DESIGN AND PILOT IMPLEMENTATION OF A MODEL SCHEME OF ASSISTANCE TO SMALL SCALE MINERS

PHASE I

Prepared for:

Department For
INTERNATIONAL DEVELOPMENT

July 2000

Contact: Mr Kevin P.C.J. D’Souza
Lancaster Building, High Street, Newcastle-under-Lyme,
Staffordshire, ST5 1PQ, UK
Tel: 44 (0)1782 612626 Fax: 44(0)1782 662882
E-mail: kdsoouza@wardell-armstrong.com
DESIGN AND PILOT IMPLEMENTATION OF A MODEL SCHEME OF ASSISTANCE TO SMALL SCALE MINERS

PHASE I

Prepared by:

Kevin P.C.J. D’Souza Senior Mining Engineer- WA ..........................

Approved by:

A. Jeff Smith Managing Partner - WA ..........................
ACKNOWLEDGEMENTS

The project team is most grateful to receive considerable help from numerous individuals, organisations who have contributed in various ways by providing advice, information or by acting as reviewers. We give thanks to all these people and organisations. In addition, those to whom particular appreciation is due include the following:

Dr Alexander Horkel (independent consultant); Mr Jeremy Bates (independent consultant); Mr Edward Nyamekye (Ghana Minerals Commission); Mr Robert Yakubu (Ghana Minerals Commission); Dr Henry Appiah (University of Koforidua, Ghana), Ms Diana McDonnell (Guyana Geology and Mines Commission); Mr B Woodford (Guyana Geology and Mines Commission); Mr Edward Shields (Guyana Gold and Diamond Miners Association); Mr Kandidus Lupindu (World Bank SSM Project, Tanzania), Mr Geoffrey Kalilo (Ministry of Mines and Development, Zambia); Mr C W Chansa (Ministry of Mines and Natural Development, Zambia); Dr Jewette Masinja (Ministry of Environment and Natural Resources, Zambia); Dr Stephen Simakunga (School of Mines, University of Zambia); Mr Joseph Chanda (Minerals & Marketing SADC); Mr Chris Campbell (British Embassy Venezuela); Mr Peter Van der Veen (World Bank, USA); Mr Jeremy Bates (SSM Consultant, Brazil); Ms Meredith Sassoon (independent consultant); Mr Norman Jennings (ILO): Dr Jan Ketelaar (DFID); and Mr Peter Smith (DFID)

There are numerous other individuals who have contributed to this report. We apologise for not mentioning everybody who has assisted – we are very grateful for your assistance and advice.
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>1</td>
</tr>
<tr>
<td>1.0 Introduction</td>
<td>4</td>
</tr>
<tr>
<td>1.1 Small Scale Mining in a Global Context</td>
<td>4</td>
</tr>
<tr>
<td>1.1.1 Definition</td>
<td>4</td>
</tr>
<tr>
<td>1.1.2 Production and Employment</td>
<td>6</td>
</tr>
<tr>
<td>1.1.3 Poverty</td>
<td>8</td>
</tr>
<tr>
<td>1.1.4 Other Concerns</td>
<td>10</td>
</tr>
<tr>
<td>1.1.5 Interaction with Large-scale Mining</td>
<td>12</td>
</tr>
<tr>
<td>1.2 Terms of Reference</td>
<td>15</td>
</tr>
<tr>
<td>1.3 Project Overview</td>
<td>15</td>
</tr>
<tr>
<td>2.0 Methodology</td>
<td>19</td>
</tr>
<tr>
<td>2.1 Literature Survey</td>
<td>19</td>
</tr>
<tr>
<td>2.1.1 Conclusions from Literature Survey</td>
<td>21</td>
</tr>
<tr>
<td>2.2 Country Surveys/Questionnaires</td>
<td>21</td>
</tr>
<tr>
<td>2.2.1 Conclusions from Country Surveys/Questionnaires</td>
<td>22</td>
</tr>
<tr>
<td>2.3 Country Visits</td>
<td>23</td>
</tr>
<tr>
<td>2.3.1 Conclusions from Country Visits</td>
<td>24</td>
</tr>
<tr>
<td>2.4 Project Survey</td>
<td>25</td>
</tr>
<tr>
<td>2.4.1 Conclusions from Project Survey</td>
<td>27</td>
</tr>
<tr>
<td>3.0 Recent Experience</td>
<td>31</td>
</tr>
<tr>
<td>3.1 General Findings</td>
<td>31</td>
</tr>
<tr>
<td>3.2 Issue Related Findings</td>
<td>34</td>
</tr>
<tr>
<td>3.2.1 Institutional Capacity</td>
<td>34</td>
</tr>
<tr>
<td>3.2.2 Legislation and Licensing</td>
<td>35</td>
</tr>
<tr>
<td>3.2.3 Health and Safety</td>
<td>37</td>
</tr>
<tr>
<td>3.2.4 Environmental</td>
<td>39</td>
</tr>
<tr>
<td>3.2.5 Mineral Potential</td>
<td>41</td>
</tr>
<tr>
<td>3.2.6 Technical Assistance and Training</td>
<td>42</td>
</tr>
<tr>
<td>3.2.7 Credit and Finance</td>
<td>44</td>
</tr>
</tbody>
</table>
3.2.8 Marketing 47

4.0 Conclusions 49

4.1 Model Policies 50

4.1.1 Institutional Capacity 50
4.1.2 Legislation and Licensing 53
4.1.3 Health and Safety and Environment 55
4.1.4 Mineral Potential 57
4.1.5 Technical Assistance and Training 59
4.1.6 Credit, Finance and Marketing 60

4.2 Recommendations 62

4.2.1 Purpose 63
4.2.2 Activities 64
4.2.3 Outputs 66
4.2.4 Evaluation Matrix 67

TABLES

Table 1. Examples of SSM definitions from a variety of countries
Table 2. Largest employers in small-scale mining
Table 3. Percentage of total World production of selected commodities produced by SSM
Table 4. Comparison of country scores from the evaluation matrix.

PLATES

Plate 1. Women and children crushing and sorting aggregate on the outskirts of Lusaka in Zambia.
Plate 2. Deep surface excavations for emeralds in the Ndola Area in Zambia.
Plate 4. ‘Compressor mining’ in gold bearing gravels in the Philippines.
Plate 5. Sluicing of gold bearing alluvials in the Lake Victoria region in Tanzania.
Plate 7. Washing of diamond bearing gravels in the Oda region in Ghana.
Plate 8. Dredging’ operations in the diamond Kurapong region in Guyana.
Plate 9. Miners co-operative hand picking diamonds from the lamella screen in the Kurapung Area in Guyana.

Plate 10. Typical sluice construction (no in operation) for gold and diamond extraction – Mazaruni Area in Guyana.

Plate 11. Local four year old child hand panning, using mercury for the amalgamation of gold, in the Philippines.

Plate 12. Severe deforestation caused by hydraulic mining in the Mahdia Area in Guyana.

APPENDICES

Appendix A    Glossary
Appendix B    Bibliography
Appendix C    Country Surveys
Appendix D    Project Survey
Appendix E    Terms of Reference – Logical Framework
EXECUTIVE SUMMARY

This report details the policies and actions that should be implemented by central authorities and multilateral donors to combat the poverty that exists within small-scale mining communities worldwide. The report concludes that it is necessary to take a holistic approach to the whole subject.

The various aspects of small-scale mining are inter-related and often are dependent on one another to some degree. The purpose of this study is to impact, positively, on the quality of life of the miners, and other local inhabitants, by advocating structured policies that are aimed at sustainable and environmentally beneficial development of the small scale mining sector. The recommended policies and actions are generic in nature. They are intended to form the basis for a concerted effort to make each country’s small scale mining sector a valuable contributor of foreign earnings. In sub-Saharan Africa gold and gemstones worth about US$200 million are produced. In Peru, annual gold production from SSM has been estimated to be worth around US$250 million; in China US$200 in Bolivia and Brazil about US$180 million; and about US$140 in Indonesia.

The research confirmed a number of problems relating to small-scale mining and the funding of aid programmes in the sector. Some of these are:

- The attitude of host Governments, to the sector, varies considerably and is rarely the result of a rational development of strategy but often due to reactions to recent events.
- While a great deal of aid money is spent on the sector by donor agencies the projects that are sponsored are usually aimed at specific topics and rarely address the sector as a whole and particularly the poverty issues.
- Many of the projects that are funded are unsustainable in the long term in that they only last as long as there is aid money and once this finishes then the projects cease.
- The projects that are undertaken are often designed to control and regulate the sector. They are often studies rather than technical activities.
- There is widespread duplication of projects with little thought of budget sharing or information exchange. This has often resulted in poor utilisation of resources.
- There appears to be a general reluctance, on the part of certain aid agencies, to divulge information. This makes the determination of the success of projects extremely difficult. The reasons for this reluctance is not always clear but may be due to each having specific agendas (often as laid down by their own Governments) and therefore having little reason to feel that co-operation is important.
- There is little co-ordination between aid agencies, either on matters of funding or exchange of technical findings. Often this appears to be the case because the aid agencies have their own specific agenda.
- The World Bank have recognised that this lack of co-ordination and co-operation between agencies is inhibiting the sustainable development of the
sector and have reacted by launching the Consultative Group for Artisanal and Small-Scale Mining (CASM). This group was launched at a meeting in Washington in September 1999, which the authors attended. Its main objectives are shown below. There are marked similarities between the objectives set by CASM and the ones contained within this report.

- There are very few NGO’s working within the sector, unlike sectors such as agriculture. This means that there is little historical precedent.

### MAIN OBJECTIVES of CASM

- Creation of a Consultative Group for artisanal and small-scale mining (ASM).
- Design and implement creative solutions to the problems encountered in the ASM sector.
- Regularization of the ASM sector.
- Reduction of environmental, social and cultural damage linked to the activities of ASM.
- Reduction of tensions and conflicts between the large mining sector and the ASM sector.
- The development and dissemination of a coherent set of best practices.

*Source: World Bank A Global Consultative Group For Artisanal and SSM Development*

Many of the problems traditionally associated with small-scale mining occur as a direct result of poverty. Often the miners appear to have been effectively disenfranchised by Governments and donors alike and the scale of the problem should not be underestimated. However, this scenario may be changing as a result of the National Strategy for Sustainable Development (NSDD) that all countries have to prepare for by the year 2005.

Up to 13 million people earn their living directly from small-scale mining. Up to 100 million people depend on this sector for their livelihood. While it has been argued that the miners are often better off than their compatriots it is still common for earnings to be US $ 50 per month (or less) for a family, all undertaking hard physical labour.

If Governments and aid agencies want to make a real difference to the plight of the miners, and the communities within which they live, they must start to address all the issues that affect the sector and not just the ones that are currently “in vogue” or “politically correct”. There should be a move to a culture of wealth generation and an attempt to draw the small mining sector into the legitimate social fabric of the country. Many of the present negative impacts of small-scale mining will be mitigated by a concerted attempt to develop and execute the policies described in this report. They are intended to enhance quality of life and persuade them to work within the legal framework rather than outside it.

The policies and actions that have been advocated should be tested practically in the field.
in either one or two countries. The field testing can be done in Phase 2 of the project which is split into two parts. The first part will test the practical application of the chosen country’s legislation and institutional capacity by undertaking a baseline survey and ongoing monitoring of a number of SSM working areas. It is intended that in Phase 2, the development of the “projects”, in terms of environmental performance, poverty alleviation and socio-economic advancement will be assessed over a period of time and the impact of the legislation and capacity of the country will be evaluated.

The second part of Phase 2 will involve the establishment of a regional training centre in an area that has a high existing density of SSM. The centre will be used as a base to establish a Technical Services Unit and to test model policies dealing with technical services, the environment, health and safety, finance and marketing.

Plate 1. Women and children crushing and sorting aggregate on the outskirts of Lusaka in Zambia
1.0 INTRODUCTION

1.1 SMALL SCALE MINING IN A GLOBAL CONTEXT

1.1.1 Definition

Artisinal (small-scale) mining is the most primitive type of mining, characterised by individuals or groups exploiting deposits – usually illegally – with the simplest equipment.


There is no widely accepted definition of small-scale mining and those used often vary according to the context within which the subject is being discussed. The very broad nature of the terms of reference received from DFID made it necessary to include as many different groupings of SSM within the research study framework as possible. Thus at the lower end of the spectrum the term has been applied to all types of artisanal miners producing a variety of different commodities. This includes individuals, groups, families and co-operatives, both in the formal and illegal sector of the market. The cut-off for SSM at the upper end is, to an extent, dictated by legislation within the host country. Thus the upper limit of what is perceived to be SSM will vary from country to country.

Small-scale mining means different things to different people. To some it is dirty, dangerous, disruptive and should be discouraged. To others it is profitable, productive or simply the only way out of poverty.

So small-scale mining is really in the eye of the beholder – the relevant controlling agency. Attempts down the years to find a workable definition have proved fruitless. The small-scale mines are labour intensive, with mechanisation being at a low level and basic. By and large production is low too.


The difficulty in defining SSM is perhaps best reflected by events at the International Workshop on the Importance of Mining to Industrial Development (held in Bandung in 1982). At that meeting, a working group was formed primarily to describe and define SSM. However, after lengthy deliberations, the group failed to provide a definition. They agreed only that the definition of SSM is highly dependent upon the policy, practice and other conditions of a given country. Some countries have their own definition and some have even provided separate meanings for SSM and for their artisinal mining. That some countries have more than one definition further illustrates the difficulty in defining SSM. The variety of criteria for defining SSM included the size of the concession area (e.g. Ghana, Zambia and Zimbabwe), depth of working (e.g. Columbia, Senegal and Ethiopia), capital investment (e.g. Argentina, South Africa, Pakistan, Thailand and Zimbabwe), crude production levels (e.g. Senegal), use of explosives (e.g. Ghana and Sri Lanka) income levels, numbers of miners, etc. It is however, apparent that these different definitions have some similarities. Common features in the different definitions include the following:
• The proponents or stakeholders are usually limited to citizens of the country concerned, consequently prohibiting the participation of foreign nationals and companies in SSM.

• The use of sophisticated equipment is restricted and only simple means and techniques are normally allowed.

• There are set limits on the level of production output and infusion of capital, though these limits differ from one country to another and even by mineral commodities.

<table>
<thead>
<tr>
<th>Country</th>
<th>SSM Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>Individual or collective extractive work, using rudimentary tools, manual devices or simple portable machineries – for immediate exploitation of a mineral deposit which, by its nature, dimension. Location and economic use can be worked, independent of previous exploration work, according to criteria set by the National Department of Mineral Production. Also provides a separate definition for ‘garimpagem’ (artisanal mining) as individual work performed by panners with rudimentary forms of mining using manual or portable equipment, and applied only to alluvial, colluvial and eluvial deposits.</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>Provides a definition for artisanal exploitation to refer to activities conducted on ore bodies or deposits by natural or legal persons using traditional techniques or low mechanisation levels.</td>
</tr>
<tr>
<td>Chile</td>
<td>Mining operations by a person who works a mining property or process plant by himself and with or without the family support, maximum number of 5 salaried workers, or by legal society with no more than 6 partners. It also includes operations by a mining cooperative with partners who are actual artisan miners. SSM is also defined as that mining sector that produces up to 2,000 tonnes/yr of fine copper, or equivalent.</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>SSM means mining operations to be designated as such by the Minister of which the annual ROM ore does not exceed a certain limit, which differs from one mineral product to another and on the nature of mineral occurrences. Also provides a definition for artisanal mining which refers to non-mechanised mining operations, of gold, platinum, precious minerals, metals, salt, clay and other similar minerals as essentially manual carried out by Ethiopian individuals as groups of such persons.</td>
</tr>
<tr>
<td>Ghana</td>
<td>SSM refers to operations of individual Ghanaians or organised groups of Ghanaians (4-8 individual), or co-operative of ten or more individuals, which are entirely financed by Ghanaian resources at a certain limit, and carried out on full time basis using simple equipment and tools. It also refers to prospecting and mining in an area designated to SSM, which uses specialised technologies and methods not involving substantial expenditure.</td>
</tr>
<tr>
<td>Guinea</td>
<td>SSM refers to exploitation of precious materials, as in the case, gold, diamonds and other gemstones found in primary or alluvial deposits, outcrops or sub-outcrops.</td>
</tr>
<tr>
<td>Mexico</td>
<td>Mines whose annual production values do not exceed US$3.00 million, provided that their daily production is less than 20 tonnes per day (for metal mines) and 300 tonnes per day (for non-metal mines).</td>
</tr>
<tr>
<td>Philippines</td>
<td>SSM refers to mining activities that rely heavily on manual labour using simple implements and methods, and do not use explosives or heavy mining equipment. Also defined as a single unit of operation involving an annual production of not exceeding 50,000 tonnes of ROM ore with the following requisites:- working is artisanal, either surface or shallow underground mining without the use of sophisticated mining equipment; minimal investment on infrastructures and processing plants (not exceeding 10 million pesos); and heavy reliance on manual labour (ratio of labour cost to equipment utilisation cost to produce, process and market one tonne of ore is equivalent to, or exceeding one).</td>
</tr>
<tr>
<td>Surinam</td>
<td>The exploitation of mineral deposits which, due to their mode of occurrence and their size, can be mined economically by simple means and techniques.</td>
</tr>
<tr>
<td>UN (1972)</td>
<td>Any single unit mining operation having an annual production of unprocessed materials of 50,000 tonnes or less as measured at the entrance of the mine is a SSM operation.</td>
</tr>
</tbody>
</table>

Table 1. Examples of SSM definitions from a variety of countries
In most countries there exists the potential for a transitory progression from the most primitive subsistence mining to working in co-operatives and onward into the medium-scale mining sector, and it is this transition that needs to be encouraged and assisted. For the purposes of this research, therefore SSM is taken in its broadest sense. It refers to the ‘bottom-end’ of the mineral industry sector of developing countries, which is mainly in the hands of nationals of the country, and which is undertaken as either a means of livelihood or as a business enterprise.

