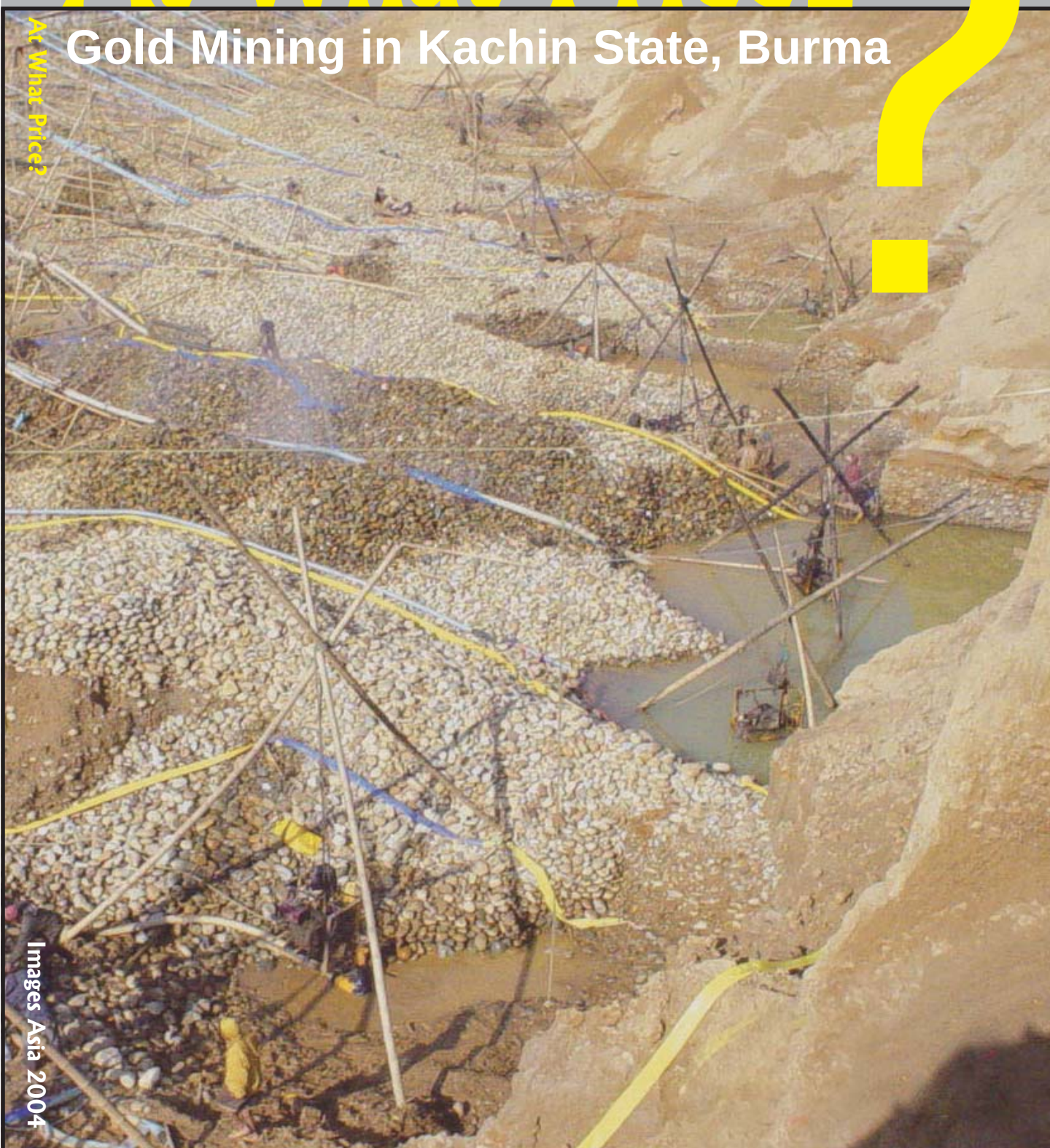
At What Price?

Gold Mining in Kachin State, Burma



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Images Asia & Pan Kachin Development Society

November 2004

“ ”

There are many places in Kachin State that have already been destroyed. There is so much mining being done it is difficult to count.

Our clean water in the Mali Hka River is spoiled with mercury. So it is dangerous for people to use water from this river.

(Statements by Kachin people)

Gold is being extracted in large amounts and at breakneck pace from throughout Kachin State. The gold rush has all the accompanying evils known from other places in the world: Pollution, degradation and destruction of large tracts of land, extremes of wealth and poverty, disturbance of communities, violence, gambling, prostitution and spread of disease. Corrupt military officials preside over the devastation, selling mining concessions and taking “taxes” from miners and locals. How can it be stopped?

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Front cover: N'Mai Hka River between Chipwe and Manwin. Gold mining can bring about changes in the structure and ecology of affected rivers.
Back cover: Gold mining area near Lahpa, close to the Mali Hka River.

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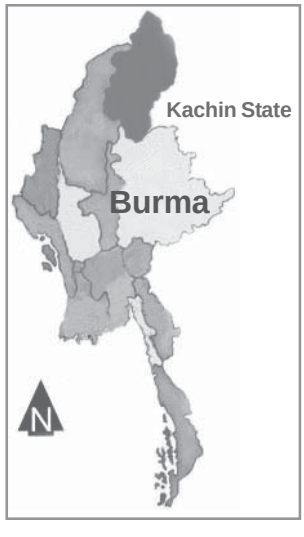
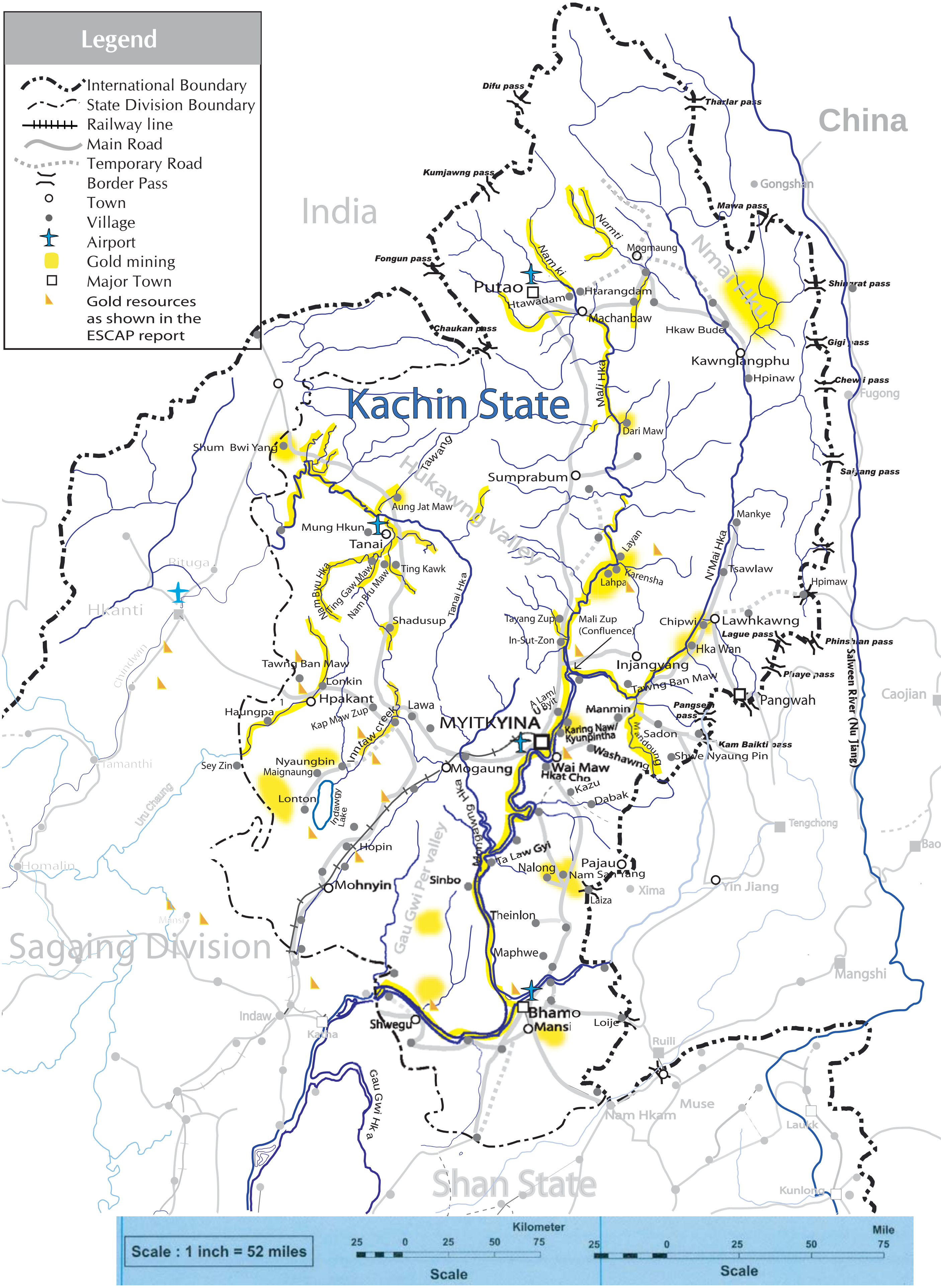
Content





Legend
International Boundary
State Division Boundary
Railway line
Main Road
Temporary Road
Border Pass
Town
Village
Airport
Gold mining
Major Town
Gold resources as shown in the ESCAP report
India
China
Kachin State
Sagaing Division
Shan State
Hukawng Valley
Nmai Hku
Difu pass
Tharlar pass
Kumjawng pass
Gongshan
Mawa pass
Fongun pass
Mogmaung
Namti
Nam ki
Putao
Htawadam
Htarangdam
Machanbaw
Shingrat pass
Hkaw Bude
Chaukan pass
Gigi pass
Kawnglangphu
Hpinaw
Chewi pass
Fugong
Mali Hka
Dari Maw
Shum Bwi Yang
Tawang
Sumprabum
Saijang pass
Aung Jat Maw
Mung Hkun
Tanai
Mankye
Layan
Ting Kawk
Karensha
Lahpa
Tsawlaw
N'Mai Hka
Hpimaw
Hkanti
Nam Byu Hka
Nting Gaw Maw
Nam Byu Maw
Shadusup
Tanai Hka
Tayang Zup
Mali Zup (Confluence)
Chipwi
Lawhkawng
Lague pass
Phinshan pass
In-Sut-Zon
Hka Wan
Injangyang
Tawng Ban Maw
Phaye pass
Salween River (Nu Jiang)
Caojian
Lonkin
Hpakant
Haungpa
Lawa
Kap Maw Zup
A Lam/U Byit
Manmin
Pangsen pass
Pangwah
MYITKYINA
Karing Naw/ Kyunpintha
Sadon
Mindoung
Kam Baikti pass
Washawng
Shwe Nyaung Pin
Sey Zin
Nyaungbin
Maignaung
Inntaw creek
Mogaung
Wai Maw
Hkat Cho
Kazu
Dabak
Lonton
Indawgy Lake
Namanthi
Uru Chaung
Tengchong
Mogaung Hka
Hopin
Ta Law Gyi
Pajau
Nalong
Nam San Yang
Xima
Yin Jiang
Homalin
Mohnyin
Sinbo
Gau Gwi Per valley
Laiza
Theinlon
Maphwe
Bhamo
Mansi
Loije
Mangshi
Indaw
Katha
Shwegu
Ruili
Muse
Nam Hkam
Gau Gwi Hka
Laukk
Kunlong
Kilometer
25 0 25 50 75
Scale : 1 inch = 52 miles
Scale
Mile
25 0 25 50 75
Scale

EXECUTIVE SUMMARY

A devastating "gold rush" is ongoing in Kachin State. Gold mining companies operate along all the major rivers and also on-land where gold yielding sediments are found (see map). The main mining centers appear to be along the Irrawaddy River north of the state capital Myitkyina and the areas around Tanai and the Chindwin River. Not even officially protected areas like the Hukawng Wildlife Sanctuary in the northwest of Kachin State, or places in the past famous for their pristine nature, like the N'Mai Ku area (northeast) are spared.

Since the mid 1990s the artisanal mining mainly done by locals, has gradually been replaced by mechanized and thus more destructive practices. These include riverbed mining with bucket and suction dredges as well as hydraulic mining of river banks and large open cast and shaft mines. On land, more and more areas are deforested in order to make way for mining and to build the necessary infrastructure. Together with the mining activities, the use of the mining agent mercury has increased. Methods of mining that disturb increasingly large areas of land are spreading, including employment of cyanide leaching, as the most easily accessible alluvial gold is depleted and deposits deeper in the ground and in hard rock are exploited.

Kachin State is known as a "hotspot for biological diversity". The conservation of its natural resources, which cannot be valued in monetary terms, is of international importance. The logging and gold mining has already caused incalculable loss of biodiversity in the riverine and forest ecosystems. Gold mining is taking place in the headwaters of the Irrawaddy, the lifeline of the country and one of the greatest Asian rivers. It threatens the ecosystem of the entire river basin and along with it the livelihoods of about 20 million people (WRI, online).

By its very nature gold mining is unsustainable and highly disruptive to the areas in which it takes place and of the downstream environment. It is controversial even in countries where the political circumstances allow the passage of adequate environmental protection laws and proper law enforcement. Under the Burmese government where the most basic human rights are abused, mining is exceptionally harmful.

Existing environment laws in Burma are inadequate and poorly enforced. There appears to be an almost complete absence of storage or treatment of waste from the mining of gold and lead. Legal requirements to recover former mining areas are frequently not met. Mining waste is discharged straight into rivers or onto land; the same is true for mercury used in the mining process. Discarded engines are simply left behind whenever a mining operation moves on. Engine oil used to run machines and waste from mining camps all add to the pollution. Bioaccumulation of mining chemicals will continue to take its toll on species diversity and human health.

Aside from the obvious pollution, mining causes structural changes to rivers which can cause severe ecological damage. Rivers are diverted for riverbed mining operations, while water blasting of sediments destroys riverbanks. Floating dredges scoop up sediments from the bottom of rivers and leave behind piles of stones and disturbed waters. These structural changes result in the loss of many riverine habitats for endemic fish species. They also affect the direction and speed of the water flow which reportedly has already led to unusually low water levels in some areas and increased flooding in others.

The state (represented by the State Peace and Development Council, SPDC) claims ownership of all land and natural resources by law, concessioning it out to businesses for large-scale resource extraction. The SPDC and the armed forces (known as the *Tatmadaw)* control most of the country's abundant mineral resources, including those in Kachin State, where it operates mainly through

numerous checkpoints[43] and a front company, the Northern Star Company. The mining industry provides substantial revenue for arms purchases and the ongoing enlargement of the military.

The Burmese military, Kachin Independence Organization (KIO) and other ceasefire groups justify gold mining as a way to gain cash for development projects, usually meaning dam construction, bridge building and further road-making. The negative consequences of these often poorly conceived and implemented projects, such as displacement and accelerated forest encroachment, are rarely considered.

New principles of development planning that balance consideration for the short and long-term needs of the different peoples of Kachin State and the nation as a whole are desperately needed.

The mining of gold in Kachin State is earning enormous profits - but mostly for the Burmese military or Chinese companies - and at tremendous cost to the environment. Foreign miners and investors are taking advantage of the financial desperation and corruption of the ruling military, its lack of concern for its citizens and the environment, and the lack of adequate laws. Communities do not benefit from the business but instead suffer from environmental degradation. They are frequently deprived of clean water and farm land, and of access to resources that formerly provided their livelihoods. They are not compensated for their losses.

The "boom and bust" economic conditions that gold mining entails cause great inequality and poverty. In areas where mining is taking place, prices for many basic goods and services have become inflated. The uneven development of ethnic areas and widespread corruption has exacerbated the situation.

While promising quick wealth, the mining often deepens poverty. It creates numerous social problems, such as drug and alcohol abuse, prostitution, gambling, loss of community identity and ethnic conflicts. Mining areas are also breeding grounds for malaria and sexually transmitted diseases.

The gold mining industry as it is operated in Kachin State exposes local people and migrant workers to serious long-term risks from mercury poisoning. According to interviews, the threat of a cyanide spill or release is on the increase. Miners and local people are often too poorly educated to access information on the threats posed to their lives and health from pollution by mining agents, so dangerous handling of mining chemicals is commonplace.

Working conditions for miners are not at all safe and under the prevailing political circumstances are extremely difficult to improve. Poorly equipped divers work exceptionally long hours under water directing the hoses of suction dredges. The loose sides of current and abandoned mining pits constantly threatens to bury mine workers and locals under landslides and have already allegedly caused many deaths. Accidents on the turbulent rivers have become more frequent as the number of vessels has increased. The anchor cables of dredges and the dredges themselves are obstacles for traffic on the river. Mining activities in Kachin State have already taken an unacceptably high toll in lives of locals, workers and people traveling along the rivers.

