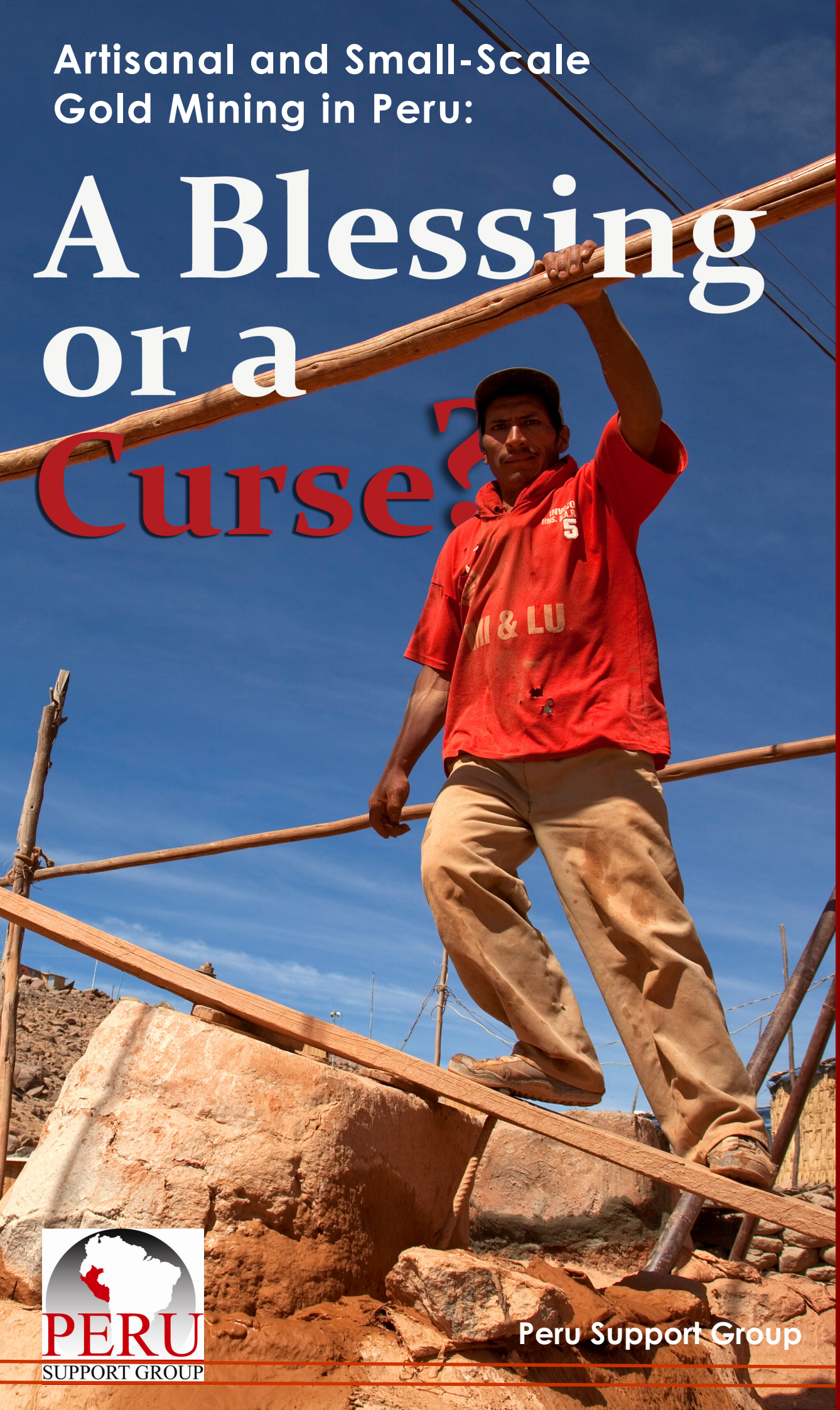
Artisanal and Small-Scale Gold Mining in Peru:

# A Blessing or a Curse?



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*Front cover: miner stands atop a* quimbalete, *a grinding device used to break down rocks containing gold. Eduardo Martino.*

# Update Extra


## Abstract:

High gold prices, persistent poverty and a shortage of employment opportunities in Peru have all contributed to an increase in artisanal and small-scale gold mining activity in recent years. The expansion of the sector has brought new political and analytical attention to a phenomenon which has been largely overlooked in the past. Notable among some of these recent analyses of artisanal and small-scale mining is a tendency to view such operations as homogeneous. The term 'artisanal' is often used interchangeably with 'illegal' and 'informal' to refer to all mining activities not carried out by internationally-recognised commercial entities. For the most part, they are denounced either for their detrimental environmental effects, their perceived links to criminal syndicates or for encouraging social ills such as gambling, alcoholism and prostitution.

However, this largely negative portrayal overlooks the great diversity which exists within the sector. Some artisanal gold miners are undoubtedly irresponsible and uninterested in formalising (as indeed are many medium-scale operations), but equally there are others who comply fully with all local legislation. These, more responsible, operations have better working practices than their illegal counterparts and make use of cleaner technologies to process gold, dramatically reducing their environmental impact. Operating somewhere between these two extremes are many miners actively seeking to formalise their operations, but who have not yet proved able to overcome the significant challenges involved. This report argues that recognition of this diversity will be a key first step in allowing the government to develop adequate policies to effectively interact with the sector. The current policy of criminalisation, on the contrary, risks undermining an industry which represents one of the few viable sources of income for the country's impoverished groups.