<table>
<thead>
<tr>
<th>No uniform guidelines to define SSM based on objective criteria have been established yet. Consequently SSM in many countries is defined by subjective criteria, some of which characterise the sector as a craft-activity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The absence of low degree of mechanisation due to high proportion of heavy labour.</td>
</tr>
<tr>
<td>• Low safety standards.</td>
</tr>
<tr>
<td>• Poorly trained personnel.</td>
</tr>
<tr>
<td>• Lack of technical personnel in the plant, resulting in deficient planning in both mining and processing activities.</td>
</tr>
<tr>
<td>• Comparatively poor utilisation of resources due to nonselective mining of high-grade ores and poor recovery.</td>
</tr>
<tr>
<td>• Low pay scale.</td>
</tr>
<tr>
<td>• Low work productivity.</td>
</tr>
<tr>
<td>• Periods of non-continuous mining, as a result of mining only seasonally when world market prices reach a certain minimum level.</td>
</tr>
<tr>
<td>• Insufficient consideration of environmental impact.</td>
</tr>
<tr>
<td>• Chronic lack of capital.</td>
</tr>
<tr>
<td>• Some illegal operations due to mining without concession rights</td>
</tr>
</tbody>
</table>

*Source: Tools for Mining, M. Priester et al, 1993, Deutsche Gellschaft für Zusammenarbeit (GTZ) GmbH*

### 1.1.2 Production and Employment

The size of the SSM sector in many countries is enormous (over 200,000 people in each of Brazil, China, Colombia, DR Congo, Ghana, India, Indonesia, Pakistan, Philippines, Tanzania and Zimbabwe) and expanding due to rapid population growth and the lack of alternative means of earning a living. It has been estimated that up to 13 million people, of whom a significant proportion are women and children, are directly involved in small-scale mining. This figure translates into somewhere between 80 and 100 million people who depend on SSM for their livelihood.

SSM activities can be largely divided into two categories: the mining and quarrying of industrial and construction materials; and the mining of relatively high-value minerals notably gold and precious stones. The former, is in general, for local markets and exists in
virtually every country whereas the output from the latter is usually exported. The value of production of the numerous minerals is prodigious as Table 3 illustrate.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Mines</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>250,000</td>
<td>4,300,000</td>
</tr>
<tr>
<td>India</td>
<td>&gt;10,000</td>
<td>1,000,000 – 1,100,000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>77,000</td>
<td>300,000 – 500,000</td>
</tr>
<tr>
<td>Brazil</td>
<td>10,000</td>
<td>250,000 – 1,000,000</td>
</tr>
<tr>
<td>Tanzania</td>
<td>4,000</td>
<td>450,000 – 600,000</td>
</tr>
<tr>
<td>Niger</td>
<td>150</td>
<td>440,000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2,400 – 3,250</td>
<td>90,000 – 370,000</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>2,000 – 5,000</td>
<td>50,000 – 350,000</td>
</tr>
<tr>
<td>Ghana</td>
<td>400 – 700</td>
<td>50,000 – 300,000</td>
</tr>
<tr>
<td>Philippines</td>
<td>700</td>
<td>200,000</td>
</tr>
<tr>
<td>Colombia</td>
<td>9,600</td>
<td>100,000 – 200,000</td>
</tr>
</tbody>
</table>

Table 2. Largest Employers in Small-Scale Mining

The minerals with lower percentages are those that do not normally lend themselves to SSM largely due to the need for economies of scale in production and use. However, these minerals are mined on a small-scale in some places to meet the limited local needs. One notable exception is in China where about 550 million tonnes of coal – 40% of total production is produced by SSM employing about 3 million people. As far as precious minerals are concerned, SSM can account for a significant proportion of the production, gemstones (90-100% in most countries), diamonds (80-100% in most countries that are not major producers) and varying proportions of gold (between 50-100% in numerous developing countries – Burkina Faso, Cuba, Guyana, Mozambique, Myanmar, Niger, Bolivia, Mexico, and the Philippines).

<table>
<thead>
<tr>
<th>Commodity</th>
<th>%</th>
<th>Commodity</th>
<th>%</th>
<th>Commodity</th>
<th>%</th>
<th>Commodity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium</td>
<td>100</td>
<td>Lead</td>
<td>11</td>
<td>Barite</td>
<td>60</td>
<td>Pumice</td>
<td>90</td>
</tr>
<tr>
<td>Mercury</td>
<td>90</td>
<td>Zinc</td>
<td>11</td>
<td>Sand and Gravel</td>
<td>30</td>
<td>Feldspar</td>
<td>80</td>
</tr>
<tr>
<td>Tungsten</td>
<td>80</td>
<td>Cobalt</td>
<td>10</td>
<td>Building Stone</td>
<td>30</td>
<td>Clay</td>
<td>75</td>
</tr>
<tr>
<td>Chrome</td>
<td>50</td>
<td>Gold</td>
<td>10</td>
<td>Salt</td>
<td>20</td>
<td>Gypsum</td>
<td>70</td>
</tr>
<tr>
<td>Antimony</td>
<td>45</td>
<td>Silver</td>
<td>10</td>
<td>Coal</td>
<td>20</td>
<td>Graphite</td>
<td>90</td>
</tr>
<tr>
<td>Manganese</td>
<td>18</td>
<td>Iron</td>
<td>12</td>
<td>Asbestos</td>
<td>10</td>
<td>Talc</td>
<td>90</td>
</tr>
<tr>
<td>Tin</td>
<td>15</td>
<td>Copper</td>
<td>8</td>
<td>Phosphate</td>
<td>10</td>
<td>Vermiculite</td>
<td>90</td>
</tr>
</tbody>
</table>

Table 3. Percentage of Total World Production of Selected Commodities produced by SSM

There are many factors which affect the overall output and lead to inefficiencies in the SSM sector including

- Insufficient incentive for legal operation.
- Liquidity problems.
- Inappropriate mining legislation.
- Lack of machinery and spare parts.
- Lack of basic mining knowledge.
- Lack of safety.
- Poor working conditions.

1.1.3 Poverty

The question of whether SSM causes, increases or sustains poverty within communities or whether poverty in itself drives people into the SSM sector is a difficult to answer. It should be remembered that many of the individuals are only operating in the SSM sector because they have no other choice and this form of work has become the mainstay of many rural economies.

The problem is that both SSM and governments are caught in negative circles of cause and effect. The use of inadequate mining and processing techniques leads to low productivity of operations and low recovery of valuable minerals, which in turn results in low revenues and the inability to accumulate funds for investment. The lack of funds to improve methods and acquire appropriate equipment traps artisanal miners in crude, inefficient mining and processing closing the negative circle.

Inadequate techniques

Low recovery and productivity

Inability to invest

Poor health and safety, environmental damage

Low income and savings

Negative Circle Affecting Small-Scale Miners

Source: World Bank IEN Paper No.8 – Regularising Informal Mining, editor B. Mamadou
They perceive that mining is the only way that they can earn an income that will support their families. The fundamental problem is that the miners are trapped in negative circles of cause and effect. People are encouraged into the SSM sector in the hope of rising above basic subsistence levels. Once within the employment of the sector there is usually little chance of fulfilling this desire as they become caught in a negative circle and continue to live in poverty. From this, it can be seen that SSM can be either the cause of poverty or the result of poverty with neither really taking precedence.

A clear example of extreme poverty and destitute conditions driving communities into the SSM sector occurred during the 1973-74 and 1984-85 droughts in southern Africa. These droughts led many rural populations, whose crops had been decimated, to find other sources of survival. SSM supplied many of them with an income relatively rapidly and, with its high labour intensity, provided an answer to the under-employment. It also reduced rural-to-urban migration by providing work to rural people who would have left had this alternative not existed.

Another particularly unfortunate and unacceptable aspect of the SSM sector is the use of child labour (as noted by the International Labour Organisation). This problem is usually a direct result of extreme poverty where families depend on their children’s pay as part of the household income. Because of their small size child labourers are used to mine hard-to-reach deposits. They are also employed in more routine activities, to haul ore or concentrate or to assist in preparing food. Due to the illegality of using child labour and the remoteness of the areas in which it occurs, reliable estimates are not available as to the number of children engaged in these activities.

Many of the multilateral aid agencies are interested in SSM because a major part of their mandates are to alleviate poverty and small-scale miners, although they may be more wealthy than their compatriots, are poor. Indeed the mere existence of informal mining is intimately linked to poverty and the lack of alternative employment in other sectors such as agriculture. This critical belief is now held by many of the international aid agencies (World Bank, United Nations, etc.) who recognise SSM as a poverty ridden sector.

Until relatively recently many Governments showed little interest in the sector because the small-scale miners have very little political influence and in most instances provide no tax revenues. In addition, they usually operate far from government control (e.g. in the rainforest interior of Guyana and Suriname) and their activities are typically inefficient, illegal, unsafe and environmentally damaging. They are also often a source of conflict with the major mining companies that most developing countries are trying so hard to attract. Frequent conflicts also occur between the miners and major landowners or agro- and forest projects or sometimes from the encroachment of SSM into national parks or nature reserves.
As many of these mining companies begin to explore further afield for future production, the proportion (as opposed to the actual quantities) of some minerals (mainly gold and diamonds) produced by SSM is likely to decline. Paradoxically, the recent dramatic fall in the gold price will probably increase the numbers of small-scale miners, because large mines may be forced to close and redundant workers need to seek an alternative livelihood. Many of the miners employed by large mining companies are unskilled, their only training being in the rudiments of mining provided by their employer. When such unskilled workers are made redundant finding an alternative source of income in their locality can prove difficult. SSM offers these workers a chance to use their basic mining skills and knowledge whilst attempting to provide an income. This has recently occurred in Ghana where a major gold mining company was forced to make redundant a significant number of workers many of whom turned to SSM as an alternative source of income.

In view of the global extent of SSM and its association with chronic poverty there is plenty of incentive for ensuring that it contributes fully to economic and social development, whilst improving health and safety conditions and minimising the adverse environmental effects of the sector. There are numerous examples in almost all countries with a SSM sector, to demonstrate that SSM mining can generate substantial local purchasing power and lead to a demand for locally sourced items (food, equipment, tools, housing) especially in remote areas. At the national level, the export of high-value minerals from SSM makes a significant contribution to foreign exchange earnings (e.g. gold and gemstone worth US$1 billion a year are produced in sub-Saharan Africa).

1.1.4 Other Concerns

Beside the exploitation of the rural poor and less than subsistence earnings, the SSM sector is also characterised by poor working conditions, and an almost total disregard for occupational health and safety and the protection of the environment. It is widely acknowledged (International Labour Organisation) that accidents in the SSM sector are under-reported or not reported at all.

Environmental degradation can often be substantial, typified by the pillage of Rondonia in the Amazon Basin, or widespread mercury pollution as occurred at Mt. Diwalwal in the Philippines or at Serra Pelada in Brazil. In other areas the degradation is more localised, although the cumulative effect throughout a region can be significant. This situation is typical of Ghana, where the World Bank sponsored mining and environmental programme is attempting to rehabilitate former SSM workings and formulate regulations and codes of practice to ensure that the future exploitation of mineral resources (small or large) is undertaken in an environmentally acceptable manner. Deforestation in Ghana, loss of fertile soils in Tanzania, heavy metal contamination in Suriname, and river silting in Guyana are just a few examples of the environmental problems that plague the SSM sector.
Illegal operations have no wish to draw attention to themselves and the fact there is frequently no form of compensation or social security provision for injury and even for death can mean reporting an accident will merely lead to unwanted administrative, legal and operational problems. Anecdote, observation and news of the occasional disaster in the media throw some light on the situation, but not much.

A combination of lack of resources, lack of non-application of safety regulations, lack of awareness, illiteracy, lack of training, inadequate equipment and remote location all point to the likelihood of there being more accidents in many small-scale mining operations than in larger, more formal, more public mines. On the other hand, the nature of small-scale mining (low level mechanisation, low insensate of operation) means that some of the risks can be lower than in large, formal mines. Be that as it may, many fatal and disabling accidents do occur in small-scale mines, and as elsewhere, can be considered to be preventable.

Underground and surface mines have different hazards and degrees of risk, with underground coal mines at the forefront in view of risk of fire or explosion arising from the ignition of methane and/or coal dust.


Other concerns within the SSM sector which have particular relevance to poverty alleviation are the social issues of women’s participation and child labour.

Women in SSM

Women provide up to 50% of the SSM workforce, but they do not get 50% of the rewards. There are many barriers and constraints to women’s participation, not all of which are gender based. A women specific approach may be necessary to overcome existing imbalances between men and women in some aspects of SSM.

Measures to improve women’s participation include the provision of schooling for their children for the women themselves. Governments have the prime responsibility for providing these services, but may need to enlist the support of the social partners and other relevant bodies. In acting to increase women’s participation in SSM, governments should ensure that they do not inadvertently introduce other forms of discrimination. Providing easier access to finance might quickly enable women’s participation to increase. The need for assistance is clear.

Child Labour

Child labour is widespread in much of SSM and is closely linked to poverty. The more remote or informal the activity, the more likely children are to be involved. Reliable data are scarce but this does not obscure the significance of the problem. Children undertake all mining activities, often for little or no pay, to the detriment of their growth, intellect, and health. They face a bleak future unless steps are taken to reduce poverty, increase education opportunities and remove them definitively from this hazardous work.

Employers’ and workers’ organisations can help SSM to become more efficient thus generating more income and eliminating the ‘need’ for child labour. Governments must improve data collection using, where necessary, the resources can expertise of IGOs and NGOs. The immediate removal of children from the most hazardous work should be accompanied by measures to ensure that family income does not suffer.

It is also appropriate to highlight the benefits that the SSM sector brings to developing countries. These include, but are not limited to:

- SSM usually fits in well with the existing social structure, particularly if seasonal operations are required because of agricultural production in the same area (some West African countries and the Indian Sub-Continent).
- The nature of SSM enables it to operate in remote areas with little infrastructure, thereby allowing the exploitation of mineral deposits that would be uneconomic to mine by other means.
- SSM generates employment, income and nurtures entrepreneurial skills in rural areas and can therefore act as a deterrent to urban migration.
- SSM can sometimes contribute more to the local economy than the larger international owned mines.
- SSM can lead to a diversification of the minerals sector and a reduced dependence on basic mineral commodity imports.

1.1.5 Interaction with Large-scale Mining

The relationship between established mining companies and the SSM is often fragile, with the Companies being wary of the activities of the small-scale miners for a range of reasons, often with some justification, especially when they encroach on the mine property. Confrontation has increased over the past decade as the new mining and investment codes adopted by developing countries (especially in sub-Saharan Africa) have succeeded in attracting increased foreign mining investment. These companies can face considerable difficulties if they become directly involved in removing the small-scale miners from their concessions.

Mining companies are increasingly finding it more productive to adopt a diplomatic solution rather than physical security measures which can leave them vulnerable to accusations of human rights violations and hostility to indigenous peoples. Indeed, many mining companies are unknowingly indebted to the SSM sector as numerous large mines are situated on sites of past SSM activity. Today many exploration companies target areas of historical importance to SSM in the hope that the surface outcrops of the orebody exploited by the SSM will continue at depth or be worthy of large-scale mining. The following are examples of interaction between large and small-scale mining.

**South Africa** – Ingwe coal mining company leased a small area that was unsuitable for underground mining to a group of ex-workers who wished to establish their own small-scale coal mine (Kuyasa).

**Namibia** – a group of small-scale miners has been assisted in establishing a legal and economically viable tin mining operation following the cessation by a company which for many years bought tin concentrates from small-scale miners at Uis.
In developing successful partnerships with small-scale miners and their community it is important that the mining company communicates its needs in a non-threatening way, at the same time learning the community’s wants and trying to incorporate them into the company’s strategy for development and operation. Critical issues for the company and community include:

<table>
<thead>
<tr>
<th><strong>Company</strong></th>
<th><strong>Community</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid confrontation with small-scale miners</td>
<td>Maintain access to viable mining areas</td>
</tr>
<tr>
<td>Keep small-scale miners out of main working areas</td>
<td>Improve quality of life</td>
</tr>
<tr>
<td>Achieve stable, longterm relationship with community</td>
<td>Have opportunities for stable employment</td>
</tr>
<tr>
<td>Avoid uncontrolled influx of people</td>
<td>Acquired rights as miners respected</td>
</tr>
<tr>
<td></td>
<td>Economic impact of mine in the community maximised</td>
</tr>
</tbody>
</table>

Areas in which larger mines could be of assistance to small-scale mining include:

- Providing affordable assay services
- Sharing geological and other technical information with small-scale miners
- Providing practical training and technical advice
- Helping to set up or sponsor small-scale central processing plants
- Buying services, tools and equipment from the local community
- Assisting with the procurement and storage of explosives
- Providing custom milling services and workshop facilities
- Buying and treating tailings (directly not through intermediaries)
- Releasing land that is suboptimal for large-scale mining
- Providing emergency assistance and mine rescue

*Source: International Labour Organization TMSMM/199 – Social and labour issues in small-scale mines.*

**Zimbabwe** – prior to the establishment of Shamva Mining Centre small-scale miners in the area used the services of the nearby large mines for milling their ore for a fee.

**Ghana** – Gold Fields has proposed a three pronged approach to dealing with the severe problems it had with over 5,000 illegal small-scale miners: strengthening small-scale mining (by setting aside specific areas that are suboptimal for large-scale mining to the small-scale miners); encouraging economic development; and ensuring the enforcement of regulations.

**Venezuela** – Placer Dome has in place a number of initiatives as part of a programme (Proyecto Pequeña Mineíra) of institutional co-operation with small-scale miners at its Las Cristinas gold mine and at the Los Rojas site.

**Colombia** – Carbocol has formulated and administered a scheme of technical and financial assistance to small-scale coal miners in the south of the country.
The need for greater collaboration and co-operation between the various stakeholders in the SSM sector is being addressed by the Business Partnerships for Development Programme (BPD). The programme is designed to study, support and promote creative involvement of businesses as partners alongside governments and civil society for the development of communities around the world. BPD is a network of private companies and institutions, central and municipal governments, non-governmental organisations and donor agencies. Under the Natural Resources Cluster (NRC) sector of the BPD programme they have instigated several projects around the world which attempt to address this issue (e.g. Sarshatali in India, Kelian –Rio Tinto in Indonesia, Las Cristinas – Placer Dome in Venezuela). The co-convenors of the NRC are the World Bank group, BP Amoco and CARE International UK.

