MMSD

Mining, Minerals and Sustainable Development

September 2001 No. 74

Artisanal Mining in The People's Republic of China

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Summary

The six million artisanal miners in the People's Republic of China compose well over half of the artisanal miners in the world and constitute one of the largest sectors of the mining industry worldwide. They produce at least 11 per cent of the world's coal output, easily out-producing the entire coal industry of other major producers like Australia or India. China is one of the largest producers and consumers of metals and minerals in the world, topping the world in antimony, coal, iron, lead, manganese, tin, tungsten and zinc; artisanal miners produce at least 30 per cent of each of these minerals. China is unique in the scale and diversity of its artisanal mining industry; however, little has been openly published on the subject. This report tries to outline the basic realities and faces of artisanal mining in China.

Most artisanal mining in China today can be categorized as Township and Village Enterprises (TVE). As China began to implement economic reforms in the late 1970s, the idea of TVEs was propagated by the state both to 'promote economic growth and to absorb the surplus rural labour force and discourage excessive urban migration'. TVEs have since come to dominate China's rural economy, employing up to 120 million workers, and producing billions of dollars of goods including everything from toys to coal. Some TVE mines are large and sophisticated enough, however, to raise the question of whether they are actually artisanal mines. There are also many privately owned small mines and an indeterminate number of outright illegal mines. Furthermore, a few of the state-owned mines, which are considered large scale, are actually quite small and primitive. Thus, there can be no clear legal definition of artisanal mining in China.

Private business mines are hard to separate from TVE operations. They are mainly financed by private money, but often this money has some connection with local government officials. Anywhere from one to several businessmen will set up a small formal company with ownership divided into shares based on the initial contributions. These mines are usually licensed, but the licences are provided by local government officials and largely a formality. The central government has rid itself of most of its artisanal mines in the last few years, giving them to provincial and local governments. However, these mines still fall under the category of state-owned mines, and could not be separated from the official statistics. The financial structure of these mines is rarely clear-cut as China moves towards a market economy. These state-owned small mines tend to follow the law much more closely than other small mines, and appear to have a significantly better safety and environmental record than the others.

Artisanal mining operations are governed by various laws; however, the concept of a legal society is rather new to communist China. Most of the laws are only a decade or so old and they mean less and less the farther one gets from Beijing. The current legal position of artisanal miners is in flux, especially since the 13 June State Council Order demanding all small coal operations be shut down. Many remote areas of China have literally no other means for a livelihood and thus try to give only lip service to the order. This also means that thousands of TVEs which were previously legitimate enterprises will become illegal operations almost overnight. Currently there are few completely illegal miners, as it is relatively easy to get some sort of permit from local government.

Curiously absent from the range of current mining operations in China are cooperatives, although some TVEs are run this way. In our experience, China seems tired of the concept after years of enforced collectivization before the economic reforms of the late 1970s. Individual small mines rarely formally cooperate with each other in associations, although the owners may be on good terms with the other mines in the area and occasionally discuss technical issues. Any attempt to set up cooperatives in most parts of China would probably arouse suspicion in both governments and locals.

Most artisanal mine labourers in China are categorized as farmers (peasants), but spend most of their time and derive most of their income from mining. The mines shut down for approximately ten days around planting and harvest time. A problem that arises from their status as farmers is that when the government or companies shut down artisanal mining operations, they do not concern themselves with the labourers, as they can 'just return to their farms'. The owners are usually businessmen who may be involved in several types of industry.

Women and children are usually not directly involved with mining or mineral processing in artisanal operations in China, but they are often on mine sites assisting with cooking and other aspects of daily life. In some cases, wives of businessmen are active in business affairs. Women are legally barred from working underground. In all but the most impoverished and remote areas of China, children usually attend school. Legally, children are prohibited from working until 16 years old, but there are rumours of underage boys working in local mines in remote areas.

The negative impacts on health and the environment due to artisanal mining in China are massive and difficult to quantify. First and foremost is the massive death toll in small coal mines. Statistics show over 6,000 coal miners die officially per year. Unofficially, there are probably hundreds if not thousands more unreported deaths or serious injuries. Other serious environmental, social and safety issues include:

- At least 50 tonnes of mercury emitted annually from artisanal gold mines and much more from dirty coal combustion.
- Erosion, sound, dust and visual pollution problems from artisanal mines, especially in the quarry and aggregate sectors.
- Poor cyanidation practices.
- Damage from gravel and gold dredges. Artisanal miners are often migrants from other areas of China and bring all the problems usually associated with migrant workers, including prostitution, violence and a displaced way of life.

There have been significant changes to artisanal mining over the past decade. Coal production expanded rapidly until 1997, when the central government worked to limit and then stop altogether, artisanal coal mining. Artisanal dolomite-lime producers also seem to be in line for shutdown. In September 1996, most artisanal gold-mining activities were strictly prohibited by the central government. This may have stopped the worst of amalgamation practices; however, significant artisanal gold mining continues. Over the 1990s, it appears that knowledge of mercury pollution spread significantly, and retorts are

now quite common. In general, artisanal miners' technology seems to have become less crude over the decade.

