

ARTISANAL AND SMALL-SCALE MINING

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Most attention in the mining industry is focused on large companies, but in many parts of the world, particularly in developing countries, minerals are extracted by artisanal and small-scale mining (ASM) – by people working with simple tools and equipment, usually in the informal sector, outside the legal and regulatory framework. The vast majority are very poor, exploiting marginal deposits in harsh and often dangerous conditions – and with considerable impact on the environment.

ASM is a livelihoods strategy adopted primarily in rural areas. In many cases, mining represents the most promising, if not the only, income opportunity available. However, ASM activities are often viewed negatively by governments, large companies, environmentalists, and others. Concerns range from the use of child labour and the potential for environmental damage (particularly through the use of mercury in gold mining) to the use of ASM revenue to finance conflicts, the social disruption and conflict sometimes caused by ‘rush’ operations, the high incidence of prostitution, and the spread of HIV/AIDS where migrant workers are involved.

At the extreme, governments consider the sector illegal and attempt to ban it through different means. In many cases (since ASM falls outside the regulatory framework), they simply neglect it, thereby allowing negative social and environmental impacts to be aggravated. In only a few cases has this part of the mining sector been supported and regulated successfully. The relationship between large companies and small-scale miners is poorly understood and often troubled, with mutual mistrust and sometimes conflict. Large companies may consider small-scale miners as ‘trespassers’, while small-scale miners may see the granting of a concession to a large company as depriving them of their land and livelihoods. Although examples of more positive relationships are beginning to emerge, accusations are still made that governments and large mining companies, sometimes in collusion, forcibly evict small-scale miners from their land.

The relative contribution of ASM to sustainable development depends on the priorities accorded to different objectives. In terms of meeting the world’s need for minerals, large companies currently dominate overall. For some minerals – such as emeralds and tungsten – virtually all production is from ASM. From an economic perspective, most resources can be mined

far more efficiently and intensively using large-scale mining methods, and in terms of environmental damage, small-scale mining generally has a greater impact per unit of output. From a livelihoods perspective, ASM often provides the only means of obtaining income and is therefore important. Yet for many people it never provides more than a subsistence wage, so its actual contribution is often limited.

In the short to medium term, whatever the contribution – whether positive or negative – at the poorer end of the spectrum ASM activities will continue for at least as long as poverty drives them. Moreover, the rights of individuals to secure a livelihood must be respected, as must the objectives of meeting basic needs and maximizing economic well-being. It is therefore essential that efforts be made to maximize the benefits brought by small-scale mining and to avoid or mitigate the costs. Attempts to achieve this are constrained by a number of factors. Some of these, such as the lack of government and community capacity, apply to larger companies as well. Others are specific to ASM, such as poor access to finance and a lack of collective capacity, particularly for artisanal mining with operations at an individual or household level.

In the longer term, however, many ASM activities are likely to disappear naturally if progress towards sustainable development is made since alternative, more attractive employment options for small-scale miners will become available. This is not to say that some forms of ASM will not persist, particularly those undertaken seasonally on a low intensity scale or those that are formalized and managed in a collective way where the nature of deposits lend themselves to smaller-scale activities.

This chapter provides an overview of artisanal and small-scale mining in developing countries and the social, environmental, and economic issues associated with it. ASM’s relationships with government, large-scale mining, and international institutions are discussed. Examples of initiatives aimed at improving or supporting ASM, including its contribution at the national and local level, and at reducing its environmental impact are given. But no one issue pertaining to ASM can be dealt with in isolation. Any attempts to introduce change – for example, to reduce the environmental impact of ASM or to phase out child labour – must be accompanied by awareness

building and the provision of immediate incentives. These may come in the form of tangible economic or health benefits or alternative livelihood opportunities. Efforts must also consider the broader objectives of sustainable rural development.

The chapter is based on a summary of a global report on ASM commissioned by MMSD. In addition the chapter draws on 18 country studies commissioned by MMSD (on Bolivia, Brazil, Burkina Faso, China, Ecuador, Ghana, India, Indonesia, Malawi, Mali, Mozambique, Papua New Guinea, Peru, Philippines, South Africa, Tanzania, Zambia, Zimbabwe) as well as the outputs of a regional and global workshop hosted by MMSD. The country studies provide a more detailed understanding of the legal status of artisanal and small-scale miners; the status, role, and importance of ASM in a country; specific support activities for the sector; and interactions between small-scale miners and large exploration and mining companies.

Characteristics and Products of ASM

There is as yet no widely accepted definition of artisanal and small-scale mining. The term can be used to cover a broad spectrum of activities – from the army-run Hpakant jade mines in Myanmar, for example, to individual *garimpeiros* panning for gold in remote regions of the Brazilian Amazon, as well as former state mining company workers or laid off private-company employees who have organized themselves into cooperatives.¹ At the other end of the scale, particularly in industrial countries, are many quite sophisticated industrialized small-scale mining activities. This chapter largely focuses on artisanal and small-scale mining in developing countries that use the most basic methods for extraction and processing.

The broadest distinction – and the one followed here – is between artisanal mining, which may involve only individuals or families and is purely manual, and small-scale mining, which is more extensive and usually more mechanized. Another distinction is in the nature of miners' rights to the land. In some instances, small-scale miners have legal title to the land that they work, which is recognized by the state and others. In other cases, they work land they have traditionally inhabited but without any recognition of land rights from the state, or they may be working the land informally and regarded as illegal squatters by local and state authorities. Of the two groups, artisanal miners are

Photograph not shown

more likely to be working without legal mining title.

But artisanal and small-scale miners also share many characteristics, broadly speaking:

- They exploit marginal or small deposits.
- They lack capital.
- They are labour-intensive, with low rates of recovery.
- They have poor access to markets and support services.
- They have low standards of safety and health.
- They have a significant impact on the environment.

Who Are Artisanal and Small-Scale Miners?

Most of these miners – men, women, or children – are rural and poor. In such countries as Bolivia, Colombia, Indonesia, Mali, the Philippines, and Zimbabwe, they often come from communities that have a long tradition of small-scale mining. But they are not necessarily involved in this full-time. Artisanal miners often work seasonally: in Malawi, for instance, subsistence farmers mine gemstones in the dry season when there is less agricultural work. People may also take up mining as a last resort during periods of economic recession – as has happened in Bolivia, Peru, Venezuela, and Zimbabwe. Many other people can suddenly be drawn into mining following the discovery of new mineral reserves, as with gold or diamond 'rushes' during which thousands of people hope to make their fortunes. Examples of this include Serra Pelada in Brazil (gold), Mt. Kare in Papua New Guinea (gold), Ilakakain in Madagascar (sapphire), and Nambija in Ecuador (gold). ASM activities can also follow environmental shocks, as occurred in Southern Ecuador following the 1985 El Niño.

Since there is no clear definition of ASM, and because many of these miners work casually or informally, it is impossible to arrive at a total number of artisanal and small-scale miners.² Recent research suggests that throughout the world small-scale mining involves on the order of 13 million people directly, mainly in developing countries, and that it affects the livelihoods of a further 80–100 million.³ The important point is that the number of people employed in ASM is very large.

In the future, the number of people working in ASM in certain regions could well rise as economies falter. In Zimbabwe and other parts of Southern Africa, for instance, the number is expected to triple over the next 10 years.⁴ The number of miners also fluctuates with the international demand – and thus price – for a particular mineral. For example, the global increase in the use of mobile phones recently contributed to a surge of informal mining activity for coltan (the mineral columbite-tantalite is a primary source for the metal tantalum, which is used in capacitors) in the Democratic Republic of Congo. (See Chapter 10.)

Artisanal and small-scale mining also contributes to the livelihoods of people other than miners, their dependants, and the local economy. Many miners do not complete the processing themselves but instead sell

the ore to intermediaries, who concentrate it and transport the products to market.

