



Policies for small-scale mining: the need for integration

by Gill Burke

Small-scale mining is a significant part of the minerals sector. The main premise of this article is that 21st century policies for mining and mineral resource development in Asia-Pacific will need to take account of and include the small-scale mining sector. There are economic reasons for this and there are examples around the world to show that exclusion and neglect of the sector results in very negative ecological and social impacts. Successful implementation of an holistic approach in minerals policy and development will often be very difficult indeed – for a variety of reasons, some of which are discussed below – but not necessarily impossible.

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The main premise of this paper is that 21st century policies for mining and mineral resource development in Asia-Pacific will need to take account of and include the small-scale mining sector. There are sound economic reasons for this. There are also sufficient existing examples around the world to show that exclusion and neglect of the sector results in very negative ecological and social impacts. To achieve an holistic approach in mining and minerals policy and development will be easier in some cases than other. Successful implementation will often be very difficult indeed – for a variety of reasons, some of which are discussed below – but not necessarily impossible.

It should be emphasised at the outset that small-scale mining is a significant part of the minerals sector. It occurs in almost every country in the world that has mineral resources. It makes significant contributions to national economies in terms of output and (in developing countries) in numbers employed. It must be acknowledged that in most developing countries today, the contribution of the small-scale mining sector to national development is not as great as it could or should be – that the negative aspects outweigh the positive. Thus, output and productivity are generally low, due to rudimentary equipment and lack of adequate information about mining techniques amongst workers. Inadequate knowledge about grades, efficient washing techniques, improved beneficiation, tailings treatment and so on all hamper effective practice. Working conditions frequently range from bad to terrible, with concomitant high accident and death rates. Furthermore, the environmental impact of these operations is often also negative.

The sector's most positive attribute lies in its labour intensity. This can make it a major economic contributor – possibly to a greater extent than more capital intensive operations. This is the case even when the two types of operation show similar financial profitability, because of the greater net value added ob-

tained from labour intensive operations. The main reason for this is that smaller investment in capital equipment allows a project to start generating surplus funds at an earlier date. Most of this surplus is paid out in the form of profit sharing and wages rather than dividends, thus immediately contributing to living standards and subsequently multiplying through circulation. There is of course net value added in the form of profits from foreign participation in capital intensive mining operations but repatriation of these usually results in considerable capital outflows.

If positive impacts are to be fully realised and negative impacts reduced or, better still, eliminated, then some fundamental changes need to occur. It is at this point that the above mentioned difficulties start galloping over the horizon.

Difficulty 1

• **Data on small-scale mining are imprecise.** For example, the extent of the sector's contribution to global mineral output is not accurately known. Noetstaller¹ estimated in 1987 that 31 per cent of global mine production of industrial minerals, 20 per cent of coal and 12 per cent of metals came from small scale mines of similar capacity. He also calculated that some 10 per cent of world diamond production and 75 per cent of gemstones came from the small mining sector. But all these calculations are underpinned by guesstimates

Difficulty 2

• **Definitions of small-scale mining are also imprecise.** The most usual basis is annual output, and mines of less than 100 000/tpa of run-of-mill ore are generally defined as small-scale. This definition will be used here.

Difficulty 3

• **Much, possibly most, small-scale mining activity, especially for high value minerals such as gold and gemstones is either semi-legal or totally illegal.** This

poses problems way beyond data gathering and definition. Many of these problems, for instance working conditions and environmental impact, are extremely serious. But for national governments, what is probably of primary concern is just how to apply fiscal and other policies to a sector which is mainly outside the legal framework and often quite beyond government control.

Given the vagueness of quantifying, defining, legalising and controlling – all that can be said with any certainty is that small-scale mining falls into two fairly distinct categories. The first is mining and quarrying for industrial minerals such as barytes, feldspar, and gypsum, together with minerals for the construction industry such as stone and clay. These operations are almost always for local domestic use. Most developing countries have at least some laws to tax and regulate this category – for example the 'Peoples' Mining Code' of Indonesia. Any persistent informal sector in this category is more a result of neglect of inspection, notification and/or enforcement than lack of legal framework.

The second category is mining for relatively high value minerals such as gold, gemstones or tin. The output from these latter operations is generally exported, either through sales to national agencies or by smuggling. In the case of high value minerals the size and character of the informal sector makes what laws exist often impossible to apply.

The existence of an informal sector in many cases has major political linkages and raises major issues of control. The Palin ruby mines in Cambodia and the current situation in the Angola diamond fields are obvious examples of such linkages. Many other examples can be found, – less obvious perhaps, but just a closely linked

Geological factors as much as price exclude many base metals from being mined small-scale. Bauxite, copper, iron, lead and zinc deposits are generally only suitable for large-scale mining, although

much depends upon the size and grade of the deposit. For example, copper and manganese are mined small-scale in Vietnam. High-grade pockets of iron ore are similarly worked in Thailand as are rich veins of specular haematite in Nepal. Another example is the small-scale mining of lower grade chromite deposits in the Philippines. Similarly, pegmatite deposits tend to be more frequently worked by small-scale mining, and such deposits were, until recently, the sole source of beryllium.