# Contents

# 1. Introduction

Over the last thirty years an increasing number of Peruvians have participated in artisanal and small-scale mining (ASM) activities. In the early part of the period, the expansion was driven largely by the economic crisis, declining agricultural fortunes, and the displacement of people during the civil war. Since the late 1980s, the sector's growth has been further spurred by various factors such as the liberalisation of commodities markets, rising mineral prices and a lack of employment opportunities in other industries (Gamarra Chilmaza et al, 2009; UNEP, 2011). In many areas it represents the only viable form of profitable economic activity for those living in poverty (MMSD, 2002).

The commodity most frequently extracted by such operations is gold. The National Society of Mining, Petroleum and Energy, for example, estimates that gold mining today represents almost three-quarters of the total non-formalised mining activity in the country (Andina, 2011). Further, the numbers directly and indirectly employed by artisanal and small-scale gold mining (a term which, as we will see, does not equate precisely with the category of non-formal mining) are increasing. According to the United Nations Environment Programme (UNEP) around 40,000 people were involved in this activity in the 1990s. By 2009, the agency estimated that some 80,000 people worked in the industry directly, while a further 300,000 were dependent on it indirectly (UNEP, 2011). Other more recent estimates of the Ministry of Energy and Mines (MEM) put these numbers even higher (Diez Canseco, 2012).

Today, ASM is evident in almost all regions of the country. It has a particularly notable presence in areas such as Madre de Dios, Puno, Piura, La Libertad, Ica, Ancash, Cuzco, Apurímac and Arequipa. Yet despite the fact this activity is so widespread, it has been a topic which, until recently, received relatively little political or analytical attention. Preferring instead to focus on attracting foreign investment in larger scale projects, successive governments have tended to overlook ASM entirely or to treat it as a low priority at most.

***"successive governments have tended to overlook artisanal and small-scale mining entirely or to treat it as a low priority at most"***

In recent months there have been some signs that this is beginning to change. The regulation of non-formalised mining has moved up the political agenda largely as a result of social conflicts and increased attention to its environmental impacts. Protests in some areas have seen agriculturalists call for government clampdowns on informal and illegal mining. Where the government has responded to these demands and taken action against such operations, their efforts have often been greeted with demonstrations by the affected parties. Dealing with these types of conflict has forced authorities to re-examine the developmental, environmental and social effects of this complex phenomenon.

### Artisanal, Informal or Illegal?

As detailed analysis of ASM is still relatively limited, it is perhaps unsurprising that some misconceptions remain about what the precise characteristics of these operations are. This confusion is reflected by the fact that many still use the terms 'illegal', 'informal' and

***"many still use the terms 'illegal', 'informal' and 'artisanal' interchangeably. Doing so is inaccurate in that it conflates two distinct concepts: the size of mining activity and the mode of its operation"***

'artisanal' interchangeably to describe any mining activity not carried out by internationally recognised commercial entities. Doing so is inaccurate in that it conflates two distinct concepts: the *size* of mining activity and the *mode of its operation*.

This is more than a merely an issue of semantics. It could prove damaging in that it implies a degree of homogeneity within ASM, which does not in fact exist, and encourages a 'one-size-fits-all' approach to tackling the issue. There is the additional danger that, for the public at large, all examples of ASM, even those performing well above domestic environmental standards, will be associated with the worst excesses of non-formalised mining. Such misunderstandings may well have already caused unnecessary hostility and contributed to the country's social conflicts [1].

Thus, before we continue our analysis, it is vital to clarify exactly what is meant by each of these three terms:

**1. Artisanal**

The sole defining feature of artisanal mining is its *size*. According to a Peruvian law of 2002, artisanal operations are those which benefit from up to 1,000 hectares of land and which excavate less than 25 metric tonnes of material a day (Law 27651, 2002). As such, the term does not give any indication about how extraction and processing is carried out or the extent to which such activity


Gold miners work at La Rinconada, a site in southern Peru

complies with local legislation. This is also true for the category of 'small-scale' operations, which can hold up to 2,000 hectares of land and excavate 350 tons of material per day (Law 27651, 2002).

**2. Informal**

Informal mining operations do not fully comply with all relevant Peruvian legislation and thus cannot be classified as formal operations. They can be conducted on any scale. However, in contrast with illegal operations, informal miners will be *taking active steps* towards becoming legally registered and fully licensed. They often face significant barriers to successfully completing this transition (see chapter six) and may be stuck in informality for a prolonged period.

**3. Illegal**

Illegal mining operations have *little or no interest* in becoming officially registered. They are mainly focused on short-term gains and are likely to have the worst environmental and labour practices. As with informal operations, illegal mining can be carried out on any scale. Of note, in some of the worst affected regions such as Madre de Dios, indications are that it is medium scale - rather than artisanal or small scale – illegal operations which have caused most damage.

This report aims primarily to demonstrate the diversity of ASM operations in Peru. We have chosen to examine gold mining in particular firstly, because it is the most widespread type of ASM (as noted above) and secondly, because the difference in environmental impact between formalised and illegal operations is especially pronounced. However, the conclusions of this study – that the government should develop a differentiated policy to reflect the varied types of ASM – are as applicable for other types of ASM activity as for gold mining operations. ■

**Figure 1: Categories of mining in Peru**

| | Type: | | |
|---|---|---|---|
| | **Illegal** | **Informal** | **Formal** |
| Size: | | | |
| **Artisanal** (<25 tonnes/day) | X | X | X |
| **Small-scale** (<350 t/d) | X | X | X |
| **Medium-scale** (<5,000 t/d) | X | X | X |
| **Large-scale** (>5,000 t/d) | | | X |

**Note:** In this report, the term 'ASM' is used to refer to all categories of mining outlined in red above. 'Non-formal' operations are those shaded in dark grey. Large-scale illegal and informal mining are excluded from this group as there are no examples of this in Peru.

