia Rivers Network, 50 of 100 species disappeared and the remaining species dropped in numbers after the Thai government built the Pak Mun dam in the country's northeast. Changes in natural water flows make local knowledge useless; for example fisher folk in Cambodia found that they could no longer use their traditional dry season fishing gear after the Yali Falls dam was built upstream.[40]

Fishing is an important part of local livelihood and diet in the confluence area. Local fishermen catch for their family consumption and local markets. The fishing season is from October to May. During the dry season, migrant fishermen from Myitkyina travel upstream to catch and sell fish to the local vendors at the confluence and to markets in Myitkyina. Once the rains begin, fishermen put away their nets and migrants return to their home places to work on their farms. This is the beginning of the spawning season. According to local fisher folk, *"No one catches during the months when the fish are pregnant and eggs hatch out."* (Interview 16) During the peak season (April-May), fishermen

Downstream impacts [of dams] can extend for many hundreds of kilometers and well beyond the confines of the river channel. The serious implications come to the fore only after completion of the dam and a number of the impacts only develop over time.

Downstream communities throughout the tropics and subtropics face some of the most drastic impacts of large dams, particularly where the changed hydrological regime of rivers has adversely affected floodplains that supported local livelihoods through flood recession agriculture, fishing, herding and gathering floodplain forest products. The disruption of downstream economies that results from the insertion of a dam and the subsequent reduction in natural floods can create uncertainty in livelihoods and render existing skills unproductive – leading to migration, dependence on informal wage labor in urban areas and impoverishment. (World Commission on Dams)

Most fishers use two kinds of nets; flow nets thrown from boats and set nets that are left in the water for 24 hours and checked 2 or 3 times a day.

can catch up to 50 kg of fish per day, but in other times the catch is less. The biggest fish caught these days can range from 30-50 kg.

Damage to downstream floodplain farming

> *"In the rainy season there are floods and the water brings natural fertilizer. There is a big difference between fertility of the fields in the flood area and in the non-flood area. There is no need to use any fertilizer in the flood area - it comes naturally with the flood."* (Interviews 6, 17, 19)

Dams trap sediment from the river and keep it from reaching downstream areas where it normally enriches floodplain and delta productivity and provide nutrients for fish and aquatic plants. Dams also alter the natural flooding cycles, disrupting the natural replenishment of water and nutrients to wetlands and floodplain areas downstream. This will affect agricultural productivity along the Irrawaddy, the delta of which provides nearly 60% of Burma's rice.

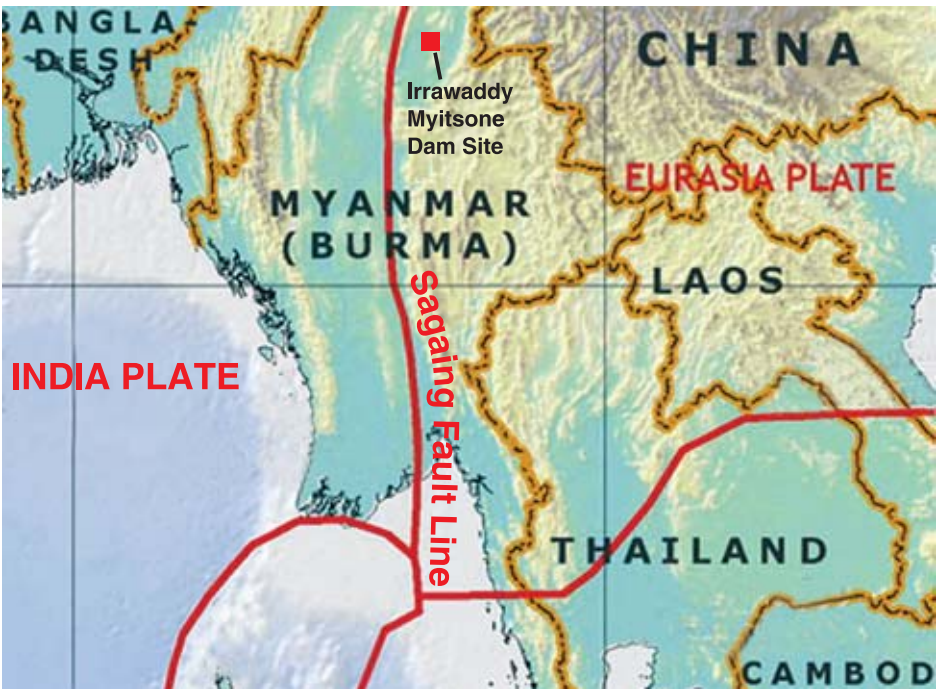
Erosion of riverbanks

Large hydropower dams create an unnatural change in water flows that causes riverbank destruction. When water is released from a reservoir it is "hungry": it wants to re-capture sediment that has been trapped behind the dam. It does this by cutting into the riverbanks, causing an increased rate of erosion.

Riverbank erosion in Cambodia caused by the Sesan Dam Photo: NGO Forum on Cambodia

Villagers along the Mekong River in Thailand have recently been losing their riverbank gardens due to erosion caused by dams upstream in China;[41] the sudden erosion of banks into the river is dangerous and has forced people to move their houses further inland. Near the Myitsone, most people grow rice in the rainy season and vegetables in the dry season. Women especially take advantage of the fertile riverbanks to grow a variety of vegetables to supplement household nutrition and income. If river banks are eroded, they will lose their ability to cultivate in the on these fertile lands.

The Washawng Dam in Kachin State breaking in May 2006; the resulting flood completely destroyed the dam



The Irrawaddy Myitsone Dam lies in an earthquake-prone area less than 100 kilometers from the Sagaing Fault Line where the India and Eurasia plates meet

Safety concerns

People in Kachin State already have the unfortunate experience of living through dam breaks. The Ching Hkrang dam, located just ten miles north of Myitkyina, broke in July 2006, after several days of heavy rains. The break flooded the village of Ching Hkrang and killed five people.The Washawng dam broke in May 2006. Neither break was reported in the media, which is strictly controlled by the military junta.

The world's worst dam disaster occurred in Henan Province in central China in 1975. Twenty years after the disaster, details started emerging that as many as 230,000 people may have died.[42]

Earthquakes

Depending on the magnitude, location and characteristics, an earthquake can also cause cracks in dams or even a dam break. According to data from the Global Seismic Hazard Assessment Program, Burma lies in a region with high to very high seismic hazard that increases steadily to the north in Kachin State and Sagaing Division.[43] The Irrawaddy Myitsone dam site is less than one hundred kilometers from the fault line running through Burma where the Eurasia and India tectonic plates meet. Earthquakes in the M7.0-8.0 range have been experienced along the Sagaing fault system. Conversely, there are also cases where large dams can *trigger* earthquakes. This is known as reservoir-induced seismicity or RIS, and is related to the extra water pressure created in micro-cracks under a reservoir.[44]

Vulnerability to floods

After extensively reviewing the effectiveness of large dam projects across the world, the World Commission on Dams found that dams have *increased* human vulnerability to floods. While some dams can stop small floods, dams can increase the damage from large floods. When a large flood occurs and the reservoir cannot hold back the water, it will spill over and make the flood very dangerous. This is of special concern in the case of the Myitsone project, as it is merely 40 kilometers upstream

Emergency measures

After the Gouhou Dam in Qinghai province broke in 1993, killing 1,200 people, China's Ministry of Water Resources issued several dam safety guidelines and regulations. The Law of Flood Control enacted in 1998 requires that emergency preparedness plans be established for each dam that is above a certain size. Plans list people to contact and actions to take in an emergency.[45] No such plans for the Irrawaddy Myitsone project have been made public, however, and there is nothing legally binding Chinese companies operating in Burma to abide by Chinese laws.