When the energy minerals are mined small-scale they fall into the 'industrial minerals/domestic use' category. Petroleum production usually requires financial and technological resources on a scale that excludes it from small-scale extraction, although oil seepage have been utilised for domestic fuel in the past in Burma and still are today in Laos. Coal, on the other hand, is mined extensively by small operations in China, India, Vietnam and elsewhere. The remaining energy minerals rarely figure in small-scale production.

The attention of the aid agencies in the past was mainly focused on domestic production and concomitant inputs into the immediate local economy.² Governments, when they legislated for domestic production clearly distinguished this from large-scale mining operations which had quite separate policies and regulations. However, events in many countries during the 1980s brought small-scale mining into an unexpected and largely unwelcome prominence.

The early 1980s saw an increased interest in gold and an upsurge in gold exploration and mining. Gold production in (then) non-communist countries rose from 943 t in 1980 to 1734 t in 1990. Major new (large scale) mines were developed in Papua New Guinea, Chile, and Western Australia. This enthusiasm for gold was the result of a combination of advances in geochemical research and economic factors. In the wake of this

gold boom however came a series of 'gold rushes' and a burgeoning of small-scale gold mining on a hitherto unprecedented scale. In countries all over the world people rushed into the interior in the hope they would become rich, or at the least, less poor.

Huge numbers of people were involved in these rushes. In 1986 at the peak of the rush in the Philippines, for example, about 500 000 people were estimated to be at the diggings and by 1989 there were still some 300 000 of which 180 000 were in Mindanao. In Indonesia during the same year a similar number of people were believed to be mining illegally in Kalimantan alone, plus others in Sumatra and Sulawesi. Even greater numbers were involved in China where small-scale gold mining was already an established phenomenon. By 1991 almost 50 per cent of China's gold production was to come from small mines.

Few, if any, of the people involved in the rushes had mining skills or previous training in mining techniques. This had serious consequences. Hundreds of deaths from mud-slides, cave-ins and tunnel collapses were a direct result. In addition, bad mining practices often resulted in high grading, inefficient working of deposits, pollution and environmental degradation. Overburden, wastes and slimes were dumped and no land reclamation practised.

But the most serious consequence of these gold rushes arose from the use of mercury by the miners, mainly as a means of rudimentary beneficiation. Since 1988 mercury has been used in such quantities and in so many countries that associated pollution and poisoning have become social and environmental problems of massive proportions. It is no overstatement to suggest that some countries face an ecological disaster as a consequence.

The impact of the gold rushes stimulated a reappraisal of small-scale mining that often resulted in new policies and legislation. In the Philippines, the Presi-

dential Decree 1899 recognised small-scale mining as 'a new dimension in minerals development.' The Decree initiated the *Minahang Bayan* (lit. 'Mining for the Land') or 'Peoples' Mining' Programme. Subsequently, the Mines Administrative Order MRD-50

provided additional rules for the small-scale sector and paved the way for specific legislation – the Small-Scale Mining Act 1994. The Act included definitions of small-scale mine, miner and mine area; details of contracts; rights of claim-holders and private landowners. It outlined designated Mineral Processing Zones, within which licensed customs mills would use mercury under supervision. In addition, a Small-Scale Mining Protection Fund was proposed. This was to be used primarily for information dissemination and training on safety, health and environmental protection.

An interesting example of another country that recently reconsidered their legislation with regard to small-scale mining is Zimbabwe. There, the publication of new regulations – Statutory Instrument 275, Mining (Alluvial Gold) (Public Streams) Regulations, 1991; – was the culmination of a long evaluation process by the Government of uncontrolled and illegal gold mining along a number of the country's major rivers. Since 1984 gold worth an estimated Z\$50 million per year had been mined and sold illegally from these operations. The new regulations gave major responsibilities to local councils in whose area alluvial gold deposits had been identified, with the emphasis upon reserving the mineral resources for the local community to enable it to provide its own social and economic well-being.

In both these countries the new or proposed Laws contained clauses stipulating that all gold produced by small-scale miners should be sold to the Government Agency – in the Philippines the Central Bank, and the Reserve Bank in Zimbabwe – or its duly appointed representatives. The advantage of special govern-

ment purchasing points is the effect these may have on smuggling and thus on revenue leakages. But it is often the case that miners are indebted (for supplies and tools) to those who finance the mining operations and thus are forced to sell the bulk of their output to their creditors. The amounts lost through smuggling are huge – the gold losses to Zimbabwe have already been referred to; and, for example, it was estimated that in 1989 more small-scale mined gold was smuggled out of Indonesia than the total tonnage produced by large-scale mining. Thus there are clear advantages to governments in establishing convenient and effective purchasing points that offer clearly posted market prices and which can utilise measures to break the miners' debt cycle.

Despite all this activity in these and many other countries, it must be admitted that in the majority of cases the gap between legislative intent and enforced reality remained very wide. It is clear that such measures alone are not enough. Enforcement, and the manner in which it is practiced, are crucial determinants to success.