# 2. Evolving Policies Towards ASM

Before examining in greater detail the different types of ASM, it is important first to discuss the Peruvian government's attitude towards these operations. This policy context serves as an important backdrop to understanding the historical development of ASM activity and the way it is viewed by the state today.

### Early Period

Though artisanal mining activity began to expand dramatically from the late 1980s, it was not until much later that authorities made their first attempts to regulate or control the sector. Under the Fujimori government (1990 – 2000) the issue had received little attention, with the president concentrating instead on increasing foreign investment in large-scale mining, as well as the other notable political and security challenges of the period. This attitude was reflected in his General Mining Law of 1992, which established the regulatory environment for big projects, but made no mention of ASM (Gamarra Chilmaza et al, 2009). However, political momentum for some regulation of the sector slowly grew until 2002 when the Toledo administration passed the Law for the Formalisation and Promotion of Small-Scale and Artisanal Mining (also know as Law 27651). The legislation reflected a largely positive conceptualisation of ASM activities, describing them as "development hubs" and "a great source of employment and collateral benefits" (Law 27651, 2002).

***"under Fujimori the issue of ASM had received little attention, with the president concentrating instead on increasing foreign investment in large-scale mining"***

The law was highly significant as it defined, for the first time, what the government understood ASM operations to be (see definitions on previous page), and set out plans for the formalisation of the sector (Gamarra Chilmaza et al, 2009). It set out an initial framework for relations between artisanal miners and the state in which (Law 27651, 2002):

- The MEM would produce a development plan for ASM operations and for assisting miners to establish land rights.
- The state would provide training and technical assistance in areas such as financial administration and contract law to the miners.
- The miners would obtain state authorisation for any physical or chemical process of extraction. This would only be forthcoming upon receipt of technical details of the project and an approved assessment of its environmental impact.
- ASM operations would be regulated by, and accountable to, the MEM. If deemed to have violated environmental or labour laws they would lose their license.

### Decentralisation

In theory, the passing of Law 27651 put the promotion and protection of small-scale mining operations on equal footing with other government activities in support of large-scale extractive projects. In practice however, it never became a priority for Toledo's government. Though some ASM operations did take steps towards formalisation during this period, it rapidly became clear that registering and regulating all such activity would be both a costly and complicated

exercise. Thus, it was with little regret that Toledo later transferred some of these supervisory functions to regional authorities as part of the decentralisation programme [2]. In this first phase of decentralisation, regional governments gained powers to tax ASM operations and to grant concessions. As is typical in such exercises, transfer of capacities and resources for these activities were entirely neglected.

Shortly after Alan García assumed office in 2006 he announced a dramatic series of reforms, known as the *shock descentralista,* which saw numerous central government duties rapidly transferred to the remit of regional authorities. It was part of this process that the regions were assigned all remaining responsibilities related to the formalisation, regulation and monitoring of ASM operations (Arguedas et al, 2011). Despite the fact that this new area of work would be highly complicated and time consuming, the García administration failed to grant regional governments the necessary support to ease the transition. Regional officials received very little (or no) training in their new responsibilities from Lima-based authorities. Neither were additional funds provided to pay for extra staff or to cover additional travel expenses (important as the majority of non-formalised mining operations are located in remote areas). As a result, the regions struggled, even by the admission of a government-commissioned report, to adapt to their new responsibilities (Arguedas et al, 2011). The creation of an Environmental Ministry in 2008 also did little to help, as this body never gained control of environmental monitoring procedures for mining activity, and thus was unable to ease the burden on local authorities. While some measure of assistance was eventually provided, the budgetary and capacity issues were never fully addressed during the remaining years of the García presidency. As he left office in mid-2011, regional governments still lacked the technical expertise and resources (and the Environmental Ministry still lacked the necessary powers) to oversee the effective formalisation of responsible and sustainable ASM.


Miners struggled to formalise their activities under the García and Toledo governments

**Emergence of Criminalisation**

Renewed attention was given to the issue during the early months of the Humala administration. Under the new government, plans were drawn up for the formalisation of artisanal mining and for the incorporation of informal miners into the tax system. This appeared to reflect a recognition of the possible developmental benefits of (well-executed) ASM and an acknowledgement that not all non-formal miners were merely seeking profit at whatever cost. These developments occurred at the same time as then Environmental Minster Ricardo Giesecke and his deputy, José de Echave, made new efforts to expand their ministry's remit to include monitoring of the environmental impact of all mining operations. Taken together, such moves had the potential to bring about a distinct and more positive approach to ASM than that which had been adopted under García.

However, as the political orientation of the government changed since Humala's inauguration, and in particular since the December 2011 cabinet reshuffle (in which Giesecke lost his post), so has its policy towards such operations. The administration subsequently increased its focus on illegal mining, of both artisanal and medium scales, and mounted various operations against such activity. For example, in November last year, approximately 1,500 police and military officials were deployed to the Madre de Dios region to destroy dredges and other mining equipment primarily associated with medium-sized, illegal gold mining.