All that remains of the Ching Hkrang Dam after it was destroyed in a flood

Case study: the Ching Hkrang Dam

The biggest dam built by the military regime in Kachin State to date is the Ching Hkrang/Kyeinkran Kha Dam, located about 10 miles north of Myitkyina. It was a relatively small dam with an installed capacity of just 2.5 MW. The dam was completed in 1993 and is well known throughout Kachin State because it broke in July 2006, causing a destructive flood that killed five people.

Forced labor, "contributions" and loss of life

Preparation of the dam site and dam construction began in 1982 and involved thousands of unpaid laborers. People were organized by village tract in a rotating system of free labor provision: villagers had to cut down trees and clear and make roads and help with construction. Interviewees suggest that approximately 500 workers came to the site per month.

> *"Those who had to go and work couldn't work for their family farms and it affected the whole family's income and well-being…every worker even had to bring their own food and other materials when they went to the site, in addition to working for free… If a family could not offer a laborer, they had to pay 3,000 kyat instead. At that time 3,000 kyat was very valuable, because rice and oil prices were not so expensive then. Widows and other families that didn't have a male member also had to either work or pay money."* (Interview 25)

According to a local pastor, two workers died when cutting big trees in preparing the dam site and seven workers died from malaria because the dam site was in a deeply forested area. An unknown number got ill or injured working for the dam. There was no health care for the workers.

Broken promises

> *"We worked hard on the Ching Hkrang Dam but after all we did not get any electricity…The government said the electricity would be used first for schools, second for military, third for churches and pagodas, fourth for government officers and the local communities in general, and finally for the road lights - but in the end nothing happened as they said."* (Interview 26)

After the dam was finished, the electricity was supplied in a rotating system. Each village tract had electricity only every four days but SPDC military offices and camps had full time electricity free of charge. One villager lamented that there is only electricity in the rainy season but not in summer time. Another said: *"every summer for years students had to work on the dam for free, but when the electricity was finally supplied, the students did not benefit and still today they have to use candles to read their books and do their homework."* (Interview 27)

The dam breaks

At 2 am on July 11, 2006, the dam broke after five weeks of heavy rains. The raging water washed away the whole hydro-electric plant situated nearby, killing at least five people. The main bridge connecting Ching Hkrang village and Myitkyina was also washed away. Neither the dam nor the plant could be rebuilt or repaired.[46] According to a local resident, five houses were completely washed away in the flood. Other houses were damaged so badly they had to be rebuilt. Local villagers helped each other because house owners did not have enough money to rebuild by themselves.

Another failed project

The SPDC is always boasting how local development projects are useful but in reality there is no benefit for the local community. Ching Hkrang dam is a prime example of this: people wasted their labor and time, affecting their livelihood. In the end, they received no benefit from the electricity supply.

***"I believe that most of the local people are very disappointed with the dam. The local communities had expectations for electricity and it did not happen and now the dam is already destroyed."* (Interview 25)**

from the city of Myitkyina. Severe flooding has been getting worse in the area recently; some have attributed this to the destructive gold mining along the river banks which has changed the direction of the rivers' flows as well as deforestation that has diminished a natural mitigation of floods. In July 2004 the city was inundated, impacting 19,000 people and leaving local community-based organizations and churches scrambling to provide for the sick and homeless.[47]

Sudden water surges

Whether or not the reservoir overflows or the dam breaks, the production of electricity at the dam site will cause unnatural releases of water from the reservoir. Dam operators upstream will decide when they need to release water depending on power generation needs (which may be determined as far away as in China). When the water is released, water levels can increase rapidly and people using the river downstream may not get any warning. People have lost their boats and fishing gear, and some have even drowned, from such water surges.[48]

Notable dam-induced floods

Italy, October 1963: The Vaiont Dam, one of the world's tallest, set off earthquakes as soon as its reservoir began to fill. One tremor set off landslides that plunged into the reservoir, creating a huge wave that overtopped the dam by 110 meters. About two minutes later, the town of Longarone was leveled and almost all its 2,000 inhabitants killed.

Pakistan, September 1992: Operators of the Mangla Dam opened its spillway gates without warning. A wall of water, described by eyewitnesses as seven meters high, rushed into villages and army garrisons below the dam, killing over 500 people.

Canada, July 1996: Flooding in the Saguenay Valley in Quebec killed seven people and forced the evacuation of nearly 16,000. It was the most costly flood in Canadian history. A government commission found that the floods were worsened by improper operation and failure of dams and embankments.

Nigeria, September/October 1999: Operators of the Kainji, Jebba and Shiroro dams opened their gates causing severe flooding along the Niger and Kaduna rivers. Reports cite as many as 1,000 dead and 300,000 people affected.

China, May 2004: Eighteen were killed when heavy rains broke the temporary cofferdam at the construction site of the Dalongtan Dam on the Qingjiang River in Hubei Province.

Brazil, June 2004: The two-year-old Camará Dam ruptured and flooded the towns of Alagoa Grande and Mulungu. Five were killed and 800 families made homeless.

Pakistan, February 2005: Five dams burst after torrential rains. The biggest – the 35-meter Shadikor Dam – killed at least 80, injured many more and left 4,000 families homeless. The Shadikor Dam was only two years old.

* *Before the Deluge: Coping with Floods in a Changing Climate*, International Rivers Network

Environmental damage

A prominent scholar described the Irrawaddy as "among the world's greatest rivers, in terms of discharge and length and thus in terms of the biodiversity it might support."[50] The Irrawaddy is one of the five great rivers in the Mekong subregion (along with the Mekong, Salween, Chao Phraya, and Red rivers). Maintaining the ecosystem integrity of enormous watersheds is critical to both the unique flora and fauna within them and to the human populations that rely on them.[51] Large dams, however, destroy ecosystem integrity, fragment riverine ecosystems, isolating populations of species living up and downstream of the dam and cutting off migrations which can contribute to inbreeding from smaller genetic pools. They also isolate the river from its floodplain, releasing water from the reservoir that has less sediment and a changed chemical composition.[52]

Kachin State is located on the border between two of the most bio-diverse and threatened ecological regions on earth: the Indo-Burma and South Central China "hotspots." These regions each contain at least 1,500 species of vascular plants as endemic species and have lost at least 70 percent of their original habitat.[53] The Indo-Burma hotspot is designated as one of the eight "hottest hotspots," with 7,000 endemic plant species.