The Natural Resource Cluster (NRC) is representative of private corporations engaged in the exploration, design and operation of projects which create a broad based economic impact. The NRC studies, supports and promotes strategic examples of tri-sector partnerships involving oil, gas and mining companies alongside government and civil society. Our objective is to explore the role of tri-sector partnerships in finding answers to key social challenges confronting natural resources projects, in particular to address the following:

- More equitable, visible and self-sustaining economic development in the region of operation
- Increased local opportunities for health, education and employment
- Good governance and more equitable royalty revenue distribution
- Effective resettlement and income restoration
- Reduced community dependence on companies in resource poor areas
- Effective social investment in situations of violent conflict
- Maintained social investment during periods of suspended operations
- Alignment of social investment best practices between corporations operating in the same region
- Management of inward migration
- A culturally responsive approach to co-operating with indigenous peoples

Source: Overview of BPD and the Natural Resources Cluster – Working Paper No.1, CARE International UK
1.2 TERMS OF REFERENCE

The research project was undertaken under DFID’s Knowledge and Research (KAR) Programme as part of the British Government aid and technical assistance to developing countries. The terms of reference were as defined in the document supplied by DFID and completed by Wardell Armstrong (Ref: Section 3, project No. R7181, File No. ENA 832540024A). The logical framework (Appendix E) was subsequently revised to slightly refocus the methodology of the project and this version was sent to DFID with the interim Progress Report.

The purpose of the project was to “Design the requirements of a model scheme for the provision by central authorities, such as Ministries of Mines, of programmes of assistance to small-scale miners with the application of technology, adherence to health and safety legislation, protection of the environment and improved output”. It should be noted that DFID’s specific aim for the project, in common with their more general ambition, was to focus on the poverty within the sector and highlight the best ways of mitigating that poverty.

The primary activities of the project, as detailed within the logical framework, will be described in more detail later in the report but it is worth highlighting DFID’s own comments as regards the reasons for the high priority attached to this project. “…Multilateral donors are generally involved in the programmes of sectoral reform that lead to the new legislative frameworks. The donors frequently seek to encourage their client nations to put in place programmes of assistance to small-scale miners, since such miners are perceived to be both poor (and in need of support for this reason) and hazardous to themselves and to the environment. The programmes that are set up are generally ad hoc reactions to such donor encouragement and fail. What is needed is an extensive investigation, based on broad experience and consensus, into what kinds of services should be provided to small-scale miners, how they should be delivered under different circumstances, and how they should be structured and paid for.”

1.3 PROJECT OVERVIEW

In analysing SSM worldwide it is important to understand the multi-faceted nature of the sector. There are a number of issues/ components that go to make up a successful SSM project, all of which have to be in place in order for the sector to contribute real benefits to both the miners who work in it, the people in the surrounding area and the national Government. Whilst many of the various facets associated with SSM are found all over the world the one common denominator is the abject poverty associated with the sector.

Much has been researched and written about the debilitating effects of SSM on the communities and surrounds in which it operates and much laudable work has been undertaken in order to try and mitigate these social and environmental problems. It should
be remembered, however, that many individuals are only operating in this sector because they have no other choice. They perceive that mining is the only way that they can earn an income that will support their families. It is also true that many of the detrimental social and environmental consequences (e.g. child labour, lack of education, sub-standard sanitation, deforestation, river silting, mercury pollution, etc.) of SSM come about, not as a result of deliberate, malicious intent but as a result of ignorance and lack of financial resources.

---

**Tri-Sector Partnership Approach**

*Source: Overview of BPD and the Natural Resources Cluster – Working Paper No.1, CARE International UK*
It is clear that assistance to the sector requires radical reform if it is to be turned into an industry that provides a net benefit to all concerned. It is also clear that the focus of any reform should be to provide the financial empowerment to small-scale miners that will then act as a catalyst to other miners who also wish to improve their financial position. The best inducement to miners to act within the legal structure, and with due regard to health, safety and the environment, will be to see other miners who have benefited financially from working within the legislation and who have been aided by the Government to do so.

The approach should therefore be all encompassing, dealing with each of the relevant issues that are fundamental to the sector. An integrated approach should give the organisational and legal aspects, management techniques, environmental and social issues at least the same priority as technical issues or the supply of equipment. An assistance programme that endeavours to solve one aspect of the sector alone but ignores the others, while being well meaning, is likely to provide little more than superficial gains and little long-lasting impact. Above all, if there is a genuine desire to draw the SSM sector into the formal business community there must be an acceptance that financial empowerment and gain is part of the process. The aim should be to encourage the miners to be entrepreneurs, to allow them to develop and grow and not to constrain and hinder them. Although it is advocated that any assistance programme should be essentially non-discriminatory there may often be a rationale for trying to identify a small group of miners to aid initially in order that they can be used as an example to others. This approach might be appropriate in concentrating the limited resources of the Government on a key objective and hopefully avoid resources being spread too thinly over a wide area and achieving little.

The choices for dealing with the small-scale mining sector are stark and broadly fall into three categories, namely:

a) Try to stop SSM (and therefore eliminate the associated problems). This choice hardly warrants serious discussion for a number of obvious reasons, particularly that the sector is so large and well established.

b) Maintain the status quo by attempting to undertake ad hoc assistance programmes that are often aimed at the symptoms and not the causes.

c) Undertake a radical, co-ordinated reform of the sector, in a phased approach, by tackling all of the relevant issues and attempting to bring the sector into the formal business community.
Small-scale mining can be viable and valuable economic activity. With attention and integrated financial, technical and social inputs, the development of an efficient, effective and appropriate sector is possible.

Although SSM can lead to a wastage of non-renewable resources and can be hazardous to human and environmental health, it can also enrich nations by virtue of its low investment costs and short lead time required from discovery to production. It utilises otherwise unexploitable small deposits, employing low-skilled labour in rural areas and encouraging indigenous entrepreneurship.

Source: The Significance of Small Scale Mining for Developing Economies, M. Allison et al, Small Mining International

The primary issues that have been identified by in this study as fundamental to improving the general management and the respective production, safety and environmental performances of the small-scale mining sectors in the developing countries are:

- Defining a model government institution, unit or set-up to handle and/or manage the small-scale mining sector.
- Establishing an enabling and appropriate legislative framework and licensing scheme for small-scale mining operations.
- Defining relevant and consistent occupational health and safety standards and practices and providing appropriate training on these issues.
- Establishing appropriate and realistic environmental protection principles and practices.
- Addressing the social welfare and gender issues that plague the sector.
- Delineating or defining the overall mineral potential for small-scale mining exploitation addressing the reliability and suitability of the deposit in terms of reserves and mineralogy to SSM.
- Establishing a self sustaining technical assistance and training scheme for small-scale miners.
- Providing a viable and efficient financing and banking scheme for small-scale miners.
- Providing a simple and effective marketing system for small-scale mining products.
2.0 METHODOLOGY

The data gathering process was undertaken over a 10 month period with the collated information being obtained by four primary means:

- Literature Survey
- Country Survey/Questionnaires
- Country Visits
- Project Surveys

These surveys and visits were performed simultaneously to ensure each was allocated the maximum time.

2.1 LITERATURE SURVEY

The project provided for a preliminary desk study to survey what is generally known about SSM. This survey utilised the extensive library facilities within and computerised databases of various institutions including:

- The Institute of Mining and Metallurgy
- The British Geological Survey
- The Royal School of Mines
- Centre for Energy, Petroleum and Mineral Law and Policy
- The Mining Journal

The sourced data included technical papers, proceedings of international conferences, multilateral aid agency reports, reference books, government reports and NGO reports. These documents were all assimilated and key points and issues considered and abstracted when the policy section was formulated. Appendix B – Bibliography details the numerous documents that were utilised in this study. The lack of resources of many Mines Departments, and the general desire to avoid drawing attention to the illegal or quasi-legal SSM sector may also perpetuate the general scarcity of relevant information.

Although the bibliography detailed in Appendix B appears comprehensive the variation in quality and depth of information, descriptions and analysis was considerable. There were numerous papers describing the SSM sector of a variety of specific countries giving basic details of the economic geology, methods of exploitation and production statistics. Such country case studies were particularly popular in the numerous conference proceedings on SSM (e.g. US Society of Mining Engineers, Royal School of Mines/Institute of
Mining and Metallurgy, Geological and Metallurgical Institute of India, etc.) and gave a sufficiently detailed world overview of the SSM sector in countries in Africa, Asia, South and Central America, and Eastern Europe. This information highlighted the global extent of the sector and initially influenced which countries to approach with questionnaires.

Other noteworthy papers within such conference proceedings were the occasional project specific papers giving descriptions of a variety of funded projects. Although these papers appeared to provide a comprehensive insight into each individual assistance project, they were very specific and further emphasised the past preference by aid agencies to concentrate on single issues affecting the sector such as mercury abatement (e.g. in Suriname or Guyana) or mineral recovery improvement (e.g. Zimbabwe or Ghana). Examination of the list participants/delegates to some of these conferences would conclude that such venues also provided a forum for cross-fertilisation of ideas. Such exchanges not only occur across the common north-south hemisphere split but also between countries solely in the Southern hemisphere (the so-called south-south transfer).

The articles in mining magazines and technical journals were usually brief although some highlight important SSM projects undertaken by mining companies project (e.g. the Minera Las Cristinas project with Placer Dome de Venezuela CA or the Goldfields project at Tarkwa Mine in Ghana) and aid agencies. The references within such papers highlighted more detailed source documents and information.

Of particular interest were the papers and booklets published by major donor organisations and included proceedings of numerous conferences and meetings including:

- Berlin I guidelines - Roundtable on Mining and Environment in Developing Countries (1991)
- Harare guidelines - UN Interregional Seminar on the Development of Small/Medium-scale mining (1993)
- World Bank Round Table on Artisanal Mining (1995)
- The Calcutta consensus - Global Conference on Small/Medium-scale Mining (1996)
- UNIDO High Impact Programme (1997)
- UNDP/Sustainable Livelihoods - Artisanal Mining (1999)
- World Bank consultative committee (CASM) (1999)

These meetings were driven by concerns about the negative aspects of SSM and the need to publicise the successful strategies that some countries (Ghana, Tanzania, Philippines, Colombia, etc.) have initiated to improve the sector. Such papers give a more
unbiased and realistic view of the SSM sector than many of the papers written by authors employed, or intimately connected with, Government organisations, as they are not affiliated with any specific national institution. These papers identify the inherent problems and attempt to propose pragmatic solutions. They addressed the social and economic implications of the sector rather than just the technical aspects. They also echoed observations from the field trips and a number of points that were raised in discussions with other SSM experts. The ILO papers on the social and labour issues (particularly women and children) in SSM were very comprehensive and were the most relevant to the project since they discussed the fundamental problems facing this sector and the requirement for a more holistic approach.

2.1.2 Conclusions from the Literature Survey

Compared to large-scale mining the quantity and quality of available information is low. However, as the literature survey stage was used as the groundwork for the more detailed and specific field research the sparseness of data did not hinder the overall research. The collated literature was studied in detail and many of the discussions and conclusions cited in these documents corroborated and reinforced our own observations from the field.

Although no definitive conclusions were expected from the literature survey, many principal issues affecting the SSM sector were initially raised during this survey. As this desk study was the first stage in the research it would have been premature to attempt to draw broad conclusions without the benefit of first hand experience and discussions with people in the field and/or organisations/institutions involved in SSM. However, the literature survey did provide a strong foundation upon which subsequent research was conducted and it allowed the team to more clearly focus this work by highlighting the key issues and identifying the countries and regions where there is a significant SSM sector.

Field observations and responses we received to questionnaires (Section 2.2 and 2.3) were recorded and analysed independently of the conclusions drawn from the literature survey. Subsequent comparison confirmed that our findings and observations were generally in agreement with previously documented reports on the sector (e.g. the World Bank International Roundtable on Artisanal Mining and the International Labour Organisation tripartite meeting on Social and Labour Issues in Small-Scale Mines).

2.2 COUNTRY SURVEYS/QUESTIONNAIRES

To justly compare the various small-scale mining countries a detailed and structured questionnaire was formulated to try and extract relevant SSM information. The questionnaire addressed key issues identified in the preliminary stages of the project dealing with, the institutional capacity, NGO capacity, legislation, licensing, marketing, production statistics, and projects. It was assumed that such a structured format would be relatively simple to complete with the required data being already recorded and documented by the relevant authorities in the country. This format would subsequently facilitate the extraction and comparison of data from the numerous countries.
Initial enquiries were made to the consular offices in London of many of the SSM countries. Although it was intended to use this stage to decide which countries to send a questionnaire to, the modest level of response left us no alternative but to send them to all the countries identified. A total of 68 surveys were sent to the Ministries of mines (or equivalent) in the respective countries. Only 17 questionnaires were returned completed – a 25% response rate.

There are numerous reasons for this low response. It is considered likely that one, or a combination of the following reasons may have been the cause of the relatively low rate of response.

- The multi-sectioned format of the questionnaire would have meant that the document would have had to be passed through various departments at each ministry, resulting in its priority diminishing.
- Bureaucracy within the various institutions would have hindered the movement and completion of the document, with no single individual being responsible for the responses.
- Lack of resources or tested mechanisms to deal with such requests.
- A general misunderstanding about the reasons for requesting information.
- The low priority of SSM on many developing countries’ agendas.
- The length and design of the questionnaires.

2.2.2 Conclusions from the Country Survey

The questionnaires that were returned gave a clear idea of the SSM sector in the respective countries. Appendix C contains a summary of these questionnaires. Responses from governments of many of those countries that did return the questionnaire indicate that small-scale mining is a priority concern and the apparent lack of government activities in the sector is due mainly to lack of resources. The responses highlighted various degrees of institutional capacity, legislation, mining activity and some of the problems. Many of these facts have been incorporated into the Recent Experience section.

There appeared to be no logical reason why the countries that did respond, did so. These countries had no obvious association and therefore it was concluded that the response was random and effected only by the reasons stated above. The somewhat disappointing response does not reflect the general consensus noted by many of the principal aid agencies (notably the World Bank, United Nations and International Labour Organisation) which state the SSM sector as a priority concern for many developing countries.

The low-level response to our survey makes the task of accurately comparing countries and collating the maximum amount of data very difficult. Many of the countries that did not respond have significant SSM sectors and would be worthy of assistance. Without an initial demonstration of commitment to their own nation’s SSM sector it is difficult to
justify allocating more resources to extract more information, especially in view of the enthusiastic and co-operative response from other countries. Although this method of ‘filtering’ the countries is imperfect it seems only logical, given the limited time and resources that must be allocated to a study of this sort.

The level of response also meant that information concerning the full geographical and mineralogical spread of SSM that we desired was not obtained. This restricted the overall global view of the sector although numerous published papers on individual country SSM sectors filled in some of the geographical areas that were lacking. However, this did not furnish all the required information for completion of the questionnaires.

2.3 COUNTRY VISITS

To gain a more detailed understanding of small-scale mining a number of country visits were organised. The selection of the countries to visit was based on a combination of the findings of the research, prior knowledge SSM activity in the country, the degree of co-operation extended by the Ministries/NGO’s in the country and the constraints and logistics of travel within the country. It is acknowledged that this precluded many countries, and thus the selection probably did not provide a truly global analysis. However, finite resources dictated that from a relatively early stage in the project some from of selection criteria had to be adopted.

The final selection attempted to produce a reasonable geographical spread of countries and examine a variety of commodities. The countries visited included:

- Ghana - gold, diamonds, soapstone, industrial minerals.
- Tanzania – gold, diamonds, semi-precious stones, tin, tungsten, magnesite, and mica.
- Guyana – gold and diamonds.
- Philippines – gold, aggregates, chromite, copper, silver, zinc, decorative pebbles, and aggregates.

Minor trips with no field visits (due to finite resources or logistical problems) and only discussions with institutions and NGOs engaged in the SSM sector

- Mali – gold and semi-precious stones.
- Cote d’Ivoire – gold and diamonds
- South Africa – gold, clay, coal.
- Suriname – gold and diamonds.

During each country visit an attempt was made to meet the respective Ministry, NGO’s, SSM associations, and all other organisations involved directly or indirectly with the SSM sector. Various reports and legal documents (including mining, environmental, health &
safety, and labour legislation) were also collected during such visits. The country visits proved to be the best method of obtaining information and understanding the fundamental issues of the SSM sector. In order to get a more accurate and unbiased understanding, a number of field visits were undertaken in the countries that we were able to arrange such visits.

2.3.2 Conclusions from the Country Visits

The findings and conclusions from the discussions with the various organisations and bodies involved with the SSM sector are summarised in Section 3. During the field visits the various methods of mining undertaken by the small-scale miners were observed. These varied considerably depending on the nature of the orebody and the general terrain.

- Conventional surface pits, and some shallow underground workings, being excavated by hand for gold, precious stones, industrial minerals and building materials were observed in Ghana, Tanzania and Zambia.

- In Guyana the application of water monitors to wash away the ground and mobilise the gold and diamond bearing strata was observed. Also in Guyana we saw the use of floating dredges used to suck up the mineral (gold and diamond) bearing alluvial deposits in the riverbeds.

- A technique known locally as ‘compressor mining’ was observed in the Philippines. This required a miner equipped with a diving mask and a rubber hose (attached to an air compressor) to dive in a shallow flooded hole to extract the mineral bearing muds.

The methods of mineral processing also varied and included:

- For gold and diamond bearing ores, the use of sluice boxes, lamellas, shaking tables, nelson concentrators, etc.

- For industrial minerals and building materials basic crushing and screening and in some cases washing.

Where convenient and practical, semi-structured interviews and open discussions with willing miners were held. Such discussions covered all aspects of the SSM sector including, geology/exploration, licensing, institutional set-up, technical assistance, training, credit, marketing, health & safety, environment. The discussions highlighted more of the social, financial and in some cases personal problems experienced by the miners. Virtually all the miners with whom we talked with mentioned the following:

- The basic and usually isolated living conditions
- The difficulty of accessing finance.
- The problems of ‘tied-finance’ and having to sell their produce to their financiers at a below average price.
- Discrimination towards SSM by main Institutions in favour of large-scale mining
particularly when there is a potential conflict over concession rights and over the length of the leases and conditions of their renewal.

- The difficulty of gaining a fair price for the produce.
- The problems of expense of basic commodities (fuel and food) in isolated locations.
- The desire to improve their standard of living and find a more productive occupation.
- Resentment toward large-scale mining companies due to perceived attempts to dispossess them of their livelihood in favour of large-scale mining.
- The feelings toward the various institutions and NGOs created to monitor, regulate and assist the miners varied from a good relationship to complete mistrust and animosity.