Women Miners

Women play a relatively small part in large-scale mining but are frequently involved in smaller-scale operations. In Bolivia, for example, women account for around 40% of the ASM work force; in Madagascar, Mali, and Zimbabwe, the proportion is 50%; and in Guinea, the figure is 75%.⁵ Moreover, women may be predominant in particular parts of the industry: in the Gaoua region of Burkina Faso, for example, the exploitation and selling of gold has traditionally been a female-only activity.⁶ Table 13–1, based on MMSD-commissioned studies, summarizes the extent of women's involvement in selected countries. Women are engaged in most aspects of mining except usually the handling of mechanized equipment, which tends to be reserved for men. They are also indirectly involved through ancillary activities such as the supply of food, drink, tools, and equipment, as well as in trading gold and gemstones.⁷

In some cases, particularly in Africa, women own mines or processing plants. Frequently, these enterprises are better managed than those run by men, even though women find it more difficult to get financial, legal, or technical support.⁸ In the case of bank loans,

Table 13–1. Women and Children Directly Employed in Artisanal and Small-scale Mining in Selected Countries

Country	Number of women	Women as share of Work Force	Number of children	Children as Share of Work Force
Bolivia	15,500	22%	–	–
Burkina Faso	45,000–85,000	45%	–	–
Ecuador	6,200	7%	4,600	5%
Ghana	89,500	45%	–	–
India	33,500	7%	–	–
Indonesia	10,900	10%	2,180	2%
Malawi	4,000	10%	–	–
Mali	100,000	50%	–	–
Mozambique	18,000 ^a	30% ^a	^a	^a
Papua New Guinea	12,000	20%	18,000	30%
Philippines	46,400	25%	9,300	5%
South Africa	500	5%	–	–
Tanzania	143,000	26%	>3,000	–
Zambia	9,000	30%	–	–
Zimbabwe	153,000	<50%	–	–

^aEstimate is for women and children. – indicates no information available.
Source: MMSD country studies.

this is because women find it harder to offer collateral and may lack the education that would help them deal with formal lending institutions.⁹ But they also face various forms of prejudice – official or popular. In seeking finance, they may find male bankers who disapprove of women engaging in business.¹⁰ And they also come up against traditional obstacles. In Zambia, for example, one of Africa's most prominent women mine owners reported: 'People believe that a woman should not venture near a gemstone mine because the spirits of the stones would be disturbed and the stones will burrow deeper into the earth. I fought all that superstition, obtained a prospecting licence, and here I am.'¹¹

A distinct advantage of having female members of the household involved in mining is that they are more likely than men to spend their incomes on maintaining their families – investing in, for example, food, schooling, clothing, or agriculture. Men are more likely to spend their wages on gambling, alcohol, and prostitutes.¹² When women are engaged in mining as members of a mining household, however, they have less control over expenditures, as the income is still likely to be managed by men.¹³

Child Labour

Artisanal and small-scale mining also involves significant numbers of children – an issue that received international attention in the 1990s following press reports of child labour in coal mines in Colombia.¹⁴ It is difficult to say how many children are working in mines, although MMSD country studies did come up with estimates in a few cases, as indicated in Table 13–1.

Child labour, in mining as in other forms of work, is rooted in poverty. Children work in the mines to help their parents, and to supplement the family income in order to buy basic goods such as clothing and food. Since much of the work is physically hard, they may not be fully involved at first. Typically children increase the scope of their activities as they grow older: from the age of three, some might start washing gold, while from age six they could be breaking rocks with hammers or washing ore. From nine onwards, however, children can be found labouring underground and doing much the same work as adults. Where small size is an advantage, younger children may also work underground.

Working long hours under arduous conditions is difficult enough for adults. It takes an even more serious toll on the soft bones and growing bodies of children. Young children are also especially vulnerable to physical and chemical hazards. In Peru, for example, children as young as six are exposed to the mercury used in gold extraction.¹⁵ Beyond this they also suffer psychological and social disadvantages and may sacrifice future prospects. Some child mineworkers do not go to school, while others do so erratically – hampering their education and ultimately reinforcing the cycle of poverty. Parents may be unaware of the immediate risks and long-term disadvantages, though in such situations of extreme hardship they are usually more preoccupied with day-to-day survival than with their children's future prospects.

Child labour is illegal in most countries. The ages of prohibition vary from country to country and from one occupation to another, but all governments try to exclude young children from mines. In 1999 the International Labour Organization (ILO) adopted Convention 182 on the 'Worst Forms of Child Labour' – and working in mines is one of these forms.¹⁶ This convention had been ratified by 113 countries by the end of 2001, yet many children continue to work in mines or in processing activities.¹⁷

What Does ASM Produce?

Artisanal and small-scale miners extract a broad range of minerals. In many countries, most of them produce gold, which has the advantage of being relatively simple to extract, refine, and transport. In Ecuador and Ghana, for example, gold accounts for two-thirds of their production of minerals; in the Philippines, it accounts for 90% and in Peru, almost 100%.¹⁸

Many miners extract gems and precious stones, such as diamonds, sapphires, and garnets; these are easy to process, transport, and sell – legally or illegally. For others, as in Bolivia, the main opportunities may lie with other metals, including silver and zinc. In China, small-scale miners work with over 20 minerals, but the majority mine coal (46%) and construction materials (44%) that they sell in local markets.¹⁹ In India, the range is even more diverse, involving more than 40 different minerals.²⁰

As in the modern part of the mining sector, the decision on what to mine is based on many different factors, including the quality and accessibility of the ore and market prices. There is also something of a division of labour: the larger enterprises prefer deposits that allow them to profit from mechanization and economies of scale – so they favour seams that are wide and uniform even if these require working underground or shifting large quantities of overburden. This leaves a niche for miners who work on a smaller scale, are more flexible, and can exploit irregular ore bodies and steep, dipping seams. However, conflict over ore bodies may arise, for example, where a large deposit has a particularly high-grade section close to the surface that would help a large-scale operation offset set-up costs, as it may also appear attractive to small-scale miners.

As the large companies do, artisanal and small-scale miners weigh production costs against market prices. But since they do not have either the capital or the time to invest in exploration or geological studies, they rely more on local knowledge and experience. And once they find a likely deposit, they will start to exploit it immediately.

The form of mining will depend on the location of the ore: whether it has to be mined underground, can be reached via an open hole in the ground, or is available as an alluvial deposit in rivers or streams. In each case, the tools and techniques used are normally fairly rudimentary – extracting with pickaxes and shovels, and sluicing and panning with simple equipment. Small-scale miners also carry out any subsequent processing with materials that are simple to use and cheap, such as mercury or cyanide. Although they may use less sophisticated processing methods, these miners can recover quite high proportions of minerals from ore by repetitive reworking and scavenging. (See Box 13–1.)

The often large numbers of people involved in ASM means that on a national scale total production can be significant – in some cases equalling or exceeding that of large mines. According to the ILO, in recent years artisanal and small-scale mining accounted for 15–20% of the world's non-fuel mineral production.²¹

The importance of small-scale mining for different minerals varies between country and sector. It accounts for the vast proportion of gemstones (90–100% in

Box 13–1. Repetitive Scavenging and Mineral Recovery

Though small-scale miners use low levels of technology, mineral recovery is often boosted by unplanned repetitive scavenging. In the first stage of recovery, miners pick out the higher grade ore by hand, leaving the lower grade ore as mine-fill. But even this low-grade ore may be used eventually: the same or other miners may return to it later, if more attractive alternatives are not available, since it will not need drilling or blasting. Sooner or later, any ore that provides a living will be exploited by some means or other.

The second opportunity for retrieving ore takes place at the processing plant, when more low-grade material is picked out before feeding the ore into the plant. After processing, the 'tailings' will be dumped along with the low-grade ore. Again, little of this residue tends to be wasted. Women and children frequently rework these dumps until nothing is left.

Recovery is also increased by sequential processing. In the case of gold, for example, artisanal or small-scale miners may recover only around 50% of the metal at the first stage by amalgamation with mercury. But they can also accumulate the tailings and later sell them or process them with cyanide. Artisanal cyanidization may not be very efficient either, recovering around 70% of the remaining gold, but this process too can be repeated, leading to overall recovery rates of close to 100%.

Source: Hentschel et al. (2001).

most countries) and diamonds (80–100% in countries that are not major producers).²² In China, ASM produces 75% of the bauxite.²³ In Indonesia, the total production of tin by small-scale miners equals that of large-scale production.²⁴ And in Ghana ASM is estimated to produce 60–70% of the diamonds.²⁵ Table 13–2 provides estimates for the total and proportional production of different minerals by ASM in various countries, along with estimates of the number of workers involved.