There is very little in the way of support activities for artisanal miners in China. Bank financing is available, but none of the miners we talked to seemed interested in dealing with the banks. The state-owned mines and TVEs have some access to government finance and would have better access to banks. The private miners we interviewed were entirely self-financed. There do not seem to be any producer associations and there is very little technical assistance available. Equipment manufacturers often help with equipment installation and provide some initial instructions, after which the miners are left to their own devices. From the late 1970s until the mid-1990s, the government encouraged artisanal mining, albeit primarily by noninterference. NGOs are extremely restricted in China, tied up in the red tape of difficult registration regulations. Many of what seem to be NGOs are actually set up by the government, in order to get international funding available only to NGOs. A few genuine NGOs have gotten around this by registering as businesses. These tend to focus on educational issues and do not interact with artisanal miners. The root of the problem is that the Chinese government is inherently suspicious of any organization that does not owe allegiance to the Communist Party or is not trying to make money.

Every foreign mining or exploration company and some of the state-owned companies can give examples of problems with artisanal miners. It is also a sensitive issue; nobody wanted to go on record on this topic and we can find no literature on it. Over the last decade, big and small international mining companies have conducted explorations in China and we doubt that any of them have not had some incident or another with artisanal miners. Suffice it to say, artisanal miners repeatedly mine on property licensed to larger companies, usually high-grade deposits. This can make conventional mining far more dangerous (there are small tunnels everywhere), less profitable and, in extreme cases, not at all viable. In other cases, larger companies often become interested in a site because of the presence of the artisanal miners, and the artisanal miners often have local permits of one variety or another. The larger companies' then send in the police and force the miners off the property. These removal operations occasionally turn ugly. Often the artisanal miners are migrant workers, and are forced to return to their home areas. Local miners might be given compensation if a larger company decides to develop their property, and sometimes the larger company arranges for other areas for the artisanal miners to mine, which may or may not be economically viable.

China has also undergone massive government institutional change in the past few years. The bureaux and ministries controlling the mining industry have had their power and status significantly reduced recently. The result of this huge flux is that few officials know anything about artisanal miners or are willing to make available what they do know. Institutional change, red tape and widespread corruption make for a huge difficulties in dealing with artisanal miners through official channels. In essence, China's artisanal mining industry is massive, rapidly changing, deadly and under-researched.

Introduction

The People's Republic of China artisanal mining industry employs at least six million artisanal miners, composing well over half of the artisanal miners in the world and constituting one of the largest sectors of the mining industry worldwide. They produce at least 11 per cent of the world's coal output, easily out-producing the entire coal industry of major producers like Australia or India. China is one of the largest producers and consumers of metals and minerals in the world, topping the world in antimony, coal, iron, lead, manganese, tin, tungsten and zinc; artisanal miners produce at least 30 per cent of each of these minerals. China is unique in the scale and diversity of its artisanal mining industry; however, little has been published openly on the subject.

It is extremely difficult to appreciate how sensitive the Chinese government is about information regarding artisanal mining. There are five main levels of government (central, provincial, prefecture, county and village). Some officials in central government and many more at lower levels in the bureaucracy are clearly uneasy at the thought of anyone, especially foreigners, researching these matters. There are several reasons, from national security concerns to the very real fear that the central government will shut down any mines which get negative publicity. Furthermore, Chinese bureaucrats essentially do not believe in open disclosure. If you call an official or businessman (and they are overwhelmingly men in China's mining industry) with whom you have no personal connection, you are not likely to get any useful information (the term 'personal connection' is a simplistic definition of the Chinese term *guanxi*, which is almost a way of life). Thus, most of the research one can conduct has to be done through people one already knows. To some extent, this is true everywhere around the world, but the Chinese bureaucracy can take it to extremes. Conducting research in China can be time consuming and difficult.

The Status, Role and Importance of Artisanal Mining in China

Statistics in China

China's statistics are often unreliable, contradictory and sometimes downright misleading. For example, the official *1999 China Statistical Yearbook* massively underestimated that TVEs concerned with mines and quarries employed 490,000 staff and employees in 1998. In contrast, the official *1999 TVE Yearbook* reports that 3,965,530 people were employed by TVEs in the mining industry alone, with another 2,896,774 people employed in the undefined TVE 'Materials Industry' (presumably including quarries), and a further 10,622,286 people employed in the TVE 'Mineral Processing Industry'. The latter figures are more reliable; regardless, statistics are often collected by local officials who may have a vested interest in presenting statistics that they think will look good. These are then collected and edited by higher levels of government, who try to account for inaccuracies at lower levels while also trying to present a good picture to their superiors and the rest of the world. Overall, we have little idea about how accurate these statistics are locally or nationally. The only concrete example we could find of the limitations of Chinese statistics

is that of the estimated area of cultivated land. Researchers such as Vaclav Smil have estimated that a massive 30 per cent of China's farmland is unreported in official statistics (pers comm., 1998).