Introduction & Methodology

This report is intended as an alert and a warning about the troubles brought to the peoples, rivers and forests of Kachin State in northern Burma[1] by a rapacious, ongoing race to exploit its abundant natural resources. Among the wealth of resources are large quantities of gold, for which a major gold rush is underway. The damage done throughout the land by the extensive and barely regulated mining includes damage to river ecosystems, mercury contamination, deforestation and social disintegration.

"At what price?" aims to encourage wider attention to environmentally harmful and unsustainable resource extraction in Burma and to provide a background document for campaigns on behalf of the local people and the environment.

Any mining development can affect communities and their environments. Around the world, gold mining brings immediate wealth for some, but has serious long-term costs for a far greater number of people. In the current gold rush, a host of different groups are competing to extract mineral resources as quickly as possible. Many abuses are occurring that cause grave risk to the environment and local populations.

Much of the mining of gold in Kachin State appears to be done in a way that the substantial amounts made from the gold mining are not apparent in the national statistics (Wu, 2001) despite the fact that the granting of concessions and taxation of the miners is very tightly controlled by the Burmese military. It is therefore likely that much of the revenues from the mining are going towards defence expenditures with a large proportion being informally taken by local military units. One thing certain is that the level of direct contact between the Chinese and Burmese governments has increased dramatically since 1989, with military, transport and extractive industries being at the centre of the engagement. This, and the halt to decades of fighting in Kachin territory, has led to an equally dramatic and unsustainable increase in the extraction of gold, jade and timber by Chinese companies.

This report was only possible through close collaboration with local partners (groups and individuals whose names cannot be published in this report for security reasons) who are concerned about the rapid devastation of their homeland. The report is based on a variety of sources, including interviews, field investigations, internet research and scrutiny and translation of mining-related documents. The interviews were carried out either on-site or in Chiang Mai with newly arriving people from Kachin State over a time period of four years (2000-2004). Interviewees were miners, mining bosses, local leaders and locals affected by the mining industry. Trained local and international researchers have spent many months in the field studying the gold mining. Most of the photographic material published in this report was collected during these field trips. The map shows locations and types of gold mines as far as we were able to determine from the information available.

The report provides background on gold mining processes and their environmental and social effects in Kachin State. It represents only our knowledge at the present stage, and does not claim to be complete or comprehensive. Due to rapid and unpredictable changes in the political situation, it is conceivable that information that was factually accurate at the time of researching or writing could have become irrelevant or incorrect. Research in Kachin State is conducted at great risk and many are unwilling to speak for fear of repercussions from powerful vested interests. There are many questions that require answers, so further information, particularly from environmental testing and health studies, and from people who are willing to come forward and expose more truths about the abuses taking place is necessary.

BACKGROUND

UNEARTHING BURMA

Burma is located at the merging point of Asian ecological and cultural zones, and has aspects of the Indian Subcontinent, China and of the Himalayas and the Tropics. The country is rich in ethnic and biological diversity. It is famed for what the ruling SPDC likes to call "treasure of natural resources" – but is cursed with a long lasting dictatorship that has led the country into conflict and poverty. For many centuries Burma's wealth of natural resources, including valuable woods, fertile soils, petroleum, minerals and a wide range of gems have been exploited. Kachin State in Burma is one of only two sources on the planet of imperial jade (jadeite, as opposed to the more common greenstone or nephrite). The country is also famed as the source of the worlds largest, and some of its finest rubies and sapphires. It also produces diamonds and amber, as well as various other semi-precious stones.

In addition to precious stones, significant quantities of tin, tungsten, lead, antimony, zinc, copper, nickel, iron, wolfram and more have been extracted in the past. The Mawchi tin and tungsten mine in Karenni (Kayah) State was at one time said to have been the biggest in the world. The Namtu -Bawdwin silver – lead – zinc mine, established over 100 years ago in Burma's Shan State, was world-famous in the 19th – 20th centuries and its output was still an important earner of foreign currency well into the '70's. A large copper deposit at Monywa, Sagaing Division is currently the focus of one of the biggest foreign investment efforts in Burma. The country also has modest deposits of platinum. There are also rumors of uranium being secretly mined, but they have not been substantiated.

Plainly of most relevance to this report are the country's widely scattered gold deposits, especially those in the ethnic areas of Burma which are in the process of being excavated on a large scale. Official Burmese government sources tend to discuss only the modest exploration of areas where ethnic Burmans are the majority. Nevertheless traditional gold production areas in ethnic territories where human rights abuses are rife are rarely mentioned. For example, Shwegyin in Karen State – a place whose name literally means 'gold mining' (ERI draft report, 2003)

The mining sector including oil and gas extraction has contributed about 2–5% to Burma's GDP in the fiscal year 1999/2000[44]. Myanmar's mineral production was small in quantity, with the exception of gemstones (Wu, 2001). According to the United Nations ESCAP report of 1996, the total gold reserves of the country have not been fully recorded, but are estimated at 18.2 metric tons[2]. In light of evidence from the field, this is likely to be a underestimate.

Recent gold extraction and export figures for Burma and especially Kachin State are hard to come by. ASEAN statistics show that Burma exported base metals including gold worth 62.2 thousand USD in 2002 (see table 2). For the years between 1991 and 1997 an average of about 0.5 tonnes of gold per year had been exported according to different sources (see table 1). Asia is the market for some 70% of new gold with India being worldwide the biggest consumer, but economic growth in China has created another vast market for gold jewellery. Gold produced in Burma's Kachin State, bordering China, is mainly for the domestic and China markets.

"The Ministry of Mines is desirous of expanding its activities in developing the gold [...] mineral resources in Myanmar and have therefore decided to open further opportunities to foreign companies to conduct mineral prospecting and mineral exploration activities in Myanmar."
(Myanmar Ministry of Mines, online)

Gold has long been associated with Burma, which is often referred to as the "Golden Land." The religious use of gold is typical of Burmese followers of Buddhism (the majority religion in the nation, although not among Kachins). Devotion is manifested by applying tiny sheets of gold leaf to Buddhist statues and pagodas. As elsewhere, in Burma gold is traditionally held as a secure, portable form of family wealth for use in troubled times. Burma has a particularly unstable economy, its currency has been subject to instant demonetisation of notes and at the time of writing, its banks were in deep crisis. People have little trust in the banks or currency, so the use of gold jewellery as a "bank account" is prevalent throughout Burma, although ethnic minority people such as the Palaung, Kachin, Akha and Karen more traditionally craft their ornaments of silver.

While the title "Golden land" does not sit well with the nation's present status a 'Least Developed Country' (LDC), the name has been resurrected by the ultra-nationalist military government and by proponents of the tourist industry. The ruling military has been ever-zealous in playing up the attractiveness of the country's resources to foreign investors (Photo1) in an effort to break the economic sanctions imposed on it.

They have been no less zealous in their efforts to exploit and control the said treasures. At the same time, they have taken extreme measures to keep wealth from their ethnic opponents in whose lands most of the resources are found. Examples illustrating this are the series of abrupt demonetisations of currency in the 1980's and the still ongoing implementation of the "four cuts" policy which aims to deny revenues, food, recruits and information sources to the ethnic rebels. Despite their attempts to secure investment and to exploit natural resources, the military government never reveals the real amount of wealth generated from the natural resource bonanza[3]. They probably do this both to conceal their real military expenditure and to maintain the country's status. LDC status, while deeply humiliating to many Burmese, allows the regime to receive benefits such as obligatory UN support, preferential trade tariffs and, most importantly, write-offs of its long-standing national debt, on which it has made few payments. A very substantial portion of the debt to Japan accumulated by the BSPP regime (1962-88), was negated in 2002 when Japan wrote off 150 billion Yen (1.4 billion USD) – approximately the equivalent value of the junta's arms shipments from China in the early 1990's. Despite decades of officially reported low production, the amount of gold being dug up has plainly increased rapidly. The amount of gold officially recorded as being produced (see tab.1) and that actually extracted from the ground is certain to be very different, not least because of widespread smuggling. Under the rule of General Ne Win (1962-88) most foreign investment was discouraged and resource extraction was severely constrained by a lack of available technology and by widespread conflict. However, when the junta took over in 1988, the economy was declared open for foreign investment. The Burmese armed forces were seeking funds for their rearmament and

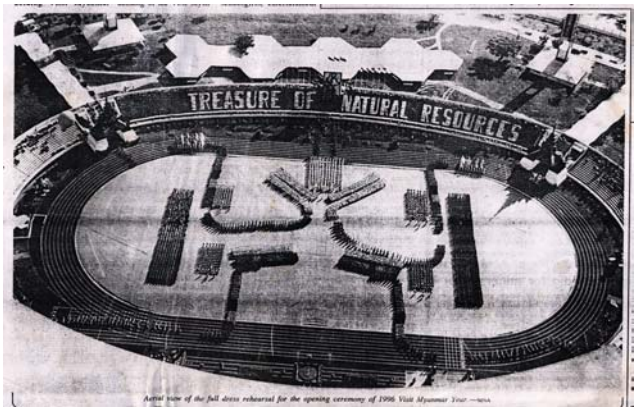


Photo 1: The SPDC has even gone to the extent of ordering a stadium full of people to spell out the words "treasure of natural resources" (Photo published in the New Light of Myanmar).

expansion program. By the end of 2002 the armed forces had more than doubled in size with most units equipped with newer weapons. While the junta has not announced the sources of funds for this military build-up, it is clear that a great deal of the money has come from primary resource extraction, particularly natural gas, logging, fishing, and mining.

In the mid to late 1990s, the junta offered large concession blocks for mineral exploration in Burma to multinational mining companies.

Following a change of laws in 1988, foreign investors were allowed to have shares up to 100% in mining projects. Since that time the largest foreign investments by far in Burma have been in the oil and mining sectors. This investment was encouraged by the Myanmar Mining Law, enacted in 1994. These opportunities drew moderate interest, and several blocks were obtained, some by large international companies, others by speculative firms, and some by outfits from neighbouring Asian nations. Despite the fact that most of them soon withdrew, foreign investment has certainly led to an increased growth of the gold mining industry. Output shares by privately owned companies increased to 93.4% in 2001 from 85.8% in 1998 (Wu, 2001). According to government reports, Burma's gold production jumped between 1991 and 1994 from a mere 0.238 t in 1991 up to 9.238 t in 1993/94 (see table1).

Photo 2: The N'Mai Hka River is an example of the exeptional natural beauty of Kachin State.

Year	1991	1991/92	1993/94	1994
Amount of gold [Troy ounce]*	768	20,081	29,746	19,56
Amount of gold [t]**	0.024	0.624	0.924	0.608
Export of minerals and gems [USD]***	n.a.	n.a.	278,268	138,1

Tab. 1: Amount of gold produced and minerals and gems exported in Burma during the years 1991-1997. (Source: *United Nations, 1996, online; **The Ministry of National Planning and Economic Development, 1998; *** U Soe Mra, 1998)

Year	1999	20
Miscellaneous base metals (Thousand USD)	26.9	1.'

Table 2: Total Export of miscellaneous base metals from Burma (Asean Trade Data, online)

ENVIRONMENT AND MINING LAWS

In Burma the state officially holds rights to all resources under the earth's surface. Land and water resources can be taken for mining only if the junta gives permission. Effective environmental laws have not been enacted in Burma. Environmental protection related to mining activities is covered by the Myanmar Mining Law (1994) and the Myanmar Mining Rules (1996). Both are weak, having many poor definitions and failing to cover obvious and critical aspects. This is most apparent in the lack of up-to-date laws regulating pollution releases (Gutter, 2001) such as the use of mercury. Under the law no mining company is at risk of prosecution or fines[4], an incredible omission. Even if penalties existed, it is questionable to what extent they would be enforced, as the all powerful military is an official business partner (through Northern Star Co. Ltd). An example of weak enforcement of laws is the use of cyanide in alluvial mining which endures in some areas despite being banned.

The Mineral Law does mention the duty of small scale mining companies to *"carry out rehabilitation and reclamation of mined out areas"*, whereas large scale mining ventures are obliged to *"arrange backfill, re-vegetation or reclaim the land in the areas already mined out to the satisfaction of the Ministry"* (Myanmar Ministry of Mines, online). However, the law does not offer any means to reach or to guarantee these aims. (Moody, online)

"No, no. I never heard about any rules or regulations. I never heard of any penalties for polluting in Hpakant – no one ever comes to check." (Kachin interviewee, 2002)

Burma currently has no formal requirements for EIAs (Environmental Impact Assessments) and the laws lack requirements for public consultation with local people (APCEL, 2003). For more information on the Burma Mining Law, see Moody's "Grave Diggers" Report (Moody, online).

On the positive side, Burma has signed a number of international environmental agreements and conventions such as the U.N. Framework Convention on Climate Change, the Convention on Biological Diversity, the Vienna Convention and the Montreal Protocol for Protection of the Ozone Layer and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (Xinhua News, 2000).

"I was there 6 months – I saw them take some of the tailings to fill the bottom of the valleys and then make houses on top of them." (Kachin person, 2002)

THE LAND OF THE KACHIN

GEOGRAPHY & BIODIVERSITY

Kachin State is the northernmost region of Burma. It borders India's Arunachal Pradesh State on its west, China's Yunnan Province on its east, and Tibet in the far north. It is a remote, rugged and beautiful land with densely forested hills and valleys, wild rivers and snow-covered peaks. The headwaters of the Irrawaddy River, one of the great rivers of Asia, are found in Kachin State. A substantial part of its flow comes from the N'Mai Hka and Mali Hka[5] rivers.

A wide range of ecosystems embracing tropical lowland through to high alpine host a diversity of wildlife and numerous exceptional species of plants, some of great medicinal value. Of about 600 species of rhododendron world wide, around 260 are to be found in Kachin State. Numerous plant species were described by Kingdon-Ward, one of the first western scientists to explore Kachin State (1921-1952), among them the black orchid (*Paphiopedilum wardii*) a species endemic to the area north of Putao[38]. A World Conservation Society (WCS) sponsored expedition found 38 different orchid species during a short survey to the Naung Mung area, Putao district in 1998.

The valleys contain some of the last remaining extensive tracts of primary evergreen lowland forests in the region. Centuries old teak trees that have been spared the chainsaws and axes due to geographical and political inaccessibility can still be found in some areas. 84.2% of Kachin State's total land area is covered with forest, representing 22.8% of Burma's remaining forest resources (figures given by Burmese authorities, published by Lasi Bawk Naw, 2004).

Kachin State has been dubbed one of eight "hotspots of biodiversity" in the world, meaning that it contains an outstanding number of endemic species that are experiencing exceptional loss of habitat (Conservation International, online). Here three ecozones India, Indo-Malaya and Indo-China combine, creating an environment of extremely high diversity. As part of the Mizoram-Manipur-Kachin rainforest eco-region, the area is home to 149 mammal species, among them the threatened takin (*Budorcas taxicolar*), eld's deer (*Cervus eldii*), red panda (*Ailurus fulgens*), leopard (*Panthera pardus*), gaur (*Bos gaurus*), elephant (*Elephas maximus*) and Malayan sun bear (*Helarctos malayanus*). 580 birds species have been counted – which is more than for any other eco-region in Southeast Asia (WWF, online). The Myanmar Herpetological Survey Project found in surveys in Northern Kachin State (1999-2001) the highest number of amphibian and reptile species within Burma and a surprisingly high species diversity in the newly established Indawgyi Lake Wildlife Sanctuary (75 species with potentially 12 new species) (California Academy of Science, online).

Some of the most recent research on wildlife in Burma are studies on the Irrawaddy dolphin (*Orcaella brevirostris*) (2002), and on tigers in the Hukawng Valley (2001) both conducted by the WCS. Hukawng Valley in the northwest of Kachin State holds one of the biggest tiger populations in Asia. In March this year the Burmese government announced it would triple the size of the Hukawng valley wildlife sanctuary, established in 2001 with support of the WCS, to create the world's biggest tiger reserve covering 14,250 sq km (National Geographic, April 2004). Three other protected areas exist, altogether accounting for 14.3 % of Kachin State's total area; the Pidaung Wildlife Sanctuary (1917/18), the Hkakabo Razi National Park (1996) and the Indawgyi Wetland Bird Sanctuary (1999) (Lasi Bawk Naw, 2004). Establishing these protected areas is an important step towards nature conservation. To make conservation attempts really efficient much more needs to be done. Unsustainable practices like gold mining and related logging and hunting continue in many protected areas. The open trade in endangered wildlife products also needs to be curbed.