Since that stage, there have been some indications that involvement in operations against illegal miners has influenced government thinking on the whole of the non-formal mining sector. Accordingly, less support has been given to those seeking to formalise and there has been greater focus on somewhat repressive measures. Notable here were a series of legislative decrees announced in mid-February which gave all miners 120-days to comply with relevant legislation or face up to ten year's imprisonment. This principally punitive initiative almost entirely overlooked the difficulties associated with the formalisation process (see chapter six), and offered very little in the way of additional support to those seeking to legalise. This oversight seemed particularly perplexing in the domestic economic context, where as much as 80% of the population works in conditions of informality. The decrees were rejected by illegal and informal miners alike (see, for example, *El* Comercio, 2012) [3]. Following protests across the country the government later conceded an extension to the allowed period for registration. However, concerns remain over whether both the state and the informal miners will have the necessary capacity to meet even the extended deadline.

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Thus, no coherent government policy on ASM has emerged despite the sector's dramatic rise over the past thirty years. While Fujimori failed to recognise the phenomenon, Toledo supported it only briefly and García essentially ignored it. The Humala administration has further complicated the panorama by appearing to seek its criminalisation. In this confused context, it is small wonder that few ASM operations have successfully navigated the transition to formality. ■

# 3. Non-Formalised Mining: Negative Effects

The Humala administration's more repressive measures against non-formal mining in part reflect legitimate concerns over the detrimental impact of this activity. The negative consequences of this type of mining are the same in their genus, if not their size, whether conducted on an artisanal, small or medium scale. The most commonly cited problems are outlined below.

**Mercury Contamination**

The widespread use of mercury in gold processing (see box below) represents a serious public health risk as prolonged exposure to this substance can cause permanent brain damage and may induce vomiting, diarrhoea and/or sensory impairment. Due to its highly toxic nature, mercury needs to be handled and disposed of very carefully to avoid contaminating the surrounding area. Yet non-formal operations do not always have the capacity (and, in the case of many illegal operations, neither do they particularly have the inclination) to ensure that this does not happen.

There are two principal stages at which the risk of contamination is high. The first is after the metal is added to the water/rock mixture or heavy sediment. Though the majority of the mercury will combine with the gold to form an amalgam, a significant proportion will not and remains mixed in with the water. Illegal and informal miners often take inadequate steps to dispose of this solution in an

**Mercury Use in Gold Processing**

Gold is often not found in easily identifiable nuggets, but rather as small particles within a more voluminous, non-valuable, material. Processing this ore and separating the precious metal from the unwanted other substances is therefore one of the miners' key tasks. To do this, non-formal operations make widespread use of mercury in a technique known as amalgamation. There are two commonly used processes:

Extraction from rock:

1. Miners excavate, often by use of explosives, rock from a mine or other area believed to contain gold deposits.
2. Rocks are broken into small pieces and are placed in a water-mercury mix in a powered grinder, or beneath a manual device known as a *quimbalete*.
3. The rocks are ground down, releasing gold deposits into the mercury solution. As gold and mercury are chemically attracted, they bind together to form a solid amalgam.

Extraction from sediment:

1. Miners use pumps - sometimes mounted on river dredges - to suck up large quantities of river water and sediment.
2. This mixture passes through a series of filters which trap sediment particles and gold, while the excess water drains away.
3. Mercury is added to the heavy sediment mix, and the chemical binds with gold particles to form an amalgam.

Once the gold-mercury amalgam is formed, the next stage is to heat the substance in a furnace. The mercury - which has a significantly lower boiling point than gold - quickly evaporates, leaving behind the gold deposit.

environmentally sound manner, so mercury deposits end up in nearby river and eco systems. One study claims that twenty years of careless disposal of this run-off has seen over 3,000 tonnes of mercury leaked into Amazon river tributaries (Brack et al, 2011). While the rates are much lower in Puno - an estimated 15 tonnes a year – this still constitutes a serious environmental and health risk (Goyzueta and Tigos, 2009). By contaminating river systems, mercury also enters the bloodstream of the fish and animals living there. Those, including nearby indigenous communities, whose diet includes a large amount of contaminated fish are also reported to have suffered negative health effects, such as those listed above, as a result (Brack et al, 2009).

The second high risk stage is when the amalgam is heated to burn off the mercury. Here, there is an immediate danger of contamination for the furnace operators and their family who, studies have shown, regularly inhale the mercury vapour (Hurtado et al, 2006). Contamination of external groups is also a real danger. In cold areas, such as high altitude mining sites in Puno, the vapour which escapes from the furnace chimney rapidly cools and solidifies on houses, pipes and other nearby installations. Melt water passing over such sites can again lead to contamination. According to one report, 500g of mercury escapes for every tonne of gold ore processed (DevTV, 2003). In warmer climates, vapour will travel further before eventually cooling. At this stage, microscopic drops will fall back to earth and may again end up in river systems. However, the level of contamination is likely to be lower as the substance will have been dispersed over a far greater area.

**Other Health/Environmental Risks**

Mercury contamination is not the only environmental and health risk associated with non-formalised mining. The precise nature of these other issues depends largely on the


Heating the amalgam allows miners to obtain gold, but carries serious contamination risks

the location of the deposit in question. Where alluvial gold overlaps with jungle or other heavily wooded areas, deforestation is a serious issue. This is because non-formal miners often place explosive devices along river banks to clear large sections of forest in order to access the gold. Such techniques have been used extensively in the Madre de Dios region, where some 7,000 hectares of pristine forest and wetlands were cleared by miners between 2003 and 2009 (Swenson et al, 2011). This type of damage is of concern not only because of the obviously detrimental impact on biodiversity and the local ecosystem, but also because of its possible global implications for climate change. Other potentially negative effects of mining activity in wetland areas include increased sedimentation in river systems and the erosion of top soil and seed banks (WRI, 2005).