Table 1 China's Production of Major Minerals

Mineral Product	Production in 1997	World ranking by production	Produced by small-miners (%)
Bauxite (MT)	8	10	75.63
Antimony ('000t)	101	1	46.44
Coal (MT)	1,360	1	42.58
Copper, mine ('000t)	440	8	9.08
Gold ('000t)	156.8	5	19.4
Iron ore (MT)	249	1	32.13
Lead, mine ('000t)	650	1	31.13
Manganese, (MT)	2.3	1	65.77
Mercury ('000 flasks)	17.8	3	8.52
Molybdenum ('000t)	30	2	15.46
Phosphate rock (MT)	30.4	2	51.03
Salt (MT)	29.3	2	10.36
Tin, mine ('000t)	56	1	44.48
Tungsten, mine ('000t)	24	1	35.31
Zinc, mine ('000t)	1,210	1	31.13

Source: Billiton's Minerals Companion,1999;The Mining Industry in China, Canadian Government; DFAIT, 2001

Artisanal mining in China is extremely flexible. In one valley we worked in, over the period of one year the number of gold mines dropped from 70 or 80 to about 40, owing to changes in gold prices. In the same year the numbers of iron mines jumped by at least 100. Nationally, tracking such changes accurately would be difficult at the best of times. Clearly, all statistics reported in this project should be treated with a measure of caution.

Official Statistics on Registered or Formal Miners

See the attached spreadsheet for numbers of TVEs and employees by industry. Coal and construction materials are by far the largest artisanal mining industries in China, employing at least 4.0 million people. The *2000 TVE Yearbook* states that there are 3,519,615 people employed in TVE mines and 2,587,361 people employed in the TVE construction material industry, for a total of 6,106,976 people. This does not include small private mines, state-owned mines or illegal mines, and the figure is unlikely to be particularly accurate. In fact, the Ministry of Agriculture, which produces the TVE Yearbooks, is responsible for, and reports on, coal mines in only nine provinces (ILO, 1998: 2). The real wild card, however, is the industrial minerals and construction material artisanal mining industry. It is hard to find a village without a prefabricated concrete, brick, lime or tile manufacturer, all of which use massive amounts of aggregate material, usually mined on a small scale locally. China also has a substantial artisanal quarry industry; we have spotted artisanal

miners cutting slabs of marble on the sides of roads all over China. This side of the industry clearly employs (at least part time) millions of people, but it is difficult to know if or where this is accounted for in government statistics. For convenience, we will state the total number of artisanal miners as 6.0 million, although this is undoubtedly an underestimate.

Figure 1. Institutional change

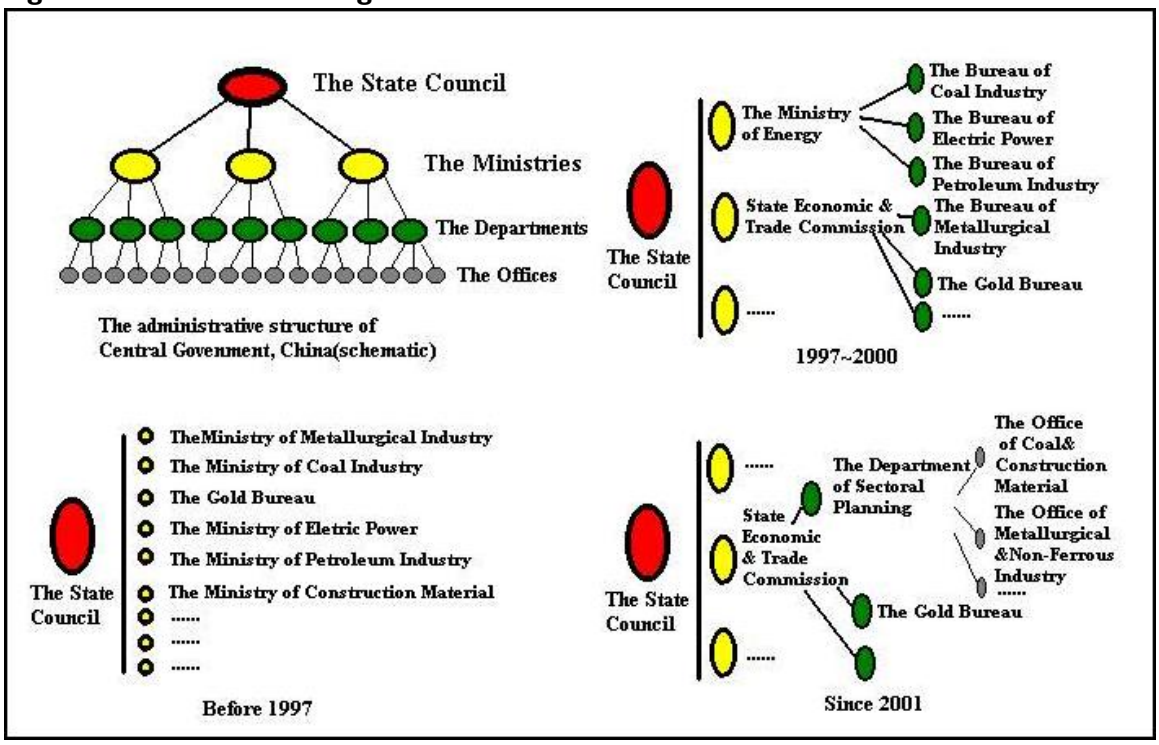


Table 2a. China's Township and Village Enterprises

Industry	No. of workers	Total sales value (1,000 US$)
Mining industry		
Total 1999	3,519,615	24,931,859
Total 1998	3,965,530	25,755,333
Total 1997	4,335,348	25,584,955
Materials industry		
Total 1999	2,587,361	36,891,249
Total 1998	2,896,774	37,844,151
Total 1997	3,309,219	38,432,023
Mineral processing		
Total 1999	9,541,292	119,566,164
Total 1998	10,622,286	120,010,440
Total 1997	12,519,653	126,189,824
Industry Total 1999	15,648,268	181,389,272