Environmental Impact

The numerous environmental impacts of ASM are perhaps of greatest concern to many observers in the mining sector:

- mercury pollution,
- cyanide pollution,

Table 13–2. Artisanal and Small-scale Mining Employment and Production in Selected Countries

	Number of Workers (thousands)	Minerals (proportion of ASM miners, where available)	Annual Production (in thousands tonnes unless otherwise indicated)	Proportion of national production from ASM
Bolivia	72	Base metals 54%, gold 45%	Gold – 12 tonnes Silver – 433 tonnes Zinc – 149 Tin – 12	All minerals – 27%
Brazil	Small-scale miners, 67; <i>garimpeiros</i> , ^a up to 300–400	Small-scale miners: construction and building materials 84%; <i>garimpeiros</i> : gold 73%, diamonds 11%, cassiterite 10%	–	–
Burkina Faso	100–200	Gold, phosphates, limestone, kaolin, clay, construction materials	Gold – 513 kilograms	Gold – 46% of all gold production
China	3,000–15,000	Coal 46%, construction and building materials 44%, iron, gold, base metals, agricultural minerals	Coal – 475,590 Limestone – 161,300 Iron – 68,120 Gold – 21 tonnes	–
Ecuador	92	Gold 65%, construction materials 23%, pumice 6%	Gold – 4 tonnes Pumice – 172	–
Ghana	200	Gold 67%, diamonds 30%	Gold – 107 ounces Diamonds – 558,241 carats	All minerals – 17%, Diamonds – 60–70%
India	500	Iron ore 23%, manganese 10%, copper 6%, limestone and building materials, bauxite, galena and sphalerite, phosphates	–	–
Indonesia	109	Gold 55%, coal 18%, tin 18%, clay, carving stone, diamonds	Gold – 30 tonnes Coal – 4000 Tin – 42 Diamonds – 33,600 carats	–
Malawi	40	Lime 12% coal, gemstones, bricks, sand, clay	Lime – 3.250 Coal – 44	
Mali	200	Gold, diamonds, semi-precious stones	Gold – 1.7 tonnes	Gold – 6%
Mozambique	60	Gold, gemstones	Gold – 360–480 kilograms	
Papua New Guinea	50–60	Gold 90%	Gold – 1860 kilograms	–
Peru	30	Gold	Gold – 15 tonnes +	Gold – 16%

Table 13–2. Artisanal and Small-scale Mining Employment and Production in Selected Countries (continued)

	Number of Workers (thousands)	Minerals (proportion of ASM miners, where available)	Annual Production (in thousands tonnes unless otherwise indicated)	Proportion of national production from ASM
Philippines	185	Gold 89%, sand and gravel 7%, industrial minerals 4%	Gold – 17 tonnes	–
South Africa	10	Gold, diamonds, gemstones, kaolin, limestone, coal, dimension stones, salt, sand, silver, talc	–	–
Tanzania	550	Gemstones 54%, gold 4%, lime, salt, aggregates 5%, gypsum, dimension stones, diamonds, sand	Gemstones – 48 tonnes Gold – 720 kilograms Salt – 97 Limestone – 120 Gypsum – 9 Diamonds – 93,205 carats	–
Zambia	30	Gemstones (particularly emeralds), lead, limestone, dimension stones, quartz, sand, silver	–	–
Zimbabwe	350	Gold, tantalite	–	–

^aBrazilian term for artisanal miners.

Source: MMSD Global and Country ASM Reports. In addition, data for Brazil are taken from Barreto (2001).

- direct dumping of tailings and effluents into rivers,
- threats from improperly constructed tailings dams,
- river damage in alluvial areas,
- river siltation,
- erosion damage and deforestation, and
- landscape destruction.

Some view these as unacceptable and as sufficient reason to ban many forms of artisanal and small-scale mining.

It is certainly true that small-scale miners tend to do more damage to the environment than those working in modern mining enterprises – with a greater environmental cost per unit of output.²⁶ A lack of awareness – particularly of the less visible or long-term environmental impacts of activities – combined with a lack of information about affordable methods to reduce impacts and a lack of obvious incentives to change all contribute to this problem. (Since their operations are often subsistence activities, small-scale

miners tend to focus more on immediate concerns than the long-term consequences of their activities.) This is compounded by the fact that in many cases, governments do not attempt to control these activities, which fall outside the regulatory framework, or they lack the capacity to monitor or control them, as the activities often occur in remote and inaccessible locations.

The activity of greatest concern for many is the use of mercury by gold miners – at the risk of their own health and that of others. This process may involve grinding the ore so as to free the gold, and then adding mercury, which combines with the gold to form an amalgam that is denser than the residual material and can be separated off as a ‘cake’. The miners then heat this cake to distil – or simply burn off – the mercury as a vapour, leaving a residue of gold. Mercury is extremely toxic, so this is a dangerous process not just for the operators but for anyone in the vicinity. Inappropriate use of mercury often arises due

to a lack of knowledge of the process. For example, in parts of Africa there is a rudimentary understanding that mercury has something to do with gold recovery, but little idea of what, so a ‘just chuck some in and hope for the best’ approach is taken. In Papua New Guinea, as in other countries, where even the simplest equipment is often unaffordable, miners just burn the amalgam in their huts, sometimes on the blades of knives used to prepare food. They may even deliberately sit down-wind of the fumes in order to keep warm.²⁷

In the Philippines, miners discharge mercury into rivers where the chemical characteristics of the water are highly favourable to its accumulation in the food chain.²⁸ Elsewhere the activity is still dangerous but the environmental risk can be less. Gold miners also use mercury in Amazonia, for example, but here there is already a considerable amount of mercury in the soil, so the high mercury concentrations observed in fish are probably due primarily to eroded soil washed down by tributaries of the Amazon.²⁹ Moreover, the chemical characteristics of rivers within Amazonia seem to control the extent to which mercury accumulates in the aquatic food chain.³⁰

Hazards to Health

Small-scale miners often operate in hazardous working conditions. According to the ILO, the five major health risks associated with ASM are exposure to dust (silicosis); exposure to mercury and other chemicals; the effects of noise and vibration; the effects of poor ventilation (heat, humidity, lack of oxygen); and the effects of overexertion, inadequate work space, and inappropriate equipment.³¹ Although the health risks of mining are similar for both sexes, there can be additional hazards for women miners, especially if they come into contact with chemicals that present a health risk to foetuses or breast-feeding infants. Children are particularly vulnerable. The mine sites can also be breeding grounds for waterborne diseases such as malaria and bilharzia.

In addition, there are many accidents in artisanal and small-scale mining. The five most frequently cited causes are rock falls and subsidence, lack of ventilation, misuse of explosives, lack of knowledge and training, and obsolete and poorly maintained equipment.³²

For a number of reasons, the health and safety risks to which small-scale miners are exposed can be significantly greater than for large-scale mining. Most obviously, the informal and unregulated nature of ASM means that it usually operates beyond the scope of legislation or enforcement on health and safety issues.³³ Some of the risks are the result of poor equipment. Self-employed artisanal miners can choose for themselves what safety measures to take. But even simple items such as helmets, boots, gloves, and dust masks represent a costly investment with no immediate return. Moreover, some miners have introduced more mechanized equipment or techniques without the complementary safety measures. Often these individuals are not aware of the risks they are running. If they have previously worked in large mines, they are more likely to use safety equipment. Otherwise they are likely to know very little about these issues.

There is also a poor flow of information in the other direction: artisanal and small-scale miners are slow to report illnesses or accidents if they fear they will be exposed to official sanctions or interventions that will damage their livelihoods.

The dangerous environment extends beyond the mines. Those engaged in ASM are already some of the poorest people and are therefore likely to have inadequate sanitation, with little access to clean water or basic health care. These problems are likely to be even worse where miners have converged around a freshly discovered deposit or settled in unorganized camps. Such remote and temporary settlements are unlikely to have public health facilities – and apart from harbouring diseases related to poor sanitation, they can also be breeding grounds for crime, prostitution, and sexually transmitted diseases. In remote areas, health care services may already be limited and a long way from the mining location, and access may be very difficult, especially at certain times of year. There is also often poor awareness of mining-related health issues in rural health services, such as recognition of mercury poisoning and appropriate treatments.

Many of these ‘boom towns’ develop haphazardly with little or no planning. As a result, working and living areas often overlap; miners frequently build houses at the mine entrance, for example, to protect the property. Similar overlap is common in local businesses: general stores will sell groceries alongside chemicals,

and restaurants may combine serving food with 'complementary services' like buying and burning amalgam. In some circumstances, the living quarters can be more dangerous than the mines. In Peru, for example, where amalgam may be burned almost anywhere, mercury poisoning can be higher among women and children than among men, who spend much of their day in the only uncontaminated area – the mine.³⁴

Although such settlements may ultimately be recognized as regular villages and towns – and qualify for sanitation and public health facilities – this can take years or even decades. Meanwhile, a whole generation of children will have been exposed to multiple disease threats, including malaria, cholera, tuberculosis, bilharzia, and other parasitic and infectious diseases. And HIV/AIDS may have had time to become epidemic.

Social Issues

ASM can be an important aspect of rural livelihoods.³⁵ Most of this form of mining takes place in remote rural areas. Here it can provide a means of survival for the miners and stimulate demand for locally produced goods and services – food, tools, equipment, housing, and various types of infrastructure. But where ASM has taken place over an extended period of time, its contribution tends to be limited to supplementing existing livelihoods.