In addition to the global biodiversity "hotspot" designation, the confluence of the Mali and N'mai rivers falls within the Mizoram-Manipur-Kachin rain forests, one of the 200 ecoregions recognized by the World Wide Fund for Nature (WWF) as outstanding examples of biodiversity.[54] This ecoregion is at a "biogeographic" crossroads: animals and plants found in the Indian, Indo-Malayan, and Indo-Chinese regions converge here, hence it has high biodiversity. Rugged mountains and hills give way to broad, moist valleys. The region's largest predator, the tiger, shares this ecoregion.

> Dams are a type of infrastructure development with potentially major impacts on biodiversity. Dam construction can inundate riverine habitats upstream, and alter seasonal flow regimes and natural sedimentation processes downstream. In addition, dams can have direct impacts on fish migration routes and access to spawning grounds....dam construction can also have indirect impacts on biodiversity, for instance relocation of human communities into areas where they place additional pressure on natural resources.[49]

Burma supports at least 1,027 bird species, a greater diversity than any other country in mainland Southeast Asia.[55] Endemic bird areas follow the Irrawaddy's course; as of 2002 there were four known endemic bird areas in the

basin.[56] The central Irrawaddy is an important wintering and staging area for migratory waterfowl from Tibet and other areas north of the Himalayas. Changes to water quality and the number of fish species will impact bird life, perhaps making extinct birds that can be found nowhere else in the world.

Enivornmental impact and the law

The Environment Protection Law of China requires that an Environmental Impact Assessment *and* a Social Impact Assessment be conducted for dam projects. By law they are required to be undertaken as part of the project evaluation and justification studies. In the design phase, the EIA and SIA must be performed and the results incorporated into the project design.[57]

There is no EIA or SIA requirement by *Burmese* law, however. In October 2006 the SPDC passed the Conservation of Water Resources and Rivers Law (CWRRL). The law has a few provisions requiring Ministry of Transport approval on projects that might impact the course of rivers, water quality and environmental impact in general. The Myanmar Directorate of Water Resources and Improvement of River Systems is also obliged to ensure that river environs are not adversely affected. The details of the process for appropriate approvals under this law, however, are not yet known and no specific rules and procedures for preventing negative effects have been issued. There is no consolidated environmental law in Burma.[58]

To date there has been no publicly available environmental assessment of the potential impacts of the Irrawaddy Myitsone dam project; it is doubtful that such an assessment has been conducted at all.

Irrawaddy dolphins under threat

The Irrawaddy dolphin (*Orcaella brevirostris*) is one of only four species of river dolphins in the world. Their habitat consists of only three river systems – the Mahakam of Indonesia, the Irrawaddy, and the Mekong of southern Laos, Cambodia, and Vietnam. The dolphins reach 2-2.75 meters in length and are dark blue to dark gray.

Irrawaddy dolphins have a unique cooperative fishing relationship with humans. In Burma, fishermen summon the dolphins by tapping the sides of their boats; the dolphins then herd fish into the fishermen's waiting nets and the catch is shared with the dolphins. This unique partnership offers science an amazing opportunity to study the relationship between man and animal.

However, the Irrawaddy dolphin was listed as critically endangered by The World Conservation Union (IUCN) in 2004. The dolphins' habitat in the Irrawaddy has declined nearly 60% in the last century, and the best estimate of the current population is just 59 individuals.[59] Burma's regime has established a 72 kilometer protection zone for the dolphins between Kyaukmyaung and Mingun, approximately 330 km from the dam site, but there is a dearth of public information on how the protection zone is working.

The loss of prey due to disturbances in fish migration patterns, the degradation of water quality, and the change in river hydrology caused by the Irrawaddy Myitsone dam and the proposed dams on the N'Mai River upstream may become a serious threat to the already endangered and special Irrawaddy dolphins. The bioaccumulation of mercury, made worse by a reservoir upstream, is also a serious potential threat. According to the World Conservation Union, in addition to gillnet entanglement, habitat degradation, and the bioaccumulation of mercury:

> "possibly the most significant threat to river dolphins and porpoises is the construction of large water development structures, *most notably dams*, barrages, and levees. The environmental consequences of water development projects are significant and far reaching. These structures fragment populations and reduce the environmental complexity that makes rivers suitable for aquatic species. Water development proceeds, however, with little understanding or concern about the effects on cetaceans, or on the assemblage of other life that shares their habitat."[60]

Children in Kachin State live under one of the worst healthcare systems in the world

Health risks

Stagnant water fosters disease

The dam will block the free-flowing Irrawaddy, creating a stagnant lake where insects, snails, and other animals that carry water-borne disease parasites can thrive. The increase in the incidence of schistosomiasis, or bilharzia, a disease caused by parasitic worms, is connected to the construction of dam projects. The worms cause various illnesses, from debilitation and fatigue, skin infections, and liver damage to epilepsy, kidney failure, and cancer. Schistosomiasis infection makes people more likely to catch other diseases also.[61] In addition to schistosomiasis, the WCD notes that "most reservoir and irrigation projects undertaken in malaria-endemic areas increase malaria transmission and disease."

A mercury-laden reservoir releases toxins to downstream communities

As the water sits in the reservoir, bacteria feeding on the rotting biomass transform any mercury in the water into methylmercury, a central nervous system toxin. As methylmercury passes up the food chain, it becomes increasingly concentrated.[62] Methylmercury exposure in the womb, which can result from a mother's consumption of fish and shellfish that contain methylmercury, can adversely affect a baby's growing brain and nervous system, impacting cognitive thinking, memory, attention, language, and fine motor and visual spatial skills.[63] Scientists have become increasingly aware of the accumulation of mercury levels in fish in reservoirs and high blood mercury levels of people living downstream of dams.[64]

According to the report *At What Price* by Images Asia and the Pan Kachin Development Society, the upper Irrawaddy, Mali and N'Mai rivers have been a main center of big gold mining in Kachin State since 1999.[65] These gold mining areas are upstream of the dam and indicate that the area *already* has elevated mercury levels. Indeed, relatively high levels of mercury were found in 22 fish species along the entire length of the Irrawaddy in 2003.[66] Any mercury accumulated in the area will be trapped behind the reservoir where it will be transformed to methylmercury. When the water is released, people living

downstream will be exposed to the contaminated water and fish. This will especially impact the 140,000 living just 28 miles downstream in Myitkina, but also the countless millions living along the Irrawaddy throughout Burma. Birds and other mammals that eat fish will also be affected.