During the field visits we were also given the opportunity to examine the environmental impact of small-scale mining operations. In general the areas were devastated with significant loss of vegetation and to the detriment of indigenous fauna. Open excavations were seldom infilled and tended to fill with water creating stagnant bodies of water perfect for mosquitoes to breed in and spread malaria and other insect borne diseases. The miners simply do not have any motivation or time to backfill these excavations as such a task would not pay. Reforestation and such environmentally friendly actions simply do not figure in the small-scale miners agenda for obvious reasons. Where in situ alluvial deposits were exploited the processed tailings were randomly dumped in the rivers resulting in a silting up of the rivers making negotiation of these waterways difficult. The use of sluice boxes and other processing equipment which utilises considerable quantities of water resulted in the creation of unnatural mud deposits and silting destroying aquatic plant and animal life. The toxic and environmentally damaging nature of mercury (commonly used to extract gold) was unknown to some of the miners. This ignorance results in its careless handling and use, allowing vapour inhalation and deliberate discharge into the ground and surface waters.

The social conditions of the miners and their dependants were almost without exception very basic with no sanitation. In most cases they occupied crudely constructed dwellings built as temporary shelters but which subsequently become inhabited for many years without real improvement. These ‘shanty-towns’ vary in size depending on the extent and age of the mining. Typically there are no medical or schooling facilities in these areas. The influx of migrant workers usually causes increased problems of crime and prostitution and less respect for the local environment. Although the employment of women and children is generally common in small-scale mining this was not observed during the field visits made during this project.

2.4 PROJECTS SURVEY

Part of the data gathering involved researching the numerous projects that have been funded by multilateral aid agencies and other development organisations to assist the SSM sector across the world.

The information was gathered via personal communications, the interrogation of numerous databases and from web pages on the Internet of many of the agencies...
who have an interest in the SSM including:

- World Bank
- Norwegian Agency for Development Cooperation (NORAD)
- Danish Aid Agency (DANIA)
- International Development Research Centre (IDRC)
- The Canadian International Development Agency (CIDA)
- Swedish International Development Agency (SIDA) – including SGAB and BITS
- Austrian Development Cooperation (ADC)
- Intermediate Technology
- International Labour Organisation (ILO)
- Deutsche Gellschaft fur Technische Zusammenarbeit (GTZ) and BGR
- United Nations Development Programme (UNDP)
- United Nations Environmental Programme (UNEP)
- United Nations International Development Organisation (UNIDO)
- European Union (EU) including SYSMIN
- Care International UK

Additionally, there are numerous projects implemented by mining companies (e.g. Gold Fields in Ghana and Placer Dome in Venezuela), state owned companies (e.g. Carbocol in Bolivia) and national ministries or NGOs (e.g. Minerals Commission in Ghana and the Kwagga project in South Africa). Some agencies and organisations (World Bank and Care International UK in particular) did provide comprehensive information on their projects. Such information was reviewed and any specific findings, observations or recommendations have been included in the relevant sections of this document.

It was anticipated that the information gathered from the various multilateral aid agencies and donor agencies would provide details on numerous SSM projects and their problems, solutions and ideas. This would have been of tremendous benefit to this project in terms of ‘learning from experience’. Unfortunately, this objective was not fulfilled on account of the difficulty of obtaining the required information. This is due to the lack of response. Some of those that replied only provided information on project location, title, brief description and in some cases allotted budget. It is likely that one, or a combination of several, of the following reasons may be to blame for the poor response to our enquiries:

- Bureaucracy within the various agencies could have hindered the movement and completion of the document, with no single individual being responsible for dealing with such a request
- A general misunderstanding on the reasons for requesting information.
- A reduced priority of SSM on some agendas compared to agriculture, education or health.
- Inertia within some larger agencies to respond to such request and ignorance about its importance and subsequent use.
2.4.2 Conclusions from the Projects Survey

Obtaining titles for the various aid funded SSM projects, and their approximate budgets and current (last known) status proved relatively straightforward. Unfortunately it soon became apparent that obtaining the more crucial information on the success or failure and the problems/solutions encountered during the project was very difficult. There appears to be an almost complete lack of communication between the various organisations involved in providing funds to the SSM sector. This has an adverse impact on the sector since the millions of dollars allocated by the aid agencies are not being effectively or efficiently utilised, although the individual projects may themselves be effectively operated. In some countries there are several SSM projects being run with little co-operation or communication between them. In some extreme cases there are projects, financed by different bodies, which are running in parallel and are almost identical in their objectives. It is also common to find projects that have been designed to tackle only one issue concerned with SSM.

The poor response and lack of detail from the various aid agencies had a greater impact on this study than missing country questionnaires. Without the knowledge of the experiences, problems, and solutions from past aid funded projects it was more difficult to make tenable statements and recommendations for future aid funded work in this sector. Information was eventually sought through unofficial channels and observations rather than directly from the funding agencies. Such information, although limited, did allow us to substantiate our overall findings.

Further research on SSM funded projects (past, current and proposed) would be valuable because it might reveal countries and issues which are favourable to funding and their overall effectiveness could be assessed and allow DFID funding to be more efficiently allocated. The results of the survey carried out for this study are detailed in Appendix D.

Plate 2. Deep surface excavations for emeralds in the Ndola Area in Zambia
Plate 3. Hydraulic mining using monitors in the Mazaruni Area of Guyana

Plate 4. ‘Compressor mining’ in gold bearing gravels in the Philippines

Plate 5. Sluicing of gold bearing alluvials in the Lake Victoria region in Tanzania
Plate 6. Sluicing of gold bearing gravels in the Philippines

Plate 7. Washing of diamond bearing gravels in the Oda region in Ghana.

Plate 8. Dredging operations in the diamond Kurapong region in Guyana. Showing a worker in the pit bottom using a plastic hose connected to a small pump to remove the washed diamond bearing gravel.
Plate 9. Miners co-operative hand picking diamonds from the lamella screen in the Kurapung Area in Guyana

Plate 10. Typical sluice construction (no in operation) for gold and diamond extraction – Mazaruni Area in Guyana

Plate 11. Local four year old child hand panning, using mercury for the amalgamation of gold, in the Philippines

Plate 12. Severe deforestation caused by hydraulic mining in the Mahdia Area in Guyana
3.0 RECENT EXPERIENCE

3.1 GENERAL FINDINGS

There are a large number of factors that influence and affect the SSM sector world-wide. Many of these factors are similar throughout the various countries and commodities but several can vary substantially, affected by different cultures, religions, working practises, Government regulations etc.

In order to undertake the research it was felt necessary to subdivide the SSM sector into a number of different issue related topics. Although these issues are all inter-related, to varying degrees, this approach allowed information to be gathered in a more structured fashion. It is suggested that these issues are the principal topics that have to be addressed if the problems associated with SSM are to be successfully tackled. The primary issues that were identified by this study were:

- **Institutional Set-up and Capacity.** Ensuring that the necessary agencies/departments (including an independent environmental capacity) are in place to effectively monitor, control and develop the sector.

- **Licensing.** Producing a framework within which the SSM sector can flourish and produce a net benefit for all stakeholders.

- **Health, Safety and Environment.** Encourage increased awareness of health & safety and environmental issues and link these issues to other possible benefits that the miners might receive.

- **Mineral Potential.** Identify the resources within a country that are suitable for exploitation by the SSM sector and making the information readily accessible in a clear and concise format.

- **Technical Assistance and Training.** Deliver a variety of sustainable services aimed at helping small-scale miners to work more effectively and efficiently, thus reducing poverty.

- **Credit.** Encourage third parties to provide credit facilities to the SSM sector.

- **Marketing.** Provide the facilities and legislation to ensure that miners have an outlet for and receive a fair price for their production.

From an analysis of the extensive database collected from interviews, meetings, questionnaires and other means a number of general points arose that were not specifically related to the issues outlined above.
Some of these issues were:

**Need**

- That there are millions (estimated between 80 to 100 million) of people in the developing countries who could immediately benefit from more structured and well supported small-scale mining assistance programmes by governments. The number of beneficiaries could be considerably increased by new groups of miners who may be encouraged into the sector, as a result of the positive financial effects of government assistance programmes. It is probable that a well structured and sustainable (model) government programme on small-scale mining which emphasised the financial gain to miners, would also tend to promote an entrepreneurial approach to small-scale mining ventures. In theory such programmes would also be easier to co-ordinate, regulate and support.

- Responses from governments of many of those countries that did return the questionnaire or which were described in specific technical papers indicate that small-scale mining is a priority concern and the apparent lack of government activities in the sector is mainly due to lack of resources. This sentiment is also echoed by the agencies (in particular the World Bank, the United Nations and the International Labour Organisation) who recognise the great significance of this sector in terms of global poverty alleviation.

- No model scheme for assistance to the sector exists although various aid agencies (principally the World Bank) and Governments (virtually all of those contacted) expressed a desire to formulate one. The result of this lack of a formulated model is the ad hoc approach to assistance schemes that DFID have previously described.

**Projects**

- Available information on small-scale mining projects indicates that almost all of the small-scale mining assistance programmes are initiated to address specific or local issues, concerns or problems. Although most aid agencies have some form of assistance agenda to the SSM sector they tend to have differing priority areas on which to concentrate. For example the UN concentrates on the environmental aspects, the ILO on the child labour and occupational health and safety.

- The more wide-ranging projects are those instituted by the EU and the World Bank (mining reform projects) and the CARE International organisation, but even in these instances, small-scale mining is normally a small component of the overall project. One reason behind this is that some donor organisations have their own specific agenda, which limits their areas of assistance.

- There is evidence to show that most of the past/on-going small-scale mining projects are generally meant to control and regulate (environmental pollution) the sector. It also appears that most of these projects are “studies” rather than direct technical activities on the ground. Most of the small-scale mining projects are donor-funded (grants). However, this does not reflect lack of commitment, or low priority attitudes or policies, but mainly the funding constraints (with finite financial and human resources to cover all areas of national development) on the governments in the developing countries.
• There is little co-ordination and information exchange among donors and implementers of small-scale mining projects. This is well recognised by many stakeholders. The World Bank organised a meeting (attended by the authors) with the aim of establishing a Consultative Group on small-scale Mining to address this lack of co-ordination.

• The lack of co-ordination relates not only to the content of the schemes but also that schemes may be running independently in the same country, at the same time, operated by different agencies (e.g. DFID and CIDA providing technical assistance to SSM in Guyana) with absolutely no interaction. This has resulted in assistance schemes that overlap in terms of project objectives (except for the long term overall objective of poverty alleviation) and therefore produce less benefit to the indigenous miners while still consuming substantial resources. This is evident by examination of Appendix D - for instance in countries like Brazil, Bolivia, Ecuador, Namibia, Nicaragua, and Tanzania where there are more than three separate and independent assistance schemes in each country. An estimate of the total funding for the projects identified during this study probably exceeds US$200 million. However, these are total aid funds for general poverty alleviation not exclusively for the SSM sector. This figure could be significantly higher given that only a proportion of the projects has been identified and the level of funding determined.

• There was a surprising reluctance, on the part of some organisations, to divulge the results of the assistance schemes in which they had been involved or had financed. This attitude appears to differ from the attitude adopted by DFID who actively encourage comments and participation from third parties and have been happy to circulate the terms of reference for their projects to any interested organisations.

• Governments sometimes appear unsure as to what their long-term goals are for the SSM sector. Often they appear to be caught between the shorter-term national economic benefits that can be gained from encouraging foreign large-scale mining (often at the expense of SSM) and the idealised vision of having a formalised, mainly local, small-scale sector.

• Unlike other sectors (e.g. agriculture, water, and energy) there are very few groups (particularly NGO’s in the developing countries) who are working in the small-scale mining sector. Therefore, there is limited information on historical lessons, and experience of projects that could be used as a basis for formulation of any model assistance, thus necessitating some kind of testing before an appropriate model assistance scheme could be established.

• There is little or no long-term planning within the sector.

• There appears to be a general acceptance that trying to get rid of the sector forcibly is not a viable or sensible proposition.
3.2 ISSUE RELATED FINDINGS

3.2.1 Institutional Capacity

The institutional capacity to govern the SSM sector has to fulfil both a regulatory role and a training/assistance role. The former ‘polices’ the sector, by issuing and checking licenses, arbitrating disputes and ensuring adherence to legislation. The second role aims to assist the small-scale miners in terms of monitoring production and providing training and advice. From Government’s point of view there are logistical and economic benefits for combining these roles into a single institution. However, such a combination reduces the effectiveness of both objectives due to general suspicion from the small-scale miners. They see a conflict of interest because the same people that are encouraging them to adjust the methods of working also want to monitor production, enforce regulations and demand taxes.

1. In most cases only a regulatory unit is present, and in a few instances the same unit is also tasked to provide technical assistance. A dedicated Technical Service Unit (TSU) rarely exists. Units are often under-resourced in terms of cash and people.

2. The current trend in policy making is to encourage SSM integration into the formal mining industry; but in general, promotion of the mining sector in developing countries remains biased towards large-scale mining, with the aim of attracting foreign investment.

3. A large proportion of small-scale miners continue to operate outside the regulatory framework. This suggests that they see disadvantages from working within the formal sector, that legal and regulatory provisions are inappropriate, or that the institutional capacity to implement such provisions is lacking.

4. Decentralised regulation - by local government becoming involved in the licensing processes (Philippines) or even managing the mineral resource itself (Zimbabwe). Alternatively, the Ministry of Mines may have local/regional offices which regulate/issue SSM permits - examples, Ghana, Zambia, Philippines, Tanzania.

5. Monitoring and enforcement of legislation is rarely carried out effectively, due to lack of resources (common to many countries). Laws are often inappropriate (Tanzania - limited area covering tanzanite licence). Sometimes enforcement is not undertaken due to other reasons such as intimidation or bribery.

6. PNG has a specific department in charge of small-scale mining based at head office with extension officers in selected parts of the country; the main role of extension offices is to provide assistance to small-scale miners, but they also function as safety inspectors. Their role in issuing SSM permits mainly involves receiving and processing applications.

7. There is commonly a large degree of mistrust between miners and the Regulatory Units. This often hampers the ability of the units to provide other services because the miners feel that they have ulterior motives.

8. Ghana has created a separate division in the Minerals Commission to oversee the
SSM sector. The Commission has ‘mines officers’ in all the principal mining districts whose role is to police the SSM activity by ensuring regulations are adhered to, checking licenses, collecting fees and providing technical assistance. In Tanzania Mining Zonal Offices have been established but those are still not fully operational.

9. Philippines has established a Small-scale Mining Unit based at its central office and is replicating the unit in the existing regional mining offices. This unit is aimed mainly to provide technical services, but it is under-resourced.

10. Zambia continues to establish regional offices to issue artisanal mining licenses, but only receive and process SSM licence applications, which are then determined by the Director at head office.

11. South Africa has produced a “National Small Scale Mining Framework” which was contained within the White Paper on Minerals and Mining Policy. The proposals included; access to finance for small-scale miners to be encouraged and all spheres of Government to work towards encouraging SSM with reference to Local Economic Development Strategies. The framework consists of two components - a National Steering Committee of service Providers (NSC), and Regional SSM Committees.

12. The South African NSC will assist in geological resource evaluation, business planning, promotion and finance. It has been split into three working groups, which are finance, capacity building and mineral rights. The NSC, which has a proposal for an initial budget of R2 million, intends to identify projects to test the support capacity of the committee and also to create mechanisms to extend technical and financial support to SSM projects. This is viewed as a transitional body with the aim of establishing a self-financing SSM Development Foundation. A national database will also be formed, combining information that is currently residing in several Government Departments.

13. The South African Regional SSM Committees will have active participation from all Government departments. They are intended to act as an agent to identify the nature and extent of problems that are created by SSM operations. The provincial Department of Minerals and Mining will vet licence applications.

3.2.2 Legislation and Licensing

Legislation within new Mining Acts often comes about as a result of imposition by donor countries according to their political requirements. Since there is no local political will to enforce such legislation, for which no political consensus exists, the process creates “dead” law. Imposed legislation creates rules which are not accepted and which are frequently violated. The most important aspect of legislation and licensing for SSM is therefore to create the political awareness of the issues and the potential benefits. The creation of a consensus process involving all stakeholders in the mining sector should provide the political will required to formulate enabling legislation.
1. Most SSM legislation is meant to regulate and control the sector, not encourage it.
2. SSM is generally perceived as a national undertaking that should remain in the hands of nationals of the country concerned.
3. Except in a very few cases, SSM legislation generally has a countrywide application. (Brazil is an exception).
4. SSM is very rarely recognised as an industry and therefore receives little support of any kind. There is rarely any effort made to encourage it. Often the opposite is true.
5. Most of the major issues connected with small-scale mining – including illegal trading, health and safety, environmental degradation, and taxation; but not labour matters – are addressed by existing legislation. In Guyana there is a minimum age of employment of 17.
6. The current trend in policy making is to encourage integration into the formal mining industry; but in general, promotion of the mining sector in developing countries remains biased towards large-scale mining, with the aim of attracting foreign investment.
7. A large proportion of small-scale miners continues to operate outside the regulatory framework. This suggests that they do not see advantages from the legislation, or that legal and regulatory provisions are inappropriate, or that the institutional capacity to implement such provisions is lacking.
8. Nearly all the legislation recognises the difference between extraction of minerals for commercial purposes and personal use. Landowners, for example, usually enjoy free access on their own land to natural materials used for building or fertilisers.
9. SSM permits generally provide only short-term licenses, for one year (Guinea, Ethiopia, Uganda, Philippines, Guyana, Kenya, and Malawi) to two years (Namibia, Mozambique, and Philippines). Zambia and Ethiopia are the most notable exceptions, offering 10-year licenses.
10. SSM licenses generally cover small areas of 20 hectares or substantially less; but the area may vary according to the type of mineral being mined and the legal
status of the applicant. Often licences are granted relating to the ground surface with no consideration as to what actually happens underground or due regard for the geology of the deposit. In the Tanzanite mines in Arusha, surface licence areas are only 100’ by 100’ but miners go anywhere underground, resulting in frequent accidents and unsafe conditions. The large number of deaths, from drowning, that occurred in this area in late 1997, was as a direct result of underground intersections by different claimholders).

11. SSM licenses are normally treated as transferable assets (exceptions include Ghana, Morocco, Namibia, Senegal, Sri Lanka and Papua New Guinea) subject to Government approval.