Many of the social issues facing communities affected by small-scale mining are similar to those associated with large-scale mining. In some cases, there is a major issue of change in social order where a move from subsistence agriculture to ASM occurs. The local environmental damage caused by ASM can also aggravate economic hardship and cause ill health. In addition, ASM can be disruptive – particularly when it takes the form of a sudden 'rush'. Some of this is linked to in-migration: when large numbers of new people arrive, they can come into conflict with local residents, sometimes provoking violence and introducing new social and health problems. But other problems can arise when local people are attracted by glittering opportunities, real or imagined, that cause them to desert their farms. This is even more likely when the mineral concerned becomes a parallel local currency, as gold does. When the rush is over and mining activities have subsided, local people may

conclude that they have seen few lasting benefits: most of the profits will have disappeared, while the social and environmental damage persists.

In extreme cases, small-scale miners have been accused of killing local people in order to gain access to mining land. This happened to Yanomami Indians who live in the forest on the border with Venezuela. They are the largest of Brazil's tribal groups and have managed to maintain their traditional way of life. At least 10,000 members of this tribal group live across the border in the southern part of Venezuela, on lands rich in mineral resources. Following the illegal entry of thousands of gold prospectors into Yanomami lands in 1987, some 1500 Yanomami were estimated to have died from violence and disease. Since 1990 there have been several government attempts to remove illegal gold prospectors from the area, and in November 1991 the Venezuelan government signed a decree officially demarcating 9.4 million hectares of land as the Yanomami Indian reserve. It appears, however, that the re-entry of Brazilian miners into Yanomami lands as well as brutal killings of villagers continue in both Brazil and Venezuela.³⁶

Relationships with Others in the Mining Sector

Governments

As noted earlier, artisanal and small-scale miners work largely in the 'informal sector'. This serves as a serious impediment to improving the sector's contribution to sustainable development. It implies that their businesses are not registered – they operate beyond government supervision and thus do not strive to follow health and safety regulations or meet environmental standards. Nor do they receive any formal support. ASM enterprises do not normally pay royalties to the state or taxes on profits. They may also lack official rights to exploit a particular deposit – working without mining title or any kind of contract with the owner of the concession, which makes them vulnerable to eviction. In these circumstances, informality also shades into illegality. In many countries, over 50% of small-scale miners are thought to operate illegally.³⁷

In some cases, ASM workers operate informally as a matter of choice. There are often strong financial incentives for avoiding regulation and participation in the formal sector. Registering their business may be a

tortuous and expensive process – costly in both time (it often takes years to become registered) and money and offering limited advantages. Moreover, in the remote areas where they work, the national government or local authority generally lacks the capacity to regulate or support such disparate activities. In many cases, however, governments choose not to recognize ASM activities and may even enforce bans on them. This may be the case if land rights are not recognized or if the health, safety, environmental, and social costs of ASM are perceived as too high relative to the benefits. A recent example of this is in China, where the government ordered the closure of all small-scale coal mines on the grounds that they posed excessive safety risks. (See Box 13–2.)

Informality and illegality extend to the marketing of products. Here there are clearly some disadvantages. The lack of formal protection increases the risk that the miners will be exploited by intermediaries or traders, and they will rarely get fair prices. It also encourages criminality in the commodities chain.

Since the products enter the supply chain informally, they can also be diverted into illicit channels and are frequently smuggled. In countries where the

government is officially the monopoly buyer of mineral products such as precious metals and gemstones, traders can usually make more by smuggling the items out of the country and selling on international markets. These products can also be used to launder money. In Central and South America, for example, drug traffickers often buy gold from informal miners and then declare the metal to be part of the output from a formal mine.³⁸ Another illegal use for these products is to finance rebel activities – as with the ‘blood diamonds’ in Angola, for example (see Chapter 8), and the mining of jade in Afghanistan. In these cases, the links between informality and illegality tend to be self-reinforcing. Governments that wish to stamp out such illegal activities often try to suppress small-scale mining, though this may simply have the effect of further marginalizing these workers – and driving them straight into the arms of smugglers and traffickers.

Even where they have tried, few governments have had much success in supporting artisanal and small-scale miners or in controlling their impact on the environment and society – finding it difficult to monitor activities that are mostly informal, often illegal, and frequently distant from urban centres of authority. Governments that have tried to ban the use of mercury, for instance, or to shut down ASM operations have generally failed. When the miners have no other source of income, they will usually find ways to evade controls and carry on working.

The lack of government success in controlling ASM activities has in part been due to a tendency for regulatory frameworks to be control-oriented, with few obvious benefits or incentives for miners. Artisanal and small-scale miners will only formalize and register their operations if they see some real advantages to doing so. And they will only stop mining if alternative, more attractive sources of income are available. Thus those who register might gain access to technologies and services, along with training for health and safety and for environmental management. They could also get financial assistance, as well as information on prices and access to markets – which would make them less reliant on intermediaries for the sale of their products and enable them to get better prices.

But government officials also need incentives for action. Many at present do not consider it worth the effort, especially where land rights are not recognized

Box 13–2. China’s Dangerous Small-Scale Coal Mines

China’s small-scale coal mines, which employ roughly 2.5 million people, are among the world’s most dangerous. Official statistics suggest that around 6000 people die each year – though there are probably thousands more unreported deaths in illegal operations.

In June 2001, the central government issued a State Order to shut all the country’s small mines immediately – citing their bad record on health and safety and their environmental pollution. This would also serve to remove a supply of coal that was undercutting the viability of larger state mines.

Closing these mines in remote areas without providing alternative employment will cause considerable hardship and is unlikely to be successful. Given previous experience, the most probable outcome is that many of these mines will continue to operate, but now illegally. In Hunan province in central China, for example, the government has closed some mines as many as 20 times.

Source: Gunson and Yue Jian (2001).

Photograph not shown

and it is difficult to grant legal title. Other officials may actually prefer the status quo, especially if they are corrupt and ASM is giving them ample opportunities to smuggle or launder money.

Nevertheless, for most governments there should be advantages to regulating artisanal and small-scale mining. Those that want to attract foreign investment in large-scale mining, for instance, will find it simpler if small-scale mining is already well regulated. Social problems and community conflicts associated with ASM can also be reduced. And there should be fiscal incentives. One would be a reduction in smuggling. This is particularly important for countries that produce precious metals or gemstones. If this sector is largely informal, it risks being 'captured' by warlords or cartels from neighbouring countries, allowing most of the output to slip across the border, along with the associated profits and potential foreign-exchange earnings. If, on the other hand, informal miners can sell their output in regular local markets at a fair price (that is higher or equal to what they are able to get by illicit trading), the profits will stay within the country and subsequent exports will earn foreign exchange. Indeed, the fiscal situation is even more advantageous with ASM production than with large-scale mining corporations, which often repatriate profits to foreign investors. In some circumstances, regulations will also provide tax revenues.

Tanzania liberalized its minerals markets in the 1980s – licensing private gold and gemstone dealers and thus offering new legal channels for ASM sales. Between 1989 and 1997 the number of mineral dealers' licenses increased from 17 to 2000. This, along with efforts to

encourage local investment in mining, resulted in a steep increase in mining activity, mostly in ASM: between 1990 and 1995 the number of registered claims increased from 1998 to 4123. This also boosted total mineral exports, which between 1989 and 2000 rose from \$16 million to \$184 million.³⁹ It should be noted that more recently, three large-scale gold mines have begun operations in Tanzania, accounting for a large part of the increase in production and exports. By contrast, in nearby Madagascar virtually all the country's \$400 million worth of gemstones are still exported illegally.⁴⁰

Less obvious but equally important considerations for government are the role that ASM has in rural development. This is particularly critical in light of the difficulties of rural poverty and mass migration to the cities being experienced in most countries with ASM. Moreover, the significant problems associated with this type of mining are likely to worsen if ignored, with implications for broader society.

Large Mining Companies

The relationship between large mining companies and smaller-scale operators has often been characterized by tension and mistrust. Because of the problems associated with ASM, the fact that these miners' traditional rights to land are often not legally recognized, and the potential benefits from large, organized mining operations, governments may be quick to ignore or 'clear out' artisanal and small-scale miners in favour of large companies. In these cases, legal entitlements are granted to the large companies, and the traditional miners are often forced into illegality. In some cases, a legitimate process of resettlement and compensation is undertaken to allow large-scale mining to take place. But in others, government intervention or even police involvement to enforce company entitlements is used. This obviously leads to resistance and resentment, and even to serious conflicts. To some extent, this is because the miners are competing for the same resources. Sometimes this is no coincidence – mining and exploration companies use artisanal and small-scale miners as unpaid 'geologists', exploring wherever there is ASM activity. On the other hand, small-scale miners have often congregated around a larger-scale mine, taking advantage of the better access and perhaps re-mining some of the larger company's waste.