For gold deposits on the coast and in the *Sierra,* deforestation is not a major issue as these areas tend to be less densely wooded. Rather, the primary concerns at these sites, where excavation often takes the form of pit mining, are health problems for the miners themselves. Medical conditions associated with this type of mining include gas emission poisoning and silicosis, a respiratory disease (UNEP, 2011). Further, contamination of the surrounding area remains a risk because of a process known as acid mine drainage. This is essentially where dangerous substances, latent within the rock, are brought to the surface and released as a result of extractive operations.

**Criminality and Social Issues**

Further to the environmental and health challenges described above, there are a number of other problems often associated with non-formalised mining. In the Madre de Dios region, for instance, the government has reported that there are ongoing issues of

***"in Madre de Dios the government reports ongoing issues of labour exploitation, debt bondage and prostitution related to the industry"***

labour exploitation, debt bondage and prostitution, of both adults and children, related to the industry (Brack et al, 2011). The UN Special Rapporteur on Contemporary Forms of Slavery and the Peruvian Human Rights Ombudsman have also highlighted instances of child labour within the sector (Defensoría del Pueblo, 2007). Finally, there is some anecdotal evidence to suggest that higher earnings from mining, and the inbound migration that these encourage, have fuelled nearby increases in gambling and alcohol consumption. However, many of these problems can be attributed as much to the remote location of non-formalising mining activity, which complicates policing and provision of social support, as to the manner in which mineral extraction is carried out.

The major problems associated with non-formal mining operations (of all sizes) are, in sum, health concerns caused by mercury contamination, environmental issues such as deforestation, and a variety of other social problems. The extent to which these issues are attributable to non-formal ASM operations, in particular, is the subject of the next chapter. ■

# 4. How Much Damage is Caused by ASM?

As we have seen, there are clearly some serious problems associated with non-formal mining operations in Peru. But how accurate is the view that it is artisanal miners who are principally to blame for these damaging environmental, public health and social impacts?

### Statistical Shortcomings

Reliably quantifying the total number of non-formalised mining operations in the country is an extremely difficult task precisely because of the unofficial nature of the activity. Where studies of this sort have been carried out the methodology has failed, for whatever reason, to reflect the existence of the six different categories (see figure 1) of non-formal mining. Into this 'knowledge gap' have stepped those who describe all such activity as simply 'illegal' and refer to 'artisanal' mining as if this were an appropriate synonym for illegality. This has created an exaggerated perception of the amount of damage attributable to artisanal and small-scale miners.

Undeniably, illegal ASM operations do exist which have a negative impact on the surrounding territory (see previous chapter). The most brazen cases tend to be found amongst travelling miners, who invade mine sites and extract minerals until they are discovered and moved on by the title holder (Gamarra Chilmaza, 2005). The transient nature of their activity in any given area means they have little interest in forming a sustainable enterprise or minimising their environmental impacts. They generally make use of only rudimentary equipment and focus on exploiting easy-to-access alluvial deposits. When these become depleted, or the region too polluted, they simply transfer their operations to a new area.

***"a closer examination of those regions with the highest concentration of non-formalised mining reveals medium-scale illegal operations to be a greater problem than artisanal-scale mining"***

However, the amount of damage associated with even these highly irresponsible operations is still limited to an extent by their size. They are, by definition, only ever conducted either on an artisanal or small scale. Widespread proliferation of these travelling ASM operations would indeed be problematic and cause problems on a far more significant scale. Yet closer examination of those regions with the highest concentration of non-formalised activities reveals this to be less of a problem than that of larger, more organised and better financed illegal operations.

### Illegality and Medium-Scale Mines

The widespread proliferation of illegal medium-scale operations is reflected by the increasing use of sophisticated and costly equipment in mining regions. Some of the most notable examples of this machinery can be found in the Madre de Dios region where extensive use is made of dredges to pump up river sediment containing gold. According to government estimates from early 2011, there were some 250 dredges being used by non-formalised operations in the region (Actualidad Ambiental, 2011). The fourteen largest of these alone were estimated by then environmental minister An-

tonio Brack to have a combined value of over US$ 250m or £160m (Actualidad Ambiental, 2011). Clearly, such purchases would be beyond the reach of purely artisanal operations [4]. These dredges are capable of filtering hundreds of tonnes of material a day, with the captured sediment being processed, using mercury, on a similar scale. It is thus easy to see how the environmental damage and mercury contamination associated with these medium-scale illegal operations is far more significant than that produced by travelling artisanal miners.

In other parts of the country informal artisanal miners have been blamed for damage caused by what is, in reality, a medium-scale illegal operation. In some sites, such as La Rinconada (see box below), wealthy concession holders sit behind mining activity

**Case Study: La Rinconada, Puno**

La Rinconada is a mining town located more than 5,000m above sea level, in the southern region of Puno. It has a population of around 35,000 people, of which more than 83% work directly in the extraction or processing of gold (Goyzueta and Tigos, 2009).

Miners work on formal concessions owned by 'cooperative enterprises' such as *Corporación Minera Ananea* or *Central de Cooperativas Mineras de San Antonio de Poto*. These enterprises are more than just organisations of local miners. In reality, they are run by a number of affluent and/or politically influential individuals, reportedly including Congressional representatives (*La República*, 2011).

The majority of those working in the area - nearly 90% according to one study - do so as 'contractors' for the cooperatives (Gamarra Chilmaza, 2005). Contracts are usually verbal and therefore offer workers little in the way of security of pay and conditions.