Table 2b. Mining Breakdown of Township and Village Enterprises

Mining breakdown	No. of Workers	Total sales value (1,000 US$)
Coal mining and preparation		
Total 1999	1,505,847	6,682,181
Ferrous metal mining and processing		
Total 1999	227,353	2,045,598
Non-ferrous metal mining and processing		
Total 1999	294,315	3,524,833
Industrial Materials Mining and Processing		
Total 1999	1,424,978	12,099,487
Other Mining and Processing		
Total 1999	76,530	649,233

TVEs provide the major source of financial support for local governments; however, the actual amount varies widely from region to region. No statistics are available to estimate the percentage of registered versus non-registered production. The entire artisanal mining industries' value could be in the range of US$25 billion to $180 billion. China's GDP is around $1 trillion. Even at the lower end of the range, it is around 2.5 per cent of China's GDP, or roughly equal to the entire GDP of many Latin American countries.

There are few completely illegal or unregistered miners, as it is relatively easy to get some sort of permit from the local government. However, statistics estimating the number of illegal miners are simply not available, although it would certainly vary widely from region to region. Higher levels of government may regard many locally registered miners as illegal. Regardless, the TVE and private business miners claim that genuinely illegal miners exist and because of the current crackdown in the coal industry, more and more miners will fall into this category.

In a country as massive and diverse as China, it is impractical to estimate the numbers of people being supported by the income generated from artisanal and small-scale mining activities, or the multiplier effects of mining. The country is far too large for such numbers to hold much real meaning. In a poverty-stricken, remote, agriculturally poor province like Guizhou, these small mines are often the only source of income for relatively large areas. In contrast, in a booming coastal province such as Shandong, the impact of small mining is probably quite localized and relatively minor. It may help to remember that these provinces are often the size of large European nations in area and population, with vastly different climates, languages, ethnic backgrounds and so on. For example, the *China Statistical Yearbook* states that the average number of dependants per rural labourer is 1.54 (p. 311). Using our figure of 6.0 million artisanal miners, this would suggest there were 9.24 million dependants nationally. However, this would bury the real importance of the industry in areas such as Guizhou. To have these statistics on a regional or provincial basis would be interesting but it was beyond the scope of this study to create or find them. We found no statistics on the multiplier effects of artisanal mining.

Production and Processing Activities

Most artisanal mine labourers in China are categorized as farmers, but work most of their time and get most of their income from mining. The mines shut down for approximately ten days around planting and harvest time. One problem that arises from the miners' status as farmers is that when the government or companies shut down artisanal mining operations, they do not concern themselves with the labourers, as they can 'just return to their farms'. The owners are usually businessmen who may be involved in several types of industry.

TVEs include mines owned by bureaux, townships, villages, collectives and individuals; however, the breakdown varies widely from area to area. In 1998, the ILO reported that the TVEs consisted 150,000 collectively owned and 130,000 privately owned mining firms, compared with 10,000 state-owned mining enterprises, and that many TVE mines were explored or exploited illegally, without state licences (ILO, 1998: 3). Furthermore, some artisanal mines would not be classified as TVEs at all. The private business mines are hard to separate from the TVE statistics as some are counted as TVEs and others are not, depending on how they are registered. There are no available statistics on how many artisanal miners actually fall into this category. The private business mines are mainly financed by private money but often this funding is connected to local government officials. One or several businessmen will often set up a small formal company with ownership divided into shares based on the initial contributions. Profits are then split accordingly. These partnerships are sometimes referred to as collectives, but the labourers usually do not have a share in the partnership. The company will sometimes hire a professional provincial geological team to find a deposit, will already have a deposit in mind or will use local prospectors to find a deposit. One or two of the businessmen will manage the mine. In practice, the managers often skim a significant amount of the profits off the top before paying dividends (pers comm, 2001). These mines are usually licensed, but these are provided by local government officials and largely a formality. The operators are not particularly concerned with the laws; they can usually bribe their way out of trouble at the local level. Safety regulations are lax, and in the event of causalities, the operator is expected to pay the family or miner around 20,000RMB (around $2,415). These private businesses are often incredibly flexible. They make investments that they expect to pay back in a few months (pers comm, 2001).

The central government has rid itself of most of its artisanal mines in the last few years, transferring them to provincial and local governments. However, these mines still fall under the category of state-owned mines, and we could not separate them from the statistics on official state-owned mines. They are almost certainly not accounted for in the TVE statistics. The financial structure of these mines is rarely clear-cut as China moves towards a market economy. These state-owned small mines tend to follow the law much more closely than the other small mines, and appear to have a significantly better safety and environmental record than the other mines. As mentioned, the small state-owned coal mines have all been ordered to shut down, but many of them will reopen as private mines, simply because they are among the few small mines that will be able to pass all the safety regulations (pers comm, 2001).