Photo 3: N'Mai Hka River at Chipwe.

History

The Kachin people are an ethnic affinity of several tribal groups, known for their fierce independence, disciplined fighting skills, complex clan inter-relations, embrace of Christianity, craftsmanship, herbal healing and jungle survival skills. Other residents of Kachin State include Shans (Thai/Lao related), Nagas, and Burmans, who form the largest ethnic group in Burma, also called "Burmese" or "Myanmas". During the British colonial period, many of the Kachin tribes were barely subdued. However, loyal Christian Kachin fighters were of crucial assistance to British and American guerrilla units fighting the Japanese Imperial Army during World War II.

Following the end of World War II and Burma's independence from Britain, long standing ethnic conflicts between frontier peoples such as the Kachins and the Burman-dominated central government resurfaced. Nevertheless Kachin soldiers formed a core part of the Burmese armed forces and stayed loyal to the central government when the anti-Rangoon Kachin Independence Organisation (KIO) with its armed force, the Kachin Independence Army (KIA), was formed in 1961. However, after Burma's elected government was overthrown by General Ne Win in 1962 and atrocities were perpetrated against Kachin civilians, the Kachin rebellion gathered force and the KIO became one of the largest of Burma's many ethnic non-communist rebel groups. Much of Kachin State outside of the cities and larger towns was for many years KIO administered.

The KIO formed alliances with other ethnic groups resisting the Burmese occupation, and later despite its non-communist stance along with China informally supported the Communist Party of Burma (CPB), which held strategically sensitive parts of the country vis a vis the Kachin positions. The KIO continued to fight when Ne Win's dictatorship was succeeded by another incarnation of the military junta in 1988 called the State Law and Order Restoration Council (SLORC). However, with a gradual withdrawal of Chinese support, in 1989 the Communist Party of Burma soon disintegrated into warlord led groups that negotiated ceasefire deals with the junta. This led to the KIO being surrounded by organizations effectively aligned with the SPDC. It was squeezed by redeployed battalions of the rearmed and ever growing Burma Army, and constantly urged to make peace by a civilian population suffering from years of warfare. In 1994 the KIO chose to enter into a ceasefire with the junta.

GOLD IN THE KACHIN HILLS

Most of Burma's mining has historically taken place in north-eastern Shan State, central and south-coastal Burma rather than in Kachin State. However, exploitation of imperial jade, some gold and platinum[6] and a limited amount of coal has traditionally taken place in Kachin State. Since many of the former gold areas outside Kachin State have been depleted over the years, mining exploration and exploitation pressure has increased substantially in Kachin State, especially since the cessation of fighting in 1994.

In the beginning of the 20th century (1903-1918) the Burma Gold Dredging Co. operated in the upper reaches of the Irrawaddy in Myitkyina district. During that time a total of 56,624 ounces (17.587 t) of gold was recovered there (Goosens, 1978). Gold mining in other parts of Kachin State prior to the mid-1990s, was a small scale local activity done by Kachin villagers who used hand-held pans, small bamboo chutes, and banana leaf fiber to sift soil and rocks for gold dust or nuggets. Kachins living along the Mali Hka and other rivers sometimes panned for gold during dry weather from September to May, but spent most of their time farming. Children often panned for gold in the evenings or at the weekends in order to earn pocket money, selling the gold they found to goldsmiths in the local markets. Taxation of locally mined gold was an important source of income for the KIO, although that income was far less than the proceeds from the jade trade[9].

Although some small scale gold panning by local people still continues, most gold mining in Kachin State is now done with heavy imported machinery[10], mostly from China and Korea. At places where mining concessions have been given to companies, locals are now reduced to sifting the waste rock material to search for gold. Currently gold concessions and exploration sites are scattered throughout Kachin State. In a fourth round of bidding in October 2002 the Ministry of Mines offered 42 blocks[7] of the most promising gold mining areas for prospecting and exploration. 23 of these blocks are located in Kachin State (Myanmar Ministry of Mines, online), which means that approximately 16,083 sq km (18% of Kachin State's total area) are currently given over to potentially destructive exploitation. (Photo 7-9) Mining activities can be found in all three major watersheds of Kachin State, the Mali Hka, Nmai Hka and Chindwin[11] River basins, as well as further down the Irrawaddy River and along many of the small rivers (see map).

Along the Mali Hka the expansion of the gold mining started in 1997 and appears to be continuing despite depletion of resources in some areas. Informed Kachin sources claim that the entire stretch of the Mali Hka River to even beyond the northernmost town of Putao is covered by gold mining concessions.

In early 2003 the SPDC imposed a ban on all river mining in Kachin State supposedly for reasons of environmental protection. To impose the ban in the beginning of the rainy season, when companies have to stop their operations anyway, prompted speculation about the junta's intentions. Observers suspected political reasons behind the ban - cutting KIO revenues. Despite the ban, river mining reportedly continued without any visible restrictions after the rainy season. Recent interviews even mention several hundred boat dredges mining the Irrawaddy between Myitkyina and Tayang Zup in the beginning of 2004[33].

The Irrawaddy River and adjacent areas appear to be the main center of both river and on-land gold mining although there is inadequate information about the scale of mining activities on the Chindwin River. Most of the on-land mines are situated on the eastern river bank. The area with the largest number of mining operations is between Mali Zup (Kachin name for confluence of the Mali Hka and N'Mai Hka Rivers, Burmese: Myitsone) and Sumprabum, with a concentration of mining operations around Tayang Zup, Leyan, Karensha and Lahpa. (Photo 30-33) Here large scale mining has

"There are many places that have been destroyed. As you can see, along a length of 43.5 km of the Uru Chaung, areas to the right and left of the river have been destroyed. There is so much mining being done it is difficult to count." (Owner of a gold mining lot in Shwe Nyaung Pin area, 2002)

reportedly been taking place since 1999. According to recent interviews, on-land and riverbank operations are more common than river mining.

Other large on-land dry season mines are in the Hukawng Valley and in Hpakant area, especially along the Uru Chaung River where in 2002 there were reportedly at least 600 gold mining operations with an average of 10 workers per operation. Shaft-mines have been excavated in the region of Maignaung and Man Loi[34], Northwest of the Indawgyi Lake area, in Theplat, southwest of Indawgyi and in the N'Mai Hku region in the Northeastern border area (see map).

Photo 4: Panning for gold and mercury leftovers from the mining, close to Nam Byu.

Photo 5: Children panning for gold and mercury, December 2001, Tanai, Nam Byu.

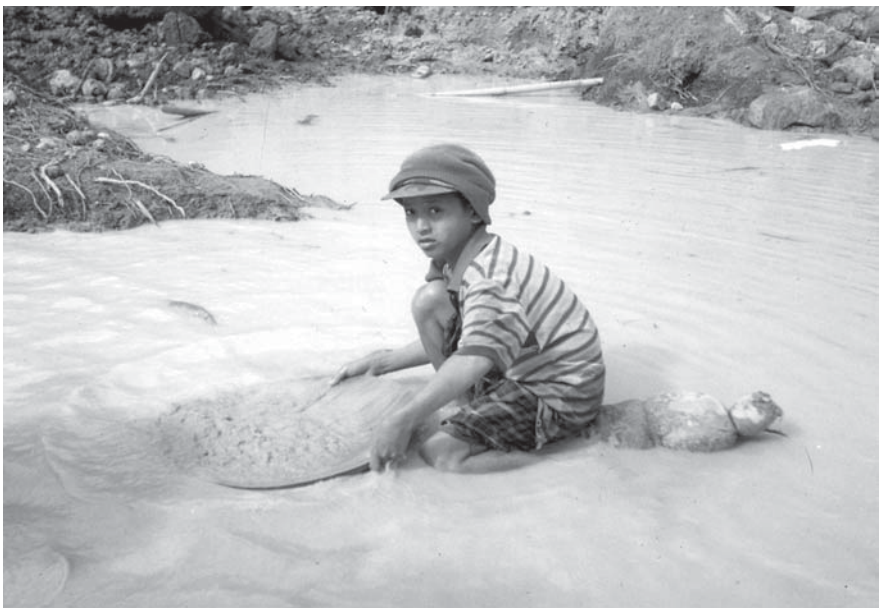


Photo 6: Boy panning for gold. Myitkyina, A Lam.

CONCESSION POLICY

Since the ceasefire agreement between the KIO and the SPDC, most parts of Kachin State have come under SPDC control, including all former "brown areas". Only some places, including those to the east of the Mali Hka and south east of Myitkyina, the area within and to the north east of the triangle[34], the Kumon range and parts of Hukawng valley and remain "officially" KIO territory.

Mining concessions and investments are tightly controlled by the SPDC. This control is also evident in the way the jade mines at Hpakant are managed since the KIO ceded power to the SPDC. Unauthorized prospectors are frequently arrested and fined. Numerous mining concessions were granted by the junta along the Mali Hka and N'Mai Hka Rivers during the 1990s. One Kachin gold mining boss estimated a total of more than 100 different concessions had been issued to local, national and international concession holders and subcontractors operating mines in Kachin State. The interrelations between the concession holders, their subcontractors and various military, political and economic groups involved in gold mining in Kachin State are complex and require more clarification. There is a lack of transparency in this lucrative business in which corruption is a commonplace. Many of those involved, do not want others to know what is going on.

Much of the actual mining is done by subcontractors. Essentially, the SPDC - controlled Ministry of Mines, Mining Enterprise II leases gold mining plots to contractors such as the Northern Star Minerals Production & Trading Co.. It is widely believed that Northern Star Company is a front for the Northern Regional Command.

Large concession-holding companies include those with ties to the KIO (e.g. Buga Co.) and to the New Democratic Army (Kachin) (NDAK). Concession holding companies sometimes sub lease their claims to subcontractors[16], many of them Chinese, who have more capital to import machinery and to hire workers. The subcontractors can make significant profits by developing the claims, but have to pay a portion of their profits to the company that owns the concession. Usually, all the gold recovered by the subcontracters has to be sold to the company holding the concession. Some of the subcontractors are Kachins but more often they are Chinese business people who supply their own machinery, almost always manufactured in China, and hire their own workers, also mostly from China[17].

Northern Star and Sea Sun Star are the largest of around ten companies operating in Kachin State. They have large concessions in the Indawgyi area, where permits are given for one to three years, allowing a company to mine or sell mining rights to an area of land or stretch of the Inntaw creek which flows into the Indawgyi Lake.

Ayawaddy Myipa Co. (Golden Aspen) is a joint venture owned by NDAK and the SPDC. The company operates along the Mali Hka River and sells seasonal permits to Chinese companies which bring in their own barges and equipment to work the claim. They operate from about October to June with around 10 Chinese workers per barge, only stopping during the annual monsoon rains. The workers live on the barges and work in shifts, so that mining continues 24 hours a day. Ayawaddy Myipa has been reported to hold at least 200 licences for gold dredges, while other companies reportedly have over 300 concessions.

"Northern Star Co. is owned by SPDC (Northern Military Command). Northern Star Co. does gold mining, wood trading and jade mining. Captain Kyi Myit is the mediator between the military and businessmen (the one who has to be asked for permission to do business). Other normal businessmen have to get permission from Northern Star Co. to mine jade, gold, wood trading." (Kachin interviewee, 2002)

Prices for concessions vary. Northern Star Co. however sells one year concessions for one lot along the Mali Hka River for between 500 and 600 USD and 20% of the profit[18]. Around the Confluence, a dredge concession reportedly costs ~5,500 USD per 1.6 km, plus around 42 USD per dredge payment to the SPDC authorities. Small investors pay about 85 USD per season to the concession-holding companies, and according to the agreements, are supposed to turn over 40% of their profits.

Testimonies of numerous sources suggest that gold mining is directly controlled by the military. These revenues may be used primarily for military expenditures such as arms purchases and military intelligence operations. Burma spends 48% of total government expenditures on defence (Global Witness, 2003). Control over gold no doubt also results in personal gains for military personnel.

"On August 25th 2002, Northern Commander Maung Maung Swe and his colleagues from Kachin State (Northern Star Company) sold an area along the Mali Hka River to Ying Hai (a Chinese business man) for 800,000,000 Kyats[8]. Ying Hai planed to do gold mining ."
(Kachin interviewee, 2002)

"Northern Star is an SPDC holding company. All the gold mining concessions are in their hands. The whole Kachin State - all of it.[...] The SPDC owns all natural resources. So if the KIO wants a concession they ask the Northern Star Company for a permit."
(Satement by high ranking KIO official, 2002)

"All the gold mines are owned by Northern Star Co. This is not under Burmese law - they make their own laws. Officially they joined with Ministry of Mines. If you want to dig here- you can't - you buy the land, pay for the area to Northern Star Co.."
(Kachin interviewee, 2002)

ROLE OF THE KIO

Certainly the KIO has a share in the profits gained from the mining business. Before the ceasefire, the KIO controlled big parts of the jade mines in the Hpakant area. Since the ceasefire the KIO jade mines have come under SPDC control and the KIO is desperately seeking sources of alternative revenues. It claims it has no choice other than to join into the resource exploitation of their own land as it would continue with or without them being involved. It has become necessary for them to buy concessions for previously KIO-owned areas. Concessions have become more expensive due to competition from much better funded groups such as Chinese, Wa and Pa-O business men. Big percentages of the profit from the mining have to be paid to the SPDC. Inflation due to the dramatic increase in economic activities has added to the financial woes of the KIO.

The hard line anti-drug policy adopted by the KIO in response to international pressure was not rewarded. Instead of international support to solve their problems, they face accusations of destroying the environment. From within the Kachin communities criticism of the KIO resource extraction policy has frequently been raised (see quotes).

To their own people the KIO attempt to justify the mining business as means of gaining "development" they have long been denied as a result of decades of war. Another common argument is the need for financial resources to maintain military strength against the SPDC. Because of the obvious similarity to SPDC structures, where only those who have rank and power benefit, the military has lost its reputation and the trust of many.

In 2001 a group of 50 civilians from Shatapru together with monks from Wun Tho wrote several petitions to the Northern Commander requesting a stop to the gold mining; none were answered. Reportedly some young people have demonstrated their disapproval of the granting of concessions by throwing stones at the gold dredges on the Irrawaddy close to Myitkyina.

"This is not a good way, but I told you before, they don't have any choice. That's why they need to do it, the KIA/KIO. Because if they don't sell, they don't cut wood or timber, they will die. Because they don't have money. Also the gold mine, even if they don't do it themselves, the Burmese government would allow other people to do. "
(Kachin interviewee, 2002)

"Since the ceasefire the KIO has lost territory to the SPDC, for example, in the Hpakant jade mine areas. 98% of Hpakant is controlled by the SPDC."
(Kachin activist, 2002)

FOREIGN INVESTORS

Although most Western and Japanese mining investors looked elsewhere in Burma in the mid 1990s, Canadian companies (for more about Canadian involvement in mining in Burma see Ivanhoe Mines Ltd., Appendix I) and Leeward Capital Corp., obtained a gold exploration and mining concession in Kachin State, which they reportedly gave up in 1998 to pursue extraction and export of amber in another part of Kachin State. However, Leward Capital in early September 2003 was in the final stages of concluding an agreement to explore, "develop", and mine for precious and base metals on a 700 sq km block on the border of the Shan and Kachin states. The site called Set Ga Done, north of the Shweli River in Mabein Township has already been partially explored by another company and is currently being worked by local surface miners. The 75% interest in the block formerly held by East Asia Gold, an American company, is now shared by Leeward Capital Corp. and Canadian Jet Gold Corp (Jet Gold Corp, online)[42].

As the biggest importer of gold worldwide, India is potentially a huge market for Burmese gold and a possible source of investment. The Indian and Burmese governments have made efforts to improve relations in business and politics in recent years[41] with Indian businesses strongly behind the move. It is however uncertain whether there is Indian involvement in gold mining in western Kachin State, an area only partly covered by investigations for this report. There are indications for large scale mining in the western part of Kachin State and the Sagaing Division. One interviewee estimates around 2000 mining dredges operating on the Chindwin River.