Health vulnerability at dam construction sites and among the displaced
Increased health problems, especially the introduction and spread of HIV/AIDS, at dam construction sites and surrounding communities is a growing concern in dam projects around the world.[67] The traumatic disruption of life caused by displacement also increases health risks. The WCD notes that "among the resettled, access to drinking water, health services and ability to cope with new social and physical environment determines health conditions."

A broken healthcare system
The World Health Organization ranks Burma's healthcare system as one of the worst in the world. UNICEF reports that government spending on healthcare in Burma amounts to US$0.40 per citizen per year, compared to US$61 in Thailand. HIV/AIDS gets a pitiful $137,000 per year for 52 million people.[68] Given the abysmal condition of health care in Burma, increased disease rates due to the dam project will jeopardize the entire community's health.

Dangerous tailings from gold mining on banks of the Mali and N'Mai rivers will concentrate in the dam's reservoir and then be released in a more toxic form to communities downstream

Militarization

Between 1992 and 2006, the number of Burma Army battalions stationed in Kachin State increased from 26 to 41 and the number of artillery units increased from 3 to 7. There has also been an extensive establishment of military outposts in the state since 1994.[69]

Soldiers being brought in for the security of large-scale projects, including dams, is commonplace in military-ruled Burma. The Lawpita hydropower project in Karenni State, for example, witnessed an expansion of Burma Army battalions around the project site during and after construction. An increase in troop levels often results in increased pressures and harassments on local people, including extortion, land confiscation, and forced labor. It has been documented that increased troop presence leaves women particularly vulnerable to abuse.

In September 2006, Light Infantry Battalion 29 with an estimated 500 soldiers relocated from Lay Kong south of Myitkyina to Palana, north of Myitkyina. Palana is only about 20 miles from the Irrawaddy Myitsone dam site. Over 50 households that lived near the new battalion's camp were forced to relocate by order of the Northern Commander. The villagers were forced to leave their homes with no compensation.

Villagers report that currently Asia World's implementation camp has been fenced off and a private guard with a gun stands at the entrance gate to the camp. As the project grows, it is unclear whether or not Burma Army soldiers will be used to secure the dam site and/or associated infrastructure.

Risks for women

Sexual violence by Burma Army troops

Sexual violence committed by Burma Army troops against women in ethnic areas has been documented in many reports.[70] The vast majority of rapes committed by Burma Army soldiers go uninvestigated and perpetrators are not charged. This was true of soldiers providing security for the Lawpita hydropower project in Karenni State.

In February 2007 four school girls aged 14-16 were gang-raped by three army officers and four soldiers in Putao in northern Kachin State. The *girls* were sentenced for prostitution and only released after the case caused international outcry.[71] No details are available about whether the alleged rapists were charged. In the current atmosphere of impunity and state-sanctioned violence against women, there is grave concern for the safety of local women in the project area following increased deployment of soldiers to ensure security of the dam.

Displacement and gender differences

Displacement and resettlement from dam projects affect women differently than men. Displacement breaks up existing communities and extended family networks; because women tend to be less mobile than men, the breakdown of family, village and social units affects them much more severely. Once resettled, the greater mobility of men makes it easier for them to seek waged work in towns or alternative jobs as compared to women.[72]

In his study for the World Commission on Dams, Marcus Colchester writes that after resettlement: "Overall, incomes declined, gathered foods became scarcer and firewood hard to find. The women found it hard to carry on their traditional weaving and basketry, as they had lost access to forests from which to collect the materials….Compensation, which should have been paid to both men and women as co-owners of the land, was only paid to male heads of household. Some husbands abandoned wives, taking the money and setting up house with other women. In some cases women-headed households, widows for example, were excluded from compensation."[73]

The World Bank also acknowledges that women are harder hit by resettlement than men since they are more likely to earn their living from small businesses located at or near their residences. Women may also be affected disproportionately in rural areas since they are more often dependent on common property resources.[74]

Rise in the sex industry

In its detailed study of the gold mining industry in Hugawng Valley, KDNG documented that an influx of transient workers living in squalid conditions, coupled with limited job opportunity and low wages for women, cultivate an expanding sex industry in those areas. A large-scale construction project such as building a dam at Myitsone will likely produce similar if not worse social conditions. Women who work in the sex industry or are forced into prostitution face the dangers of violence and disease as well as the trauma of community censure. The possibility of HIV/AIDS spreading in the project area, where public health services are very poor, is of concern for the wider community.

Vulnerablity to trafficking

The Irrawaddy Myitsone dam is expected to leave an estimated 10,000 people displaced. These migrants will seek employment elsewhere. The Kachin Women's Association Thailand (KWAT) has documented how poverty and lack of employment opportunity leave women vulnerable to trafficking. In its study *Driven Away*, KWAT described how women desperate for work are tricked into following traffickers in search of legitimate work only to find themselves trapped in a cycle of involuntary sex work or sold as wives to Chinese men across the border. This pattern, already in practice in Kachin State, will worsen should the number of desperate migrants increase due to the Irrawaddy Myitsone dam project.

Our Homeland

The most pleasant and glorious homeland of ours,

The site where Mali hka and Nmai hka join together

It is surrounded by snow mountainous and green forest hills,

The mist and the cloud encompass this location

Here, beautiful flowers are blossoming

Rivers and streams flow eternally

Birds and cuckoos fly around,

Cool and pleasant is our homeland

Welcome everyone, just for a visit

Unforgettable Kachin culture which can never be satisfied to observe,

Awesome scenic views and natural sights, precious jade and wildlife abound

All kinds of fruits and crops are abundant

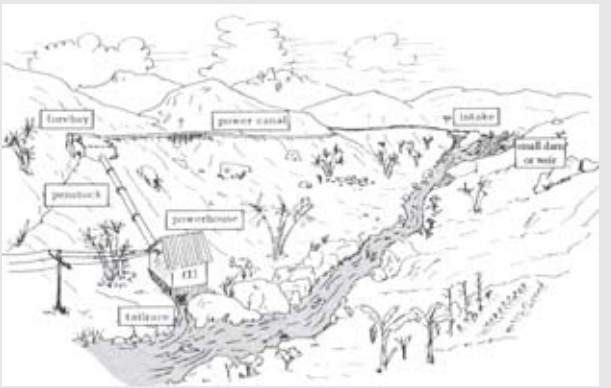
As long as the Irrawaddy (Mali hka) river flows

The love of the ethnic Kachin will never cease

- *Sung by Zung Ki*

Small hydro power (SHP): a better alternative

Small hydropower (SHP) can be tapped from small streams, medium and large rivers and is an environmentally-friendly source of energy generation. SHP, defined most frequently as generating less than 10 MW of power, has very little negative impact and can provide needed power to remote locations.



Inversin, A. R. *Micro-Hydropower Sourcebook*

In small hydro systems, water is diverted through a channel to a turbine where it strikes the bucket of a wheel, causing the turbine to rotate. The rotating shaft is connected to a generator which converts the motion into electrical energy.[75] They require no large dams or reservoirs and thus no displacement or submergence of forests and farm fields.