Once operations have started, some companies have tried to keep small-scale miners at bay and to build systems of security. Others have found that building constructive relationships works better than trying to shut small-scale miners down and hope the ‘problem’ disappears – through, for example, finding alternative employment, setting aside areas for them to mine, and providing other forms of assistance.

Still, cases of conflict between large mining companies and small-scale miners, sometimes involving government, abound. One example of this is the reported attempt by the Brazilian state mining company, CVRD, to evict a group of small-scale miners from a concession in Serra Leste. The local miners are alleged to have taken seven employees of the mining company hostage until their demands were met.⁴¹ Similarly, in Suriname conflict emerged between villagers and Golden Star Resources (GSR) over access to the region’s gold reserves. According to a special assessment team assembled by the Organization of American States, ‘from the perspective of the small-scale miners...these deposits represent a lifetime of employment. From the perspective of GSR, however,...mak[ing] available parts of their concessions to small-scale miners may not be realistic from an economic perspective.’⁴²

Conflicts sometimes occur in situations where it is difficult to ascertain the legality of occupation and claims to the land, what policies of resettlement or relocation are applied, and whether rights have been violated or abused. In part this may be because of the difficulty that artisanal miners have articulating their views effectively to authorities or to world media, and the difficulty that company officials, finance institutions, governments, NGOs, or others have in establishing the facts of events occurring in distant mining regions.

A recent controversial case involves the alleged eviction of small-scale miners from a site in the Bulyanhulu mining area of Tanzania. A Tanzanian environmental NGO has alleged that in 1996, Tanzanian police, acting to assert mining rights claimed by Kahama Mining Corporation Limited, displaced or evicted a large number of small miners (the group suggests 400,000) and their families from the site.⁴³ Eventually the rights to the site were acquired by Barrick Gold, well after the events allegedly occurred, which began to develop a mining project.

Subsequent allegations, which if true would be very serious, included the charge that some small-scale miners had died or been killed in the earlier eviction process. There have been a number of attempts to determine the validity of these allegations. One of these was by the Multilateral Investment Guarantee Agency (MIGA), an arm of the World Bank, which had insured part of Barrick Gold’s interest in the project since the company had received a \$56.3-million MIGA guarantee for its investment in an underground gold, silver, and copper mine.⁴⁴ The results of MIGA’s investigation were described in a September 2001 press release:

The Multilateral Investment Guarantee Agency said today that the so-called ‘new’ evidence it has received relating to deaths that allegedly took place in 1996 at the Bulyanhulu mine in Tanzania during a government operation to fill illegal mining shafts provides no evidence of wrongdoing on the part of either the Tanzanian government or Barrick Gold Corporation of Canada.⁴⁵

MIGA also asserted that ‘Amnesty International, the Tanzanian government, the Canadian High Commissioner, and many others investigated the allegations and consistently found that they could not be substantiated’.⁴⁶

These investigations have not satisfied the NGOs that raised this issue, however, and they continue to press for further investigation.⁴⁷ The issue was further complicated by an allegation that ‘Tanzanian police have carried out arrests and searches of witnesses, government critics and researchers to silence those who have been raising the allegations in that country’.⁴⁸ And in April 2002, MIGA announced that the ‘IFC/MIGA Office of the Compliance Advisor/Ombudsman (CAO) has received a complaint from LEAT, a Tanzanian NGO and has decided to make a preliminary assessment of the complaint’.⁴⁹

MMSD has not investigated this case itself and has nothing to add to the record of documentation already in existence. But whatever the outcome, this clearly illustrates the kind of issues that increasingly are presented to lenders, governments, civil society organizations, and companies, as well as the lack of any mechanism trusted by all that can reach a result that will stay undisturbed.

Companies have often been ill equipped to build good

relationships with small-scale miners. Difficulties are compounded by a lack of government presence or support for this part of the mining sector. The link between ASM activities and large-scale mining operations means that small-scale miners need to be treated with consideration to avoid serious problems between the two groups. As discussed later in the chapter, there are several examples of proactive measures being taken by companies to better relations.

International, Donor, and Non-governmental Organizations

The importance of artisanal and small-scale mining and the difficulties that governments have had in addressing it have increasingly been recognized at the international level and by individual donor governments. ASM has been the focus of a number of international meetings. In 1995, for example, the World Bank held a major conference in Washington on artisanal mining, and in 1999 the ILO held a Tripartite Meeting on social and labour issues in small-scale mining. ASM issues have also been considered in meetings of the Mines Ministers of the Americas and of the Union Économique Monétaire Ouest-Africaine.⁵⁰ The focus of these discussions has gradually sharpened and moved from definitional and legal issues, and purely technical assistance, towards policies that consider assistance to artisanal and small-scale miners as part of overall strategies for poverty alleviation and building sustainable livelihoods.

A few bilateral agencies currently have programmes of assistance for ASM. Germany, for example, finances programmes in Colombia, Ghana, and Zimbabwe, and the United Kingdom is looking at a model scheme of assistance for small-scale miners. The UK's Department for International Development (DfID) is also undertaking research on ASM issues. At the multilateral level, the most important initiative began in March 2001 when a group of donors launched the Communities and Small-Scale Mining (CASM) initiative.⁵¹ CASM's mission is to enhance the developmental impact of ground- and policy-level work in the artisanal and small-scale mining sector, both at the grass-roots and policy level, in ways that will directly contribute to reducing poverty and realizing sustainable development in communities affected by or involved in ASM in developing countries. It intends to achieve this by providing a forum to facilitate communication and coordination between miners, communities, donors, governments, industry, and other stakeholders and by actively

promoting the sharing of knowledge, lessons learned, good practices, and policies. CASM is housed in the World Bank and chaired by the DfID. Although there have been similar attempts to address ASM in the past, prior to CASM few agencies recognized the important role that artisanal and small-scale mining plays in rural livelihood strategies. Continued and increased support is needed in order to have a real impact.

A number of international and local non-governmental organizations (NGOs), such as the Intermediate Technology Development Group (ITDG) in Zimbabwe and the Mineral and Energy Policy Centre in South Africa, are actively undertaking research, training, and support work for artisanal and small-scale miners.⁵² Such organizations also play an important role as independent facilitators.

Maximizing the Contribution of ASM to Sustainable Development

Artisanal and small-scale mining is critically important for many poor communities, providing temporary or full-time work and offering potentially the only source of income, though it also has many serious social and environmental implications, as indicated. The challenge now is to capitalize on the livelihood opportunities while ensuring that ASM also contributes to other goals of sustainable development, particularly to rural development.

Achieving this depends to some extent on the nature of the mining. With better organization and training, a degree of mechanization, and an integrated approach to livelihood strategies, small-scale mining communities in some instances should be able to pursue mining activities while co-existing productively with larger enterprises. The situation for individual artisanal miners, however, is more difficult. Here the aim should be to develop other employment opportunities for them either in the small-scale sector or elsewhere. In the case of mining camps that suddenly spring up as a result of newly discovered deposits, the priority should be to integrate the mining operations with existing local economic activities and strengthen the miners' relationship with neighbouring communities.

Broadly speaking, with respect to sustainable development, the short- and medium-term goals of artisanal and small-scale mining should include:

- where applicable or feasible, encouraging alternative economic activities;

- encouraging a contribution to poverty alleviation and local economic development through ensuring that revenues are invested in ways that bring sustained benefits;
- adopting a gender-sensitive approach that gives particular emphasis to the role of women;
- ending child labour in mining through providing viable alternatives;
- avoiding or mitigating negative environmental and social impacts as well as impacts on human health;
- encouraging 'fair trade' markets for mining products;
- increasing the ability of individual enterprises and ASM in general to make a better contribution to sustainable development;
- developing the collective capacity of miners to contribute to sustainable development; and
- ensuring good relationships between miners and other stakeholders.

The remainder of this chapter discusses ways of working towards these goals.

Supporting Rural Development

In the past, most efforts on ASM have focused on the mining operations themselves – trying to improve productivity and environmental performance and to regularize their legal status – but these have often helped only a few select operations or entrepreneurs rather than whole communities.

A better approach is to take into account the existing socio-economic system and consider how mining can best contribute to poverty reduction and sustainable development in the context of holistic local or regional development. In the case of longer-term or seasonal operations in small-scale mining, the main priorities will be finding better ways of integrating them into the rest of the economy and encouraging mining communities to invest their revenues in other forms of economic activity as well as in communal services such as schools and health centres (while recognizing the need to ensure that government does not abrogate its responsibilities as a provider of public services). (See Box 13–3.)