12. There are several types of licensing arrangement which include Informal (no written permit issued), general pronouncements (which entitles land owners to have access to minerals within their land for their own use - Philippines for guano and aggregate), depth or strata limitations (permit covers only a certain horizon PNG gold mining, Zimbabwe alluvial gold, Philippines - 50 meters deep, Ethiopia - 15 meters deep), Group permitting (Philippines and Zimbabwe), by type or name of mineral (very common), phased licence for exploration, extraction and marketing (Zambia) as against a Single licence to cover all operations, which is more common.

13. Most existing SSM legislation provide restrictive provisions (ban on the use of explosives and machinery, limited depth of extraction, short duration of license, etc.) which hinders the development of a sustained local small-scale mining entrepreneurship.

14. The relationship between land ownership and mineral ownership is often unclear.

15. The reasons for licence refusals are not always given.

16. Licence holders often “sit” on properties undertaking as little work as possible in the hope that they will be bought out at some point in the future.

### 3.2.3 Health and Safety

In general the SSM sector provides poor working conditions, and an almost total disregard of occupational health and safety. It is widely acknowledged (International Labour Organisation) that accidents in the SSM sector are under-reported or not reported at all. The likelihood of there being more accidents (than in larger, more formal, more public undertakings) is increased by a combination of lack of resources, lack of non-application of safety regulations, lack of awareness, illiteracy, lack of training, inadequate equipment and the remote location of many SSM operations.

1. It is widely acknowledged that accidents in SSM are under-reported or not reported at all.

3. A combination of a lack of resources, lack of non-application of safety regulations, lack of awareness, illiteracy, lack of training, inadequate equipment and remote location all increase the probability of there being more accidents in many SSM operations than in larger more formal mines.
Small-scale mining is an important part of the social and economic infrastructure in many developing countries and should be accorded sufficient attention to ensure its continued contribution to local and national well-being. This contribution will not be fully realised until more attention is paid to improving the occupational health and safety of mineworkers and their communities. In several countries in Africa, Asia and Latin America, the small-scale production of gold and gemstones ranks in the top five of the of national production, yet small-scale mining is largely ignored as far as safety, health and the environment are concerned. Indeed, prevention measures for accidents or occupational safety, if they exist are minimal and rarely enforced.


4. Underground and surface mines have different hazards and degrees or risk, with underground coal mines (e.g. China, India and Pakistan) being the highest due to the risk of fire or explosion arising from the ignition of methane and/or coal dust.

5. The main reasons that accidents in SSM occur are varied but can be broadly grouped into management/operational-related and equipment/work-environment-related.

6. The major health risks to small-scale miners include: exposure to dust (silicosis); exposure to mercury and other chemicals; effects of noise; effects of poor ventilation (heat, humidity, lack of oxygen); effects of over-exertion, inadequate works spaces and inappropriate equipment.

7. Community health is another problem with poor sanitation and lack of clean water, malaria, cholera, typhoid, dysentery, tuberculosis, bilharzia, sexually transmitted diseases (including AIDS), malnutrition and substance abuse being commonplace.

8. The Chinese Government has enacted the ‘Safety Regulations of Small-scale Coalmines’.

9. In Tanzania (Mererani district) after the floods in 1998 inundated many small tanzanite mine killing many people a set of health and safety rules was introduced in consultation with the miners.

10. In Ecuador a written agreement between many of the mines, the Government and an NGO ensures certain health, safety and environmental standards are funded, implemented and adhered to.

11. Philippines has recently introduced a separate safety rules and regulations on SSM.

12. Philippines is the only country that has separate safety regulations for SSM (adopted only in 1997). Its impact is too early to determine; elsewhere, health and safety is usually covered by general health and safety legislation.

13. Small-scale mines are seldom monitored (to implement/promote safety practices and other concerns) by government agencies, due to lack of resources.
While various fiscal and technical concessions may be necessary to ensure the small-scale miners can operate successfully, there can be no case for compromising on safety and health issues. Because many small-scale mines operate on a shoestring there is often no question of spending scare resources to improve health and safety practices, particularly since such expenditure will not bring financial rewards in the short term. Moreover, many or all of the workers may be co-owners of the mine and therefore willing to accept a higher degree of personal risk in order to increase profit levels. Where mineworkers are employed in artisanal mines, as opposed to be co-owners, the relatively high wages that are often paid can be sufficient to make them ignore the hazards of the work. Also, unemployment in many regions is such that the mineworkers have no alternative but to accept the working conditions they are faced with. These practices, where they occur, are made possible by a lack of government safety and health regulations and inspection.

Source: Small-scale Mining: A Labour and Social Perspective, N.S. Jennings (in Small-Scale Mining a Global Overview, A.K. Ghose), 1994

14. Existing safety rules are mainly promulgated with the large-scale mining operations in mind, and many specific provisions are not necessarily applicable or are difficult to implement for SSM. For example, equipment standards and personnel supervision requirements.

3.2.4 Environmental

Problems with environmental degradation caused by SSM can vary in scale from the major mercury pollution such as that occurred in Brazil to more localised deforestation such as in Ghana. Beside varying in scale there are a variety of environmental problems that plague the SSM sector including deforestation, erosion of fertile soils, heavy metal contamination, and river silting, degradation of river banks, digging holes and trenches that endanger wildlife, etc.

1. Some environmental regulations (Zambia, Philippines, PNG, South Africa, Bolivia, Ghana, Bolivia, and Ethiopia) require SSM applicants to incorporate environmental protection plans that must be approved before a mining license is granted.

2. Other countries (Guinea, Zambia, and Sri Lanka) require bonds to be deposited to cover any related environmental damage.

3. Ghana and the Philippines levy some kind of environmental tax on SSM output, which is used to rehabilitate areas affected by the mines.

4. In Ecuador (CENDA) an NGO is managing a unique rural development program of 63 environmental management projects forging a partnership between the Government, an NGO and a group of small-scale miners.

5. In South Africa the miners have to indicate what their proposals are in order to mitigate potential environmental problems via a simple Environmental Action Plan.
6. There is often a link between the accrued environmental benefits and resolving technical issues. For example, if the recovery of gold can be increased from 40% to 80% then the miners would only have to excavate half as much material for the same reward. Likewise if geological knowledge was better then the number of excavations that produced nothing could be reduced dramatically. Both of these examples would result in less environmental impact and an improvement in the welfare of the miners.

Environmental destructiveness is the single most visible aspect of small-scale mining. The problems include acid mine drainage; deforestation; soil erosion and river silting; and for gold mining, pollution of river systems with mercury.

Ideally all mining, including small-scale mining should be subject to the same environmental health and safety laws but recognise the special circumstances of the informal sector. To bring small-scale miners into the system, regulations and technical standards need to be realistic and achievable. Enforcement will often be needed. Ministries of mines and environment, along with local governments, will need to become actively involved in these efforts. NGOs and private companies could also play a role in environmental management.

Education and the communication of information are also key in making all interested parties, miners, governments, and the local communities, aware of the situation and encourage them to improve it. This can be done through newsletters, comics, seminars, videos, and radio and television campaigns.


7. UNEP (jointly with UNDP and UNIDO) has established a training workshop in Guyana to focus on SSM. In Tanzania UNEP/UNIDO have instigated pilot training workshops for small-scale miners which include environmental issues.

8. Most global studies of the SSM sector do not properly address the environmental issues. Most environmental data is from reports dealing with specific countries (Tanzania, Ghana, Bolivia, Chile and Peru).

9. In the tin mining area of Uis in Namibia an SSM project (started in 1994) includes the objective of establishing a legally and environmentally acceptable method of mining.

The outstanding characteristics of the artisanal and small-scale mine sectors (ASM) is its informality and heterogeneous nature. A common perception is that it is very dirty – barely feasible even if environmental costs are not included and not at all when they are. Moreover, its problems are commonly perceived as of a social nature, rather than strictly economic or environmental.

Source: An Environmental Study of Artisanal, Small and Medium Mining in Bolivia, Chile and Peru, G. McMahon et al World Bank Technical Paper No 429

10. More comprehensive data is required to determine the extent of the environmental impact of SSM.

11. World Bank studies in Latin America (Bolivia, Chile and Peru) indicate that the
environmental effects of SSM can be quite small under specific circumstances and the serious dangers that exist could be remedied without jeopardising the profitability of the SSM enterprises. However, this is partially due to the relatively ecologically insensitive nature of much of the SSM areas in these countries that comprise dry sierras and deserts.

There is widespread agreement that SSM causes extensive environmental damage. However, most global studies have focussed on the occupational health and safety aspects. For environmental data, we have to rely on reports dealing with specific countries, and a large collection of anecdotal data. The focus on human health and safety is surely correct, given that, in the words of the Rio Declaration, ‘human beings are at the centre of concern for sustainable development’. However, there is a need for a better understanding of the global environmental damage caused by SSM, not least because this damage has, and will have in the future, profound impacts on human beings.

Any solution that UNEP or other agencies propose to deal with environmental impacts of SSM must ensure that the miners and the many people who depend on them are not only as well off afterwards, but better off. The imperatives of sustainable development must not put the needs of future generations above the needs of the present generation. Not only is this immoral, but is doomed to failure.

Source: Small-Scale Mining and the Environment, A. Parsons, UNEP

3.2.5 Mineral Potential

The fundamental concern for any SSM venture is the accessibility and recoverability of the mineral deposit. Without an accessible mineral worthy of exploitation by primitive non-mechanised means there would be no SSM sector. Not all mineral deposits are favourable to SSM exploitation. Only deposits composed of a relatively simple and high grading mineralogy, which do not have to be excavated in bulk and need minimal or no processing to extract the desired commodity, are suitable for SSM. For example only 8% of the World’s copper production is from SSM, because most copper is extracted from massive open pits exploiting low grade copper porphyry deposits in the USA and Latin America, or complex oxides and sulphides in Zambia, and not from the mining of high grade copper oxide or native copper sources more suitable for SSM.

1. It is very rare to find that a systematic approach to defining mineral deposits for exploitation by SSM has been undertaken.
2. Maps of past and present mineral exploration are often not available
3. Plans showing existing concession or licence areas are often available for large-scale mining but not for SSM mainly due to the low priority of this sector and a lack of sufficient regulation and monitoring.
4. Little assessment of the mineral potential of areas outside existing formal mineral concessions is undertaken. Areas relinquished by larger companies may be particularly important.
5. Very rarely is basic exploration undertaken on actual deposits that are suitable for SSM.

6. Little evidence of commodity based maps showing areas available for SSM.

7. Little consultation undertaken with large companies about the possibilities of defined areas of regulated SSM within their concession area (notable exceptions to this occur in Ghana, Colombia, South Africa and Venezuela).

8. Some countries set aside or segregate areas for small-scale mining operations through legislation for example - (a) Philippine special laws for pebble extraction and lahar deposit mining and identification and segregation of areas for peoples mining co-operatives (b) alluvial gold deposits in Zimbabwe are reserved for local councils who issue special permits to local residents to extract alluvial gold (c) Tanzania used to designate areas for claim location (equivalent to small-scale mining) for its nationals. Unfortunately the mineral potential of the areas that are being reserved has not always been established.

9. There are conflicts and competition for areas between small-scale miners and other landowners and claim holders in virtually all countries.

10. When areas are set aside for SSM it is often as a reaction to short term pressures rather than as a result of long term planning. There is rarely a land development plan to cover proposed future development of such industries as forestry, agriculture and mining.

11. Small scale Miners operate inside mining concessions of large mining companies through operating agreements (gold mining Philippines, Burkina Faso, tributing arrangements of alluvial gold mining in PNG, and chromite and tin mining in Zimbabwe).

12. Philippines tried to protect “mining rights” of small-scale miners who have been operating in a certain area for considerable time,( but have not acquired the necessary mining permits), by not accepting new applications in the same areas, giving the existing miners the priority to apply for the required permits.

13. The Philippines also adopted rules and regulations to allow SSM applications inside existing mining properties, provided the owner gave written consent. The practice did not work effectively because written consent was rarely obtained.

3.2.6 Technical Assistance and Training

Although SSM has been undertaken since man first discovered the process of smelting (around 4000 BC) many of the adopted techniques, although improved over time, have changed little. Some sharing of ideas from different areas occurs between regions (e.g. the Brazilian grameperios migrated throughout the Amazon basin and taught the local small scale miners various techniques and refinements to their method of gold mining and processing) but there is general reluctance to change traditional methods. In addition to mining and processing, training must also include education about the environment, safety, healthcare, finance and business.
1. Technical assistance, if any, is ad hoc and generally reactionary to particular problems rather than a planned and sustained service.

2. Provisions of existing SSM regulations tend to limit the technological development of small-scale operations through restrictions on the depth of workings and the use of explosives or certain types of equipment.

3. Small-scale miners often have little idea that the processing methods they use are highly inefficient.

4. Most assistance schemes that involve the provision of equipment rarely survive long past the funding period as they are frequently not set up as self financing and often there are no resources for maintenance and up keep.

5. There is little evidence of local TSU’s, that will really benefit SSM (with the probable exception of Ghana) in the long term despite numerous projects having been undertaken by third party agencies.

---

Few small-scale mineworkers have any formal mining skills – less than 10% in most countries (typically about 5%). Those that do, obtained them during their former jobs as miners in large mines. That is not to say that many small-scale mineworkers are not very experienced, having benefited from on-the-job training in large mines before turning to small-scale mining following redundancy. Other small-scale miners pick up skills from these experienced workers. Formal or semi-formal training is sometime provided to small-scale miners by mines inspectorates or ministries of mines, by national vocational training institutions, by large mining companies in one or two cases, or as part of development assistance projects. For the most part, however, opportunities for training are few and far between. Even when they are available, many small-scale miners cannot afford to take time off work for training or to travel to training sessions. The need for mobile training facilities was cited as an important contribution to assisting small-scale mining that development agencies could make.

_Source: International Labour Organization TMSMM/199 – Social and labour issues in small-scale mines._

---

6. Most of the external training assistance that is directed at small-scale mining includes a training element, specifically in increasing the capacity of officials in minerals commissions or mines inspectorates to provide training to small-scale miners and to active owners and managers.

7. Linking of the training of different aspects of small-scale mining and business management might work if it were packaged carefully.

8. Zimbabwe provides free laboratory and metallurgical testing services while in the Philippines, lab and metallurgical test works from government is paid for. Services of government technical personnel (metallurgists, mining engineers and geologist) are offered free in both countries.

9. South Africa has set up an Integrated Resource Centre that consists of a technical advisor (mostly concerned with the geological database), secretariat type support and help with issuing permits. The whole ethos behind the centre is the realisation that it will only flourish if it develops partnerships with the miners.

10. Small-scale miners in Shamva mining district of Zimbabwe get free and cost-recovery charges from the Shamva Mining Centre that was established by a...
British Development organisation in collaboration with Ministry of Mines and the country’s SSM association. The centre was established from donor’s fund, but its subsequent operation is sustained by its own income. Donor funding was fully spent in 1994, but the centre is still operational to date.

11. Custom milling is common practice among small-scale gold miners in many countries. The scheme provides services to miners who could not afford their own plants, and the mill owners derive some income from the process. The practice optimises the use of the mill, and reduces the financial risk involved in establishing a milling plant. However it should be remembered that as the custom millers often recover gold from the tailings by cyanide there is little incentive for them to want better recovery for the miners.

12. Chile and Morocco have initiated government technical assistance programmes for small-scale miners (development of artisanal mining activities in the region co-funded by BIRD).

13. Small Scale Miners often have difficulty in taking up new technology for a variety of reasons.

### 3.2.7 Credit and Finance

The International Labour Organisation recently undertook a survey of the issues that affected the small-scale miners. Nearly one third of the problems identified directly involved obtaining finance. Being able to obtain credit would allow the small-scale miners to break out of the negative poverty circle (see section 1.1.3) that the majority are trapped within. The SSM sector has many unique attributes (mainly lack of collateral and the opportunity to ‘get-rich-quick’ and default on loan payments) that have resulted in banks and other financial organisations being confronted with problems when trying to extend credit to this sector.

1. Access to credit is the most important issue cited by miners with the lack of capital being an obstacle to mechanisation and improving efficiency which in turn leads to low productivity, low revenues, and where paid, low wages.

2. Successful credit schemes are extremely difficult to implement and to sustain.

3. Most initial funding is self-financed, with succeeding finance heavily dependent on production, therefore the need to produce immediately.

4. Financing small-scale operations is a chronic problem with the miners unable to raise the relatively small investment capital required out of their own cashflow. In general the mine owners have few if any assets that banks and other lending institutions will accept as collateral. Numerous schemes have been implemented and subsequently failed (Ghana, Guyana, Zimbabwe, etc).

4. Access to formal credit is usually not available due to a general reluctance of banks to finance SSM due to the inherent risk, lack of assets and collateral, formal mining titles, equity and the absence of feasibility/due diligence studies and adequately explored and proven reserves. Moreover, banks traditionally require
borrowers to provide some equity from their own resources which are extremely limited and sometimes non-existent (15-20% is typical), which can be a formidable task for many small scale miners.

The lack of capital is an obstacle to mechanisation and improving efficiency. This in turn lead to low productivity, low revenues and, where they are paid, low wages. Mine owners and mineworkers generally have few if any assets that banks or other lending institutions will accept as collateral. It is not until they start producing something saleable that they can get credit. Obstacles to obtaining formal credit can be overcome if governments recognise mining claims and issue mining rights that can be freely traded, sold or pledged as collateral. This point has been raised time and again at international forums and underpins the establishment of a sustainable infrastructure for small-scale mining. Even when mining rights exist, however, banks are not readily prepared to take them as security because of the geological risk of unmined reserves, the mobility of many small-scale miners and the widespread lack of enforcement of laws and regulations. Moreover banks traditionally require borrowers provide some equity from their own resources (15-20% is typical), which can be a formidable task for many small-scale miners who then find themselves caught in a viscous circle.


6. Informal “cash advance” financing practised by “middlemen” and miners appears to work but leads to exploitive practises. Miners are often not paid the correct amount for their product. This can also lead to localised inflation due to the need to pay for the cost of providing credit and the bad debts of many non-payers.

7. Countries including Burkina Faso, Chile, Ecuador, Ghana, Mexico, Mozambique, Namibia, Pakistan, South Africa and Zimbabwe have all initiated some form of loan guarantee, credit scheme, equipment leasing and/or hire purchase arrangement to assist small-scale mining.