Rural communities in Burma and Kachin State are utilizing the appropriate technology of small hydropower to realize their electricity needs on their own. In fact China is a leader in SHP generation, with 43,027 small hydro power stations as of 2006.[76] The policy of "self-construction, self-management, and self-consumption" has been guiding small hydro development in China since the 1960s. The concept of decentralized management and the right of local people that invest in small hydro to manage and utilize the electricity generated needs to be promoted in Burma. Yet the military regime insists on building large dams and Chinese companies are assisting them in doing this.

PART IV: Conclusion

> *"The government has not officially informed us. When Asia World came they informed the village head that they would be doing work in the area, but they didn't tell the villagers themselves what they are doing and why."* (Interview 14)

The military regime has not officially informed the local people about the Irrawaddy Myitsone dam plans. However, villagers have seen many groups of survey teams come and go, and some have realized that the dam will be built. One Japanese survey team left behind some documents detailing the dam plans in Tang Hpre village and others learned that way.

After seeing some of the documents, including a map that showed the reservoir area, villagers from Tang Hpre wrote a letter of concern to leading Kachin organizations "to take necessary action to stop the dam and to submit the issue to authorities concerned" in January 2004. On May 21, 2007, twelve respected elders and community leaders sent an open letter to Senior General Than Shwe objecting to the dam construction (see Appendices). To date, neither letter has received a reply.

The World Commission on Dams has recommended that before making a decision to build a dam, the needs for water, food and energy should be clearly assessed. All options should be considered, and the first priority should be improving the efficiency of existing systems. Those who would be affected should be involved in decision-making processes and should be among the first to benefit from projects. No dams should be constructed without the acceptance of affected people. Indigenous and tribal peoples should be given special consideration.[77] In addition to WCD criteria, the Water Law of China encourages public participation in all stages of planning and review of projects.[78] However, a process that involves local participation is not happening with this project.

The Kachin Development Networking Group (KDNG) joins those who have already spoken out to call for an end to the Irrawaddy Myitsone dam project. The ruling military junta is promoting mega-development that places all the costs and risks on disenfranchised peoples while simply fortifying military control. Small-scale alternatives that recognize the rights of local communities and empower them to participate and manage resources are possible. China is an important neighbor that can be a positive influence in the region. KDNG therefore calls on China to abide at least by its own standards when operating in Burma and to heed the voices of affected peoples.

footnotes

[1] *Valley of Darkness: Gold mining and militarization in Burma's Hugawng Valley*, KDNG, 2007.

[2] "Myanmar commits to building more hydropower plants," Xinhua, May 7, 2007. The megawatt is a unit for measuring power corresponding to one million watts. For reference, about 2,000 computer systems use 1 megawatt of power.

[3] http://www.energy.gov.mm/efficiency_conservation_sustainability.htm, *Greater Mekong Subregion Atlas of the Environment*, Asian Development Bank, 2004.

[4] "Legal aspects of hydropower projects in Myanmar," *Hydropower and Dams*, Issue One, 2007.

[5] "Govt goodbyes gas for hydropower," *The Myanmar Times*, July 10 - 16, 2006.

[6] *Dams and Development - A new framework for decision-making*, The report of the World Commission on Dams, 2000, hereafter WCD.

[7] "Dam the consequences - Big, bad dams return to South-East Asia," *The Economist*, June 13, 2007. The article also notes that "Big dams such as the ones Myanmar is building along its Salween River, and Laos's proposed Don Sahong dam on the Mekong, seem likely to be forced through regardless of the suffering imposed on locals or the damage to the rivers' delicate ecosystems. It does not matter whether the World Bank or ADB are prepared to finance such projects, the two authoritarian governments know they can turn to their unscrupulous and power-starved neighbours, especially China, to stump up the cash."

[8] "Myanmar's Push for Hydropower," *Energy Tribune*, February 23, 2007, at www.energytribune.com/ articles.cfm?aid=400.

[9] WCMC Biodiversity Series No. 8 Freshwater Biodiversity: a preliminary global assessment, World Conservation Monitoring Centre, 1998. One of these pressures is dams. The report notes that "dams affect flow regimes, often dramatically, and destroy large areas of exiting habitat…they have particularly significant impacts on fish that migrate down or up river systems to breed."

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[12] "*Amblyceps Carinatum*, a new species of hillstream catfish from Myanmar (Teleostei: Amblycipitidae)", *Raffles Bulletin of Zoology*, 2005 53(2): 243-249, December 31, 2005. The article also mentions that the pattern of certain catfish found in the Irrawaddy and the Mekong is unusual since the Irrawaddy is more like the Ganges river system. This could indicate that the river is a crossroads of different biogeographic regions.

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[14] *Greater Mekong Subregion Atlas of the Environment*, Asian Development Bank, 2004.

[15] "Irrawaddy's bounty is its people's curse," in *The Nation*, January 24, 1997.

[16] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im0116_full.html

[17] The legend varies: some say the Great Spirit poured water from one gold and one silver cup; the relation between the rivers also varies. Please see *The Kachins: Religion and Customs,* A. Gilhodes, 1996 and http://www.pandaw1947.com/irrawaddy_river.htm

[18] *Myanmar Hydroproject Report*, China Power Investment Corporation Myanmar Hydro Division, April 2007.

[19] More information can be found on the website of China Southern Power Grid at www.csg.cn

[20] "West-to-east Power Transmission Program Well Underway in SW China," *People's Daily Online*, January 10, 2003.

[21] "China to Build Dams in Northern Burma," *The Irrawaddy Business News*, *February 2007.*

[22] *Power System Development Plan for Lao PDR*, Maunsell and Lahmeyer International, 2004, page 89.

[23] Exchange rate assumed to by 1US$ = 34 baht. In the case of Lao, payments are made 50% in Thai Baht and 50% in US$.

[24] *China eyes second dam on Thanlwin*, The Myanmar Times, Volume 19, No. 366, May 14 - 20, 2007, "China firm to build Myanmar hydro-power plants," *AFP*, May 5, 2007.

[25] *China eyes second dam on Thanlwin*, The Myanmar Times, Volume 19, No. 366, May 14 - 20, 2007.

[26] "Hydropower plays a leading role in Myanmar's power development plans," International Journal of Hydropower and Dams, Issue Two, 2005.

[27] From "Who Rules on the Ground? The power of Myanmar's area commanders," at http://www.asiaweek.com/asiaweek/magazine/99/0903/nat_myanmar.html

[28] http://eng.cpicorp.com.cn/channel.do?cmd=show&id=5

[29] *Myanmar Hydroproject Report*, China Power Investment Corporation Myanmar Hydro Division, April 2007.