Agreements are generally based around a pre-capitalist reward system known as *cachorreo,* in which workers receive no fixed salary. Instead, they work at the mine for between 28 and 30 days a month without pay and, in return, are allowed one or two days' free access to the site. During this short period, contractors are permitted to excavate and remove as much rock as they can carry on their backs. Some work shifts of up to 24 hours on such days to maximise the amount they can excavate. Whether or not the material they take contains any gold however, is largely down to chance.

The total earnings from one mine site, near the foot of the Riticucho peak, are estimated to exceed US$ 300m a year (*El Correo*, 2012). However, the overwhelming majority of those contracted under the *cachorreo* system earn just US$40 - $100 a month (DevTV, 2003). They have to cover the costs of their own mining materials from this sum (Gamarra Chilmaza, 2005).

The work conditions are very poor and respiratory problems are common due to the amount of dust in the air. Stomach and digestional problems are also widespread among miners, principally because their main water sources, the Cumuni lake and Riticucho melt water, are both highly contaminated with mercury (Goyzueta and Tigos, 2009). As such, it is the miners and their families who most often suffer the consequences of the poor environmental practices employed at the site. However, the lack of alternative employment options in the area means many are reluctant – or even unable – to leave.


Despite the harsh conditions, tens of thousands still work in gold mines at La Rinconada in Puno

which initially appears to be artisanal-scale and non-formal in its methods. These individuals or groups contract, on highly exploitative terms, impoverished locals to extract and process material from the site.

***"concession holders generally have little or no interest in formalising as this would significantly reduce their profit margins. Many of those actually working the site, by contrast, would be interested in doing so"***

Such agreements are invariably made in the full knowledge that local workers will not (be able to) comply with mining legislation. These types of concession holders generally have little or no interest in formalising as this would significantly reduce their profit margins. Many of those actually working the site, by contrast, would be interested in doing so as it would mean improved pay and conditions. Without actually owning the land on which they operate however, formalisation is likely to remain a distant goal. In these situations, it is the hidden concession holder who is responsible for essentially creating an illegal medium-scale operation, yet it is frequently the on-site workers who are publicly blamed. ■

# 5. Formalised ASM

Examples of poor practice by non-formalised operations are well known and have been widely publicised. However, a less often discussed element of ASM is the existence of a small, but growing, number of fully formalised and profitable entities. These operations comply fully with all relevant local legislation and pay taxes to the central government.

### How is Formal ASM Different?

There are substantial differences between formal and non-formal ASM in almost every aspect of their operations. Formal ASM essentially means that miners hold title to their land, possess all relevant government permits, pay tax and are expected to comply with environmental regulations regarding gold extraction and processing (Gamarra Chilmaza, 2005). It is in this last area that divergence with non-formal operations is most evident. While illegal and informal miners make widespread use of mercury (see chapter 3), its use in fully legal operations is, at the very least, far more limited. This significantly reduces the associated environmental impact and brings them into compliance with local environmental legislation.

Moving away from mercury use requires artisanal and small-scale miners to adopt one of the alternative methods of gold processing. One option, known as 'leaching', involves adding a cyanide solution to the crushed ore, before adding zinc and other minerals to isolate the gold. Leaching requires more sophisticated equipment than amalgamation, which helps reduce the risk of leakages and accidental contamination (particularly where cyanide is transported in dried form). Further, though cyanide is obvi-


Miners manually crush rocks to reach the gold contained within

ously also highly poisonous, it (unlike mercury) can be detoxified and is biodegradable with exposure to UV light and oxygen (ARM, 2001). For these reasons, cyanide use is generally considered to be a less damaging form of gold processing than mercury. Other technologies, such as gravimetry or froth flotation, are cleaner still as they do not rely on any corrosive substances. However, these may be more expensive than either amalgamation or leaching and cannot be used for all types of gold deposit. This serves to inhibit their widespread use by artisanal and small-scale miners.

Non-mercury based processing is invariably more expensive than its more damaging alternative, either because it requires investment in new technology and/or because it is slower and recovers less gold from the ore. Any individual miner is unlikely to possess sufficient capital to purchase this type of equipment, or to be able to use it on such a scale so as to make its use profitable. To overcome these challenges therefore, many of those seeking to formalise have formed small organisations by pooling their resources with colleagues. By making joint investments of this type ASM operations have been able to significantly reduce the impact of their activity on the surrounding area.

**What are the Advantages?**

There are a number of economic benefits to be derived from formal ASM, both for those directly involved and for the country as a whole. Firstly, they can generate significant employment - given the labour intensive nature of the work - and can offer a route out of poverty for the country's poorest groups. Secondly, they provide another revenue stream for the central government through the taxation of mining profits (in a similar way to large-scale extractive projects). Finally, they may allow for greater exploitation of the country's mineral wealth by focusing on smaller deposits which are of no interest to bigger firms (Veiga, 2011). Indeed, some have even argued that large-scale and formalised ASM operations could work in tandem to maximise the exploitation of the various different types of gold deposit found on any given concession (Gamarra Chilmaza, 2005). By increasing the productivity of existing mining concessions in this way, the country could potentially achieve the same rates of mineral output from a smaller area of its territory. This could, in turn, have positive implications for levels of social conflict in the country.

***"Formal ASM operations can generate significant employment and offer a route out of poverty for the country's poorest groups"***

**Fairtrade and Fairmined Gold**

Given the economic benefits of formalised ASM, and in recognition of the difficulties miners face during the transition to formality (see next chapter), some analysts have recommended that the government provide incentives for those willing to embark on the endeavour (Barreto, 2011). Though no such state programme has yet been developed, an alternative scheme – run by civil society organisations - is already operational at both national and international levels.