8. A loan and plant-hire scheme in Zimbabwe is a long established government initiative, which is availed by small-scale miners but suffers from low repayment. The ADC (1992) initiated a revolving trust fund to assist chromite miners (with deduction of loan repayments at source from ore sales). The main problem for the future is that, for various reasons, the trust fund was prevented from registering as a financial institution. Interest rates for local currency are thus limited by the Zimbabwean regulations to a level below market rates, and below the inflation and devaluation rate of the Zim$. It was also not possible to issue US$ denominated or US$ indexed loans at US$ interest rates. In consequence, the fund is unable to refinance itself fully in the long term under these conditions, and slow erosion is to be expected.

9. Group schemes have been introduced successfully into the Agricultural sector in a number of countries. Many of these schemes are based on the principle of the whole group acting as guarantor of a loan to an individual. Repayment rates have been reported to be in excess of 90%. This type of scheme, which does not involve the polling of production, may be workable within the SSM sector. However, partners from the micro-lending sector e.g. for rural development or micro-enterprises, usually have problems with the size of individual loans and no
confidence or familiarity with SSM (e.g. Zimbabwe Banking Corp.) They therefore need a certain time to become comfortable with the lending of comparatively larger amounts to small mines, and require suitable partners with a mining background to share the risks.

10. However, Micro-lending schemes are not always the right project partners, since the financial volume for lending to small-scale mines is usually in the range of US$ 5,000 to 200,000 per project, and thus far above the usual micro-loan. Micro-lending schemes for SSM (e.g. a church-sponsored scheme in Nicaragua to provide loans for shovels, picks, wheelbarrows, etc.) may have a questionable impact. Since the size of the loans exceeds the size of usual micro-lending significantly, the question of collateral becomes an issue. Even with a formal mining right or claim, small mines usually have no established reserves because of lack of exploration capital, and day to day mining of the ore body ‘as it comes’. At best, a registered claim with a proven production record and an indicated or inferred mineral resource is usually the only collateral.

11. Exchange rate fluctuations and local devaluation can often create problems for loan recipients. For example if a loan is in dollars and a commodity is sold in local currency a devaluation of that currency would often mean that the loan recipient finds it difficult to repay the loan.

12. Bolivia – numerous projects. (a) The Banco Minero which closed in 1991 due to difficulties resulting from inadequate debt service (the Banco Minero in Peru shared the same fate), (b) the Fondo Nacional de Exploracion Minera (FONEM), a fund to finance feasibility studies with repayment only in case of success, which stopped in 1990, (c) FADES, a NGO financed by Canada and providing loans to small mines, which had no access to formal lending, which has ceased to operate in the meantime, (d) the project to provide loans in co-operation with the Federation of Mining Co-operatives (FEDECOMIN), which has suffered financial problems, and (e) an organisation of the church (CEPAS), which has provided loans up to US$20,000 with limited success.

13. Revolving loan fund scheme for small-scale miners introduced by the Austrian government in Zimbabwe attracted a large number of applicants and applied a very strict screening process, which resulted finally in a small number of loan applicants.

14. Mineral Development Fund of Namibia, which is available for lending to small-scale miners in the country, is derived from loan repayments of an EU (Sysmin) grant to the Namibian government. The fund suffers, however from an inadequate servicing of debts.

15. The ADC initiated a pilot program for a mining trust fund (1994). This project seems to be succeeding, the main reason being the co-operative was treated like a commercial client from the start of the project, they had a comparatively good management structure, and the loans were granted on US$ basis.

16. Small-scale miners in Tanzania contribute to a loan fund for the members, members act as guarantors for borrowers.
3.2.8 Marketing

In the absence of a fair market in which prices for the commodities reflect the world price a parallel black market develops. Smuggling of gold and precious stones is the most obvious manifestation of this. Government intervention by the establishment of an official buyer who guarantees world (or almost) market prices can help to curb smuggling. (In Ghana since the legalisation of SSM and the establishment of an official gold buyer much of the gold won by SSM that was smuggled across the border in Togo is sold through official channels providing additional revenue to the Government). Gemstones are more difficult to market with no World price because of complete dependence on gem quality.

1. There is no common approach to regulating the marketing of mineral products. Whilst a few countries have government controlled buying or licensing of traders (The Precious Minerals Marketing Corporation in Ghana), others include permission to market or export minerals as part of the individual license or permit to mine.

| In countries where sales are not transparent and smuggling is rife, much of the benefits to the government are lost. There are plenty of examples of large increases or decreases in statistics of official exports of product from small-scale mines when changes have been made to purchasing arrangements, even though physical production has not changed much. Even when the product can freely be sold at the prevailing market price it often passes through several hands at discounted prices before reaching the formal 'market price' buyer. In some countries the small-scale miners themselves receive as little as half the value of their production, although some accept this in order to ensure a regular cash flow form small amounts of production. When market prices are not received, this can be due to local prices being set by the government, to there being a single buyer (e.g. cement plant), or to the poor quality of the product. Quality is also an issue in the trading of gemstones. If, as is sometimes, the case, payment is based solely on weight, small-scale miners are likely to be disadvantaged. Proof or suspicion of being cheated will quickly lead to a parallel market, particularly in larger stones. Governments have to find a path between paying the full market price at a single centre with expert quality control and making the selling process convenient for the miner by enabling decentralised sales close to the mines at cost. Illicit marketing is primarily the result of inadequate government policies. When official prices are too low, black markets develop. Also an overvalued currency and high inflation depress the effective price. 


2. Several countries have a system of licensed buyers (e.g. Guyana) who visit mining areas and buy small amounts of product for substantially less than the world market price, consolidate it and then resell it at a higher price. If there were sufficient licensed agents, competition between them should prevent the purchase price from being so low that it leads to widespread black market transactions.

3. Miners often sell their production locally, to whoever will buy it, at reduced prices.
in order to avoid having to travel long distances and because they are desperate for
the cash.

4. SSM produce often passes through several hands at discounted prices before
reaching the formal ‘market price’ buyer.

5. Prices being set by government or limited access to buyers can often result in the
miners receiving well below fair market prices.

6. The traditional strong ties established by traders (legitimate and illegal) through
the pre-financing of SSM operations is another means that can prevent the miner
from obtaining fair market prices.

7. Gemstones in Sri Lanka and Tanzania are sometimes sold by auction. Quality is a
major issue with gemstones and small-scale miners are likely to be disadvantaged
when payment is based only on weight. Suspicion of being cheated will quickly
lead to a parallel market, particularly in larger stones.

8. Small-scale chromite and tin miners (by tributing) in Zimbabwe have access to
assured buyers. These are the large mining companies who own the properties and
tribute them to the small-scale miners; this allows some security of operation.

9. Gemstone miners in Tanzania are encouraged to produce finished products for
export. They do not pay royalty on finished (cut) gemstones, but are charged
royalty when exporting raw gemstone products.

10. Buying centres can be controversial issues. The Nicaraguan experience showed,
that the gold buying centres, which the state mining corporation INMINE
maintained in remote mining areas, and which purchased gold from small-scale
miners with a discount of about 20 % below the world price, made practically no
business because the local private buyers offered better rates. The closure of these
centres, however, caused an almost immediate drop of the local gold price, since
the state buying centres performed the essential role of setting a guaranteed floor
price for all the small-scale miners in these remote locations, who were without
market access.

11. In areas where there is a heavy concentration of mineral working, informal cartels
often spring up. They have no real incentive to liberalise the market as they do
very well under the existing system.
4 CONCLUSIONS

Model policies and possible actions have been identified to assist in the development of a sustainable and productive SSM sector. These model policies are deliberately non-prescriptive in order to provide guidance to Governments wanting to assist their indigenous small mining sector. The policies are generic and should be modified and adapted to suit local circumstances and conditions. They are intended to be a reference document for interested parties to assist in the formalisation and development of the sector.

The following identifies a number of inter-related issues which should be considered when evaluating options to assist SSM activities. These issues, and model policies to address them, are followed by suggestions for actions which can be applied to any mineral, any mining method, all cultures and social settings.

These issues, and the ‘principal factors’ relating to them, are presented in a matrix which has been designed to assist in the structured and objective evaluation of SSM sectors or potential projects. Following such a ‘holistic’ or matrix approach will avoid the ‘quick fix’ SSM assistance projects which tend to focus on a limited number of issues. The adoption of a ‘matrix’ approach to rank SSM sectors or

---

**Elements of Promotional Policy for Small-scale Mining**

Source: Small-scale Mining: Practices, Policies and Perspectives, R. Noestaller (in Small-Scale Mining a Global Overview, A.K. Ghose)
projects should greatly assist in the relative evaluation of numerous potential assistance schemes. By carrying out a full evaluation, taking account of all the principal and inter-related factors, technical and financial assistance for SSM schemes will be used to better effect and will be more sustainable than in the past.

There is a clear need to communicate to policy makers the potential benefits of small mining to national economies. Partnerships should be developed and strengthened between governments, small miners; associations, NGOs, agencies for international cooperation, and the international mineral industry, in order to implement successful policies. This will lay the foundations for an economically strong mineral industry that will help alleviate poverty in rural mining districts, creating an engine for sustaining economic activity after mining has ceased. The SSM sector itself also has the responsibility to shape its own future, building on the new interest in small mining. Small miners themselves need to be more active in assisting appropriate government initiatives and in meeting the expectations of government and the general populace. Only by recognising these obligations and by committing itself to meeting them through environmentally and socially sound mining practices can the sector’s future be assured.

Source: The Significance of Small Scale Mining for Developing Economies, M. Allison et al, Small Mining International

4.1 Model Policies and Actions

4.1.1 Institutional Capacity

POLICY 1: Provide two separate bodies to oversee the SSM sector. (A Regulatory Unit, within the Ministry of Mines, which will deal mainly with regulatory functions, and a separate (independent) Technical Service Unit – see Policies 2 and 3).

The rationale for having two separate units is that often, where the regulatory unit tries to combine both roles, the miners will not trust the information or help that is being offered. This distrust can manifest itself in a variety of ways, from open hostility to disregard but the result is often the same in that advice is ignored. By splitting the roles of the two organisations and by demonstrating the independence of the Technical Services Unit the miners will not only listen to the advice on offer but also will eventually learn to seek help from the unit.

The organisational structure and budgets of both units needs to be determined at the earliest stage. Also, the involvement of other Government departments (health, education, aid, conservation and environmental departments etc.) at the local/regional level will have to be co-ordinated, in order to achieve common aims, and to avoid conflict and waste.
POLICY 2: Establish a Regulatory Unit.

The primary function of the Regulatory Unit will be processing and issuing of licenses, preparing statistical records, ensuring compliance to other regulations (health & safety, environmental protection, tax/rentals, etc). The Regulatory Unit could be part of an existing mines and minerals body but should have a stand-alone environmental capacity within it.

It is imperative that the Regulatory Unit concentrates on licensing and enforcement matters that are locally relevant. Continuity of the unit will depend, to an extent, on the ability to retain qualified and experienced staff to reduce training costs and mistakes through inexperience. For these reasons, and to reduce the risk of corruption, the Regulatory Unit will be best served by having a small number of well paid staff and minimum bureaucracy.

Three options for the Regulatory Unit should be considered. The choice of which model to adopt will depend on the local administrative structure and the quality of local infrastructure. Whichever one is adopted, it is essential that local representatives are able to influence what happens in their areas without the creation of local “fiefdoms” where individuals exert undue influence and power. The licensing system needs to be flexible and take due cognisance of the local circumstances. The three suggested options are:

1. In a country that has a well-established local administrative structure the licensing decisions could be made regionally. A board or committee, consisting of mainly independent, non-political appointees (representatives of local communities, miners etc.) would determine licence decisions within the framework as laid down by the Government. The method of selection of these members would require some discussion but could be by the appointment of an individual from each of the member organisations. For example each organisation such as the local miners, district council, chamber of commerce etc. could nominate one member to sit on the committee for a set period of time. In this instance the composition of the member organisations would have to be pre-determined. The Philippines and Sri Lanka are examples of countries where licenses are determined locally.

2. In a country that has a less well-established local administrative structure (but has a reasonable communications system) the decisions could be made centrally with the involvement of local representatives. A network of regional offices could administer licences, receive and make recommendations about licence applications and enforce licence conditions. New licence applications would be determined by the central Regulatory Unit, say once a month, after consulting with the regional officers. Countries such as Zambia, Tanzania, Ghana, Mexico, and Indonesia could be examples where this system could be implemented.

3. In a country where there is little local administrative structure and poor infrastructure, the decision making process will have to be at the central level. The majority of countries that have an active SSM sector fall into this category and include Columbia, Guyana, Mozambique, Senegal, Morocco and Papua New Guinea. However, this will
be seen as remote interference and is unlikely to gain the support of any SSM sector unless some ‘local’ advantage or assistance is provided. The need for some form of local “ownership” or involvement is extremely important and should not be underestimated. The current unregulated state of the sector in a lot of these countries is due, in at least part, to the fact that the miners feel disenfranchised. In these cases some form of local representation from the Unit, coupled with technical assistance from the TSU, will start the process of drawing the miners into a more formal structure. Obviously the major problems in areas like these are their remoteness and subsequent difficulty and expense of travelling.

POLICY 3: Establish a Technical Service Unit.

The primary function will be to provide free or affordable services to small-scale miners, including help to comply with regulations and other aspects required by the Regulatory Unit.

The size of the TSU will depend on funding and the nature and extent of the SSM sector. The unit should be located centrally and travel to various areas as required on a priority basis. It must not undertake a dual role by ‘policing’ the SSM sector and attempting to address breaches of regulations or licence conditions. It will however have a duty to advise on best practise in accordance with environmental and health and safety policy. If there is any suspicion of the Unit undertaking a dual role, it will not be perceived as independent and it will lose whatever credibility it had gained.

The unit must have a core of qualified multi-disciplinary and trustworthy personnel (mining engineers, geologist, processing engineers, economist, social scientist, etc.). Specialist expertise can be provided as needed from supportive mining companies or from voluntary technical aid schemes. It is essential that this unit gains the trust of the miners’ groups that they are advising by providing useful advice and not reporting breaches of regulations etc. to be followed up by the Regulatory Unit. (Wherever possible, visits of the TSU staff should follow the Regulatory Unit staff and not vice versa).

POLICY 4: Provide both bodies with adequate budgets and qualified personnel to ensure effective regulation and monitoring of activities of the sector.

Initial funding of the TSU should be from:

- government allocation.
- and supplemented by donor grants
- must be self financing within three years.
The possibility of “ring fencing” mineral royalty payments to pay for the Technical Service Unit could be considered. Miners would then be encouraged to use a service that they were effectively paying for. Other methods of financing the unit would be by the provision of equipment that would be charged for, say at regional training centres or by encouraging larger mining companies to donate assistance in the form of equipment, personnel or money.

The Regulatory Unit will be funded from Central Government and staffed with a core of highly trained and well motivated personnel to ensure continuity and sustainability. Examples of civil servants leaving the public sector for the private companies are common.

**4.1.2 Legislation and Licensing**

<table>
<thead>
<tr>
<th>POLICY 5: Provide legislation, and guidance for the SSM sector that is concise, transparent, and relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>A working party should be set up, to include all potential stakeholders, to evaluate all aspects of SSM, including the review of legislation of other countries seeking to encourage SSM. Potential stakeholders may include, inter alia:</td>
</tr>
<tr>
<td>• large mining companies;</td>
</tr>
<tr>
<td>• small mining associations;</td>
</tr>
<tr>
<td>• local land owners;</td>
</tr>
<tr>
<td>• Government departments (such as Agriculture, Finance, Geology, Health, Education etc.);</td>
</tr>
<tr>
<td>• aid agencies that are active within the country;</td>
</tr>
<tr>
<td>• NGO’s;</td>
</tr>
<tr>
<td>• technology companies, and</td>
</tr>
<tr>
<td>• financial organisations.</td>
</tr>
</tbody>
</table>

The working party should have a high level of political credibility and authority as it will undoubtedly be recommending a degree of cross departmental co-operation. There should be a timetable within which the working party must complete its evaluation and produce recommendations for action. This timetable should include key dates and critical action paths.

Legislation, and guidance arising from it, should be concise and cover all aspects of the operations (mineral ownership, licensing, environmental concerns, health and safety, marketing, penal provisions, incentives, etc). This will contain all the information that miners need to know in a format they can understand without quoting comprehensive and detailed laws and regulations. Guidance should be written in simple language and, where appropriate, ‘cartoon’ illustrations should be prepared and distributed.
Particular attention should be paid to environmental protection of all areas, especially those of a particularly sensitive nature (these will hopefully already have been identified). The legislation should also aim to limit the use of harmful substances (such as mercury) and processes.

Reasons for refusing or revoking licences should be made clear to the applicant, and there should be a simple and speedy appeals procedure that is totally transparent and fair.

Legislation should apply nation-wide with clearly defined and consistent licence administration procedures.

SSM licences or permits should be readily granted to nationals of the given country. They should not discriminate against, or bias towards any particular group. Whilst they should not discourage partnerships with foreigners, some control will be needed to avoid large influxes of immigrant groups.

Licence durations should take into account the nature of deposit, and the investment (in time and effort) needed to develop sustainable mining operations.

Licence areas should take into account the geological nature of the deposit and local topography. They should be large enough to allow proper planning and must avoid subdivision into unworkable small plots.

Licences should be transferable by agreement between Licensees subject to notification to the Licensor.

Licences should stipulate a minimum level of activity to discourage “sitting” on mineral properties. A limit should be placed on the number of licences that an individual or corporation has at any one time.

Operational restrictions should be minimised (e.g. non-use of explosives & mechanised equipment, limited depth of workings, selling limitations, etc). Care must be taken to ensure that larger companies do not abuse a ‘SSM friendly’ regime because SSM licences may be cheaper or the provisions less onerous.

Licences/permits should be administered at local level, where possible (closer to the miners), in one location with minimal (or nil) processing fees. Applications must be processed speedily within a limited duration and with minimum bureaucracy.

**POLICY 6: Legalise SSM operations, set basic standards, encourage adoption of “best practice”, and make clear the obligations of all stakeholders.**

The working party must consider all possible measures to encourage the formal recognition and licensing of claims and ‘illegal’ mining operations. Such measures could include ‘no cost’ licence issues, the provision of free, or low cost technical services, assistance with micro credit schemes, and assistance with sales of mineral product.
4.1.3 Environmental Protection and Health and Safety

POLICY 7: Implement a system of best practice for environmental and health and safety protection.