[30] http://eng.cpicorp.com.cn/news.do?cmd=show&id=24580

[31] Information from http://finance.mapsofworld.com/company/c/china-southern-power-grid.html and www.csg.cn

[32] http://www.ymec.com.cn/en/about.htm

[33] www.yndaily.com/html/20051201/news_88_714449.html

[34] http://www.cjw.com.cn/index/civilization/detail/20070530/88736.asp

[35] Asia World Company is one of the main companies contracted by the government to build facilities in and around the new capital Pyinmana (Neypyidaw).

[36] Information on Asia World was researched by Hkun Sam of the *Irrawaddy* and draws on the article "Hanging drug couriers but investing with their suppliers," in *The Nation,* October 20, 1997.

[37] http://www.suntactechnologies.com/

[38] http://www.japancorp.net/company_show.asp?compid=453

[39] *Dammed by Burma's Generals: The Karenni Experience with Hydropower Development from Lawpita to the Salween*, The Karenni Development Research Group, 2006.

[40] *Down River, The consequences of Vietnam's Se San River Dams on Life in Cambodia and their meaning in international law,* The NGO Forum on Cambodia, 2006.

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[43] http://asc-india.org/maps/hazard/haz-myanmar.htm, last accessed June 22, 2007.

[44] *Silenced Rivers, the Ecology and Politics of Large Dams*, Patrick McCully, 2001, p. 113-114.

[45] Experience with Dams in Water And Energy Resource Development In The People's Republic Of China," China Country Review Paper prepared for the World Commission on Dams (WCD) by Professor R. Fuggle and W.T. Smith, 2000.

[46] *Dam burst kills five in northern Burma's Kachin State,* Democratic Voice of Burma, July 12, 2006.

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[48] *Down River, The consequences of Vietnam's Se San River Dams on Life in Cambodia and their meaning in international law,* The NGO Forum on Cambodia, 2005, "Death toll rises in Indian dam tragedy," 12 April 2005, www.waterpowermagazine.com

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[50] "Large-scale hydrological changes in tropical Asia: prospects for riverine biodiversity," David Dudgeon, in *Bioscience*, September 2000.

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[52] *Silenced Rivers, the Ecology and Politics of Large Dams*, Patrick McCully, 2001.

[53] The hotspots were first studied and published in 1988 by Dr. Norman Meyers. Over the years the study has been updated. The latest revision is a book titled *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions.* It can be found at http://multimedia.conservation.org/cabs/online_pubs/hotspots2/cover.html

[54] http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/im0131_full.html

[55] *Myanmar: Investment opportunities in biodiversity conservation*, Birdlife International, 2005.

[56] Irrawaddy Watershed, EarthTrends/World Resources Institute, 2002.

[57] Experience with Dams in Water And Energy Resource Development In The People's Republic Of China," China Country Review Paper prepared for the World Commission on Dams (WCD) by Professor R. Fuggle and W.T. Smith, 2000.

[58] "Legal aspects of hydropower projects in Myanmar," in *Hydropower and Dams*, Issue One, 2007.

[59] Smith, B.D. & Beasley, I. 2004. *Orcaella brevirostris* (Malampaya Sound subpopulation). In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 21 June 2007.

[60] Occasional Paper No. 23 Biology and Conservation of Asian River Cetaceans, accessed at http://www.iucn.org/themes/ssc/publications/rivercetacean.htm

[61] Information on Schistosomiasis from *Silenced Rivers, the Ecology and Politics of Large Dams*, Patrick McCully, 2001.

[62] WCD p. 118.

[63] http://www.epa.gov/mercury/effects.htm#meth. Minamata disease was first discovered in 1956, caused by the release of methyl mercury in industrial wastewater. This highly toxic chemical bioaccumulated in fish which when eaten by the local populace resulted in mercury poisoning. As of March 2001, 2,265 victims had been officially recognised (1,784 of whom had died) and over 10,000 had received financial compensation. Minamata disease is considered one of Japan's top four Big Pollution Diseases.

Symptoms of the disease include numbness in the hands and feet, general muscle weakness, and damage to hearing and speech. In extreme cases, insanity, paralysis, coma and death follow within weeks of the onset of symptoms. Information from http://en.wikipedia.org.

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[66] Smith, B.D. & Beasley, I. 2004. *Orcaella brevirostris* (Malampaya Sound subpopulation). In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 21 June 2007.

[67] For example, in the case of the Kariba dam in South Africa, the influx of immigrants during construction and the resulting urbanisation increased levels of sexually transmitted diseases and, more recently, HIV-AIDS prevalence rates which have negatively affected local women. In the Lesotho Highlands Project Area, infection rates are far higher than in surrounding areas. *Dams and Development - A new framework for decision-making*, The report of the World Commission on Dams, 2000.

[68] "Aid and sanctions in Burma," Boston Globe, June 16, 2007.

[69] *Valley of Darkness*, KDNG, 2007.

[70] Sexual violence against women by Burma Army troops, especially in ethnic minority areas, has been documented in several reports. Please see: *License to Rape: The Burmese Military Regime's Use of Sexual Violence in the Ongoing War in Shan State,* Shan Women's Action Network, 2002, *Shattering Silences,* Karen Women's Organization, 2004, *Catwalk to the Barracks,* Woman and Child Rights Project in collaboration with Human Rights Foundation of Monland, 2005, *Unsafe State,* The Women's League of Chinland, 2007.

[71] "Jailing of four minor girls gang-raped by members of the military, Case MMR 090307.CC.VAW," the International Secretariat of the World Organisation Against Torture, March 9, 2007.

[72] *The Impact of Dams and Resettlement on Women's Lives*, Carol Yong, www.wrm.org.uy/bulletin/79/dams.html

[73] *Dams, Indigenous Peoples and Ethnic Minorities*, Prepared for the World Commission on Dams (WCD) by Marcus Colchester - Forest Peoples Programme, November 2000. It should be noted that in the past compensation for displaced persons in Burma has been non-existent or negligible.

[74] *The Relocation Component in Connection with the Sardar-Sarovar (Narmada) Project,* World Bank, Washington DC, 1984.

[75] "What is small hydro?" from the International Small Hydro Atlas at http://www.small-hydro.com/index.cfm?fuseaction=welcome.whatis

[76] *Development of Small Hydro,* G. Baidya, presented at the Himalayan Small hydropower Summit, October 2006.

[77] For more information on the WCD recommendations, visit www.dams.org

[78] Experience with Dams in Water And Energy Resource Development In The People's Republic Of China," China Country Review Paper prepared for the World Commission on Dams (WCD) by Professor R. Fuggle and W.T. Smith, 2000.

Appendix 1: Objection letter from Kachin leaders

Date: May 21, 2007
To: Chairman of State Pace and Development Council (SPDC)
Neypyidaw

Subject: Require to stop the Myitsone dam

(1) Concerning the above mentioned subject, we community leaders request you to stop the building of a dam at the Myitsone area.