The UN Department for Economic and Social Affairs has developed a sustainable livelihoods approach for artisanal mining communities. This is currently being implemented as a pilot scheme in Ethiopia, Ghana, Guinea, and Mali.⁵³ The main policy recommendations are:

Box 13–3. Diversification for Small-scale Miners in Mali

In 1997, a large open-cast mine entered production at Sadiola in western Mali. The major shareholders were AngloGold and a Canadian company, IAMGold; the minor shareholders were the International Finance Corporation and the Government of Mali. Sadiola was already a traditional artisanal gold mining area. After the mine began operating, environmental concerns led to a decision to resettle the inhabitants of two adjacent villages, Sadiola and Farabakouta, to sites a couple of kilometres away.

To compensate local communities, the mining company introduced the Sadiola Gold Mining Project. This had several objectives: to help artisanal miners, to promote community development, and to diversify the local economy. Activities started with a public consultation with traditional groups and local NGOs in order to identify target groups and potential partners.

On the mining side, this resulted in the creation of the Sadiola Mining Cooperative and a programme of technical assistance to the gold miners – including geological studies and the identification and testing of mining equipment. On the community side, it led to the creation of a community development fund and support for a school, a health centre, and a learning centre for adults. Environmental work included improvement of mine sites through the planting of fruit trees. The project also supported small enterprises such as bakeries, woodwork shops, jewellers, metalwork shops, and, specifically for women, market gardening and businesses making dyes and soaps. In all, the project has affected some 500 people in four villages and has stimulated local entrepreneurial activity and purchasing power.

Interestingly, the number of people engaged in ASM at the Sadiola site is declining rapidly because of the better commercial opportunities provided by trading with workers in the large mine. This illustrates the links between ASM and poverty – as soon as something better turns up, people will take it.

Source: Keita (2001).

- *Poverty eradication* – Policies on poverty eradication should be included in national policy-making for all sectors, including minerals.
- *ASM as a starting point* – ASM should serve as both a catalyst and an anchor for other productive activities, stimulating complementary and alternative productive ventures.
- *A focus on people* – The organizational capability of the local community should be strengthened.

- *Building on enterprise* – Instead of hands-on state intervention, which has rarely been successful, governments should encourage private initiatives, especially micro-enterprises or cooperatives, that can provide better local services.

Assisting Women in Mining

Although women play a central role in many small-scale mining operations, they have frequently been bypassed by programmes of assistance. Future programmes will need to focus more sharply on gender issues – looking for ways to give women more power in their communities and their households.

A good starting point for this kind of work is a women's mining association. The Southern African Development Community, for example, has a Women in Mining Trust. Founded in Zambia in 1997, the trust now has chapters in a number of other countries, including Angola, Botswana, Democratic Republic of Congo, Kenya, Mozambique, Namibia, Swaziland, Tanzania, and Zimbabwe. Its main objectives include lobbying for support of women in mining, training women in environmentally sound mining methods, establishing revolving loan funds, and facilitating the marketing of members' products.⁵⁴ Another example is the Tanzanian Women Miners' Association. This is establishing a centre that rents mining equipment and tools as well as a lapidary and jewellery production unit. It also has a training centre that focuses on environmentally sustainable mining and processing methods, health and safety issues, and the rehabilitation of ecologically sensitive mining areas.⁵⁵

Eliminating Child Labour in Mines

No children should be working in mines, so the objective must be to eliminate child labour, and immediate measures must be put in place to bring this about. In the interim, it is important to try to reduce the dangers and to improve the conditions for children currently involved in mining. The ILO is one of the leaders in the field through its International Programme on the Elimination of Child Labour (IPEC). On the southern coast of Peru, in the artisanal gold-mining community of Santa Filomena, for example, IPEC has a programme run by the Peruvian NGO Cooperación. Started in 1998, the first two phases are now complete: the local population has identified alternatives for child labour in mining, and

children no longer carry minerals. It is expected that in the future children will be withdrawn from mining here altogether.⁵⁶ The ILO is also working in the Philippines to provide education and vocational training to children withdrawn from gold mining.

Protecting the Environment

As noted earlier, artisanal and small-scale miners often use excavation and extraction techniques that are harmful to their own health and to the environment.⁵⁷ But given the scattered and informal nature of much of this activity, governments are unlikely to be able to raise standards immediately simply through legislation and enforcement. A more realistic approach is raise awareness of the risks and to demonstrate less dangerous alternatives that are appropriate to local circumstances – social, cultural, and economic – and that allow mining communities to make better-informed choices.

A first step should be to alert people to the dangers – to themselves, their children, and the environment in general – of, for example, using mercury to extract gold and to encourage them to use a simple method to capture the mercury vapour. In Papua New Guinea, the Department of Mining, with the support of AusAid, has started an outreach programme that includes demonstrating safer ways of burning amalgam. One option is to use empty fish tins. These cans are widely available and can be fashioned into simple retorts that can be used to recycle the mercury.⁵⁸

Another option is to introduce alternative forms of gold extraction that do not involve mercury at all. In South Africa, the government's mineral technology research body, Mintek, has developed a new Minataur process. This involves treating the ore with hydrochloric acid in the presence of sodium hypochlorite and then using sodium metabisulphate or oxalic acid to precipitate the gold out as a concentrate that is 99.5% fine gold powder. This has the key advantage of avoiding the use of mercury or cyanide through the use of simple equipment.⁵⁹ For miners to take up a new process like this, there must be immediate and obvious financial or time-saving benefits. Miners also need to understand and trust the new technology.

Meanwhile, governments also have to develop appropriate and enforceable legislation that will draw

ASM into national programmes for environmental protection.⁶⁰ When governments deal with large-scale enterprises, one of the first requirements is an environmental impact assessment (EIA) and a corresponding environmental management plan. But this is expensive and far beyond the reach of most small-scale miners, who at best will try to comply by contracting low-quality environmental consultants or, more likely, continue to operate illegally. In these circumstances, one solution is to bring small-scale miners together to produce a collective EIA – on the assumption that small-scale mining enterprises in an ecologically homogenous zone will have similar environmental impacts and therefore could use identical environmental management plans.

In Ecuador, for example, a local NGO, CENDA, has worked with 100,000 or so artisanal miners in the southern part of the country and a government agency to develop a collective solution: Plan ECO+. This involves technical assistance to miners along with a host of social programmes – including providing meals for miners' children, improving water supplies, and promoting alternative sources of work. The government accepted this idea as a pilot project, and between 1996 and 1999 the miners adopted more than 200 individual environmental measures. When the project ended, the government incorporated the concept in its regular mining environmental legislation as 'joint environmental studies'.⁶¹ Several other countries have since implemented or are evaluating similar models.

Better Markets for ASM Products

Mining communities in the ASM sector typically have to sell their products, either refined ore or metal, as quickly as they can – and usually get low prices. Those working further along the chain – traders, intermediaries, and manufacturers – tend to make higher profits. This imbalance is likely to be even greater when the miners are working illegally and are effectively selling black market goods. There are a number of ways in which the profits retained by mining communities can be increased.

One way to retain more of the profits is for mining communities to establish processing industries of their own. (See Table 13–4 for some opportunities to do this.) They might be able to take some of these steps while still in the informal sector, but they would stand

Table 13–4. Opportunities for Processing ASM Products

ASM product	Potential local transformations
Gold	Jewellery, coins, medals
Gemstones	Cutting and polishing (lapidary), jewellery
Coal	Coke
Dimension stone ^a	Tiles and slabs
Non-metallic minerals	Bricks, ceramics, paint, and so on

^aMaterial capable of being cut to size.

a better chance of getting access to capital and to government services in the formal sector. Governments that want to promote such enterprises will need to simplify the requirements for establishing a small business.

Government, companies, international agencies, and other actors should also be able to offer some guidance on suitable businesses to develop. There is no reason why miners should also make good jewellers, and most experiments that have encouraged them in this direction have failed. So such businesses will need to be established by other people, or miners will need to be encouraged to engage in activities that better complement their existing skills.

Another priority should be to make it easier to divert ASM raw materials to existing manufacturing enterprises. In Bolivia, for example, small-scale miners produce gold on legally granted concessions, but tend not to declare or pay tax on their output. As a result, Bolivian jewellers who want to operate legally have often found it simpler to use imported gold. In order to help the jewellery industry, the Bolivian government has therefore established a system of 'autodeclaration' for gold purchased from the informal market. Jewellers who wish to export their products simply have to include the value of locally bought gold as a deductible cost and they can then export the products exempt from value-added tax.⁶² This has helped make the industry more competitive internationally, and has also formalized at least one part of the production chain.

Direct links with the growing 'fair trade' movement in

industrial countries could also help achieve better prices for ASM output. Consumers in richer countries are becoming increasingly concerned that the goods they buy – including jewellery – may have been produced under exploitative conditions and possibly with child labour, may have had unacceptable levels of environmental impacts, or may have played a role in fuelling conflict. In response, a number of NGO trading companies are now prepared to pay a premium for guarantees of ethically and environmentally sound production and have established direct links with small-scale producers in developing countries.