It is difficult to justify different basic laws and regulations for any one sector of an industry as opposed to another although concessions for small undertakings and enterprises are commonly built into many legal regimes. Therefore the basic legal regime governing SSM should be the same as for all other types of mining. However, the implementation of a system of best practice will need to make allowances for the SSM sector in recognition of their special nature such as their small size, relative poverty and lack of education. A system of best practise must recognise what can reasonably be expected while always aiming to achieve the very highest standards. For example it would not seem reasonable to expect that small-scale miners could produce an EIA to the same detail as a large mining company (or to undertake to produce one at all without technical assistance). Neither could they carry out the same degree of environmental monitoring throughout the operation and post closure of the mine.

Ideally, best practise would require the preparation of a basic Environmental Action Plan and Health and Safety Plan. However, unrealistic, unachievable, and unenforceable standards must not be imposed merely to be consistent with mainstream mining operations. The provision of a form of environmental bond (either as a lump sum, or in the form of ongoing payments) could be prescribed as part of the process and progress measured against simplified and understandable procedures. For example small-scale miners could submit an EAP in a pro-forma document – perhaps as part of a licence application as is undertaken in South Africa.

Health and safety and environmental standards in SSM areas need to be inspected and monitored periodically on an advisory rather than a prescriptive/policing basis and incentives offered to improve seriously hazardous operations. Incentives would usually be linked to the provision of a service that would be beneficial to the miners. Therefore the link between improved environmental standards and the provision of technical services is important.

Above all it is extremely important to demonstrate to these communities the benefit that will accrue to them if they work within the best practise system. These benefits will often be of a financial nature and their importance will have to be stressed. For example a miner could be given access to technology or assistance that allows him to increase his mineral recovery (and therefore his financial reward) on condition that he operates within the framework that has been laid down. A policy of enforcement can only be introduced in the more organised and better managed SSM activities, and only after they have been ‘formalised’ into the country’s mining regime.
POLICY 8: Minimise the use of harmful substances and unsafe practises by small scale miners.

Small-scale miners should be made aware of the more important and fundamental safety practices and regulations by information and education. Initially, the dissemination of this type of information should be in the form of advisory actions. It will be important to link the concept of a safe working environment to benefits to the miners themselves (a healthy miner will have greater productivity). If this concept is accepted then the introduction of rules and regulations will be much easier.

Small-scale miners should be inducted and educated on relevant health and safety matters. This could be done on a ‘no cost’ and ‘no penalty’ basis by a local representative from the TSU in a ‘mentoring’ role. There is an obvious link here to the introduction of regional technical training centres, which could involve various Government Ministries such as Health, Education, Agriculture and Environment in order that a consistent approach is taken towards the SSM sector.

Awareness of the risks involved in mining and associated activities should be enhanced by the distribution of information at technical centres, regional offices and the mines. Technical centres would not just be aimed at passing on information to the miners but would seek to train other trainers who would pass on the information. Community groups, labour unions and NGO’s could all be used as methods of information dissemination. It is important that the literacy standards of the miners are understood and that information dissemination is aimed at the miners with the poorest literacy levels. For this reason minimum written information and maximum use of ‘pictograms’ may be important in getting the message across.

There must be a clear demonstration that there will be some form of benefit if the miners cease to use a particular substance or change their working practises. For example it is unlikely that demonstrating the long term adverse health effects of mercury exposure, however dramatically, is likely to have a pronounced affect on its use unless the miners perceive a short term benefit. Therefore this type of approach would have to be coupled with the introduction of other types of process that give at least equal or better results to the miners.

POLICY 9: Minimise the environmental degradation caused by small scale miners.

Various types of simple environmental measures that can be implemented relatively easily and which will start to show benefits to the miners, local residents and the environment should be identified. There are a number of environmental issues that occur frequently as a result of SSM that can be readily identified. Issues such as random tipping of waste, and
contamination of watercourses are two that frequently occur. It would therefore make sense to tackle these issues first while recognising that there are others that will have to be addressed in the future.

The implementation of suitable environmental standards should be linked to some form of reward strategy where the miners can easily see the benefits that will accrue to them if they work within the legislation. The rewards that the miners will gain will very often be related to the technical innovations that can be demonstrated. Hence there will always be a strong relationship between helping the miners achieve better results, and therefore becoming financially more secure, and mitigation of the environmental effects of the mining. This linkage must be sustainable over a long period of time and cannot be reliant on continuous external funding.

**POLICY 10: Mitigate the historical degradation caused by SSM activities.**

There is a need to formulate innovative schemes to deal with the historical environmental degradation that has occurred. Large mining companies are often drawn to areas where SSM has been taking place and may therefore be persuaded to facilitate in the cleanup of the historic degradation as part of their mining application (on a more general note it should be remembered that mining companies are often the best source of finance and technical support and should be brought in as a stakeholder at the earliest possible opportunity). There may be instances where small-scale miners may be persuaded to help the cleanup of an area especially where “waste” dumps or tailings contain potential value. Where the only realistic source of funding is from donor agencies then the miners should be involved in the process of cleaning up the area rather than having external organisations undertake the work.

**4.1.4 Mineral Potential**

**POLICY 11: Maximise the effective, efficient and environmentally responsible exploitation of the mineral resources of the country to the benefit of all.**

There is a requirement to define the criteria for mineral exploitation for all types of mining enterprises and delimit areas for SSM, for all commodities based on existing geological information. This means that the Government must have a plan related to mineral exploitation and in order to do this it must undertake a survey in order to understand what the potential is. Only when the mineral potential is understood can a policy to exploit that potential be formalised.

There may be a requirement to undertake basic exploration to identify and delimit new areas suitable for SSM. Based on these results, technical advice could be provided on techniques and processing required. Areas relinquished by large companies may be
particularly important in this context. The provision of free geological information to small-scale miners, in a form and language that they understand will be of benefit. This information could be provided in a variety of forms such as maps and plans showing areas of past exploration and existing concessions for a range of commodities.

**POLICY 12: Provide a mineral exploitation framework within which all types of mining enterprises are catered for and their interests protected.**

In many countries the formal mining sector is often well catered for and a recognised legal framework, that protects their interests, has already been put in place. Often this is not the case for the SSM sector although the protection of their rights and interests should be an important factor. The actual legal framework concerning the SSM sector is dealt with below but it is important that there is a system devised to monitor any potential conflicts between the different sectors of the mining industry. It is therefore recommended that an independent arbitration board under the auspices of the regulatory body (as mentioned below) is set up. This arbitration board would be independent of political parties but would aim to have representatives from all the stakeholders concerned (NGO’s, large mining groups, unions, community groups etc.). In some ways the role of this board would be similar to that of a Chamber of Mines or Minerals Commission although it would have to have both the authority and resources to deal with land and mineral disputes.

**POLICY 13: Declare the percentage of the country’s mineral output, which shall be sourced from small-scale mining.**

Following the completion of a survey of the whole country’s mineral potential a baseline survey of the current production from SSM should be carried out. This will allow the Government to calculate realistic targets for the percentage of mineral output achievable from SSM. Once this has been accomplished then sufficient areas, with relatively defined/known mineral potential, for small-scale mining operations can be made available. These areas should have sufficient potential for sustainable development and provide opportunities for entrepreneurs to expand their operations. The baseline survey could be undertaken in the context of producing a development plan for other types of land use as well e.g. agriculture, industrial, housing etc. As part of the production of a development plan areas of particular environmental sensitivity could be identified in addition to areas that have experienced particular environmental degradation in the past.

Delineating and segregating areas for SSM might be appropriate where the mineral potential or deposit is reasonably well defined (pebble extraction in the Philippines, emerald mining in Ndola Rural, Zambia, and alluvial gold deposits in Zimbabwe). Where the mineral is not well defined, the administration and control of such areas is almost impossible and ultimately unhelpful to small-scale miners.
4.1.5 Technical Assistance and Training Schemes

POLICY 14: Provide technical assistance and training schemes that are long-term and sustainable and aim to be self-financing.

The Technical Services Unit (TSU) should have an emphasis on providing simple, low cost, locally reproducible and maintainable technology/equipment. The benefits to the miners of any ‘new’ technology must be easy to demonstrate in terms of a saving in physical effort or a more efficient and lucrative operation. The TSU should always be aware of technology that is environmentally beneficial and should aim to encourage its use if it fulfils the other criteria mentioned. An obvious example of this would be the introduction of some form of gravity separation, which can have pronounced beneficial effects, not only on the productivity that the miners can achieve but also the environment and people’s health.

Technical assistance services should take account of the capabilities and the working environment of small-scale miners. Advice should be clearly worded (or illustrated) and be relevant to the local conditions and culture. The introduction of ‘new’ technology, which is accepted by the miners as being beneficial, must result in improved working practices, which should be monitored by the Regulatory Unit. The Technical Services Unit should also be capable of preparing external applications to aid funding of the projects on its priority listing. All potential methods of communication should be used such as leaflets, posters, meetings with group leaders, village elders etc. to ‘sell’ the credibility of the Technical Services Unit.

POLICY 15: Establish regional training centres based around mining areas.

An ultimate aim would be to have regional training centres based around specific projects or mining areas. These centres need not be purely mining related and could incorporate other types of training that the Government wished to promote, such as water management, health etc.

Technical assistance and training schemes should aim to have a broad capability to deal with the main issues and operational components of each country’s particular SSM sector. (Initially, at ‘start up’, such schemes may have to concentrate on particular regions or mining activities because of limited resources). A working party will identify and produce a priority list of groups/areas/projects that require technical assistance and determine the shortfall in resources that exists.

The projects should be long term and sustainable, avoiding one off demonstration mines or projects that only last as long as there is external funding. One of the ways of achieving this will be to have a limited amount of equipment on the site, such as mills, gravity separators, compressors etc. which can be charged out to the miners. These will therefore
not only provide a service to those miners that are operating legally but they will provide a revenue stream for the centre. Having established one centre, initially, the aim will be to reproduce these centres around the country learning from the experience gained.

**POLICY 16: Implement a non-discriminatory approach to all small-scale miners regardless of gender, educational capacities, physical conditions, etc.**

There may be a need to select certain individuals/groups to “fast track” in order to demonstrate to others the advantages that can be gained from the programme. This means that it might be beneficial to use the limited initial resources of a particular group and measure the socio-economic and environmental benefits that accrue in order to demonstrate the success of the project.

**POLICY 17: Encourage mainstream mining industry to aid in training programmes.**

Generally the best source of finance, equipment and expertise within mining regions is to be found within the larger mining companies. Historically these companies have not been involved in any development of the SSM sector and often they are actually perceived as the protagonists in the numerous conflicts that have occurred between the sector and the Government.

It is therefore very important that the mainstream mining sector is involved in the process of trying to bring the small-scale miners into the formalised sector as early as possible. The attitudes of large companies are changing and they realise that they can play an important role in the socio-economic development of a region and that the SSM sector is part of this process. Some good examples of this are Placer Dome’s involvement in Venezuela, Rio Tinto in Indonesia, WMC in the Philippines and numerous mining companies who have helped the Kwagga project in South Africa. Toll milling of concentrates is also a common example of how larger companies can assist the sector.

**4.1.6 Credit, Finance and Marketing**

**POLICY 18: Provide long-term and sustainable credit schemes, which ensure good repayment results based on firm business terms.**

The working party (which includes all the stakeholders) should analyse successful credit schemes in other business sectors (such as agriculture) and other countries. It is important to establish what has made them a success as well as what went wrong with credit schemes which failed. It will also be important to establish who controls the finances and production of commodities within local communities as this information will allow the accurate targeting of credit services. The Government Finance Department should also seek out third parties who are willing and capable of running credit schemes to small-scale miners. It is possible that the Government may have to offer a package of fiscal
incentives (that may require legislation) to encourage these organisations to administer micro-credit schemes.

Governments should set up pilot schemes in conjunction with the credit scheme administrators and provide loans selectively to groups of miners, who have followed the Government’s lead, as a positive example to other miners. Some obstacles to obtaining credit could be overcome if Governments recognised mining claims and issued mining rights that can be freely traded, sold or pledged as collateral. The scheme should be simple to administer and easy to monitor, and take into account the special needs of small-scale miners.

The approach to lending needs to be tailored to suit the mineral commodity because the ‘turnover’ and income pattern from commodities with high unit value (e.g. gold, gemstones) differ fundamentally from industrial minerals produced for local markets (e.g. lime, clays, etc.) or from bulk commodities for domestic consumption (e.g. coal). The aim should be long-term and sustainable credit schemes, which ensure good repayment results based on firm business terms.

The scheme should ideally be based on miners’ groups or co-operatives acting as guarantors of loans to individual miners. In this way the schemes will be locally based and then accessible to those who actually need to use them. In this way the ‘peer pressure’ in organised SSM undertakings and mining communities will ensure that repayment terms are honoured.

**POLICY 19: Ensure that miners get a fair price for the commodities that they produce and eliminate or minimise illegal (black market) trading activities.**

The system should discourage monopoly organisations from controlling mineral markets and pricing of commodities. It should foster competition among buyers and sellers, to ensure that miners have a number of options for disposal of their output.

Buying and selling arrangements for minerals should be supported by appropriate legislation and an SSM license should confer a right to trade the mine output. A separate buyer’s license or registration system should be set up to regulate those persons or companies who trade in SSM products. The Technical Service Unit should provide advice to the SSM sector on potential markets and realistic prices of commodities.

A central buying and selling arrangement could be linked to the collection of government revenues by retaining a royalty from each sale. However this could not be introduced immediately as it could destroy all trust with SSM operators. Where royalties are already being paid, the royalty level could be reviewed in order to encourage the maximisation of the value of the commodities.

Central Government could provide assay/laboratory support services to both buyers and sellers, and where required provide an independent ‘referee’ to maintain confidence in the system.
POLICY 20: Encourage as much downstream processing of commodities as possible within the country.

There is a need to increase awareness of the SSM sector regarding methods of adding value to commodities and the income increases that can be obtained by following certain alternatives in the handling, processing and disposal of their products. Often the miners are aware of the added value that could be obtained but they do not have the resources to undertake such processes. There is a substantial benefit to all the stakeholders if the commodity is exported having undergone as much upgrading as possible. This would require the provision of finance, knowledge of the potential markets and the ability to process the commodity in order to add this value. This demonstrates, once again, the interconnection between the provision of finance and technical services.

Central Governments could vertically integrate the functions of licensing and monitoring, product purchasing and financing service under a Regional Regulatory Unit. By undertaking these roles locally the Government could pay fair prices and attempt to cut out the local brokers, some of who provide short-term finance to miners on unfavourable terms and buy their output at very low prices. There should be some encouragement for local and foreign partnerships, to provide incentives to both parties to engage in SSM ventures, utilising funds from individual foreign investors.

4.2 Recommendations

It is clear that the SSM sector requires radical reform if it is to be turned into an industry that provides a net benefit to all concerned. It is also clear that the focus of any reform should be to alleviate poverty by providing financial betterment and empowerment to small-scale miners. Such obvious and visible improvements will then act as a catalyst to other miners who will also wish to improve their financial position. Small-scale miners must also act within some sort of legal and control framework, and with due regard to health, safety and the environment. It would be a considerable incentive for small scale miners to see others who have benefited financially from working within the legislation, and who have been aided by the Government to do so.

The primary issues that have been identified as fundamental to improving the general management, efficiency, safety and environmental performances of the small-scale mining sectors in developing countries are:

- Defining a model government institution, unit or department to administer and manage the small-scale mining sector.
- Establishing an ‘enabling’ mechanism within an appropriate legislative framework and licensing scheme.
• Defining relevant and consistent health and safety standards and practices.
• Establishing appropriate and realistic environmental protection.
• Delineating or defining potential mineral bearing areas suitable for small-scale mining exploitation.
• Establishing self-sustaining technical assistance and training schemes.
• Providing a viable and efficient financing schemes.
• Providing a simple and effective system for purchasing mine produce at fair and equitable rates.

The approach should therefore be all encompassing, addressing collectively each of the relevant issues that are fundamental to the sector. Any assistance that endeavours to solve one aspect of the sector but does not deal with the other inter-related issues, is likely to provide only superficial gains with little long term and sustainable effect. Above all, a genuine desire to draw the SSM sector into the formal business community must recognise also that financial empowerment and betterment (poverty alleviation) is part of the process. The aim should be to encourage the miners to be entrepreneurs, to allow them to develop and grow and not to constrain and hinder them. Although any assistance programme should be non-discriminatory, a small group of miners may need to be targeted initially in order that the benefits of the scheme and their achievements within the scheme can be used as a positive example to others. This approach would concentrate finite budget resources on a key objective, and will avoid resources being spread too thinly over a too wide an area.

4.2.1 Purpose

Phase 2 will evaluate the model policies that have been developed in Phase 1 in order to assess their effectiveness in assisting the small-scale mining sector to achieve the following:

• Increase productivity.
• Increase institutional capacity, including local associations and NGOs.
• Improve occupational health, safety, environment and living standards, not just of the miners but also of the local community.
• Develop a sustainable increase in the standard of living of the miners and the local community by alleviating poverty and raising incomes above basic survival levels.
• Mobilise local capital to invest in suitable local commercial ventures.

Overall the project will be designed to ‘partner’ appropriate ministries/departments in the target countries. The respective contribution of the host and those of DFID would be combined in order to produce a more cost effective result and a sustainable project.
4.2.2 Activities

Choice of Country

This report has continually stressed the importance of tackling all the issues related to SSM, in a holistic approach, if a meaningful contribution is to be made to the sector. However, there is little point in attempting to test the validity of the model policies within a country if the country in question does not recognise the SSM sector as a legitimate and worthwhile sector to encourage. Thus the chosen country must at least recognise the sector as being important and worthy of assistance. This does not necessarily mean that the SSM sector needs already to have been formalised, but it does mean that the country is willing to attempt to bring the sector into the formal business community and has the basic legislative framework to allow them to achieve this aim.