Curiously absent from the type of mining operations currently existing in China are worker cooperatives. In our experience, China seems tired of the concept after years of enforced collectivization before the economic reforms of the late 1970s. Individual small mines rarely formally cooperate with each other in associations, although the owners are often on good terms with the other mines in the area and occasionally discuss technical issues. Any attempt to set up cooperatives in most of China would probably arouse suspicion from both governments and locals. If the idea could be presented as a business, this would ease their qualms.

The typical salary for mine labourers in the regions we have visited is between 600 and 800 Renminbi per month (RMB) ($1=8.28RMB) (Chinese almost always speak of salaries in monthly terms). This translates into about 8,40 RMB per year ($1,014). In comparison, the average Chinese mining engineer at a state-owned mine makes 27,000RMB per year ($3,260) (pers comm, 2001), and the average annual income per capita in rural China is 2,210RMB per year ($267)(*China Statistical Yearbook*, 2000: 311). This varies widely from region to region. The mine owners can often be quite wealthy, capable of investing hundreds of thousands of Renminbi in a new project. They are also often quite diversified, owning anything from hotels to buses.

Women and Children in Artisanal Mining

Women and children are usually not directly involved with the mining or mineral processing in Chinese artisanal mining, but they are often on mine sites assisting with cooking and other aspects of daily life. In some cases, the wives of the businessmen are active in business affairs. Only in one remote area of Shaanxi did we find a woman who had been directly involved with processing gold ore, but she had insisted that her husband sell the processing centre and she bought a small store with the proceeds. She claimed she did not want to raise her children while operating a mine. There are probably hundreds of other such cases but they do not seem to be a significant source of labour. In contrast, at larger state-owned mines often a significant number of employees, including engineers, are female. Regardless, women are legally barred from working underground. In all but the most impoverished and remote areas of China, children usually attend school. Legally children are barred from working until age 16, but we have heard stories of teen-age boys working in local mines in remote areas. However, because of the one-child policy, there are perhaps fewer children around than in other countries. It is common for rural families to have two to three children, but more than this is rare. Since such labour is illegal, there are no official statistics on its extent. Regardless, child labour does not seem to be prevalent in China's artisanal mining industry.

Figure 3. China's safety statistics for coal mines

Casualty Statistics in China's State-controlled Key Coal Mines 1999							
	Total	Roof	Gas	Mech/Elec	Transport	Water	Others
Total	6478	1997	3209	114	364	468	323
1. Coal Production	6399	1986	3166	108	354	468	317
State-controlled coal mines	509	152	203	28	81	2	43
Locally administrated coal mines	940	395	354	13	76	58	44
Village and township coal mines	4666	1324	2487	63	179	398	215
Coal mine-run pits	284	115	112	4	18	10	16
2. Capital Contruction	70	11	43	3	10		3
Of which: key construction	63	6	43	3	8		4
3. Machine manufacturing	4			2			2
4. Geological prospecting	1			1			0
5. Others	4						4

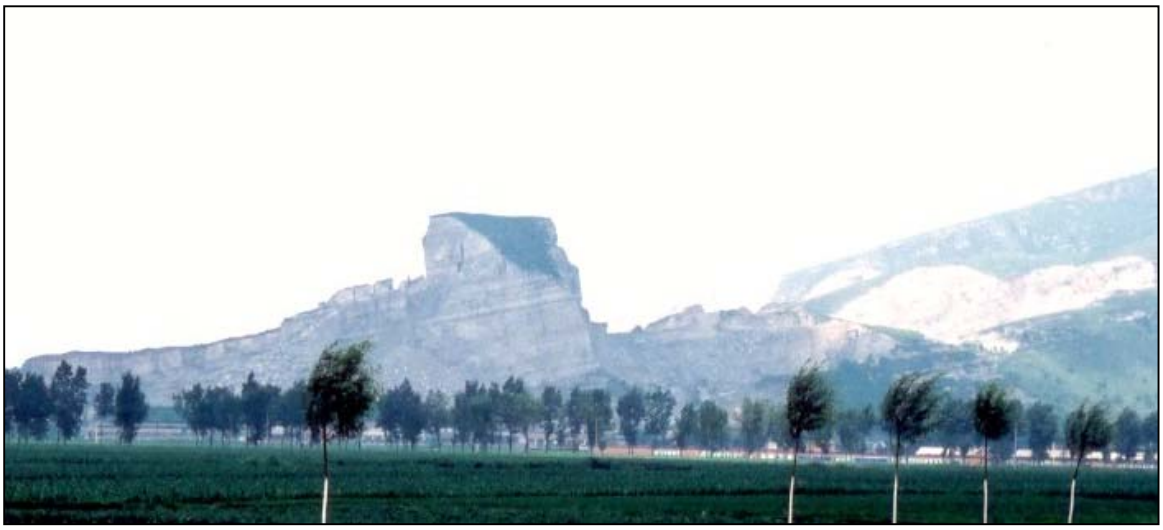
Source: Coal Industry Yearbook 2000.