China

Most foreign investment in mining in Kachin State has come from companies based in China. China has become Burma's biggest trading partner by far due to it's proximity, it's rapidly growing economic strength, its hunger for resources and it's refusal to participate in political and economic sanctions against the regime. The Yunnan provincial government especially has actively promoted trade. A report on cross-border development published circa 1993-94 by Yunnan University Press, stated: *"Burma's land resources, forest resources, biological resources and mineral resources are very rich, and these are precisely the important resources that we* [China] *urgently need."* (Peng Yongan, 1993/94). Burma has purchased and been "gifted" billions of dollars worth of weaponry from China. Enormous amount of resources have been taken out by China in return in reported barter deals. Chinese entrepreneurs seem to view Burma as a new frontier for their activities where they can escape the intense competition and restrictions in their own country and take advantage of old ties with the KIO and newer connections with the SPDC junta. A high level of technological skills allows those companies to pursue their business in a very efficient way. Chinese business people and former military personnel have taken up residence in Burma's cities and developed infrastructure in border regions. Some have built casinos or become involved in prostitution and the trade in heroin refined from Burma's heroin crops. Big casino complexes at Mong La in Shan State and at Mai Ja Yang at the Kachin-Chinese border are tips of the iceberg in this respect. Given the ever-increasing Chinese demand for gold, the lack of political sanctions against Burma by China, a porous border, and entrepreneurial mobility, the Chinese companies have been perfectly positioned to go for the gold in the Kachin hills.

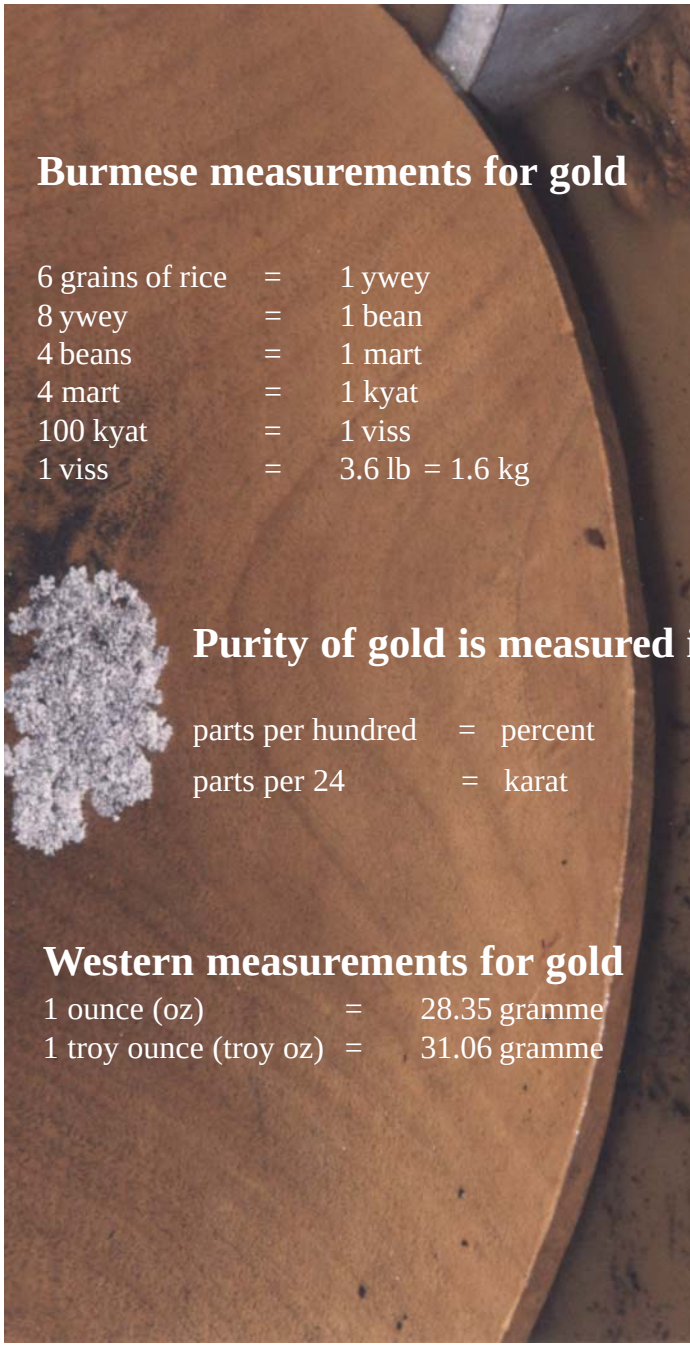


Photo 7: Stream polluted by gold mining. Gold mining associated pollution by mercury, cyanide, toxic tailings and acid mine drainage is a severe threat to wild flora and fauna.

Photo 8: Abandoned 3-year-old dredges on the N'Mai Hka near Chipwe. After a company has finished the mining concession equipment is often left behind to save transportation costs.

Photo 9: A log lies across a big gold pit. Great damage has been done throughout Kachin State by the extensive and barely regulated mining.

GOING FOR KACHIN GOLD: MINING TECHNIQUES

Enormous amounts of soil, sand and rock are disturbed in order to gain small amounts of gold. Each year an estimated 28 billion metric tons of material is removed worldwide by mining activities (Marr, 1993). Methods for extracting gold vary. Gold can be extracted from crushed rocks, or from alluvial sediments. In most cases, sand (or crushed rocks in open cast and shaft mining) is then mixed with chemical reagents used to separate the gold. In Kachin State, mercury is currently the reagent most commonly used for gold extraction, but sometimes cyanide is also used. There are five main methods used for alluvial (placer) gold mining in Kachin State in addition to shaft and open cast mining.

Photo 10: Sand and rock pumped or scooped from the river bottom passed through a sluice tray (in this case a simple bamboo sluice) with water in order to separate the gold containing sediments.

PLACER MINING

Panning, suction dredging, hydraulic mining and riverbank mining are the primary mining methods for recovering gold (UN ESCAP, 1992) from alluvial sediments, also called placer. All these methods are applied in the Kachin State. Placer mining systems use sluices as a way to separate gold from sand and rock particles. Sand and rock scooped from layers of sediment is passed through a sluice tray with water. The sand is then scraped from the sluice, or collected from strips of material laid across the sluice and mixed with mercury for gold extraction. Gold and mercury combines into a material called "amalgam", which is first squeezed and later burned in order to obtain pure gold. During this process some mercury flows into the river, some is collected for reuse, and the rest is released into the air and the wider environment as gas.

1 **Panning:** This traditional type of small scale mining, in which gold is "washed" out of easily reached deposits, continues to be used in Kachin State, with or without the additional employment of mercury as a reagent (e.g. in the Hukawng Valley of western Kachin State). The dense gold dust and nuggets come to rest in the very bottom of the pan as the movement separates them from other sands and pebbles. (Photo 25,27) Simple bamboo sluices (tilted boards) lined with fibres from banana leaves to trap and separate gold from rocks and sand, can also still be seen in some parts of Kachin State. (Photo 10) The small scale miners, who use these methods, often handle mercury with their bare hands. This type of mining is practiced in all areas not mined by companies where placer deposits can be found. In 2002 a Wildlife Conservation Society survey counted 245 manual sluice and gold panning operations along the Irrawaddy between Myitkyina and Bhamo (approx. 170 km) (WCS, 2002).

2 **River mining with bucket dredges:** Bucket dredges operate in the river using belt-driven buckets to scoop material from the river bottom. Cables reach to the riverbanks to hold the dredging machines in place, often blocking river traffic and creating sometimes deadly hazards. The most common engines on the dredges are 25 horsepower motors made by a Chinese company called *Jinma*. There are

bucket dredge set-ups which can dredge from 9-15 metres and others which dredge from 6-12 metres. The stones and sand are processed using sieves, sluices and mercury. According to KIO estimates, 500-700 mining dredges are active on the Mali Hka and N'Mai Hka Rivers, most of them operating on the Mali Hka. An unknown but reportedly large number of dredges are operating along the upper Chindwin River. Along the N'Mai Hka riverbank mining and suction dredging are the most frequently used techniques due to the shallowness of the river. On the Irrawaddy River 107 large boat dredges have been counted by the Wildlife Conservation Society (WCS, 2002) between Myitkyina and Bhamo. Other areas where bucket dredges are common are a tributary of the Mali Hka north of Sumprabum, and the Nam Ki north-east of Putao. (Photo 11-13, 15-16, 29)

3 **Suction Dredging:** Essentially, suction dredges are rafts, 12-20 m in length, with engine-driven high power suction pumps to suck up material from the river bottom, similar to the way a vacuum cleaner works. The dredges either float on the river or are anchored along the riverbank and operate day and night (Photo 17, 19). Usually divers with simple diving equipment including hoses supplying them with air work on the bottom of the river directing the suction hose to areas between the rocks, where there is soil, loose gravel and sand. (Photo 18) This is dangerous work because the suction dredging operations are often carried out in areas where the river flow is too fast for the bucket dredges to operate or where there are many underwater obstacles. A recent interview stated that several divers have been killed by sliding underwater boulders.

The material from the bottom of the river is then further processed on land. (sluicing, gold extraction using mercury, mercury squeezed, then burnt in order to gain pure gold). (Photo 21-23)

4 **Hydraulic mining:** Hydraulic mining is practiced on riverbanks or further away from the river, at places where alluvial deposits are found. This technique requires two different machines. The first blasts high pressure water into the riverbank, to wash out the alluvium; the second sucks up the alluvium onto a sluice or tray made of wood or other material. (Photo 14) The sluicing and gold extraction process using mercury is the same as described above. A study by the WCS identified 69 hydraulic land blasting operations along the Irrawaddy between the confluence and Bhamo: 26 operations between Myitkyina and the confluence and 43 operations between Myitkyina and Bhamo (WCS, 2002). Another area where hydraulic mining is practiced is Mawk Ya Ja Maw, west of Bhamo.

Photo 11:Bucket dredges operate in the river using belt driven buckets to scoop material from the river bottom.

Photo 12: Buckets on gold sifting equipment.

Photo 13: Gold mining dredge.

MINING GOLD ORE

1 **Shaft mines:** Tunnels are carved out in order to reach gold deposits in the rock material. Rocks carried in baskets to the surface by ropes or on workers' backs are then crushed, usually by machines, but sometimes by hand with hammers. The process of gold extraction is the same as for other mining methods. Crushed rock is mixed with mercury and the amalgam is burned. Some shaft miners use cyanide instead of mercury (for more details about the technique see paragraph about cyanide leaching).

Companies sell shaft mine claims of 0.5 to 2 acres. The smallest mines have eight to ten workers. Within a group, some are part-share workers and others get a daily wage. The larger companies may employ as many as 1,000 day-wage labourers to work in a shaft mine.

2 **Open cast mines:** Large mining pits are dug in mountains, valleys and plains, and hillsides are cut away to expose the gold-bearing rock. The rocks are washed with water piped from mountain streams, and crushed. The crushed rock is then pumped or placed onto sluices to separate the fine sand and gold. Mercury is added, and the gold-mercury amalgam is squeezed, then burned. Mining tailings consisting of rocks, fine material and mercury are washed away into streams and valleys. There are no specific mentioning of open cast mines in Kachin State as yet, but the Canadian Leeward Co. exploring in Mabein Township close to the Kachin border is expected to use this method.

Photo 14:Water blasting of the riverbank.

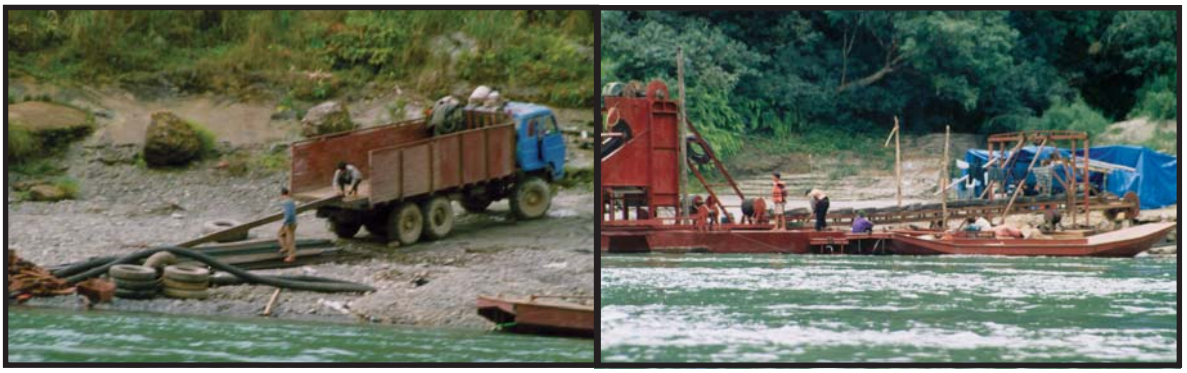


Photo 15-16: Steps in building a dredge.

Photo 17: Suction dredging along the N'Mai Hka River. The rafts carrying the engine and the suction hose are anchored along the riverbank. Alluvial sediment is pumped to the bank for further processing (sluicing, etc.) on land.

Photo 18: Divers on the Mali Hka spend up to eight hours per day under water working only with simple diving equipment.

Photo 19: Suction dredges on the Mali Hka river use suction pumps driven by Jinma engines to suck up sand and gravel from the bottom of the river.

CHEMICALS USED IN THE MINING PROCESS

DANGER: MERCURY

Mercury is the reagent of choice for gold mining in Kachin State. It is relatively inexpensive[19]. Mercury is toxic and fat soluable, absorbed into the tissues of living organisms and not expelled from the body. It is passed up the food chain to larger organisms that end up with increasingly high concentrations in the body. It is a "bio-accumulative poison". Now that gold mining is carried out on a large scale in Kachin State, much of the mercury used is brought in from China (for examples of mercury poisoning see Appendix).

When using mercury to extract gold, miners in Kachin State commonly squeeze the mercury-gold amalgam inside a cloth by hand, and then burn off any remaining mercury. (Photo 21-23) Often the mercury mixing is also done by hand. Villagers and migrant miners seem unaware of the dangers of this toxic element (Photo 20). In a land-based mine near Ah Lam village (near the Confluence) mine workers and villagers frequently handle mercury with their bare hands and spend long hours bare-legged in water where the mercury contaminated tailings have been dumped. Although much of the mercury can be collected and reused, significant amounts are often released into rivers or into the ground. Some miners report that in the past, Kachin children would dig up and reuse mercury from former mining processes in droplets from the ground. Children also pan for leftover gold downstream from the sluices (Photo 5).

There is little local awareness about mercury dangers. Although some local people reportedly seem to avoid eating fish from areas where there is mining, the majority probably do not connect illnesses or birth defects to mercury contamination.

It appears that some mining companies take precautions regarding mercury and that there have been attempts to recycle and remove it from the tailings. In some companies mercury use is controlled and has to be approved by the company. One miner reported that on the barges where he works mercury processing was all done by machines and workers rarely handle it

"Our clean water in Mali Hka River is spoiled with mercury. So it is dangerous for people who use water in this river".(Kachin interviewee, 2002)

"Some of people know and worry about eating fish because of the mining. In Myitkyina some people afraid to eat fish, now only eat meat. Fish is quite important for Kachin but this time they are afraid to eat." (Kachin interviewee, 2002)

Photo 20: Worker at a mining camp cleans fish caught in the Mali Hka close to the Confluence.

"In the event of a large mercury spill (more than a broken thermometer's worth), immediately evacuate everyone from the area, seal off the area as well as possible, and call your local authorities for assistance." (US Environmental Protection Agency fact sheet)

Photo 21: Miner in Hukawng Valley squeezes the toxic gold-mercury mixture called amalgam, in order to extract gold.

Photo 22: Miner holds amalgam in his hands.

Photo 23: Like these miners in Ta Yang Zup, who handle mercury bare handed, locals are often unaware of the toxic nature of the most commonly used agent for the extraction of gold.

themselves. Nevertheless, given the large quantities of mercury being used on so many sites, the 24-hour mining operations, and the small amount needed to poison people, these few precautions taken, may not be effective.

There is only limited specific documentation regarding the extend of mercury contamination in Kachin State. Besides the pollution surrounding mining sites, it is probable that there is high mercury pollution in the dust of gold workshops in urban areas of Burma as well. River water from areas with heavy mining activity is still reported to be widely used for irrigation and household use.