The programme, known as Fairtrade and Fairmined, allows artisanal miners to obtain a better price for their gold provided they operate in accordance with exacting standards of environmental, social, economic and labour practices. Operations certified under the programme receive, from buyers, a price equivalent to at least 95% of the market rate for gold, plus an additional 'Fairtrade Premium' of 10% or 15%. This pre-


A group of formalised women miners work at a site in Arequipa

mium is then used for investments such as technological improvements, cleaner equipment or training/education programmes (ARM, 2009).

***"To gain certification, the operation must first establish a democratic structure to be able to determine spend of the premium, and also begin to move away from using mercury during processing"***

To qualify as Fairtrade and Fairmined, ASM operations must first comply with all local legislation regarding mining. Peruvian miners are assisted in this process by local partner *Red Social*, which helps groups organise and provides technical assistance throughout the registration process. To gain certification, the operation must first establish a democratic structure (not least, to be able to determine spend of the premium) and also begin to move away from using mercury during processing. To retain it, they must eventually seek to adopt chemical-free processing techniques.

Thus far, the number of certified entities is fairly small. To date, only three operations have fully met the requirements. However, *Red Social* is either already working alongside, or is in planning discussions with, another twenty groups [5]. For those already certified, the scheme has proved very successful in helping impoverished groups establish legitimate and profitable enterprises (see box below) and providing employment to both men and women. These examples of successful transitions to formality may contain valuable lessons which could be replicated elsewhere in the country. ■

**Case Study: Sociedad de Trabajadores Mineros**

The Sociedad de Trabajadores Mineros S.A. (SOTRAMI) was the first ASM company established in Peru. The organisation grouped together informal artisanal miners who had been working in an abandoned mine in the Atacama Desert, central Peru. The majority of these miners and their families lived in nearby Santa Filomena, a town established by small-scale agriculturalists, unemployed and landless people displaced by the country's civil war violence.

Since its formation in 1989 SOTRAMI has made significant strides in improving working conditions, eliminating child labour and minimising its environmental impact. It has been sufficiently successful in this endeavour to comply not only with government legislation concerning mining operations, but also with the still higher standards of the Fairtrade and Fairmined certification programme.

***"Since its formation in 1989 SOTRAMI has made significant strides in improving working conditions, eliminating child labour and minimising its environmental impact"***

By organising and pooling resources miners at SOTRAMI have been able to build their own processing plant, meaning they can now more efficiently process ore for higher quality gold and better prices. Miners receive regular training on how to use chemicals in a safe way and have established an internal safety committee to manage this. Chemicals are often reused, but where they are not, SOTRAMI must ensure drainage of effluents from processing areas are disposed of safely and neutralised to remove toxic substances.

To comply with Fairtrade and Fairmined environmental requirements SOTRAMI must manage, reduce and mitigate the use of toxic substances, control emissions of dust into the air and mud effluents into water systems, ensure proper water management, and enhance ecological restoration practices including protection of biodiversity. To continue to qualify as Fairtrade and Fairmined the organisation must take steps towards chemical-free or near chemical-free processing in the future. All this serves to dramatically reduce the environmental impact of mining activity.

Today the mine supports some 500 families. There are 88 shareholder workers in two groups and an additional 30 self-employed miners working in the mine. There is also a women's group (who help with manual sifting of rocks) and five engineers who manage the mine and processing plant. The premium gained from the Fairtrade and Fairmined programme has been used to invest in improving environmental standards, providing childcare for mine workers and there are also plans to install electricity, purchase computer equipment and connect to the internet.

*Adapted from: ARM / Fairtrade Foundation (2011), SOTRAMI Mining Organisation, Peru*

# 6. Barriers to Formalisation

Becoming a formal ASM operation is not just a matter of will. Those seeking to turn their non-formal extraction efforts into a fully legitimate enterprise (which is, of course, not all miners) will face numerous and sizeable obstacles in their endeavours. The registration process is in itself long and complex. To be officially recognised as formal, mining operations of all sizes must first complete the following steps [6]:

1. Application and approval of a mining concession by the state.
2. Environmental approval. Depending on the mine's size, this will entail producing an environmental impact declaration, a short Environmental Impact Assessment (EIA), or a full one.
3. The presentation of a Mining Operation Certificate to the MEM, detailing technical project details.

And, where applicable:

4. A global permit to use explosives (valid for one year).
5. A permit to buy explosives (i.e. to purchase the first part of the above annual allocation of explosives).

Completing the above requires miners, in the first instance, to be aware of the relevant legislation they need to comply with. Far from all do. As one mining leader reports: "community members often have no idea that they have any obligations to the state. They think their responsibilities are, first and foremost, to the community" [7]. Further, in order to formalise miners must also possess the requisite technical knowledge and language skills to fill in official documentation (Gamarra Chilmaza, 2005).


Permits must be obtained before using explosives to excavate rock


Most ASM miners come from impoverished indigenous communities

### Challenges for Miners

The difficulty here is that non-formal mining tends to be concentrated in remote areas where levels of education are low and state presence is limited. The majority of the population in such regions are from indigenous and peasant communities, who frequently speak Spanish only as a second language. As a result, dealing with Spanish-speaking officialdom may be neither an easy nor familiar experience for these groups. Furthermore, for the majority of ASM operations, becoming formal entities will involve organising and pooling resources, not just to purchase equipment (see chapter 5), but also to pay the various technical and administrative fees associated with the above five steps. Bringing miners together in this manner brings its own challenges, and even more so in Peru's highly fragmented political context [8].