A German NGO, Fair Trade e.V., for instance, has established links with many ethically approved producers – including a women’s diamond cooperative in Lesotho, cooperatives producing gold and jewellery in Bolivia, cooperatives producing platinum and other metals in South Africa, and gem producers in Madagascar and Tanzania.⁶³ For producers to qualify for these marketing channels, they have to work within a democratic framework – typically cooperatives – and must be committed to high environmental and labour standards. Producers benefit in a number of ways. First, they get better and more stable prices because selling directly cuts out various layers of intermediate trader and opens up new markets. Second, they get a guaranteed market. Third, they get more money to invest in improving local social and environmental conditions.

Access to Finance and Credit

Most artisanal and small-scale miners would like to step up to higher levels of productivity and output by mechanizing more of their activities and developing new reserves. But few are able to gain the necessary capital: banks are wary of ASM producers, who are usually in the informal sector, work in rural areas, and lack acceptable forms of collateral. Even bankers who do lend to such individuals regard these as high-risk loans and charge correspondingly high interest rates – which can render many sound projects non-viable.

A number of international donors have identified the lack of credit as a bottleneck and have supported small-scale credit programmes for mining and other enterprises, often as part of projects for raising levels of technology and productivity. These programmes have yielded a number of lessons. One of the most important is to ensure that the lending is sustainable.

The lending institution has to be able to make its decisions independently and charge interest rates sufficiently high to cover inflation and operating costs – including loan losses – and also have enough clients to permit economies of scale. The best strategy is to ensure that loans are combined with the borrowers’ own savings, and to start with small loans and then move on to larger ones that become part of a longer-term relationship. Donors also need to sustain their links – helping build the capacity of lending institutions and maintaining an interest in their control and supervision.

Finance for small-scale mining need not, however, be confined to banking and credit schemes. Funds can come from a range of more specialist institutions, such as exploration funds or mining development banks. Other ways of channelling finance to miners include leasing equipment, selling shares, and establishing joint ventures.

Associations for Artisanal and Small-scale Miners

When governments are developing policies for formal-sector activities, they usually consult a relevant trade association that can represent the interests of the sector as a whole. This is difficult in the case of ASM, which normally lacks any sort of organized representative structure. Some NGOs, governments, and international donors have therefore tried to encourage the creation of such groups, whether as cooperatives, enterprises, or other associations. This has not always been successful, and artisanal and small-scale miners have often resisted joining cooperatives for mining operations. They have been happier to work in groups when it comes to getting finance, marketing, pooling equipment, or collecting by-products. Even where associations have been welcomed, however, difficulties have sometimes arisen in transferring the management of the cooperative to the small-scale miners and in ensuring its continuing financial viability. (See Box 13–4.)

A further possibility is to arrange for the trade association for larger mining enterprises, usually the Chamber of Mines, to represent the interests of artisanal and small-scale miners by having ASM groups as associate members. This would have many advantages, including assisting informal miners to join the formal sector, as well as offering a channel through which the government and other bodies could communicate with and support ASM. Many Chambers

Box 13–4. A Problematic Mining Project in Zimbabwe

The Shamva Mining Centre in Zimbabwe was established in 1989, originally to support 43 small-scale gold miners in the Shamva area northeast of Harare. This was a joint initiative between the Ministry of Mines, the Intermediate Technology Development Group, the Small-Scale Miners' Association of Zimbabwe (SSMAZ), and donors. The centre was to provide a milling facility for the miners and offer training on mining, health and safety, and environmentally sustainable mining methods.

By 1995 the centre had proved so popular that more than 150 miners from a radius of 200 kilometres were using it. They paid fees for the milling that were directly related to the price at which the gold was bought by the reserve bank. By using this service, miners were able to increase their incomes, sometimes by as much as 30%.

Nevertheless, the centre was running into problems. One was a lack of capacity to meet the growing needs of local miners. The SSMAZ responded by requiring miners to bring at least 10 tonnes at a time for processing – effectively excluding the smallest operators. However, the worst difficulties emerged in 1999. The centre decided it could continue without external assistance but did not succeed in replacing the ITDG-appointed manager and soon ran into financial problems. In January 2001 the Executive Committee decided to lease the centre to a local miner, and since then it has operated at well below capacity. This experience raises doubts about the advisability of putting such projects in the hands of producers' associations rather than more experienced commercial managers who can provide an efficient and competitively priced service.

Source: Mugova (2001).

of Mines would not welcome this kind of collaboration, however, because large-scale enterprises often have a strong aversion to ASM. Until recently, for example, the Zimbabwe Chamber of Mines was in the forefront in condemning artisanal and small-scale miners for their impact on the environment.⁶⁴ Nevertheless, there are promising signs of change. The South African Chamber of Mines is currently exploring ways of accommodating the interests of these miners – helping with the formation of ASM associations that could then become associate members of the Chamber.⁶⁵

The lack of local ASM associations is mirrored at the

international level. At different times, there have been various ASM-related networks and communication, but these have typically been through specialist journals or channels established by NGOs. Modern communications technology, and particularly the internet, has created other options, though these too operate at the level of general information and research about the sector. They include FACOME, which promotes collaboration and communication on issues related to mercury in the Amazon (at www.facome.uqam.ca), and Redminera.com, which is concerned with mining in general, including ASM. For donors and other institutions, an important development has been the Communities and Small-Scale Mining initiative mentioned earlier. Thus far, however, there is no evidence that miners themselves are able to take much advantage of internet-based linking. This is not surprising, given their scattered locations, though the situation could change with the spread of mobile and satellite-based systems.

Improving Relationships

Between Large- and Small-scale Mining

In recent years, the attitude of some of the larger companies towards small-scale mining operations has begun to change. As they have become more sensitive to criticism of their activities, they have begun to pay greater attention to their relationships with those near mines – including artisanal and small-scale miners. They also see the business case for doing so.

The large mining companies can gain from greater cooperation. For example, in the near term, it will help to avoid tension and potential conflict with local miners. In the longer term, if they have developed a more stable relationship with miners and the community as a whole – and have supported community development – then local people are more likely to take greater care of the site after the mine has closed and less likely to restart mining in rehabilitated areas or in waste facilities, for which the mining company may still retain environmental liability.

Artisanal and small-scale miners also gain from good relationships with mining companies. The company can, for instance, buy their ore, provide laboratory services, or help them to develop clean and productive small concentration plants. Companies can also help with such issues as health and safety, and can provide

technical assistance on the use of explosives along with geological information and legal advice. However, there needs to be a clear business case for this on the part of the company.

Building this kind of relationship requires considerable sensitivity and patience and has to start from the first phases of exploration. Companies should endeavour to understand the needs, perspectives, and concerns of small-scale miners and respect their rights to secure a livelihood. While the right of large companies to protect their assets should be respected, companies should try to avoid using forms of harassment against small-scale miners. The companies have to facilitate an early process of dialogue and participation, not just with ASM leaders but also with other members of ASM communities – signing agreements, where necessary, with all the miners in the group. Such agreements should be based on an honest assessment of what the company can and cannot do for ASM. The most difficult negotiations may be with indigenous groups, whose laws, land rights, and ownership of natural resources may not be formally recognized. Governments can help foster these dialogues, but only to a limited extent, since small-scale miners are also frequently at odds with local officials. Where necessary, NGOs or other local institutions could play the role of independent facilitators.

Fortunately, there are a number of positive examples of cooperation between larger enterprises and small-scale miners. The experience of AngloGold in the Sadiola area of Mali was described earlier; the relationship between Placer Dome and local miners in Las Cristinas in Venezuela is also noteworthy (see Box 13–5).

With Governments

Governments should acknowledge and provide appropriate support to ASM. Consistent and well-integrated policies need to be developed that contribute to four strategic objectives: alleviating poverty and contributing to integrated rural development, avoiding or minimizing environmental and health impacts, achieving a productive business climate, and stabilizing government revenue. There needs to be consistent regulation and legislation for large- and small-scale mining.

Priority areas for action should include the following:

Box 13–5. Placer Dome and Small-scale Miners in Venezuela

One of South America's most important gold mining areas is Km 88 in southeastern Venezuela – an area that has attracted many artisanal miners. In 1990, the government gave exploration and development rights for the Las Cristinas deposit in Km 88 to the Canadian company Placer Dome. To make way for the new mine, it had to resettle some 2800 small-scale miners but did not compensate them by offering other mining areas. So when the government left, the miners simply returned and resumed operations, leading to tensions between the miners, the company, and local authorities.