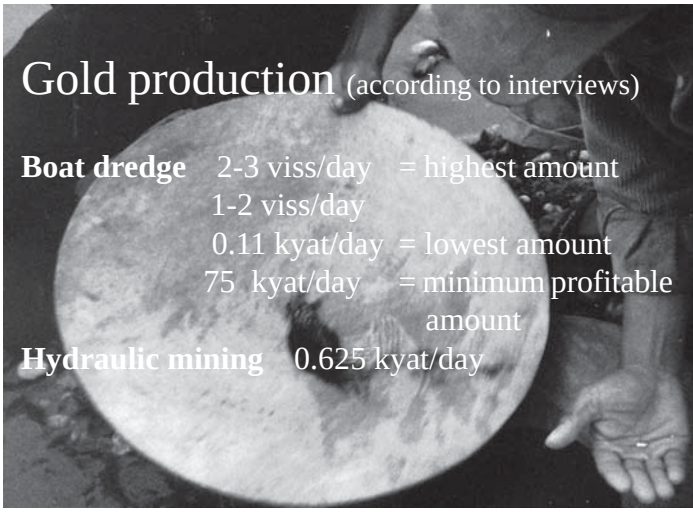
ALTERNATIVES TO MERCURY

Mercury vapour can be captured when it is burned off, and then recycled, to lessen its effects on health and the environment. Gold mining can also be undertaken without mercury or other toxic reagents, but it requires training and skill. According to mining expert Roger Moody, *"Gravity based technologies exist and are likely to spread in years to come"* which would lessen the use of chemicals. Moody also states that *"retorts, which eliminate mercury gas given off during the burning process and burn just as quickly, can now be made locally [in Third World countries]"* and there are *"other low-cost modifications which include better sluice gates and traps to help prevent mercury spilling into watercourses, and processes to cleanse and recycle mercury."* (Moody, 1996)

Unfortunately, the advice and training programs which could bring safer mining processes to Kachin State are not in place and are difficult to implement under the present military regime, which spends state funds on weaponry and the control of resistance rather than on health or environmental protection. Workers in the mining areas lack basic information, and the areas are off limits to independent researchers, health workers, environmental organisations or labour unions. Mercury pollution is a silent killer, so any victims in Burma suffer in silence.

METHYLMERCURY (CH_3Hg^+)

Methylmercury a mercury compound, is an especially toxic form of the metal. It can be made as an industrial product, or formed by the activity of micro organisms living in the sediments of lakes and rivers. Wetland areas like the Indawgyi Lake and the Irrawaddy delta are particularly effective producers of methylmercury. Methylmercury can be absorbed into the lungs and through the skin, or can be ingested by eating fish, or other aquatic foods.



IMPACT OF MERCURY ON HUMANS

Mercury damages the brain, affecting behaviour, emotions, memory, the nervous system, eyesight, hearing, and control of movement. Short-term exposure to high levels of metallic mercury vapours may cause effects including lung damage, nausea, vomiting, diarrhoea, increases in blood pressure or heart rate, skin rashes, and eye irritation. It also harms the reproductive system, and foetal development. Infants and children are especially vulnerable to mercury during their development and growth. Harmful effects passed from the mother to the foetus could include brain damage, mental retardation, lack of coordination, blindness, seizures, and inability to speak. (ATSDR, online) Mercury can cause such damage directly, but it can also generally weaken a person's health and immune system. There are efforts in the United States to completely ban the use of mercury, even in thermometers, batteries, and dental work.

"Locals say that because there is oil and mercury in the Mali Hka, people who use water from the river suffer from health problems. [...] The local people are worried about the many problems they will face as the gold mining continues..."
(Kachin interviewee, 2003)

CYANIDE LEACHING

Most of the world's large gold mining corporations use cyanide as the extraction reagent for gold. The process known as "cyanide leaching"[35] is a highly effective method for extracting gold, as the cyanide combines with almost all of the gold in the rock or sand, and then releases it into water. Cyanide is more efficient than mercury for this use, but it is also extraordinarily toxic to humans, animals and plants[40]. In contrast to the slow build-up of mercury which causes poisoning over time, cyanide poisons quickly. Cyanide poisons will break down relatively quickly into harmless elements in air and sunlight, but the break down can be inhibited by the cold, humid climate found in some parts of Kachin State. Even in favourable conditions, the cyanide often will not break down quickly enough to prevent pollution, and can persist in underground water systems (for examples of cyanide pollution see Appendix II).

> *"In Theplat they are using cyanide [..]". "They crush the stone and mix the cyanide into it to get the gold out [..]".* (Kachin interviewee, 2002)

> *"I saw a lot of mining companies that came from Myitkyina to Malizup (The confluence). They were on the river, every day they dig gold. They used many kinds of chemicals- mercury and cyanide."* (Kachin interviewee, 2002)

In central Burma, cyanide is used in at least one of the large gold mines near Mandalay. Private business-owners have sent young Kachin men there to learn methods for using cyanide. Although mercury is by far the more common reagent used in Kachin State gold mining, there are reports of the use of cyanide in different mining areas as mentioned above, and in the Hukawng Valley (National Geographic, 2004). A senior adviser to the Ministry of Mines was quoted by The Burma Courier (24. Sep 2001) stating that *"although there is a government imposed ban on the use of cyanide in alluvial mining in Burma, its use in the amalgamation process of extracting gold is quite common in Kachin State and Sagaing and Mandalay divisions [...] was responsible for the trebling of gold production in these areas in 2001"*. In 1999 investors in Indawgyi Lake shaft mining projects (north-west from the lake) expressed a desire to start using cyanide, to obtain higher percentage extraction. Our informants reported cyanide use along the Irrawaddy between the confluence and Myitkyina, in the Theplat area and in Gau Gwi Pa (south west of Myiktyina, west of Bhamo). It is likely to be used in the shaft mines in the north eastern N'Mai Hku area as well.

HUKAWNG VALLEY

Photo 24: Hukawng gold mining area, January 2002. Until 1994 Kachin State's Hukawng Valley remained as an unspoilt wilderness, effectively protected by its remoteness and the realities of civil war.

A remote valley in western Kachin State, the **Hukawng** region contains surviving primary forests and dense bamboo groves. Until 1994 the area was an unspoilt wilderness, effectively protected by its remoteness and the realities of civil war. The abundant watershed rainforests of the **upper Chindwin** (**Tanai Hka River**) were cut only in a few places by the little used Ledo Road. But now there are indications that Hukawng Valley may have been opened to petroleum exploration and to gold mining activities. Gold containing sediments deposited by annual floodwaters can be found on the banks of all the tributaries of the Tanai Hka[30]. There are at least a dozen mining areas of which the most recent are **Nam Byu, Shing Bwi Yang, Kap Dup, One Pala, Dalu Daga,Ting Kok and Nam Gawn.** Both river mining with floating dredges and on-land mining is practiced. Trees are cut down to clear the land, which is excavated to a depth of 15 to 30 ft (4-10 meter) Tailings from the gold extraction process are left behind. The forests are turned into denuded, muddy wastelands of tailings pools and rock piles. Miners buy mining sites, deforest them, exhaust them, and move on. Some pan for gold independently in abandoned concessions.

Mining is difficult in that area where poor roads prevent much vehicle access. Gold mining supplies (machinery, petrol, rice for the workers) are often brought in by oxcart or even by porters who are often teenagers[32]. The miners are mostly Shans from the Bhamo region (Southeast Kachin State), Burmese from other places in Burma, Kachin or Chinese. Among the miners are also nearby villagers who abandoned farming for gold mining. Due to the presence of migrant workers, Burmese became the Lingua Franca in this area.

Photo 25: Gold panning at Nam Byu, December 2001.

In the **Danai** region a concession of 40 by 40 feet in a popular area costs 170 USD whereas the price for less popular areas can be negotiated. Around **Nam Byu**, small concessions (1 lot) are purchased from the KIO for around 8.5 - 25 USD per lot. One day's mining in one lot can produce up to 80 "ywe" of gold (or 0.625 kyat gold weight; in 2001 one ywe was worth 0.7 USD). Normally around 6 - 8 miners work in each mining concession lot. Earnings are distributed one third to the workers,

one third to the mining concession holder, and one third to be used by the concession holder for expenses such as equipment, supplies and food for the miners. At Nam Byu, someone with one million kyat to invest would be able to pay for mining concession, hire miners, buy equipment and start a gold mine. There are some concession owners from China at Nam Byu, and a junta joint-venture reportedly called Twe Company.

The Burma Army collects tolls for bridge access to the **Shing Bwi** plains (near Shing Bwi Yang village), a gold mining area in western Kachin State crossed by an old British road. This area was in the past mainly inhabited by an ethnic minority group called the Naga. The Naga, who panned for gold around Shing Bwi Yang in the past, have knowledge of the gold deposits. Sometimes they are hired by the companies to find gold deposits. The SPDC is said to have gained control over the area and given mining concessions through the Northern Star Company out to Chinese and other companies, without necessarily consulting or compensating the Nagas. Northern Star has been viewed as the main encroacher on the Naga's gold-rich land, and there has been friction between the Naga and that company. The Naga try to prevent the miners from cutting bamboo for construction rather than buying it from them. The SPDC Mining Department grants gold mining concessions for Shing Bwi Yang (village), at 10 million kyat (8474 USD) for one acre, plus a payment of 10,000 kyat (8.5 USD) to SPDC surveyors. Companies in Shing Bwi Yang include Northern Star, Buga, Twe Kaw Seng (a Wa goup), NDA, and Palawng (not the Palaung ethnic group).

Photo 26: Deforestation in Hukawng Valley.

Photo 27: Collecting earth to sift for gold at Nambyu. Small scale gold panning by local people continues along the rivers of Kachin State, but most gold mining is done with heavy machinery.

MALI HKA

The Mali Hka River is one of the main centres of mining activities in Kachin State. Since the business man Lawa Zawng Hkawng found a lot of gold along the river south of Sumpra Bum in 1999 the area has become a "boom and bust" gold mining area. In contrast to the N'Mai Hka River, most of the mining on the Mali Hka is done with floating dredges scooping up sediments from the bottom of the river. One interviewee estimated up to 1000 dredges on the Mali Hka River between Sumpra Bum and Myitkyina and the number of large size dredges along the section between Machanbo and Htawadam alone is reportedly 40 - 50[33]. At some places the river is wide enough to allow river bank mining. Before the gold boom, the villagers along the Mali Hka made their living through rotational farming, forest cane (rattan) gathering, and some small scale gold panning. Now most locals work in mining related activities and thousands of outsiders have come as migrant workers.

Photo 28: Piles of stonesdug from the riverbed for gold mining along the Mali Hka River.

Some villages including Tawng Ban Maw, Tayang Zup, Lahpa, Leyan, Karensha, Nsensha are seriously affected by gold mining. The numerous social and environmental problems these villages face are repeated in many other areas of Kachin State and elsewhere in Burma[31] where mining for gems, gold, or illegal logging cause a temporary boom. As sustainable local livelihoods have changed to dependency on gold mining, communities have become less self sufficient, particularly in food. In this way, mining has caused communities to become less viable in the long term. Dependence on prostitution and drug dealing, drug abuse and the spread of HIV/AIDS and other diseases are part of the reality. Deforestation is a major concern since the trees of the surrounding forests are being cut to clear land, for the construction of mining camps, fuel

Photo 29: 15 gold dredges on the Irrawaddy.

"The Mali Hka River is shrinking and its waters are being polluted. Local people drank from the river in the past, but now they are afraid even to take a bath in it."(Kachin intervewee, 2003)

wood or simply to make space for mining. Sewage from the mining sites contaminates the rivers. Many people do not understand that the river is polluted, and continue to take their drinking water from the river.

The case of the Tawng Ban Maw gold mining site, 1.6 km south of the Confluence, gives a typical example for the destruction brought by gold mining. The concession is run by an NDA company and covers 0.5 km of the river. After a seam of gold-rich rock was found near an existing village, the banks of the river were destroyed to reach the gold, causing erosion, especially during the rainy season. This forced people to move their homes further from the river, where they had to clear more of the forest in order to create space for the new village. Due to mining activities clean water for consumption and agricultural use was harder to find.

Photo 30: Gold mining along the Mali Hka at Lahpa. The Mali Hka remains one of the centers of gold mining in Kachin State.

Photo 31: Gold mine pools and bamboo sluices on the eastern side of the river at Nawng Hkying (between the Confluence and Myitkyina).

Companies involved in gold mining on the Mali Hka River at Lahpa include Northern Star, Buga, Sea Sun Star, "Kachin Star" and Kachin mining entrepreneur La- Wa Zawng Hkawng (not the same as Kachin businessman Yup Zau Hkawng). Similar to other areas here Northern Star is reported to sell mining concessions to other companies.

Photo 32-33: Riverbank mining along the Mali Hka, Lahpa.

A concession covering a 1.6 km stretch of the Mali Hka River at Lahpa costs 4-5 million Kyat (3,390 - 4,237 USD). Independent operators can also buy into concessions, by working in the companies' concession areas in return for paying 15% of their gold earnings. Workers earn around 30,000 Kyat (25 USD) per month. Most are Burmans in their teens and twenties from cities in Kachin State and other areas. Big dredges operate 24 hours a day along the river.

N'Mai Hka

"In the N'Mai Hka they also search for gold using big motors. They work the whole day and the whole night. They search for gold in the river and also on the river banks. I feel very upset because God gave us a beautiful land but it's been destroyed, and the beautiful environment is going to be destroyed also." (Kachin interviewee, 2002)

Although gold mines on the N'Mai Hka River are largely depleted, the area around Chipwi town is still being mined. Magyeng Nyang is a mining-affected village in the Chipwi region. Northern Star Company operates in this area with dredging machinery. The workers are Shan, Burman, Kachin and Chinese. There are some 16 mines, with at least 13 workers in each. The workers receive a two thirds share, the employer one third. The mining in this area has reportedly moved from the river onto the river bank. The Chipwi region is severely deforested from gold mines abandoned over ten years ago.

Photo 34: Long stretches of the riverbank along the N'Mai Hka River downstream of Chipwe are affect by the damage caused by large scale mining activities.

Photo 35: Virgin forest in the triangle area between Mali Hka and N'Mai Hka River.

Photo 36: Mining irreversibly destroys the river banks: Mining area along the N'Mai Hka River south-east of Chipwe.

HPAKANT

Hpakant, now a city, southwest of Myitkyina, is internationally famous — or infamous — for its jade mines, which also produce gold as a secondary product. In the 1980s, the area surrounding Hpakant was still covered in forest, but this was destroyed rapidly over the period 1988-1993 with the increase of mining. Since the junta's 1994 ceasefire with the KIO, which led to the KIO's loss of control of the jade trade, Hpakant has experienced massive expansion of roads, business activities, and migration. More than 500,000 people were living in Hpakant by 2001. Most are migrants from many of Burma's ethnic groups and from China. The mining city of Hpakant is now plagued with narcotics dealing, heroin and amphetamine drug abuse, spread of HIV/AIDS and other infectious diseases, increased prostitution, and corruption. Trafficking of women and girls is said to be a major industry in this area, with victims often younger than 13 years. A first-hand description of Hpakant's agony is found in "Stone of Heaven: Unearthing the Secret History of Imperial Green Jade" by Adrian Levy and Cathy Scott-Clark.

Photo 37: Gold mining in the area of Hpakant.

Photo 38: Polluted water and degraded forest in the area of Hpakant. Although officially required, in reality the rehabilitation of mined out areas does not take place.

"It was forest and unused land to the west of the Uru River. Then people came and claimed the land for their own use. It was on a first-come, first-served basis. At first they did lowland farming there, and it was then that they found gold on the land. They started to do mining, and all the land became destroyed." (Kachin nterviewee 2002)

Gold and the Environment

After the Gold Rush: Tailings and Acid Mine Drainage

Tailings left over from hard rock mining are a soupy mass containing acids, finely crushed rock material, toxic heavy metals, and chemicals like cyanide. It is difficult to store this waste, or to make it harmless. Storage ponds and dams may leak, overflow, or break. According to local informants and photographic evidence, in Kachin State, tailings of waste rock and sand mixed with leftover mercury are not treated or stored at all, and appear to be released straight into the rivers and valleys.

In addition to pollution from the dumping of tailings and chemical reagents, mining can cause *acid mine drainage*[36]: Gold is mined from rock ore that often contains high levels of sulphur. Once the rock is moved and crushed the sulphur comes in contact with air and water and produces sulphuric acid. This acid then dissolves heavy metals like cadmium bound up inside the rock, which then pollutes the environment. We do not have specific information about pollution caused by acid mine drainage in Kachin State, but we know of no active gold mining sites in Burma making any effort to clean up waste rock or restore water quality.

Many of the most famous deposits are now depleted and the areas from whence the minerals extracted are poisoned wastelands. (Photo 38) In the area of the Namtu - Bawdwin mine for example, massive quantities of tailings containing zinc and toxic lead have for more than a hundred years been spread over the land or simply thrown in the Myitnge River, a tributary of the Irrawaddy River. In announcing the signing of a contract with a Chinese company that will reprocess the on-land tailings at Namtu, the main Burmese government mouthpiece, The New Light of Myanmar, revealingly stated that "The 5 million ton waste material at Namtu Mine is the largest waste dump in the world"[20]. Also notable, the regime is building a 400 megawatt hydro-electric dam called the Yeywa dam on the Myitnge River, an activity that is likely to create a reservoir with dangerously toxic levels of lead and other heavy metals.