Negative Impacts on the Environment, Communities and Health

The negative impacts of artisanal mining in China on health and the environment are huge and difficult to quantify. First and foremost is the massive death toll from the small coal mines. As can be seen from the statistics, over 6,000 coal miners die officially every year. Unofficially, there are probably hundreds if not thousands more unreported deaths. We could not find statistics for injuries in the coal industry (although presumably they are huge), or statistics for casualties from other sectors of the artisanal mining industry. Coal death statistics are readily available, as the central government is actively trying to shut down the small-scale coal industry. Other than the sheer scale of the tragedy, the government has a vested interest in stopping the oversupply of coal, which is undercutting the viability of the larger state coal mines.

In contrast, the central government is less concerned with other sectors of the artisanal mining industry, so their more unsavoury aspects are covered up. One example of this can be found in the flooding of a tin mine in the impoverished province of Guangxi, an incident that occurred while we were researching this paper. A newspaper in Shanghai initially covered the story, but then local and central government officials denied that any accident had occurred. The Shanghai newspaper claimed that local officials tried to black out the news by preventing journalists from visiting the mine and telling victims' families to keep quiet (media reporting for 2001 at www.scmp.com). Apparently, families were each paid 50,000–130,000RMB ($6,039–15,000) to keep quiet, far more than the 20, RMB ($2,415) in their contract. However, following domestic and international press coverage, a central government inspection team was sent down to investigate the story. By 6 August, the death toll was estimated at 200 miners and the mine owner had been detained (ibid.). The private owner, previously a schoolteacher, owned 17 mines and factories and had fixed assets valued at over $54 million, a small private army and close gang connections, all of which were used to try to keep journalists away, the workers' families quiet and the story from leaking. A few years ago, the government would never have allowed such a story to surface.

Throughout China one can see the results of unchecked mining for construction material



Other serious environmental, social, and safety issues include:

- Erosion, sound, dust, and visual pollution problems from artisanal mines, especially the quarry and aggregate sector.
- At least 50 tonnes of mercury emitted annually from gold amalgamation. This however could be much higher. Even some larger state-owned mines still use amalgamation. In one small valley alone, we estimate that around 2–3 tonnes of mercury has been emitted. There are also a few artisanal mercury miners in Guizhou province.
- Hundreds of tonnes of mercury emitted annually due to coal combustion (estimated to be 302.87 tonnes in 1995, but probably less now because of cleaner coal policy). Coal from artisanal mines often has higher ash, sulfur and mercury contents, thus this is partly an artisanal mining problem.
- Gold producers' cyanidation practices are often questionable and visibly cause significant problems downstream. Some of the streams we visited had lost all their fish in the last ten years, probably because of the cyanide.
- Dredges for gravel and gold (although most gold dredges have been officially shut down) cause significant sedimentation problems.
- Artisanal miners are often migrants from other areas of China and bring all the problems usually associated with migrant workers, including prostitution, violence and a displaced way of life. This may be a particular problem with Chinese moving into ethnically distinct regions like Yunnan and Tibet.

None of these topics is well researched.

The Range of Practices in Mining, Processing, and Environmental Control

Gold mining: Gold is extracted primarily from small underground mines. Most gold dredges or panning operations have been shut down within the past four years, although many gravel dredges still operate, sluicing for gold as a side operation. Many of the smaller operations run a muller mill for amalgamation and to crush the ore, followed by cyanidation. Slightly larger operations use a ball mill, followed by a mercury plate, followed

by flotation of sulfides, ending with cyanidation. Gold is recovered by the zinc-strip precipitation and the zinc strips can be smelted later at home.

Coal mining: Because of the recent attempts to shut down all small coal mines, site visits were not possible. However, most small coal mines are underground operations with few or no safety precautions. Most of the coal produced is not washed.

Iron mining: Artisanal iron miners in China usually mine magnetite. They use a ball mill to crush the ore and a magnetic separator to liberate the magnetite. The magnetite is then sold to large iron and steel plants. Some smaller producers have been using large muller mills instead of ball mills to grind the ore.

Dolomite mining: Dolomite is mined in open-pit operations (perhaps underground as well), then ground and roasted in kilns to produce lime on roadsides throughout the countryside. The kilns produce huge amounts of lime dust and the mining leaves entire mountains missing.

Other minerals: We could find not published information on production methods of any other mineral types, although Chinese artisanal miners do mine virtually every economic mineral produced on earth. It would be interesting to study the practices of these miners to see if other developing regions could learn from them.

China's environmental control agencies can be effective. We have found many instances of artisanal mines being shut down by environmental agencies, although they often start up again when they get a chance. There have been significant changes to artisanal mining over the past decade. In September 1996, most artisanal gold-mining activities were strictly prohibited by the central government. This may have stopped the worst amalgamation practices, however, significant artisanal gold mining continues. Over the 1990s, it appeared that knowledge of mercury pollution spread significantly, and retorts are now quite common. The current low gold prices have put many small gold miners out of business, and there continues to be heavy pressure from the central government to phase out mercury use. In Beijing municipality, miners now use only gravity concentration. However, mercury mines still operate in Guizhou Province. Other changes include: the entire small coal mining industry is being shut down after peaking around 1997; there has been a massive upswing in the production of iron by artisanal miners in the last year; and the iron muller mills are a recent innovation. Many of the small lime producers seem to have been shut down this year, although we could find no documentation regarding this (pers comm, 2001).