Facing the prospect of social unrest, the company initially followed a path of 'passive accommodation', allowing the miners free access to certain areas. Then it moved to a 'constructive engagement' phase by offering technical and other assistance. The miners organized themselves with a representative committee and began to introduce better mining methods and to reduce the use of mercury.

Ultimately, harmonious relations were established not only with the miners but also with the surrounding communities, who were able to serve as a stabilizing force that prevented new small-scale miners from working the concession. This effort by Placer Dome, which has now sold its interest in the mine, is recognized as one of the best examples of a company developing good relations with informal miners.

Source: Davidson (1998); Wood (2001).

- *Building appropriate legal and regulatory frameworks* – These should be transparent, consistent, and non-discriminatory, and should offer people easy access to mining titles and legal channels for production. They should be developed with participation from small-scale miners to ensure their needs and priorities are reflected. At the same time, the capacity of government needs to be boosted to ensure compliance and the ability to penalize infractions.
- *Offering incentives for regularization* – These could include tax allowances for new enterprises, exemptions from import duties on equipment or supplies, access to finance, and assistance with exports.
- *Creating necessary services* – Government should organize services that meet miners' real needs – legal, organizational, technical, and health and safety.

They can also encourage ASM to develop its own services by supporting the formation of associations or cooperatives.

- *Ensuring coherent administration* – The government will need to make sure that all the ministries involved – finance, mining, and environment – coordinate their policies. These departments also need to work closely with regional and local governments. Indeed, governments should try to decentralize as many activities as possible to ensure that they mesh with other strategies for promoting rural development.

All these policies will apply to ongoing mining operations. But governments also need to deal with ‘rush’ events. Few governments currently have the legal or administrative ability to control these situations.

It remains true that most governments are unlikely to have the capacity to support and regulate artisanal and small-scale mining. Although this will differ from country to country, government cannot be solely relied upon and will need to collaborate with NGOs, donors, industry, and other actors.

The Way Forward

Given the complexity of issues surrounding artisanal and small-scale mining, a coordinated and collaborative approach is required to improve ASM’s contribution to sustainable development, involving all levels of government, industry, and civil society. The approach taken should be appropriate to local social, cultural, and economic circumstances.

- *Governments, donors, and NGOs* should continue to recognize the importance of ASM and focus on improving the livelihoods of those involved as well as reducing its impacts as part of integrated rural development. ASM activities should also be incorporated in relevant regional and local development programmes.
- *Governments* have a principal role to play. They need to develop an appropriate, consistent, and transparent policy and regulatory framework that focuses on both the facilitation and management of ASM. For the framework to be effective, they need to ensure that sufficient financial and regulatory incentives exist for small-scale miners to formalize their activities. It is also important that any framework recognizes the linkages between large-scale mining and ASM, and that there is coherence in policy, regulation, and legislation for the whole spectrum of mining activities.
- *Donors and international organizations* should increasingly work together through such efforts as the Communities and Small-Scale Mining initiative to disseminate examples of best practice, facilitate communication and cooperation, and implement pilot projects geared towards helping those involved in ASM activities to contribute to sustainable development.
- *More large mining companies* could engage directly with artisanal and small-scale miners and ASM communities near a mine, helping them to work in a more sustainable fashion and, where necessary, to find alternative employment.
- Many more in *the mining industry* could recognize ASM as part of the minerals sector and find ways to support it, for example through the provision of technical advice, support of the CASM initiative, or collaboration with national governments and NGOs. A key incentive for the mining industry to help small-scale miners is reputation protection. Civil society often does not differentiate between large- and small-scale mining, so social and environmental problems in the ASM sector can rebound on the industry as a whole.
- *Small-scale miners* need to be alerted to the effects of their activities and encouraged to take measures to mitigate or reduce the negative impacts. Where possible, this should be enforced through government intervention. In practice, new measures will need to be financially attractive to miners if they are to adopt them. In particular, they need to be informed about the dangers of mercury amalgamation and helped to adopt appropriate techniques for using mercury more safely in the short term, although ultimately its use should be stopped. Although raising awareness is primarily the responsibility of government, all actors can assist in this effort.
- *International and bilateral organizations, governments, and NGOs* must continue to develop outreach programmes to ensure that parents fully appreciate the hazards faced by children engaged in small-scale mining. These programmes must provide children with livelihood opportunities that ultimately eliminate the need for child labour.
- *Governments, donors, international organizations, and companies* could do more to assist in the formation of

ASM associations and work with them to raise standards.

- *Research institutions* should increasingly focus on the development and implementation of viable solutions to the well-documented problems in ASM. Research should be directed at learning from existing experience and successes in ASM, in community development, and even in large-scale mining operations that could be incorporated within ASM initiatives.

Endnotes

- ¹ Levy and Scott-Clark (2001); Veiga and Hinton (2002).
- ² See, for example, Gunson and Yue Jian (2001) for a discussion of the difficulty of making these estimates.
- ³ ILO (1999b).
- ⁴ Drechsler (2001).
- ⁵ United Nations Economic and Social Council (1996).
- ⁶ Gueye (2001).
- ⁷ ILO (1999b).
- ⁸ Ibid.
- ⁹ World Bank (2001a).
- ¹⁰ ILO (1999b).
- ¹¹ AllAfrica.com (2001).
- ¹² UNDP (1999a) p.17.
- ¹³ ILO (1999b).
- ¹⁴ Hentschel et al. (2001).
- ¹⁵ ILO (2001d).
- ¹⁶ ILO (1999a).
- ¹⁷ Ibid.
- ¹⁸ Hentschel et al. (2001) p.12.
- ¹⁹ Gunson and Yue Jian (2001).
- ²⁰ Chakravorty (2001).
- ²¹ ILO (1999b).
- ²² Ibid., p.4.
- ²³ Gunson and Yue Jian (2001) p.8.
- ²⁴ Aspinall (2001).
- ²⁵ Hilson (2001a).
- ²⁶ This section draws on Wotruba et al. (1998); McMahan et al. (1999); Hentschel (1998); IENIM (1996).
- ²⁷ Hentschel et al. (2001).
- ²⁸ Appleton et al. (1999).
- ²⁹ Lodenius and Malm (1998); Roulet et al. (1999).
- ³⁰ Silva-Forsberg et al. (1999).
- ³¹ ILO (1999b).
- ³² Ibid.
- ³³ Hentschel et al. (2001).
- ³⁴ Ibid.
- ³⁵ This section draws on Labonne (1997) and on Labonne and Gilman (1999).
- ³⁶ Amnesty International (1993).
- ³⁷ ILO (1999b).
- ³⁸ Hentschel et al. (2001).
- ³⁹ Drechsler (2001).
- ⁴⁰ Hentschel et al. (2001).
- ⁴¹ Rosenfeld Sweeting and Clark (2000) p.54.
- ⁴² Unit for the Promotion of Democracy-Organization of American States (1997) p.114.
- ⁴³ Lawyers' Environmental Action Team, at <http://www.lead.or.tz/active/buly>.
- ⁴⁴ MIGA website, at <http://www.miga.org/screens/projects/guarant/regions/ssa/Barrick.htm>.
- ⁴⁵ MIGA Statement on Bulyanhulu Mine in Tanzania, 26 September 2001, at <http://www.miga.org/screens/news/press/092601.htm>.
- ⁴⁶ Ibid.; see also Hutchinson (2001).
- ⁴⁷ Letter to National Post from Lawyers' Environmental Action Team, 9 January 2002, at <http://www.lead.or.tz/about/pr/2002.01.09.national.post.php>.
- ⁴⁸ Statement by Mining Watch Canada and the Council of Canadians, at http://www.miningwatch.ca/publications/NP_response.html.
- ⁴⁹ MIGA website, 4 April 2002, at <http://www.miga.org/screens/projects/guarant/regions/ssa/Bulyanhulu.htm>.
- ⁵⁰ Hentschel et al. (2001).
- ⁵¹ See CASM (2001).
- ⁵² Drechsler (2001).
- ⁵³ Hentschel et al. (2001).
- ⁵⁴ South African Women in Mining Association (2000) p.11.
- ⁵⁵ World Bank (2001b) p.2.
- ⁵⁶ For more detail see OIT/IPEC and AECI (2000).
- ⁵⁷ This section draws on Priester and Hruschka (1996) and on Fundación MEDMIN (in press).
- ⁵⁸ Susapu and Crispin (2001).
- ⁵⁹ Mining Industry Associations of Southern Africa (2001). For a description of the Minataur process in general, see MINTEK (2001).
- ⁶⁰ For further discussion on regulation and environmental instruments for ASM, see Lagos et al. (2001).
- ⁶¹ Mamadou (1995).
- ⁶² Hentschel et al. (2001).
- ⁶³ Ibid.
- ⁶⁴ Drechsler (2001).
- ⁶⁵ Ibid.