Land rehabilitation

There are no available records of cases of land rehabilitation in the interviews or other sources, but rather evidence of the opposite. Photographs taken by our field researchers of devastated areas around Chipwi, Hpakant, Waimaw and many other areas show that the rehabilitation of mined out areas is not taking place as required by Burmese law (Photo 7-9, 37-38). Companies often leave old dredges behind in order to save on transportation costs (Photo 9). Photographic records of the major copper, tin, lead, zinc and silver mining sites of Letpandaung, Mawchi and Namtu-Bawdwin also show massive disturbance of the natural landscape, with no evident attempt at remediation.

The River Ecosystem

Riparian ecosystems include rivers and their banks. These habitats having plenty of water year-round, are especially fertile and diverse, providing homes for birds, mammals, reptiles and amphibians as well as many types of fish, shellfish and other aquatic creatures[39] (Photo 45-48).

Gold mining associated pollution from mercury and cyanide, acid mine drainage, toxic tailings, diesel and engine oil[21] is a severe threat to wild flora and fauna. A study conducted by the WCS indicates a declining number of dolphins in the Irrawaddy River. Zoologist Brian D. Smith states

"The main threat to the dolphins beside nets and the use of electrical charges to catch fish, is mercury run-off from gold mines along the river" (AFP, January 2003). *"The potential for mercury to have toxic effects on Irrawaddy dolphins may be especially high, due to their affinity for areas of reduced flow where entrained metals probably settle in higher*

concentrations than elsewhere in the river channel." (WCS, 2002)

According to an analysis of mercury content in fish samples, areas with the highest mercury pollution were the confluence of the Mali Hka and the N'Mai Hka and the Irrawaddy downstream of the Chindwin confluence. These findings suggest that overall mercury levels are probably higher in Irrawaddy tributaries due to intensive gold mining activities and reduced dilution capacity in these smaller rivers (WCS, 2002). Data about ecological impacts, such as bioaccumulation of pollutants, directly in the mining areas as well as further downstream towards the delta area is still insufficient. More research needs to be done here. The Irrawaddy Dolphin is certainly not the only species threatened by the gold mining.

Gold mining brings about a complete structural change to affected rivers. Pictures taken in the field show that dredging operations clearly cause silting and create waste rock piles in the river (Photo 28,34,36). The pits and shafts of land-based gold mining also cause erosion and again silting as the soil runs into streams and rivers. Structural changes like displacement of river beds, changes in the seasonal variance water levels, shift in sedimentation areas and increased riverbank erosion[22] have been described by many interviewees. As mentioned before, techniques like sluicing and hydraulic mining take up large amounts of water, that has to be diverted from the rivers. All these interferences in the natural river system have reportedly increased the danger of flooding and droughts.

With around 84% forest cover, deforestation inevitably is a side effect of the gold mining process in Kachin State. Forest has to be cleared to make space for mining sites and the necessary infrastructure. Roads that serve gold mining areas cut through remote forests bringing further deforestation and destruction. In most cases the logs are not even used as timber, partly because people focus only on the gold and partly because mining concessions often do not cover logs. (Photo 40-44)

The dramatic influx of population into the mining areas together with rising commodity prices increases the pressure on natural resources in these often remote areas. Locals, too poor to buy gold concessions, are not allowed to continue with the small scale gold mining for additional income. They try to make a living on Non Forest Timber Products (NFTP), such as cane, Tikadoe oil and wildlife products. This results in commercialization and often depletion of these resources.

The rubbish, spilt fuel and sewage from mining barges and camps further pollutes the environment. (Photo 39) Gold mining severely threatens Kachin State's riparian ecosystems and associated watersheds.

Photo 39: Removing an empty petrol tank from mine site between the confluence and Lahpa. Fuel used to operate mining engines contribute to the pollution of the rivers.

Felling Trees for gold in Nam Byu, Hukawng Valley (Photo 40-43)




Photo 44: Wasted natural resources: Trees cut down to clear land for gold mining are, if not used for construction of mining camps, usually burnt or simply left behind.

"Because they have already negotiated with the authorities and have already paid taxes, they can cut down the trees in their mining areas. We cannot punish them."

"In a gold mining area the most important thing is the gold, people don't know how valuable the other things are. If they know they would set up sawmills and sell the wood [...]"

(Kachin interviewee, 2002)

"The river is like a rubbish dump and contains lots of engine oil. In the past it was very clean and cold and full of living things. Now, as you see, it is muddy, oily, so the living things in the water are gone. Our people breathe the polluted air, consume polluted water, the weather is changing and becoming unstable, and the local people are getting sick."
(Owner of a gold mining lot near Shwe Nyaung Pin, Hukawng Valley, 2002)

"Now all the villagers on west of confluence collect tikadoe tree roots- which are boiled to collect a scented oil, sold for 1,500 - 2,000 kyat per bottle to China. [...] Those people have no capital to invest in gold so they look for tikadoe oil."
(Kachin interviewee, 2001)

"All the cane up through Kachin State is gone".
(Kachin interviewee, 2001)

Photo 45: River banks are part of the riparian ecosystem. These habitats are especially fertile and diverse.

Photo 46-47: Seasonally flooded forests become threatened ecosystems.

Photo 48: Pristine forest along the Mali Hka River.

Photo 49: The feeding habits of ducks may make them particularly susceptable to mercury absorption.

GOLD AND ITS SOCIAL IMPACT

Aside from the risks involved in the gold mining process, communities in areas of Kachin State where mining is taking place suffer from a range of new social problems. Drug abuse, gambling and prostitution already serious problems among miners at the jade mines of Hpakant, have spread further throughout the state.

The members of local communities, who previously made their living in traditional ways such as farming and hunting, instead serve the mine operators or miners in a variety of ways that frequently lead to trauma and conflict. These local people may become paid miners, or providers of food, construction materiasl or even sexual services. When the resources are depleted and the miners move on, locals suddenly lose the income and find themselves left with many residual problems (Photo 50). The problems such as mercury poisoning or drug addiction worsen and multiply, dragging families and sometimes entire communities into misery. The influx of miners and their bosses is tearing apart the social fabric along Kachin State's rivers. Villages may lose their identity and roots if in the course of a local "gold rush" the village is inundated by mine workers[25] or the village loses its population because the villagers become paid workers who follow the mining operations from place to place.

The gold mining "boom economy" often profits people from outside of the region rather than locals. Many people lose their land due to gold mining, when the Burmese government or the companies to whom they have given concessions force villagers to give up their land. Forced relocations related to gold mining have happened in many places, such as Naung Hkin[23] and in Mali Zup[24]. Education, which in Burma is already of an extremely poor standard, especially in remote ethnic areas, is often neglected as many children are tempted to earn quick money in the gold mining industry instead of going to school (Chan, 2002). Another effect of the gold rush is inflation. Rising commodity prices (double the normal price) are not affordable for local non-miners. As one Kachin State miner put it, "*In gold mining areas everything is expensive. People get money easily and spend money easily*".

Photo 50: Begging girl near the railway tracks. The mining areas while promising quick wealth, in reality create poverty.

Residents in one area along the Mali Hka River reported that miners living on the dredge hire local girls, aged 14 or 15, as prostitutes. The abuse of very young girls for this purpose is common in some areas of Burma. The rise of prostitution, drug use and the migration of labour to mining areas has accelerated the rate of HIV/AIDS infection in Kachin State, especially in border areas (Beyrer & Chelala, 1999). The HIV prevalence rate among Intravenous Drug Users (IDU) in Burma is up to 90% in some states (including Kachin State) the highest in the world (Reid & Costigan, 2002). Local indigenous people who work in the mining-associated sex business may lack any knowledge of the disease or its prevention and are at special risk for HIV/AIDS. The government seems not to be willing to recognize and solve the problem. There is an absence of decent medical care and health education. According to UN sources in 2001 1.1 - 2.2% of the urban population of Burma was HIV positive, a number considered to be an underestimation by others who estimate it to be around 4% (BBC News, 2001).

SEEKING WORK, SEEKING GOLD

In mining for gold on the rivers in Kachin State, the workers doing the harder and more dangerous work (such as the divers) tend to be Kachins or Burmese, but the mining companies mostly employ Chinese workers to handle the actual process of gold extraction on the dredges. One Kachin worker who worked on a Chinese owned dredge said that the extraction process was a closely guarded secret and that non-Chinese workers were not allowed to witness it. It is widely rumoned that this is done in order to conceal the real level of production, allowing the Chinese companies to declare less income and take more gold out of Kachin State.

Because of their technical expertise and their capital, Chinese businesses have control of a significant portion of the alluvial gold mining, whereas land-based open-cast or shaft mines employ a greater variety of people. Land-based mining workers are mainly internal migrants who come from Myitkyina and other areas of Burma and include Burmese, Kachins, Shans and Chins (from western Burma). Chinese bosses and workers are uncommon in these land-based mines.

Work on the river is very well-paid by local standards – one Kachin diver reported earning between 50,000 to 70,000 kyat (42-60 USD) per month in 2001, a normal mine worker about 50,000 per month in 2004, a remarkable sum in Burmese terms. However, Kachins are allegedly only hired by Kachin bosses, not by Burmese or Chinese employers. Some of the Lisu, Rawang and Shan workers along the Mali Hka reportedly earn between 10.000 to 50.000 kyat (8.5-42 USD) per month. Shaft mines pay a daily wage, or employ part-share workers.

Several interviewees stated that Chinese mining workers were entering Burma unofficially by paying bribes at the China-Burma border crossings in order to stay and work without permits, Burmese identity cards, or other official documents. The majority of such workers are reported to cross into Burma through NDA controlled border at Pangwah from the vicinity of Tengchong, a town in Yunnan, into Kachin State east of Myitkyina. Some also enter at Sadon and Kam Pai Ti border passes. It is not clear if the workers are paying the bribes themselves and crossing individually to look for jobs, or are being recruited and brought in by Chinese companies[26]. Many Kachin villagers appear to feel at a disadvantage of foreign (mostly Chinese) investors and workers who profit from their land or take high-paying jobs. This is creating local ethnic resentment.

"I don't know what kind of sickness this is, only that one or two people die each week. That is different from before. Very different. [...] The people say that during the last 2-3 years so many people between 30 and 60 died, some were still young. More than before. Most of them are sick. [...] Maybe some have HIV-AIDS."
(Kachin Interviewee)

"There has been some development [in mining areas], some people are able to sell things and they can earn an income. There are also costs-the behavior of youth has become corrupted, because people earn and spend a lot of money in gold mining areas." (Kachin interviewee)

The workers sexually abuse all the 13 and 14 years old girls in the villages and pay them just 300 kyat (25 US cents) a night. Because the economic situation is deteriorating so fast in this area, many girls have begun to use their bodies to earn an income. These illegal Chinese workers are turning our simple villagers into prostitutes".
(Statement of a Kachin person)

ENDANGERING MINERS

"When I was young almost no Chinese in the villages- now over half the population in the villages are Chinese. 20 years ago in Kutkai Shan, Palaung, Kachin- now the majority Chinese- Lashio also the same". (Kachin person)

"Because of gold mining, [...] businessmen came from other countries, mostly from China. They come and take the money... and our people don't have the chance to dig, don't have money."
(Kachin interviewee)

"I want to tell you how the SPDC accepts bribes from illegal Chinese workers who are mining gold along the Irrawaddy, in the areas round Maykha, Malikha and Alam. The SPDC allows the workers to do whatever they like."
(Kachin interviewee)

"They dig along the N'Mai Hka and Mali Hka- a lot of Chinese come- about 20,000 they told me."
(Kachin interviewee, 2003)

Aside from being exposed to toxic chemicals mentioned earlier, gold miners in Kachin State face other dangers. The divers take great risks using very basic air-pumps as diving equipment and pay a high price in health terms. On average, a diver spends 8 hours per day under water. As a result, many suffer from coughing, breathing difficulties, chest pains, hearing problems, and/or bleeding from the ears, nose and eyes. One former diver undergoing medical treatment in Thailand for respiratory problems reports that in the past such damage was very common, but more recently the underwater breathing apparatus has improved.

Not only are Kachin State mining sites operated under typical Burmese conditions - no safety regulations, no legal recourse for workers, no trade unions - but many of them are operated by business men, who appear to care little for anything but profit. Many of these are Chinese. China has *"by far the most deadly"* of the world's mining industries (BBC news, 2002) and an astounding level of mining safety violations and accidents. In 2001, according to an official Chinese government estimate, some 5,000 Chinese workers died in mining disasters[27]; Many experts believe that the true amount may be twice as high. The coal miners of China, lacking basic ventilators or fire fighting equipment, endure enormous casualties from accidents[28]. Yearly at least 10,000 Chinese miners are killed by lung diseases from working in unventilated coal mines.

In Burma there are no statistics, the casualty rate may well be proportionally higher. There are many local miners, estimated half a million in Hpakant alone. In only one famous disaster in the jade mines at Hpakant, which was never mentioned in the state controlled media, hundreds of people were said to have died when an embankment diverting the Uru River collapsed and the river poured into a huge underground mine on the riverbed.

There is little or no supervision of worker safety in the gold mining areas of Kachin State. The erosion of river banks and muddy slopes caused

by mining excavations pose severe mudslide threats to miners and to local residents. (Photos 7,32-33) Landslides and cave-ins around the bare, muddy, excavated gold mining sites are likely to occur especially in a climate characterized by heavy rains as it is in Kachin State.

The Kachin State's gold mining takes place in regions where malaria is endemic, and the mining operations create pools of stagnant water in which malaria-carrying mosquitoes can breed. Exposure of miners to other infectious diseases such as TB, Typhoid and Typhus is probable, and the migrant miners may lack resistance to particular strains of such diseases.

Another common source of accidents for alluvial mining is the strong current and the rapids along some stretches of the rivers i.e. the Mali Hka River between Ta Yang Zup and Lahpa, which poses a threat both to divers, and to workers on floating river barges. (Photo 51-52)

Anchor cables (partly submerged) across the river from these barges endanger miners and non-miners alike, as they hinder navigation on the river. Transportation becomes more difficult as rivers are blocked by gold mining operations and locals have to pay bribes to the mining companies for river passage[29]. In several reported accidents, rattan workers travelling by night[37] on floating bundles of cane have lost their cargo, and some cane workers have been knocked off and drowned.

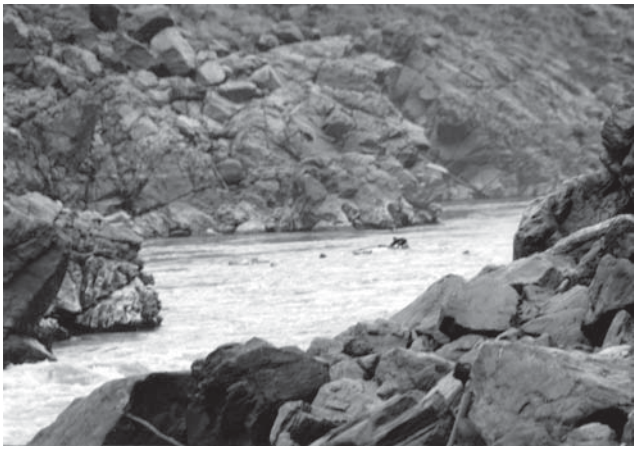


Photo 51: Capsized boat on fast flowing stretch of the Mali Hka River, January 2002.

Photo 52: Boatmen negotiate dangerous currents in the fast flowing Mali Hka. Gold mining along the fast flowing stretches of the Mali Hka is a dangerous business for miners.

"He works as a diver, inside the river. Very dangerous, he told me. He went to Mali Hka- 3 or 4 places- very dangerous places. Where it is very narrow, very strong water. Some boats crash in the water, a lot of people die he told." (Kachin interviewee, 2002)

"Because the Chinese dredges are anchored to big trees on the riverbanks by ropes that stretch underwater all the way from the dredge to the riverbanks, some boats have hit the ropes and capsized, and as a result, people have died." (Kachin interviewee, 2003)

Photo 53-54: Human Rights violations related to mining: Kachins in Hpakant area forced by soldiers (marked in red) to move a house to make space for mining . This area has been mined for both, gold and jade.

Human rights violations

"In mining areas people are portering in food for the people working there. Previousely Kachin villagers panned for gold for many years." (Kachin interviewee 2001)

With or without the application of formal laws, in Burma access to natural resources is often taken by military personnel without consent, and with violence. Villagers are compelled to give up lands without compensation. Access to rivers and forests that were common property and sources of livelihood for local people is increasingly denied. Resources are given over to concessionaires or claimed by the state for reasons ranging from building military bases or the dsignation of forest reserves without regard to the needs of the local people or their customary laws.