• **Licensing** can be used more positively if it is seen as a policy tool for the sector rather than simply a form of revenue raising. The Zimbabwe example above is one option. There, not only are licences restricted to local residents, but the responsibility for enforcing the regulations, including licensing, rests with the local councils. These are then allowed to keep all the licence and other permit fees. In this way incentives and revenue raising are combined.

There are other forms of positive use of licensing. One is to link it with the conditional availability of suitable equipment, – such as jackhammers, pumps and compressors, to rent at a reasonable fee; or to the services of local processing centres. Such opportunities not only provide an incentive to miners to become licensed, and where necessary to pay the relevant fee, but also offer opportunities

for District Mines Offices to give technical training not only in using the equipment but in more general mining methods. Training given in this way – linked to the miners' immediate and obvious needs, is far more likely to be successful than advice given unasked. Furthermore, it allows the introduction of low technology equipment specifically suitable for the sector. For example, the Department of Environment and Natural Resources (DENR) of the Philippines developed a retort for gold beneficiation, cheaply constructed from materials easily available at the gold-fields, which was safer and less wasteful of mercury than the amalgam-burning method generally practiced.

The linking of licensing to shared operations with larger scale mines is another option. In this instance a mining licence is granted to the large scale company conditional on allowing parts of the orebody to be developed by local small-scale operators. This can be done in cases where it is geologically feasible. The small miners then sell their output to the larger company at an independently agreed price. The larger company, in turn, is responsible for paying overall production taxes. This option has the advantages of enabling policy to be formulated for the mining sector overall rather than the more commonplace compartmentalisation, but has the disadvantage of requiring considerable and on-going regulation to prevent abuses.

• **Taxes** These can be levied at production purchasing points. Again, if the objective is to encourage the small-scale sector rather than simply to raise revenue, such taxes may be levied on the purchasers rather than the producers: – for example by taxing refined metal rather than concentrates, or by imposing an export tax. In the case of high value, low bulk minerals such as gold, tin and gemstones, many countries have set up specialist purchasing and marketing agencies (although, in the case of diamonds, few governments attempt to market their

stones to other than the De Beers' Central Selling Organisation).

In almost all the examples discussed above, *successful implementation of policy and legislation has been hampered by lack of resources and administrative personnel*. In some cases this has meant failure to introduce schemes~ at all. In others it has meant failure to follow up or monitor, with the result that problems have not been checked early on and projects have fallen through. In most cases the existing, highly unsatisfactory, situations have continued.

It seems clear that in most developing countries, successful integration of the small-scale mining sector with the other sectors and into the economy as a whole, *requires a strengthened Mines Department*. This would not simply be to ensure sufficient numbers to allow for regular and effective inspection of all mines even in very remote places; it would also take into account the extended range of inputs necessary and the various skills required to achieve these. The 1972 UN Report recognised the importance of distinguishing between government officers with administrative responsibilities over the mining operations and those who came into contact with the miners by other means, such as renting out basic mining equipment from strategically located depots:

"A concomitant of this service is the availability of experienced and practical technical assistance. After initial suspicions on the part of most the miners have been overcome, it will generally be sought and followed. If technicians actively seek out the miners and offer advice unasked,...the effort will be self-defeating"³

Twenty years later, this still remains the case. Most countries had neither sufficient personnel nor resources to adequately implement provisions. In Zimbabwe, for example, one government geologist covered the riverine area from Mutare to Victoria Falls – a distance of some 400 kilometres. The Philippines DENR

had six officers who, amongst their other duties, were responsible for implementing policies involving some two to three hundred thousand gold miners in scattered operations in difficult terrain. In many developing countries this shortage is part of a general lack of trained people in the public service, but in mineral-rich countries the shortage is exacerbated by competition with the private sector coupled with generally low levels of public sector salaries.

In many countries the relationship of the small to large-scale sectors also needs to be re-examined by policy makers. In some countries, so much emphasis has been placed upon resource rent collection from large foreign operations that the established small-scale sector has been largely ignored. In others, the need for foreign exchange to help economic development has led to active discouragement of the small-scale sector. Yet the experience in other countries has shown small-scale mining to be very resilient and resistant to coercion; indeed, coercion has generally had the effect of driving operations even further into illegality and thus maximising economic leakages and negative impacts.

To formulate policies and introduce fiscal regimes that bring the small scale sector in from the cold, and then to effectively implement these, is far from simple. Nor, in the first instance will it be cheap. Governments, international mine companies and (especially) the aid agencies will need to grasp the nettle of illegality and the need for inputting resources of funds, time and training. But the downside costs, in economic, human and environmental terms, of not taking these actions are very great. In addition, the benefits, in the same terms, from even moderate success could be considerable – more than enough to make the exercise worth attempting.

Notes

1. Noetstaller, Richard (1987) *Small-scale Mining: a review of the issues*, World Bank Technical Paper Number 75, Industry & Finance Series, Washington DC.
2. United Nations (1972) *Small-scale Mining in Developing Countries*, United Nations ST/ECA/155, New York.
3. United Nations, *ibid*. ■