(2) According to the *New Light of Myanmar* in May 2007, there will be hydropower projects at 7 locations east and northeast along the N'mai and Mali rivers, including the Myitsone dam.

(3) The area where the Myistone hydropower project is planned is based close to the corner zone of Tang Hpre village tract, 26 miles from capital city of Mitykyina.

(4) Tang Hpre village is based between N'Hkai Mountain and the confluence. If we cross the Mali Hka from Tang Hpre we immediately reach the N'Mai Hka and Mali Hka triangle. From Myitsone there are 9 villages connected to N Jang Yang Township. Tang Hpre and N Jang Yang Township are at the same elevation.

(5) The population of Tang Hpre village is 1,046 in 187 households. There is one elementary school, one cooperating high school, and one medical room in Tang Hpre village. There is one police station, one communication station and the weather center. Moreover there is a government hall, three local churches, one Roman Catholic sister church, one temple and pagoda. The people living at the triangle of the N'mai Hka and Mali hka are farming and some are living from local businesses and marketing. Some tourists come to see the beauty of the Myitsone area and the local people also get income from these tourists.

(6) Mountain streams flow down to the Mali and N'mai rivers. In the rainy season usually those streams have high water levels and there are landslides along the rivers. Trees from the area flow down with the river and the local people who live along the river can get the wood for cooking. The government's projects have caused destructive floods. For example the Wa Shawng and Chying Hkrang dams were destroyed by floods. Many destroyed materials from Chying Hkrang dam flowed down with the flood.

(7) If the dam is built at Myitsone there will be big flood and all local people who live along the river will face big problems. Our natural resources will also be destroyed by the flood. The local people will lose their livelihood and means of survival. The motorcar road heading to the north will be submerged and a new one will have to be built.

(8) The Irrawaddy River is the heart of Burma flowing from north to south throughout the country. It is rich in heritage forests and natural resources. The Irrawwaddy offers survival to the Kachin people as well as to the Burmese people. The Burmese people must preserve the valuable natural resources and cultural heritage of the Irrawaddy. We must maintain these for the new generations.

(9) As man made projects are full of flaws, the Myitsone hydropower project will not be maintained for the long term. If it breaks it will destroy Myitkyina and Waimaw townships. The lives of the large populations there depend on the quality of the dam construction.

(10) We hope that we don't need to build these kinds of large hydropower projects in Kachin State for local development. There are many different ways to supply the electricity from small-scale dams in Kachin State. We don't need such a huge dam in our state.

(11) This project is carried out between the military regime and China Power Investment Corporation. The Chinese president must keep the security for Kachin State and Kachin people as it impacts the economic security for China as well.

(12) The Asia World Company holds the contract with the foreign companies and guiding those companies to invest in the project. Asia World should inform the foreign companies of the exact data and the cause of grievous impacts so those companies can understand the problem.

(13) As we are protecting our natural heritage and cultural heritage we are seriously afraid that our natural resources and valuable cultural heritage will be damaged by building the dam at the Myitsone. We Kachin people will keep continuing to demand a stop to this kind of huge project in Kachin State.

(14) If the dam is built the local people will lose their houses and way of life. Moreover the natural resources and valuable cultural heritage and environment will disappear and will not return. Therefore we Kachin people strongly demand a halt to the Myitsone hydro power project.

Yours respectfully

1. Name: U Haw Wa Zaw Gam
   Age: 78 Location: Myitkyina

2. Name: General Hkun Seng
   Age: 90 Location: Chyunpinta Myitkyina

3. Name: U Waw Hkun Sai Htong
   Age: 63 Location: Sadung / Wai Maw Township

4. Name: U Nhkum Tang
   Age: 60 Location: Bamaw Kachin state

5. Name: U N Tau Tu
   Age: 65 Location: Mugawng township Kachin state

6. Name: U Maji Zau Awng
   Age: 64 Location: Zetkan Hupin Township

7. Name: U Hawng Ze
   Age: 56 Location: Wai Maw Township

8. Name: U Saw Lum
   Age: 52 Location: Wai Maw Township Kachin state

9. Name: U Tingra Ah Hpung
   Age: 60 Location: Myitkyina

10. Name: U Myitung Naw Ja
    Age: 29 Location: Myitkyina

11. Name: U Lazum Tu Raw
    Age: 48 Location: Myitkyina

12. Name: U Maran La Seng
    Age: 28 Location: Tang Hpre Myitkyina

Copy to

1. Vice General Ye Myint
   State Peace and Development Council, Neypyidaw
2. Northern Commander, Myitkyina
3. Minister No. (1) Ministry of Electric Energy, Neypyidaw
4. Minister No. (2) Ministry of Electric Energy, Neypyidaw

Appendix 2: Objection letter from dam-affected community

January 2004
To: President/ Secretary
Kachin Consultative Assembly
Shatapru, Myitkyina, Kachin State

Subject: Dam construction at the Mali-N'mai confluence

Sir: Concerning the above mentioned subject, we the residents of Tang Hpre village present a complaint of the danger on the whole tribe.

The construction of a concrete faced rock-fill dam by the Japanese Kansai company about 500 feet high is soon to be started at a location three miles south of Tang Hpre village near the Mali-N'mai confluence and it seems to be a threat to the whole Kachin tribe.

We have apprehended the following consequences of the dam construction as a danger to our people:

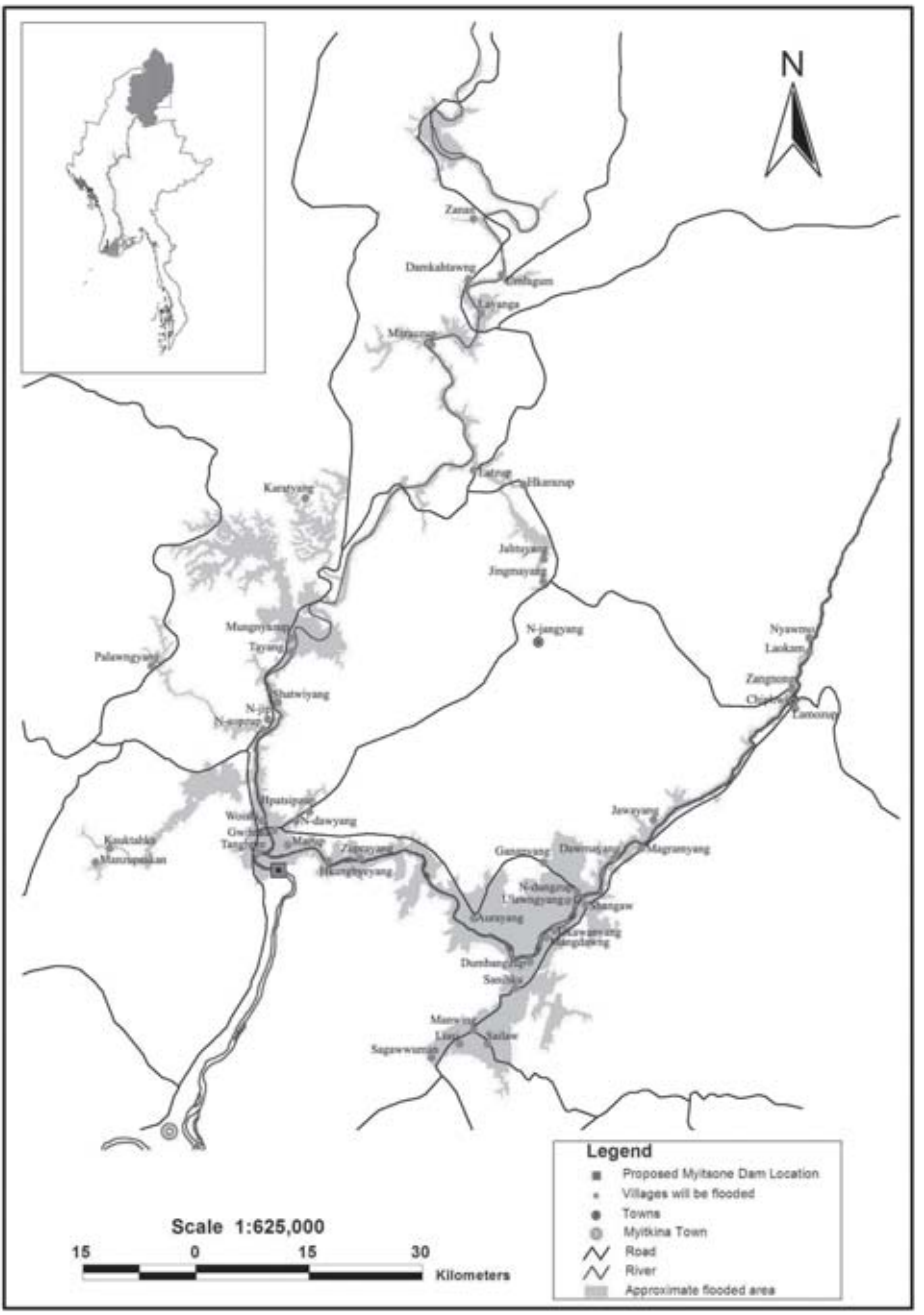
1. Over 20 villages with 3,000 people of 500 families will be flooded
2. 18,000 sq. miles of farmlands will be destroyed by the flood
3. The local residents will lose their stable profession and become insecure
4. The beautiful natural environment of the Kachin people will be ruined
5. Hundreds of flora and fauna species will be destroyed
6. Communication and transportation will be cut off between Mali-Nmai Walawng, Mali-Hkrang Walawng and Sumpra Bum triangle area due to the man-made flood
7. The Kachin traditional homeland of Hkrai Naw and Hkrai Gam legendary figures will disappear from the map
8. The Christian mission headquarters for the northern part of Kachin State will lose its location
9. The historical sites and heritage of the Kachin people will disappear.

Therefore, we hereby attach two documents along with this letter of complaint to take the necessary action against the dam construction by submitting the issue to the authorities concerned.

Respectfully undersigned all the residents of Tang Hpre village

Copies to: KIO Liaison office, NDAK Liaison office, Kachin Cultural Department, Kachin Baptist Church Headquarters, Myitkyina Diocese Catholic Headquarters, Kachin Theological College seminary (all in Myitkyina), Tang Hpre Village Council file

Villages in the food zone of Irrawaddy Myitsone Dam



Population of villages in the flood zone

No	Village Name	Household	Population
1	Nyawmo (Myaw Maw)	21	113
2	Laokam (Lawk Gam)	13	58
3	Zangnong (Zang Nawng)	72	386
4	Jawayang (Je Wa Zup)	18	87
5	Dawmayang (Dau mang Yang)	10	57
6	Gananyang (Gaw Nan Sut Ja)	14	73
7	Ndungzup	15	77
8	Ulawngyang or Hpung Mai Yang	32	179
9	Aurayang	42	401
10	Zuprayang	8	60
11	Hkangbyeyang or Sut Ja	6	51
12	Mazup	54	292
13	Ndawyang or Sani Tu	11	109
14	Chibwe	218	1097
15	Lamozup (Na Maw Zup)	17	65
16	Magramyang	29	138
17	Shangaw	65	334
18	Hkawanyang	69	354
19	Mangdawng	165	847
20	Dumbangzup	31	163
21	Sanihku or Zani Hku	18	107
22	Manwing	189	897
23	Sailaw	263	1294
24	Laisi	5	25
25	Sagawwuman or Sangawmun	6	30
26	Tang Hpre	173	1406
27	Gwihtau	22	106
28	Woishi	4	15
29	Patsipzup or Hpa Tsip Zup	10	57
30	Kauktahka or Kaukahka	5	20
31	Manazupsakan	7	28
32	Nsopzup of N-Sawp	10	30
33	N-Jip	18	180
34	Shatwiyang or Nai Tsung	18	160
35	Tayang	40	150
36	Mungnyazup	10	60
37	Karatyang	6	28
38	Jingmayang	10	45
39	Jahtuyang	27	143
40	Hkarazup	37	192
41	Latzup	7	29
42	Marauhka or Marau Zup	8	39
43	Layanga or Layan Mare	68	357
44	Umlagum	5	20
45	Damkahtawng	17	96
46	Zanan	6	25
47	Plawng Yang	5	25
	TOTAL	**1904**	**10505**

List of in-depth interviews

No.	Date	Sex	Age	Occupation
1	March 2006	Male	35	Church leader
2	March 2006	Male	24	Ferry transporter
3	March 2006	Male	38	Fisherman
4	March 2006	Male	60	Hunter
5	March 2006	Male	30	Fisherman
6	March 2006	Male	58	Farmer
7	March 2006	Female	64	Farmer
8	March 2006	Female	27	Vendor
9	March 2006	Female	46	Small scale-miner
10	March 2006	Female	39	Herbal doctor
11	Sept. 2006	Male	28	Bamboo seller
12	Sept. 2006	Male	24	Fisherman
13	Sept. 2006	Male	26	Ferry transporter
14	October 2006	Male	24	Daily worker
15	October 2006	Male	40	Church leader
16	October 2006	Male	27	Fisherman and Ferry transporter
17	October 2006	Male	60	Farmer and Fisherman
18	October 2006	Male	55	Farmer and Small-scale miner
19	October 2006	Male	60	Farmer
20	October 2006	Female	65	Farmer
21	October 2006	Male	44	Village leader
22	October 2006	Male	40	Pastor
23	October 2006	Male	43	Forced laborer
24	October 2006	Male	56	Pastor
25	March 2007	Male	58	Pastor
26	March 2007	Female	29	Farmer
27	March 2007	Female	26	Farmer
28	April 2007	Male	40	Pastor
29	April 2007	Male	29	Pastor
30	June 2007	Male	63	Pastor