The press is tightly controlled, and there are severe consequences for unauthorized distribution of information. Human rights violations are especially common in rural, conflict and ethnic nationality regions. Abuses of a variety of basic rights are a fact widely documented by the United Nations and other credible organizations like the International Labor Organization, Amnesty International and Human Rights Watch.

There is evidence of gold mining related human rights violations such as forced labour and forced relocation. (Photos 53-54) A rape case related to gold mining has also been reported; a 20 year old girl working for a Chinese gold digging business in Shwe Maung, Myitkyina Township, was reportedly raped and killed by a Chinese gold trader (Mizzima News, online). However independent observers are denied access to most areas of Kachin State and there is no way to verify allegations of abuses. The KIO has shown itself to be unwilling to allow or support any investigations. Due to the likelihood of reprisals few people have made claims of abuses by the SPDC.

RECOMMENDATIONS

TO THOSE HOLDING POWER IN BURMA

Stop the granting of new concessions in protected forest areas. To prevent serious erosion and destruction of biodiversity, no new concessions should be permitted in virgin forest areas, or in areas along riverbanks. Because of their remarkable qualities and large number unique species, the forests of Kachin State deserve world heritage protection status – including the N'Mai Hka old growth fir forests and the forests of the Hukawng Valley.

Dredging operations should be strictly monitored for public safety. Dredging operators should be compelled to restore streambeds to their natural topography, not create navigation hazards. Anchor cables and dredges should not be placed where they endanger boats or rafts.

Immediately stop the discharge of untreated mining wastes into rivers. The World Bank noted in a report that "Riverine tailing disposal is considered to be a practice of the past that is no longer acceptable." Where mining for metals takes place, permanent impoundment of the toxic tailings in tailings dams should be a minimum requirement. Remedial and mitigation treatment should also be carried out. This should be strictly enforced by law, and with mining companies obliged to put up funds in advance to cover the full costs of clean-up in the event of toxic waste spills.

Regulate the sale and use of chemicals in the mining process. Cyanide use should be either prohibited or strictly regulated, due to the impossibility of safe containment. Regulations should be enforced that competent authorities should be notified of any accidental spills of more than 1 pound (0.6 kilograms) of cyanide, especially where it can enter rivers and water supplies. The sale of mercury should be strictly regulated, and all sales should carry safe handlings and health advisory warnings in relevant local languages.

Conduct research on specific effects of mercury pollution in Kachin State. This is urgently needed both in Kachin State and in downstream areas, concentrating on the human impacts already experienced in Kachin State. Testing should cover human hair and blood tests on the living; and autopsies on those who have died with nerve or kidney related disorders. Further tests for contamination of shellfish, fish and weed species may also be necessary.

Restrict the influx of migrant mine workers. The large scale increase of illegal migration into ethnic areas should be stemmed through straight policing. Corruption by government and military officials allowing large numbers of Chinese migrants to purchase citizenship documents should be subject to investigation.

Miners activities should be more effectively policed. The widespread killing and consumption of wildlife by migrant gold miners and timber workers must be ended. The smuggling of gold and timber across the borders, which is reportedly commonplace, should be curtailed.

Employ locals, transfer technology. Foreign-owned dredges allowed to remain in operation should be obliged to employ and train local people to ensure that locals have a fairer share of the economic benefits. Training should include minimizing environmental and social impacts.

Review environmental laws and guarantee proper enforcement. A thorough review of the existing environmental laws in general and on mining in particular is urgently needed in order to introduce effective legal measures to prevent and mitigate further environmental damage and social fallout. The legal review team should include government, non-governmental organizations, and scientific and community representatives. The public and the mining community should be effectively

notified of the environmental protection laws. The laws should be properly enforced, without discrimination and not as a tool for extortion as is too commonly the case at present.

Make environmental and social impact assessments. The implementation of laws making it compulsory to have EIA's and SIA's that cover all potential significant impacts should be carried out without further delay. Full EIA's and SIA's for all active and new mining and related development infrastructure should be conducted, made widely available for public review, and made part of a transparent local community consent process.

Provide improved healthcare services. Miners and the general population suffering from pollution effects require affordable, skilled medical treatment and specific medicines. A greater proportion of state revenues should be allocated to healthcare, including primary health education – and much less to sustaining, arming and expanding the military.

Provide information on health impacts of mining. Inform local people about the impacts of mining and risk mitigation through the school and medical systems. Warning signs and advisories in local languages should be put up in appropriate places about consumption of river fish and shellfish. Medical staff and community health workers should be trained to identify and treat mercury and cyanide related sickness.

Provide more HIV/AIDS education for miners and local communities. Wide distribution of information and condoms is needed in the mining areas.

Guarantee a participatory development process. Ensure that where "developments" are carried out, local communities are consulted, participate equally, get a fair share of the benefits, and are not just left to cope with the long-term problems.

Respect the rights of local people and communities to their lands and livelihoods. This call is especially to the ruling SPDC, but is also to the Kachin leadership, and leaders of the business community: Please stop taking the land and basic resources necessary for making a living away from the indigenous poor. To do so is like the rich stealing from the poor and is too often a form of racial discrimination.

Be more transparent. Publish gold production, sales and export figures, including the government's share in the revenues. Publicly list the names of concession holders and shareholders.

Allow more freedom of speech. The SPDC should lift its many restrictions on the freedom of speech and association guaranteed under its UN obligations. The KIO is asked to facilitate more independent investigation of the situation in Kachin State, rather than inhibit research and publishing. Through the recent issuing of a directive on the registration of all Kachin publications as an extension of SPDC censorship, and as a way of silencing those who would discuss the causes of the current social and environmental crises in Kachin State.

Allow a process of genuine democratization. Only a true dialogue between all stakeholders, especially the ethnic nationalities in whose lands most of the remaining resources are located, will make possible the effective long-term protection of the environment and more sustainable use of natural resources in the country. An important step towards that is the implementation of a genuinely representative and coercion-free national convention, which should result in the empowerment of people who legitimately represent the interests of all of the peoples of Burma.

Stop the process of militarization in Burma. Corruption and other abuses of power by unaccountable military personnel contribute to the deepening of powerty and environmental abuses, as well as human rights abuses. Restraint and withdrawal of troops stationed in the ethnic states is essential for the establishment of a peaceful nation.

TO THE ETHNIC ORGANIZATIONS

Develop and express clear conservation policies. The ceasefire groups and most of the ethnic armed forces claim to be nationalists fighting in the interests of their people and their land. Therefore ethnic organisations and activists should push for the introduction of policies and practices to conserve natural resources. The nationalist ceasefire groups should be the first to defend the beauty of the land from environmental destruction by outsiders, and should be the last to participate in activities that harm their people's interests.

Help research the environmental problems in your areas and their causes. More information needs to be collected on what is wrong and where it is happening. People need to know the reasons the damage is taking place, and who is involved. It is very important to know what local people think can be done to solve the problems.

Become more active on conservation issues. Please join the many indigenous people in other lands who have been taking steps to protect themselves from gold mining destruction. Representatives of the peoples of Kachin State would certainly be welcomed into their ranks. This report, which could only be done with close collaboration from Kachin partners, is proof that environmental awareness among the Kachin does exist. We would like to encourage concerned Kachins to contact groups like Community Aid Abroad (Australia), Oxfam America, Earthworks, the International Labour Organization (ILO), Minerals Policy Institute (Australia), Minewatch (UK) and Project Underground (USA) .

Aim to increase environmental awareness amongst your community. Environmental education materials should be produced and distributed to locals suffering from impacts of mining and deforestation, as well as to the decision makers on all levels. People in both the local and overseas communities need to share information about to decreases in fish and wildlife numbers, the increase of water pollution, the spread of deforested and disturbed areas, the extent of fertility and topsoil loss, and of displacement of peoples and conflict over land and resources.

Come up with development alternatives. Urge those who have lost their lands and livelihoods to the mining industry, and those directly involved in or funded by the gold mining, to think about alternative ways of making a living that fit the idea of "right livelihood" (e.g. agroforestry, herbal medicine research and production, food processing, cultivation of rattan cane, hardwood trees, orchids, etc.).

Restore mining areas. As basic principle, mining companies should restore areas affected by their activities to their original condition. This should include covering mined areas with layers of soil and topsoil, reforestation and permanent containment of heavy metal and acid contaminated water.

Educate mine overseers and workers on safety. Training on basic and improved methods of handling toxic substances and the use of safety equipment should be compulsory for individuals responsible for overseeing mining operations. Miners should learn and use safe techniques such as the use of retorts for heating mercury- gold amalgam.

Invest in the safety of miners. A moderate investment by operating companies in improved equipment and techniques such as wetsuits and better air supply equipment would save much in human lives and health – and may even be profitable.

TO MINING COMPANIES

Do not evade responsibility for the long-term damage caused to workers, communities and the environment. Pay the costs of preventing, mitigating and cleaning up damage. Promptly report spillages of mercury or cyanide.

Please write to the government and the KIO to express concerns about environmental issues in Burma. Please note concerns about the unsustainable exploitation, damage to biological diversity and the prevailing gross injustices.

All international resource extraction and engineering companies should withdraw from Burma. Under present conditions it is not possible to conduct an ethical business operation in Burma free of complicity in human rights abuses, nor do the conditions lead to environmentally and economically sustainable practice.

TO THE INTERNATIONAL COMMUNITY

Closely monitor the Chinese role in Burma. The international community should pay close attention Chinese entrepreneurs' roles in primary resource extraction and their efforts to open up remote areas for exploitation. Substance needs to be sought to allegations of barter or preferential access deals involving Kachin resources in exchange for arms.

Develop and transfer appropriate technologies. Both China and Burma would benefit from research, development and transfer of new safety equipment and technical solutions to mitigate the detrimental effects of mining.

Support ethnic minority activists. Further organisational, training, financial and advocacy support is requested from international environmental groups for those actively working to protect their people's environment, sustainable livelihoods and human rights.

Do not support the juntas "greenwash". Conservation, development and donor organisations working in Kachin State should not allow themselves to be used to "green-wash" the environmental abuses taking place under the military government.

TO CHINA

Chinese authorities should respect the environments of neighboring lands. China's central government should enforce its national laws regarding environmental protection and smuggling. They should abide by and help enforce international laws and conventions. China should not allow its international reputation to be damaged by the actions of a greedy minority of its nationals operating across borders to avoid Chinese law.

Close the roads into the N'Mai Hku area in northern Kachin State. Protect the Gaoligongshan Nature Reserves and other core areas of the Three Parallel Rivers (World Heritage) conservation area by closing the roads that are used for smuggling gold and illegally harvested timber. The Chinese government should consider extending the Three Parallel Rivers area into a trans-frontier wildlife sanctuary that also embraces the upper Irrawaddy watershed areas, and withhold support for destructive infrastructure developments, including mining, logging, road and dam construction in the area.

Act in solidarity with the people of Burma. Considering the Chinese people's own epic struggle against corrupt and despotic rulers, the Chinese peoples are asked to not give financial, moral and political support to the corrupt SPDC military regime that oppresses the peoples of Burma.

List of Acronyms

AI	Amnesty International
AIDS	Acquired Immune Deficiency Syndrome
AFP	Agence France Press
APCEL	Asia Pacific Center for Environmental Law
ATSDR	Agency for Toxic Substances and Disease Registry
BBC	British Broadcasting Cooperation
BSPP	Burma Socialist Programme Party
CI	Conservation International
CPB	Communist Party of Burma
EIA	Environmental Impact assessment
ERI	Earthrights International
ESCAP	Environment and Social Commission for Asia and the Pacific
GDP	Gross Domestic Product
HCN	Cyanide
Hg	Mercury
HIV	Human Immune Deficiency Virus
IDU	Intravenous Drug Users
ILO	International Labour Organization
IMF	International Monetary Fund
KIA	Kachin Independent army
KIO	Kachin Independence Organization
LDC	Least Developed country
N.S.Co	Northern Star Company
NDA(K)	New Democratic Army (Kachin)
NFTP	Non Timber Forest Products
NLM	New Light of Myanmar
SIA	Social Impact Assessment
SLORC	State Law and Order Restoration Council
SPDC	State Peace and Development Council
UN	United Nations
WCS	Wildlife Conservation Society
WRI	World Resource Institute
WWF	World Wildlife Fund

ENDNOTES

[1] For this report we have chosen to continue using the former name of the country "Burma", instead of the official name "Myanmar", given by the military government in 1989.
[2] For comparison: One of the biggest gold mines in operation in South-East-Asia, the PT Kelian Equatorial mine located in East Kalimantan, Indonesia, produces about 8 tons of gold per year.
[3] According to the WRI report "logging Burma's frontier forests" (World Resource Institute, 1998) the official export figures for logs are an underestimation.
[4] Residents of Karen State have developed symptoms of lead poisoning due to pollution from mining operations, but they cannot file any lawsuits (Gutter, 2001), while the klity lead mine in adjacent areas of Thailand has received etensive media attention for its poisoning of a Thai Karen community.
[5] Hka = Kachin word for river
[6] More research is needed about its extraction and trade, as is more openness by authorities regarding production figures.
[7] 1 block equals ~ 700 sq km
[8] In October 2002, 1,180 kyat was equal to one US dollar at the widely used black market rate.
[9] Mining operations in Theplat area reportedly have to pay either 1 kyat weight of gold per 1 acre (or 1 kyat per 100 kyat of their gold profit).
[10] Mainly "Jinma", machines. "Jinma" is a Chinese brand name for a range of powerful engines used widely to power suction hoses, high pressure water pumps and even bucket dredges. Other brands also used are "Jiang Dawng" and "Chan Chai".
[11] One of the largest "gold rush" areas in the northern parts of the country has developed at Linnfarr on the Chindwin River in Khamti township in Sagaing division where high-grade gold deposits are being mined by hundreds of diesel-powered boats equipped with gravel pumps that scour the river bed (Burma Courier, 24. September 2001).
[12] According to concession notification documents of the Northern Star Minerals Production & Trading Company limited signed by the managing director Lt. Col.Myint Thein (See Appendix IV).
[13] A KIO official interviewed stated that the shaft mines each have 10 to 30 workers, employing 700 to 1,000 people altogether.
[14] According to one interviewee, along the relatively small Mandoung stream, during the peak period in 1997-1999, 400 dredges had been in operation.
[15] Under joint control of KIO and NDAK .
[16] For the right to give out sub-concessions companies would pay around 400,000-500,000 Kyat (339 – 425 USD) to Northern Star Co.
[17] Since 1990, the SPDC has granted permits for the formation of mining companies by Kachin groups and/ or businesses from China.
[18] Ying Hai, Chinese concession holder paid for a one year concession (July 2002-May 2003) 800,000 Kyat (678 USD) to the Northern Commander and the N.S.Co. and operated 21 barges in that area.
[19] Under USD 2.00/0.5 Kg in the United States.
[20] Zinc oxide to be produced in Namtu mines by Apex Ltd. with locally manufactured and imported machinery from China (NLM: July 29,2002).
[21] In a mining area near Sinbo approximately 5-8 gallons of diesel and 4 bottles of engine oil are used per mining lot and day.
[22] One interviewee observed a tenfold increase of river bank erosion while others witnessed 40-50 feet of erosion of the banks of the Mali Hka river in 2002.
[23] People had been forced to abandon their farms in 1999/2000
[24] In this area farmers had to abandon their farms in 2000
[25] In 1997 in Tingaw and Wakan village, Tanai Township, the population reportedly increased from 200 to 2000 due to the gold mining industry.