***"Informal miners generally lack the expertise, finance and capacity to oversee the transition to formality singlehandedly"***

### Inadequate State Support

In sum, informal miners generally lack the expertise, finance and capacity to oversee the transition to formality singlehandedly. If this process is to be carried out effectively, a great deal of government support will be required. Yet, for the most part, the state apparatus charged with regulating this area suffers from the same shortcomings as the miners. This is partly a consequence of the poorly executed decentralisation programme in which responsibility for the formalisation of ASM was transferred to regional authorities (see chapter 2). As UNEP reported in 2011:

> the supervisory function [for artisanal mining] has been transferred to the

Directors of Mining of the regional governments without them having the resources or budgets to conduct it. The regulatory authority has the responsibility while lacking the knowledge and specific competencies for its enforcement, in addition to bureaucratic hurdles and excessive and differentiated costs existing among the different regions for the same legal procedures. All of this makes the goal of formality difficult and lengthens the formalization process.

The lack of regional government capacity to adequately deal with the formalisation process is patently obvious from even a perfunctory review of the relevant personnel numbers. A 2009 report on the Madre de Dios region, for example, lamented that there was just one mining post with a handful of staff to monitor and regulate the activities of at least 20,000 miners (Mosquera et al, 2009). Similarly, the regional government of Puno has just four employees who are again theoretically responsible for the operations of tens of thousands of miners. According to one regional government official, there are further difficulties in that staff have such little budget for this task that they often cannot afford to pay even for the petrol to visit the relevant areas [9]. Clearly, it is not possible for this small number of poorly-financed officials to monitor, let alone provide regulatory support, to such a huge number of miners. Accordingly, this lack of state assistance continues to represent a final barrier to informal miners' efforts to legalise. ■

***"The lack of regional government capacity to adequately deal with the formalisation process is patently obvious from even a perfunctory review of the relevant personnel numbers"***


Formalised operations, like SOTRAMI, often display high levels of organisation

# 7. Conclusion

This review of artisanal and small-scale gold mining operations in Peru has sought to demonstrate the great diversity of working practices, economic and environmental impacts found within the sector. At its best, ASM can provide a much needed source of income for impoverished groups in the country, contribute to improved labour conditions and boost local development, all without producing serious negative impacts for the surrounding area. At its worst, artisanal mining - and even more so in the case of illegal medium-scale mining - can cause serious environmental and health problems, without providing much in the way of benefit for the wider community.

Between these two extremes, there are many shades of gray and it is these operations which present the most serious policy challenges for the Peruvian government. What should be done, for example, when impoverished 'sub-contractors' of an affluent concession holder create environmental damage, but also bear the brunt of its negative consequences? Such questions do not have easy answers. The current response – heavy handed policing – has proved a wholly inadequate solution to these issues.

An important first step in efforts to formulate a coherent policy to ASM would be for the government to fully ***recognise this diversity***. It should move away from its recent tendency to apply a 'one-size-fits-all' policy to the sector, which is anyway one largely based on a negative conceptualisation of ASM. These policies risk undermining all informal ASM operations before they have even been given adequate opportunity to formalise and to make a more positive economic and social contribution to the country.

Before resorting to penalising all non-formal ASM operations, it would be prudent to first ***increase the level of support*** given to those seeking to formalise. Thus far, the provision of assistance has been extremely limited. Commitments from the central government to supply regional authorities with the necessary finance and personnel to effectively perform the tasks delegated to them in this area would be a crucial advance. Related to this could be a move to increase the strength of the Environmental Ministry, which should play a far greater role in the monitoring of the environmental impacts of mining activity.

Finally, the government could make more effort to ***analyse and draw lessons*** from the formalisation efforts of civil society. Schemes such as the Fairtrade and Fairmined programme have proved successful in some cases of informal mining, bringing sustainable employment to both men and women. These programmes may contain useful ideas which could be expanded and replicated on a national scale. The option of a state-sponsored incentive scheme for formalising miners, for example, could be explored.

Taking the above steps would allow authorities to separate far more easily those ASM operations which genuinely want to formalise (but have just not yet been able to do so) from those with no interest in becoming legal and sustainable enterprises. It would then be possible to formulate differentiated polices which target illegal mining, whilst providing support to informal miners. By jumping straight in with efforts to criminalise the sector, the government has essentially tried to skip this vital first phase. This is highly unlikely to provide a beneficial long-term resolution to the issue. ■

# 8. Endnotes

[1] Some even argue that supporters of large-scale mining may have deliberately fostered confusion over the nature of ASM so that large projects - which can also have serious detrimental effects on the environment and public health - are seen as the 'lesser of two evils'.

[2] This process aimed to reverse Fujimori-era reforms which had left political authority highly concentrated in the hands of the executive.

[3] Admittedly, illegal miners would likely oppose any moves to regulate their activity.

[4] The exact source of capital for these equipment purchases is often not known, though many in Peru talk of links to domestic and foreign criminal syndicates. In some cases, Peruvian politicians have also been allegedly involved (see, for example, *El Comercio*, 2011).

[5] Author's interview with *Red Social,* Lima, February 2011.

[6] Author's interview with *Red Social,* Lima, February 2011.

[7] Author's interview with Manuel Reinoso, Lima, February 2011.

[8] Author's interview with Javier Diez Canseco, Lima, February 2011.

[9] Author's interview with regional government official, Puno, March 2010. Transport costs can be high given the remote location of non-formal mining sites, such as La Rinconada.

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