Support Activities for Artisanal Mining

There is very little in the way of support activities for artisanal miners in China. Bank financing is available, but none of the miners we talked to seemed interested in dealing with the banks. The main reason given was that too much collateral was demanded. Bank loans would probably require very good connections with the local bank officials. The state-owned mines and TVEs have some access to government finance and would have better access to banks. The private miners we interviewed were entirely self-financed.

As mentioned, there do not seem to be any producer associations. Miners often have amicable relationships with each other, but no formal associations. There is very little technical assistance available. Equipment manufacturers often help with equipment installation and provide some initial instructions, after which the miners are left to their own devices. From the late 1970s until the mid 1990s, the government encouraged artisanal mining, primarily by noninterference. One small state-owned miner told us that a research institute once assisted their mine deal with subsidence issues while mining under buildings and rivers, but this was unusual.

NGOs are extremely restricted in China, mostly owing to difficult registration regulations. Many of what seem to be NGOs are actually set up by government, in order to get international funding only available to NGOs. A few genuine NGOs have got around this by registering as businesses. These tend to focus on educational issues and have no interaction with artisanal miners. The root of the problem is that the Chinese government is inherently suspicious of any organization that does not owe allegiance to the Communist Party or is not trying to make money. The Nature Conservatory currently has a project in northern Yunnan and certainly has to deal with artisanal miners, but did not reply to our enquiries. Of UNDP, the World Bank, CIDA and AusAID, none has interacted with Chinese artisanal miners. Apparently, David Cowig, formerly of the US Embassy in Beijing, wrote an article on safety in small mines, but we could not get a copy.

The only international involvement with artisanal miners we could find was the ILO, which helped set up and run the Changsha Safety Training Centre for Small and Medium-sized Coal Mines in 1984, discussed below.

Interactions between Artisanal Miners and Large Exploration and Mining Companies in China

Every foreign company and some of the state-owned companies can give examples of problems with artisanal miners. It is a sensitive issue; nobody wanted to go on record on this topic and we could find no literature on it. Over the last decade, many large and small international mining companies have conducted explorations in China and we doubt that any of them have not had some incident or another with artisanal miners. One indication of the extent of the problem is that the Mineral Resources Law of China contains several passages such as: 'No unit or individual may enter and carry out mining activities in the mining area of a mining enterprise that have already acquired the mining right for such areas'.

Suffice it to say, artisanal miners repeatedly mine on property licensed to larger companies, usually high-grade deposits. This can make conventional mining far more dangerous (there are small tunnels everywhere), less profitable and, in extreme cases, not viable. Larger companies often become interested in a site because of the presence of the artisanal miners, and the artisanal miners often have local permits of one variety or another. The larger companies' response is to send in the police and force the miners off the property. Apparently, these removal operations can occasionally be quite volatile. Often the artisanal miners are migrant workers, and are forced to return to their home areas. Local miners

might be given compensation if a larger company decides to develop their property, and sometimes the larger company arranges for other areas for the artisanal miners to mine. These other areas may or may not be economically viable for the artisanal miners. Again, this is an interesting topic but difficult to research.

The Changsha Training Centre for Small-Scale Coal Mines

The Changsha (Hunan Province, central China) Safety Training Centre for Small and Medium-sized Coal Mines (CSTC), was founded in 1984 by the former Ministry of the Coal Industry. In 1987, with funding by the Gesellschaft fur Technische Zusammenarbeit (GTZ, or the German Development Agency), the ILO worked with CSTC. Over the next decade and a half, the ILO worked with CSTC on numerous projects to help educate coal miners on mine safety.

The ILO helped set up advanced training facilities and satellite stations in different areas of Hunan, training thousands of miners and managers, organizing lecturers and conducting training courses. This centre may have significantly reduced the number of casualties that occurred in Hunan province. The fate of this institution is unknown as the central government attempts to shut down all small coal mines.

This centre seems unique in China's artisanal mining industry; we have found no other incidences of cooperation between China and any international organization.

The Legal Status of Artisanal Mining in China

Definition of Artisanal Mining

The definition of what constitutes small-scale or artisanal mining is never clear-cut. We use the term fairly broadly, following the International Labour Organization's (ILO) lead by concentrating on 'small-scale mines (and to a lesser extent quarries) that are labour-intensive, with mechanization being at a low level and basic'. The term 'artisanal' miners is used as a simple way to encompass all small, medium, large, informal, legal and illegal miners who use rudimentary processes to extract valuable rocks and minerals from ore bodies.

Official Definitions of Artisanal Mining in China

Most artisanal mining in China today can be categorized as Township and Village Enterprises (TVEs). As China began to implement economic reforms in the late 1970s, the idea of TVEs was propagated by the state to both 'promote economic growth and to absorb the surplus rural labour force and discourage excessive urban migration'. TVEs have since come to dominate China's rural economy, employing up to 120 million workers and producing billions of dollars of goods including everything from toys to coal. They are also covered extensively (although not necessarily accurately) in China's statistics, so are an easy target to use when identifying small mining.

The term TVE officially means an organization owned or financed by a township or village government. For the purpose of collecting statistics, the term has been expanded to include collectively and individually owned enterprises, including self-employed people, if they are officially registered and run by people from rural areas, defined as farmers. Hence, TVEs come under the responsibility of the Ministry of Agriculture. In practice, local governments interpret what constitutes a TVE based on local conditions.