[26] Indicated by the fact that the workers come from all over China.
[27] During May 2002 alone, 329 or more Chinese miners were reported killed in accidents; in June 2000 an explosion killed over 110 miners and injured dozens of others.
[28] According to an October 2000 article on the World Socialist Web Site, "the average annual figure [of those killed in China's coal mines] is higher than the total number of workers killed in coal mining accidents throughout the rest of the world." (Cook, 2000)
[29] The public ferry transport service on the river between Sumprabum and Myitkyina has to pay bribes of about 16,000 kyat (13.5 USD) to Sea Sun Star Company each time they pass the checkpoints.
[30] Some of the tributaries of the Tanai Hka: Ting Kok Hka, Hkawng Hka, Nam Hpyek Hka, Nam Byu Hka, Sha Ram Hka, Nam Hkam Hka, Gwitawng Hka, Nawng Hung Hka, N-hkaipa Hka, Sin Lum Hka, Ta Wang Hka, Maw Ning hka, Ta Rung Hka, Shing Bwi Yang Hka, Yam Mut Hka, Kap Dup Hka, Ta Byi Hka, La Mung Hka, Ka Mau Hka, Prang Brang Hka, Hu Gawng Hka.
[31] Similar problems have been reported by Moody in gem mines in Mongshu Village, Shan State (Moody, 1999)
[32] They earn 2,500 - 3,000 kyat (2,5 USD) for the trip.
[33] Boat dredges keep moving on the river, many operate in areas extremely difficult to access. Numbers are therefore difficult to determine. The numbers in the text are estimations made by different interviewees. They are not necesarily consistent and only supposed to provide a rough magnitude.
[34] The area between Mali Hka and N'Mai Hka, which is under KIO control.
[35] Three basic cyanide leaching techniques can be used: 1) Heap leaching: using piles of crushed rock, 2) Vat leaching: with crushed rocks placed in large containers, 3) Dump leaching: using piles of waste rock from earlier mining. Cyanide can only be reused if leaching is performed in vats. There have been many incidents in which storage containers of waste cyanide have leaked or been spilled.
[36] Acid mine drainage and other tailings pollution can persist for many thousands of years. Groundwater, springs and wells may be poisoned permanent by mines that reach deep into the earth. Internationally, acid mine drainage and tailings pollution are particularly common in mining areas where minerals are depleted and the mine abandoned. Companies do not wish to take on the costs and the responsibility for cleaning up waste rock and chemicals. There are some ways to treat and restore acid mine drainage sites e.g. with limestone channels, wetlands, and alkaline chemicals (for more details see Hester & Harrison, 1994) and to treat or contain tailings (Hester & Harrison, 1994), but it is certainly chaeper and better not to let the conditions arise in the first place.
[37] Extortion by soldiers demanding river tolls during the day has forced many cane workers to travel at night, when accidents are more likely to occur.
[38] Out of 2,211 existing plant species, 1,379 are endemic to Burma (BLISS, online).
[39] 314 Freshwater fish species have been listed for Burma, of which 152 are endemic (BLISS, online).
[40] According to Project Underground, "a teaspoon of two percent solution of cyanide can kill a human adult."
[41] Current engagement of the Indian government includes plans for the Tamanthi Dam on the upper Chindwin River, the construction of a most of the section of the Asia highway that runs from the Indian border at Tamu through to Meiktila in central Burma, and a multi-billion dollar gas pipeline from the Arakan coast to India.
[42] In the end of the 90th East Asia Gold had blocks 2 and 3 to mine gold and copper in Mabein Township near the south western corner of Kachin State.
[43] An example is the Myitkiyina-Laiza road, which in 2002 had 18 checkpoints, three of them controlled by the KIO, the rest by various groups of Burmese officials and soldiers, a distance of no more than 100 kilometers.
[44] According to estimations of the IMF.

GLOSSARY OF TECHNICAL TERMS

acid mine drainage	Water with acids, dissolved heavy metals and other pollutants in it that flows out from areas where ores are mined.
alluvium	Rock, sand and clay moved and deposited by floods or rivers.
amalgam	White toxic material that is a mixture of gold and mercury.
bioaccumulation	If a poison "bioaccummulates", the amount of the poison slowly increases or builds up with continued exposure. [note: Poisons bioaccumulate in humans, bigger animals, birds and fish when they eat smaller animals that have a small amount of poison in them.]
biodiversity	The great number of different species of plants, insects and animals; also called biological diversity or ecological diversity.
biodiversity hotspot	An area containing an outstanding number of endemic species that are experiencing exceptional loss of habitat.
burning off	One step in the gold extraction process used to separate the gold-mercury mixture called amalgam.
concession	An official permit from the government to allow a company to use or take something eg. logs or minerals from a defined area.
contaminate	To make food, water, a place, a thing or a substance dangerous by allowing waste, poison, germs or radiation to make it unclean.
dredge	A boat, or floating platform with a powerful engine used for lifting silt, sand and small rocks from below the water.
deposit	A layer of minerals, sand or organic matter that has slowly built up over a long time.
environment	The land, waters, air, climate, plants and animals that create the conditions and surroundings in which people, animals and plants live; also called the physical environment.
environment impact assessment	A study that is supposed to show what changes will happen if a big dam, a power station or a road is built, and describe how these changes will affect the forests, fish, people, water in the area; abbr. EIA
excavate	To make a hole or a channel by digging out and removing the soil or rock.
exploration	The act of looking at an area or an idea carefully to find out more about it; in the context of mining exploration means to search for mineral deposits that are rich enough to be mined.
food chain	The way living things connect to each other because one organism feeds on another. For example, an insect eats a plant; a

	spider eats the insect; a frog eats the spider; a fish eats the frog; and a person eats the fish.
hydraulic mining	Mining process using high pressure water to loosen sediments and rocks containing gold and wash it down to sluice boxes. Also called hydraulicking.
leaching	If a substance leaches or is leached from a larger mass such as crushed rocks or the soil, it is removed from it by dissolving in liquid that passes through the larger mass.
heap leach	To use acids, chemicals or bacteria to get metals out of rock. [note: Heap leaching is used to extract metals like copper and gold. The ore is crushed and made into small hills. Strong chemicals, like cyanide and mercury and sulphuric acid, are put on the top of the hills. The acids slowly move through the hill dissolving the metals forming a liquid solution. This solution is caught in big ponds. Then the metals are separated from the acids using electricity or other chemicals. This is efficient, but it is dangerous because the poison used can pollute the environment. When bacteria are used to start the oxidation of the ore, this process is also called bio-leaching.]
heavy metals	Metal elements that are poisonous and can be taken up by plants, people and animals. [note: Cadmium, antimony, zinc, aluminium, nickel, lead, arsenic, mercury and radium are all heavy metals.]
impoundment	Collect or confine water or liquid mine waste (e.g. a tailings dam)
mineral	A solid substance that is formed naturally in the rocks of the earth, e.g. calcium, copper, salt, tin, gold, iron. [note: Minerals can be single elements like copper or sulphur. They can be different elements joined together like ruby (aluminium, oxygen and chromium)]
mitigation	Reduce the bad effects of an accident or a problem. (e.g. Mitigation is often more expensive than finding a different way of doing something before the problem happens.)
open cast	A mine where all the ground above the mineral deposits or coal is removed so that the miners can get to the mineral; also called an open-pit mine, strip mine or surface mine.
ore	Rock that has enough of a desired metal in it that it can be mined and used profitably.
pan	To look for and extract gold or other precious minerals by putting river sand and stones in a flat container with water and moving it around to make the heavier minerals move together at the bottom of the pan.

placer deposit	A concentration of minerals and loosely packed sedimentary material that has collected in one place because of the heavy weight of the mineral.
placer mining	The mining of a placer deposit.
reagent	A substance that shows that another substance exists, by causing a chemical reaction (Longman, 1995).
rehabilitation	To restore an area, a forest, building or a person so that it returns to the good condition it was in before.
remediate	Action or treatment to repair or remove a problem; make something better again after it has been damaged. (e.g. The acidity of the field can be remediated by spreading lime powder over it).
riverine	Of or on a river or river bank.
river basin	An entire area of land and water, where all rainfall flows into one river.
sediment	Material - usually sand, stone, dust, soil or organic matter - carried by moving water, air or ice and deposited on the bottom or sides of rivers or on the land. Sediments may slowly harden to become rock.
shaft	Deep hole that goes straight into the ground, especially as a part of a mine (shaft mine).
sluice	1. To wash something with a lot of water (e.g. The miners used a large water pipe to sluice the stones and find the rubies) 2. A man-made channel with a gate and mats where water and sediments is passed through to separate the minerals from the unwanted rocks and sand.
suction dredging	Mining process using a pump and a suction hose, which sucks up water and gold containing sediments and rocks from the bottom of the river.
tailings	Mixture of dust, broken up rocks, sand, waste chemicals and waste water that are left over after desired minerals have been taken out.
habitat	The places in nature where a kind of animal, plant, insect or bird lives. [note: Habitat includes all the places and resources that a living thing uses to get food, find a mate, make its home or a nest and to hide from enemies.]
watershed	An area where all the small rivers flow into one big river; also called a catchment or river basin.

* Most definitions are taken from the "Environment Words: A Dictionary in plain English" (Images Asia, 2002).

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APPENDIX I

IVANHOE MINES LTD.

While not directly related to mining for gold in Kachin State, the investment of Ivanhoe Mines Ltd. in Burma shows the rapacious nature of the international mining industry, especially those players willing to ignore the consequences of working with a widely loathed military dictatorship. Ivanhoe Mines Ltd. is the largest single foreign investment in Burma's mining sector. The company is owned by the notorious Robert "Toxic Bob" Friedland, an international mining operator whose operations have left a legacy of pollution and dissatisfaction on at least three continents. Mineral recovery practices like those used by Ivanhoe in the Monywa project led to the single worst mining related disaster in the US, the Summitville Mine toxic waste leak. Friedland obtained mining rights to the huge Monywa copper deposit in the Sagaing Division later and secured funding from Japanese multi-national corporations for its expansion. Ivanhoe is understood to have submitted a new proposal for a gold mining joint venture with the Ministry of Mines in April 2004. Ivanhoe's first quarter report indicates that in just three months half a million dollars was spent on the preparatory work, and that cyanide may be used in the gold extraction.

Ivanhoe statements have advocated "constructive engagement" in Burma despite calls by shareholders, trade unions and environmental activists for the company's withdrawal. Opponents of Ivanhoe's Burma business cite instances of forced labour in construction of infrastructure related to the Monywa mine, including a hydroelectric dam built by 3,000 to 5,000 forced labourers to supply power for its energy consuming electro-winning process, and a railway spur built by over 921,000 forced labourers. Ivanhoe has claimed that its mining in Burma is *"conforming to international standards in terms of health, safety and the environment, and contributing to improved health care."* (Ivanhoe Mines, 2001) In response to such claims by Ivanhoe, Nobel Peace Prize laureate Aung San Suu Kyi, the leader of Burma's democratic opposition, commented, *"It doesn't come as a surprise to us, we've gotten used to some pretty strange things. What's the benefit in it for the ordinary Burmese?"* (Cohn, 2002) Ms. Suu Kyi has called for all such foreign investors to stay out of Burma until democracy is restored.

EXAMPLES OF MERCURY AND METHYLMERCURY POISONING

During the northern California gold rush of the 19th century, mercury was used to obtain gold from river sand and rocks. Chinese immigrants mined mercury in the California Mountains for this, and many of them died with severe nervous system symptoms. The river gold mines were the main users of mercury. Many of the primitive techniques used during that famous gold frenzy a century and a half ago, were very similar to those still in use in Burma. According to the United States Geological Survey, to this day, fish and stream animals in northern California are still contaminated with the mercury from those 19th century mines.

There have been many tragic cases of large scale methylmercury poisoning including some of the worst chemical poisoning cases in the world. In Iraq in 1971, thousands died from eating grain contaminated with mercury.

In the world's most notorious case, the Chisso Corporation's acetaldehyde factory released mercury into the waters of Japan's Minamata Bay from the 1930s through to 1968. More than 30,000 people are considered victims of the Minamata pollution; possibly as many as 2 million have been affected.

High mercury levels in Brazil's Amazon basin have been caused by the same gold mining techniques used in Burma. A survey in Itaituba, a town in the Brazilian Amazon, determined that as many as 37% of the gold miners had "excessive levels of mercury in their blood," and even in a upstream remote fishing village 16% had "exceedingly high levels." (Greenpeace, online)

Indonesia's post-Suharto gold rush also uses similar methods to those employed in Burma. Huge quantities of mercury from gold mining on the Indonesian island of Sulawesi are slowly killing the ecology of Manado Bay.

Appendix III

Cases of Cyanide pollution

There has been public outcry over cyanide leach gold mining in Turkey, Peru and the United States, among other places. Gold mining related cyanide accidents have occurred in Kyrgyzstan, the United States, Papua New Guinea, Australia, South Africa, Ghana, Central Europe, and elsewhere. (website: The Rain Forest Information Centre)

In 1995 and again in 2000, cyanide gold mine waste pollution caused disasters on a river in Guyana, South America. During 2000, an Australian gold mining company helicopter accident contaminated rainforest water systems in Papua New Guinea. Ghana suffered its worst environmental disaster in October 2001, when a tailings dam of a South African owned gold mine burst, spilling cyanide contaminated wastewater into the Asuman River, killing all life in it. Later the same month, wetlands in Ghana were contaminated by another cyanide spill. Yet another large cyanide spill happened in the area of the Ghana's Angonaben River in 1997. In January 2000, a cyanide overflow from a gold mine tailings reservoir polluted the Danube and Tisza Rivers in Romania and Hungary. In November 2001, a road accident spilled some 11 tons of cyanide (probably intended for mining use) into a tributary of the Yellow River, in central China. It is obvious that cyanide pollution is difficult to control even in relatively developed countries, and is dangerously likely to cause serious problems in Burma.

The most notorious case of mining pollution in the US was the Summitville Colorado gold mine. Until 1992, the abandoned Summitville mining site leaked cyanide, acid and other toxic substances from the heap leaching, badly poisoning an entire river and requiring a cleanup that by early 2003 had cost the U.S. government $155 million and was scheduled for further major clean up expenditures. The Summitville mine belonged to a company owned by Robert Friedland, the same person who claims to be running a *"clean and safe"* copper mining operation in Burma.

Northern Star Minerals Production & Trading Company Limited.
Tel: 074-22665/2664 Fax: 074-22340
Yonegyi Street, A Yar Qr. Myitkyina, Kachin State.

Seal of the Northern Star Mineral Production & Trading Company Limited

Letter No: 117 / 1 – 4 (Shwe) / Northern star
Date : July 18, 2002

To,

Township Peace and Development Council
Myitkyina Township.

Subject: Plotting for gold mining

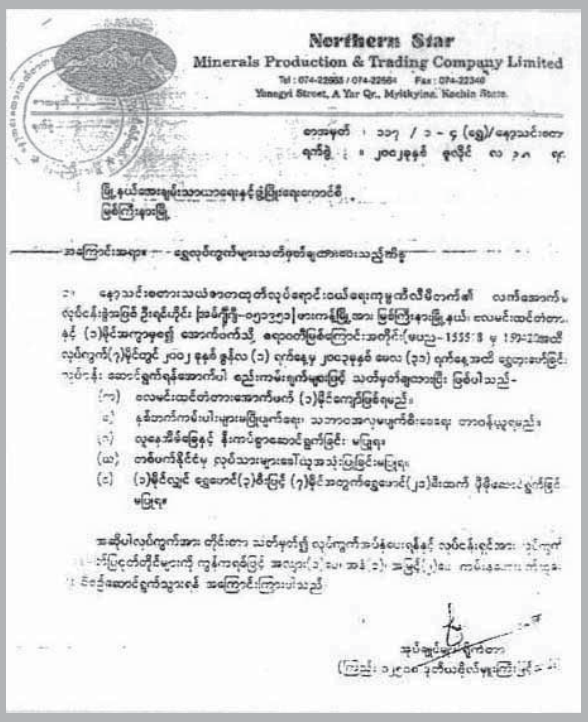
1) We let U Yin Haing (MGG-051951) who stays at Hpakant, to work as a branch, under the Northern Star Minerals Production & Trading Company Limited. The area is 1 mile down to Ayarwaddy River from the Balamintin Bridge, (the map direction-from 155518 to 150420) totally 7 miles, start from the June 1, 2002 to May 31, 2003 according to the rules mentioned as below.

   a) 1 mile away from the Balamintin Bridge.
   b) To take care not to collapse the bank at both side and to keep the environment.
   c) Not to work closely to the people's house.
   d) Not to hire anyone from the neighboring country.
   e) We only let 3 rafts for 1 mile and not to exceed 21 rafts for 7 miles.

2) Make measurement and inform the owner to post (1'x 1' x 2') concrete post at the bank.

(sgd)
Managing Director
(BC. 12508, Lt. Col. Myint Thein)

Cc: Northern Command Division
Kachin State Peace and Development Co
No (3) Military Strategy, Northern Comma
District Peace and Development Council,
Settlement and Land Records Departmen
U Yin Haing, Hpakant (not to work out of t
oversea labor. The plot will be taken back
Inter Department circular letter
Office Copy



Northern Star
Minerals Production & Trading Company Limited
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Yonegyi Street, A Yar Qr., Myitkyina, Kachin State.

Leaked copies of documents relating to a concession made out on the letterhead of the Northern Star Minerals Production & Trading Company. The documents show the controlling hand of the military in the company, being signed by Lt Col Myint Thein, as the company's managing director. Several interviewees assert that many senior army officers are bribed with shares or profits in return for helping to obtain permits and that officers of the Northern Command are the main shareholders of Northern Star Company.