Regardless, some TVE mines are large enough, and perhaps sophisticated enough, to raise the question of whether they are actually artisanal mines. There are also many privately owned small mines not registered as TVEs and an indeterminate number of outright illegal mines. Furthermore, a few of the state-owned mines, which are termed large-scale, are actually quite small and primitive. Thus, there is no single legal definition for artisanal mining in China.

Legal Codes and Regulations for Mining in China

Artisanal mining operations are governed by various laws (please refer to the bibliography database). However, the concept of a legal society is rather new to communist China; most of the laws are only a decade or so old and they mean less and less the farther one gets from Beijing. The current legal position for artisanal miners is in flux, especially since the June 13 State Council Order that demanded the shutdown of all small coal operations. People in many remote areas of China have literally no other means for making their livelihoods and thus give only lip service to the order. This means that thousands of previously legitimate TVEs will become illegal operations almost overnight.

China's general move towards a legal society should be viewed as a promising new policy direction. Stricter safety, environmental and other such regulatory laws will, however, marginalize thousands of artisanal miners, making it even more difficult to work with them to solve some of these problems.

Official Policy Statements

In a bid to prevent the frequent occurrence of coal mine accidents, reverse the severe safety situation in coal production, and earnestly safeguard people's lives and property, the State Council General Office issued an urgent circular on 13 June ordering all small coal pits run by state-owned coal mines to close down immediately and all township- and town-operated coal mines (including all small coal mines other than state-owned coal mines) to suspend production to undergo reorganization to improve operation.

Xinhua (New China News Agency) 17 June 2001

With the above State Council order, central government ordered at least 1.5 million (but probably closer to 2.5–3.0 million) small-scale coal miners to shut down their mines. The central government is taking a more active interest in artisanal mining, particularly artisanal coal mining, due to overproduction, safety and environmental concerns. The above quote comes from the latest and most drastic policy statement in the central government's effort to reign in small-scale coal mining. Putting this many miners out of work will clearly have massive social and economic ramifications in areas dependent on coal mining.

Furthermore, rumours suggested that all artisanal mining operations could be targeted in the medium term. It is unlikely that artisanal mining is part of the central government plans for a modern, developed country; the long-term status of artisanal miners is therefore precarious unless this changes.

Institutional Change Affecting Artisanal Mining

China has also undergone massive government institutional change. Bureaux and ministries controlling the mining industry have had their power and status significantly reduced over the past few years (see Figure 1). They have moved from reporting directly to the state council to being more and more distant from real sources of power. One result of this massive flux is that no one really knows who is in charge of artisanal miners, or is willing to provide much information on them. Furthermore, it is virtually impossible to meet with officials in ministries with real power; even foreign embassies often have difficulty meeting with top officials (pers comm, 2001). Institutional change, added to red tape and widespread corruption, make for a huge amount of difficulty in dealing with artisanal miners through official channels.

Conclusion

China is unique in the sheer scale and diversity of its artisanal mining industry. The industry is massive, fast changing, deadly and barely researched. Key areas of concern include the casualty rate from coal mining, the social and economic effects of the attempt to shut down artisanal mining, and mercury contamination from gold mining and coal combustion. Any attempt to understand the global impact of artisanal mining must consider China, if only because of the sheer size of its artisanal mining industry.

The Chinese central government does not see small-scale mining as part of a new, modern China. After the Beijing award of the Olympics, the central government will apply even more pressure to reduce small-scale mining. Possibly the central government will aim to shut down the industry comprehensively in the medium term. Regardless, in China's impoverished remote areas, in light of the lack of any other economic activities, small-scale mining will probably be around for quite some time yet.

Artisanal Mining Resource People

A list of resource people is perhaps inherently un-Chinese. Most people I talked to, especially at the local level, would be appalled if they knew their name was on an international list. Such a list would ignore generally accepted ideas of how Chinese networks (*guanxi*) work and, in some cases, might be quite dangerous for the people involved. I have included a short list of people who can be contacted. Anybody listed from the Chinese government will probably not speak English and will not want to talk unless they have been first introduced by somebody that they trust. There are probably exceptions to this rule but everybody to whom we mentioned it felt intensely uncomfortable about the idea (including Yue Jian). With most interviewees, we did not consider it appropriate even to ask.

Acknowledgements

This project has been made possible by the support of the World Business Council for Sustainable Development. The report was written for the International Institute of Environment and Development's (IIED) Mining, Minerals and Sustainable Development (MMSD) project. Special thanks to: Dr Lin Yuhuan, Dr Philip Andrews-Speed, Dr Marcello Veiga, Edmund Bugnosen, Jon Coates and Marc Parisien. Also special thanks to many others who helped us out in China, but who would rather not have their names written in the report due to the possibly sensitive nature of the material.

Bibliography

After extensive literature searches and discussions with academics, miners, and government officials, it seems that very little has been published on the subject in Chinese or in English. Most of what we did find consists of articles on mercury pollution from gold mines, artisanal coal mines reform, newspaper articles detailing mining accidents, industry yearbooks, and legal texts.

Appendices

The following files are included with this report: MMSD China Artisanal Mining Statistics.xls; Country Facts – China.xls; Bibliography – China.mdb; Assistance SSM Projects – China.mdb; Resource People – China.mdb.