It is possible to undertake the next stage of this project in almost any country in which SSM activities are being undertaken and, apart from those countries where civil war or other instability precludes any sensible efforts being undertaken for the time being, no countries have been precluded from consideration or rejected for any particular reason. There is little doubt that a project supporting SSM operations will be more readily accepted by a host country, and easier to implement on the ground, where the country recognises and at least tolerates SSM activities. In countries where SSM is unwelcome, discouraged and regarded as illegal, support for an aid funded SSM scheme can hardly be expected. Those countries which have not yet formalised their SSM sectors by revising their mining laws, minerals code and providing institutional administration and assistance are not seen as lacking interest or support for SSM activities and should not be ruled out for future DFID assistance. However, an obvious preference exists to undertake further work in a country that has in place some of the legislative mechanisms through which an aid funded project in the SSM sector could more easily be initiated and undertaken than in those countries where no organisation exists.

Phase 2 is envisaged as a two part project. It would be feasible to undertake these two parts in separate countries, the advantage being that there would be a greater diversity of information and cultural feedback. The main disadvantage however would be the increased travel costs etc. The main advantage of undertaking the whole of Phase 2 within one country is the likely greater co-operation that could be expected from the host nation.

Once a host country or countries have been chosen the project will be split into two parts.

Part A -

Assessment of the Legislative regime and the institutional capacity in relation to small-scale mining.

The purpose of this part of the project is to get as broad a picture as possible of the effects of the legislation on the SSM sector. There will be elements of this part of the project that will overlap with Part B (detailed below) especially if they are undertaken in the
same country but it is felt that this broader picture will greatly assist in the overall evaluation of the policies. Activities will include, inter alia:

- Identify the key components of the mining legislation and the institutional structure (as they relate to SSM). Evaluate how these differ from our own model policies and assess the likely effect of such differences.
- Identify a number of SSM activity areas (approximately eight), producing a range of commodities, and implement a procedure to track them and evaluate the effects of legislation and institutional structure on them. This assessment will be undertaken on a regular basis (3 or 4 times a year) by the project personnel although it is intended that the host country personnel would also be involved in this process.
- Undertake a baseline survey of all of the identified SSM activity areas to include socio-economic, environmental and health and safety aspects.
- The assessment of the projects will involve face-to-face interviews with the operators, measurement of the output and the effectiveness of the legislation (with regard to the environment and health and safety) as it applies to SSM. This assessment procedure would be, in part, a subjective procedure but every attempt would be made to actually quantify the changes that occur in order that the success, or otherwise, of the legislation can be measured and reported upon. This will be achieved by designing a scoring system to measure the level of environmental degradation, output, overall profitability, health and safety etc.
- During these monitoring visits a relationship with the host country personnel will be developed to the stage where their views and ideas will be sought and encouraged with a view to them becoming self reliant in the administration and control of SSM projects.

It is envisaged that this part of the project, which will run concurrently with Part B, would have to be conducted over a period of at least two years, but preferably longer. This is the minimum period over which sustainable physical changes could be confirmed as a result of the legislation and institutional capacity.

**Part B -**

**Testing of the model policies relating to the issues such as mineral potential, marketing, technical services, credit facilities, environmental protection and health and safety.**

It is recommended that this part of the project be undertaken in one country and specifically in one area of the selected country, which has a high density of small-scale miners. This will target limited resources and allow benefits to be felt by the maximum number of small scale miners and their dependants. The project is for the provision of a regional training centre, which will become the testing ground for the model policies by actually implementing the policies and measuring their success over a period of time. The method of measurement will be similar to that described in Part A. Activities will include, inter alia:
• Consultation with the host Government in order to establish the resources (in terms of manpower, funding, buildings, equipment etc.) that the various parties (such as DFID, the Government, mining companies, financial organisations and other donor agencies) are prepared to contribute to the establishment of a regional training centre. This phase of the project is extremely important, as the ‘in country’ level of support will dictate all subsequent actions.

• Consultation with the stakeholders to establish the methods by which the centre can become sustainable. As previously mentioned, this could be by a variety of methods such as charging for equipment, ring fencing of production royalties or a charge for marketing.

• Consultation with all the stakeholders to identify a region or area that meets all the necessary requirements of the interested parties.

• Undertake a baseline survey of all of the SSM activities in the region that the centre is proposed to service.

• Consultation with all the stakeholders to produce a blue print for the training centre, its aims and the intended beneficiaries.

• Establish a regional training centre, which, ideally would consist of some buildings and land (for practical demonstrations), in an area with a high density of small-scale miners.

• Identify the technology that would best serve the interests of the miners and that could be operated at the centre (or possibly moved around the locality) and for which the miners would be prepared to pay. Any such technology would have to have proven additional benefits to the environment before it was introduced.

• Establish the TSU and bring in external consultants to teach the members of the TSU. This programme would be agreed in advance.

• The centre would become the effective “home” of the TSU who would use it as a base and visit sites in the area. Targets would be set in order to improve environmental and productivity standards. These standards would continually be monitored and revised as required.

• Establish credit and marketing facilities.

4. 2.3 Outputs

Part A

At the end of the monitoring period a report will be produced which details the progress that the sector has made and also details the results of the individual sites that have been under observation. Specific reference will be made to the effects of the legislation on the projects (both positive and negative) and any trends that are apparent will be identified. For example it may be that a particular piece of legislation works well for the precious metal sector but does not for another commodity.

The report will highlight areas of the legislation and institutional capacity that are working well and others that need to be improved. Comparison will be made with the model policies and actions that are contained within this report and recommendations given for improvements or alterations. Particular emphasis will be placed on the effect the legislation has had on poverty alleviation in the community, and raising environmental and health and safety standards.
Part B

A sustainable ongoing SSM project would provide real benefits to the miners and the local community. The objective will be to develop a commercially sustainable centre within a period of three years. The principle aim will be to provide a blueprint for a regional training centre with in-house expertise that can be duplicated, with modifications, for other regions, countries and commodities.

At the end of the project, a quantitative evaluation of the measurable impacts (especially the social and environmental benefits) of the projects will be made and a detailed critique undertaken of the success (or otherwise) of the various model policies. This will be used to revise the model policies as necessary and to provide the ‘generic’ reference manual for dissemination to Governments and Agencies.

Regular progress reports will be made to the World Bank and other agencies with an interest in SSM activities to initiate and encourage discussion and the transfer of information.

A dedicated Internet web site is seen as a very important method of co-ordinating disseminating information worldwide and this will quickly result in a more coherent approach being undertaken to support the SSM sector worldwide by the various organisations which are active within it.

4.2.4 Evaluation Matrix

The following matrix has been designed to rank each country’s small-scale mining sector. The ‘Principal Issues and Principal Factors’ attract a ‘score’ that facilitates the ranking of the small-scale mining sector of the respective country. The main assumption for the use of this matrix is that the country being evaluated fulfils two fundamental criteria, namely:

- It is a LDC country – where poverty alleviation is a major concern (col. J)
- It has a sizeable SSM sector (col. E and I)

Providing these criteria are met the higher the score the greater is the country’s need for major investment in the SSM sector. A project in such a country would require significant resources to initially establish an institutional set-up to regulate and monitor the sector and develop an appropriate SSM legislation.

Lower scores represent countries that either have a more moderately sized SSM sector or that the sector is relatively well regulated and monitored. Countries having established institutional capacity and appropriate legislation (i.e. low scores in columns A and B) would be particularly suitable candidates for Phase II of this project by allowing the project to address more immediate concerns of the SSM sector and thereby focus directly on the alleviation of poverty.

The two examples of Ghana and Suriname detailed on table X indicate that in the long term Suriname with its greater ‘need’ would be a worthy recipient of major donor
funding whereas Ghana would be a more accessible and receptive host for a focused and more limited resourced project.

The numerical scoring in the matrix has been refined to include a weighting adjustment with those factors of particular importance to the evaluation of the SSM sector being given a greater weight. This allows the matrix to more clearly focus on the critical factors that govern or influence the SSM sector rather than being distracted with the other more marginal issues (although important in their own right). To avoid ‘skewed’ results when comparing and evaluating one country’s SSM sector with another, the weighting adjustment must be included in the scoring process for all countries.

Countries that produce an appropriate score on the matrix and which are suitable for hosting some form of SSM partnership include Ghana (82), South Africa (86), and Tanzania (107). However only the first two have been responsive to preliminary discussions regarding collaboration on Phase II of this project. The Philippines (115) has also shown an indication to assist with the second phase of this study. Tanzania (107) and Guyana (112) may prove to be suitable candidates although informal discussions regarding the possibility of hosting Phase II have not been held. (There may well be other counties that we have not yet talked to.)

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>MATRIX ROW No.</th>
<th>SCORE</th>
<th>DISCUSSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E</td>
<td>I</td>
<td>J</td>
</tr>
<tr>
<td>Ghana</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Guyana</td>
<td>20</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Mali</td>
<td>15</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Philippines</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>South Africa</td>
<td>20</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Suriname</td>
<td>20</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Tanzania</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Zambia</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 4. Comparison of country scores from the evaluation matrix.

Informal discussions have been held with the Advisor and the Programme Manager of the Canadian funded Kwagga project in South Africa. This has already involved the production of a new white paper on mining legislation and the implementation of a small-scale mining Steering Committee.

In addition informal discussions have been held with the Minerals Commission in Ghana who have indicated a keen desire to jointly participate in such a SSM project. They have relatively new mining legislation which addresses the SSM sector and they also have a dedicated SSM department. This department oversees the newly installed mine officers
who provide training (mining, processing, environmental, health and safety and business) and advice for the miners from regional offices. The Commission is also keen to extend their SSM assistance beyond the precious metals and gemstone sector. This objective is concurrent with their national mineral policy to diversify from a gold-dominated industry. In Ghana there is also the opportunity to monitor and examine the newly formed relationship between a large scale mining operator and the small-scale miners at the Gold Fields project at Tarkwa.
APPENDIX A – GLOSSARY

**Alluvial Deposit:** An accumulation of sediment deposited from running fresh water in a channel or on an alluvial, coastal or deltaic plain and comprising gravel, sand, mud, coal and chemical precipitates.

**Amalgam:** An alloy of mercury with another metal; particularly gold-mercury, from mercury may be distilled by returning the gold remaining behind. Amalgam usually contains from 40 to 60% gold, and is obtained from the plated in a mill treating gold ore.

**Amalgamation:** The process of recovering gold by passing the thinly divided gold-bearing metal in a thin stream over mercury covered copper or muntz metal plates or by otherwise causing contact between the gold and mercury.

**Assay:** The determination of the quantity of a desired metal per unit weight of a material containing it.

**Auriferous Deposits:** Gold-bearing deposits, lodes, sands gravels or their indurated equivalents, which contain gold in detrial grains or nuggets.

**Colluvium:** Sediment transported by weakly selective, non-fluvial processes such as mass-wasting and slope-wash.

**Copper-Porphy Deposit:** A large low-grade stockwork to disseminated deposit of copper which may also contain minor molybdenum, gold, silver, commonly in a granitic host rock.

**Custom Milling:** The processing of small quantities of ore usually using third party equipment

**DFID:** The UK Department for International Development

**Diamondiferous:** Diamond bearing deposits kimberlites, laprolites, sands, gravels or their indurated equivalents.

**Elluvium:** In situ weathered bedrock.
**Environmental Action Plan:** An essential and critical component of an Environmental Assessment report, the EAP details the mitigation, management, monitoring and institutional measures to be taken during implementation and operation of a project, in order to eliminate adverse environmental and social impacts, offset them or reduce them to acceptable levels. The EAP also includes the actions, schedules for implementation and costs needed to implement these measures.

**Fine Gold:** Almost pure gold (also Flour Gold).

**Gravity Separation:** Gravity concentration separates minerals of different specific gravity by their relative movement in response to gravity and one or more other forces, the latter often being the resistance to motion offered by a viscous fluid, such as water or air.

**Guano:** A deposit of calcium phosphate formed by the reaction of bird or bat excreta with limestone, once heavily worked for fertiliser.

**Heavy Metal Pollution:** The artificial introduction of heavy metals (arsenic, cadmium, copper, lead, nickel, silver, etc) into the environment in quantities that will adversely affect it.

**Industrial Mineral:** A mineral of economic importance in itself rather than because of the element(s) it contains (e.g. gypsum, phosphate, barytes, graphite, kaolin, potash, salt, soda ash, etc).

**Institutional Capacity:** The government and associated ministries, commissions, and departments.

**Lamellas:** A thickener is used to increase the concentration of the suspension by sedimentation, accompanied by the formation of a clear liquid. A lamella thickener utilises a nest of inclined parallel plates, which reduce settling distances and at the same time increase effective area.

**Lode:** The well defined occurrence of valuable mineral bearing material in-situ. Used synonymously with ‘orebody’ and to some extent with ‘reef’ and vein.

**Milling:** The grinding or crushing of ore. The term may include the operation of removing valueless or harmful constituents and preparation for market.

**Mineral Deposit:** A deposit of naturally occurring, homogeneous solid with a defined
chemical composition and highly ordered atomic arrangement.

**Mineralisation:** The process taking place in the earth’s crust resulting in the formation of valuable minerals or orebodies.

**Mineralogy:** The study of minerals.

**Native Element:** A mineral comprising a metallic element in an uncombined state or as an alloy with another element(s).

**Nelson Concentrator:** Nelson Davis concentrator (separator): a cylindrical dense-medium washer developed in America. It uses a magnetite water suspension as medium. The bath resembles a drum in shape, its longitudinal axis being horizontal.

**NGO:** A non-governmental organisation.

**Outcrop:** The part of a rock stratum, vein or coal seams that appears at surface. It may be plainly visible or almost obscure by superficial deposits.

**Oxides:** Compounds of oxygen with another element; very impotent class of mineral.

**Recovery:** The proportion of a desired metal and mineral obtained in the remains of ore.

**Retort:** A vessel or container in which metals ore ores are distilled. Distillation is used in expelling mercury from amalgam.

**Rio Declaration:** The outcome of the United Nations Conference on Environment and Development (UNCED) - the "Earth Summit", held in Rio de Janeiro in June 1992. This outcome included: (1) an 'Earth Charter' or Declaration of basic rights and obligations with respect to environment and development; (2) an agenda for action, 'Agenda 21', which constitutes an agreed work programme of the international community; and (3) commitments to adoption of framework conventions on climate change and biodiversity.

**ROM – Run of Mine:** The raw ore as it is delivered by the mine, prior to treatment of any sort.

**Screening:** A process used to grade or size a mineral feed.
**Shaking Tables:** The shaking table is perhaps the most metallurgically efficient form of gravity concentrator, producing finished concentrates.

**Silicosis:** A miners’ disease of the lungs due to prolonged inhalation of air containing much siliceous dust.

**Sluice Box:** A long trough like box set on a slope of about 1 in 20, through which placed gravel is carried by a stream of water. The sand and gravel are carried away, while most of the gold and other heavy minerals are caught in riffles or blanket on the floor.

**Smelting:** The process of extracting a metal from its ores by heating; the chemical reduction of the oxide of the metal with carbon in a furnace.

**Sub Outcrop:** A blind apex – the upper edge of a lode or vein reef, near the surface but covered by superficial deposits.

**Sub-Saharan Africa:** A collective term used to describe all African countries excluding the North African states of Egypt, Libya, Algeria, Tunisia, Morocco and Western Sahara.

**Sulphides:** A compound of a metal and sulphide. Metals such as lead, zinc, copper, occur most commonly as sulphides.
APPENDIX B - BIBLIOGRAPHY


AGID regional workshop on strategies for small-scale mining and mineral industries (1980), Mombassa, Kenya.


Caceres, G; Joly, P; Goffaux, D and Frenay, J (1996), “Application of the Knelson concentrator to small scale mining in the Atacama region, Chile”, Clean technology for the mining industry, proceedings of the III international conference held in Santiago, Chile.


CRS Perspectives No.52, (1996)


Ludvigsen, E S (1990), “Information technology in small scale mining”, APCOM 90, proceedings of the 22nd international symposium, held in Berlin, West Germany.


Parsons, A (1999), “Small-Scale Mining and the Environment”, UNEP.


African Mining conference, held in Windhoek, Namibia.


Small scale mining (1996), CRS Perspect., no.52, 10 papers, p.8-36.

Small scale mining (1996), CRS Perspect., no.52.


United Nations Department of Technical Co-operation for Development (1989), “Mining policies and planning in developing countries”.


Wimpfen, S P (1978), “Incentives for mineral exploration and development, the future of small-scale mining”.


Wotruba, H (1997), Environmental protection in small-scale primary gold mining in Bolivia, Proceedings of the XX International mineral processing congress held in Aachen, Germany.

APPENDIX C – COUNTRY SURVEY
APPENDIX B
COUNTRY: BOLIVIA

INSTITUTIONAL CAPACITY

Name:
Aims:
Budget:
Employees:
Facilities:
Main Concerns:

LEGISLATION

Name: Mining Code 1997
Date:
Minerals covered:
Area/duration:
Transferable:
Taxation: Holders of mining concessions must pay a patent for each calendar year
Years 1 – 5 of concession Bs125, years 6+ of concession Bs250 per square
Complementary Mining Tax
Penal provisions:
Specific provisions:
Application requirements:
License management: Mining controlled by the General Superintendent of Mines

MINERAL POTENTIAL

Extent:

MARKETING

Name:
Type of minerals:
Duration:
Taxation:
Transferable:
Requirements:
License management:
No. of Licences issued:
### TRAINING

<table>
<thead>
<tr>
<th>Training undertaken:</th>
</tr>
</thead>
</table>

### CREDIT

<table>
<thead>
<tr>
<th>Schemes in operation:</th>
</tr>
</thead>
</table>

### TECHNOLOGY

<table>
<thead>
<tr>
<th>In operation:</th>
</tr>
</thead>
</table>

### ENVIRONMENT

<table>
<thead>
<tr>
<th>Legislation: Environmental Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific provisions: Subject to Environmental Law</td>
</tr>
</tbody>
</table>
Concessionaires/operators obliged to control contaminating flow originating from mining activities
Obliged to mitigate environmental damage and carry out an environmental audit.
Environmental licence issued by National Mining Secretariat

### SOCIO-ECONOMIC

<table>
<thead>
<tr>
<th>Studies undertaken:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schemes in place:</td>
</tr>
<tr>
<td>Other comments:</td>
</tr>
</tbody>
</table>

### ESTIMATED PRODUCTION

<table>
<thead>
<tr>
<th>SSM licenses issued:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of production:</td>
</tr>
<tr>
<td>Value of production:</td>
</tr>
</tbody>
</table>
OTHER INFORMATION

Response to questionnaire has more information but is in Spanish
COUNTRY: COLUMBIA

INSTITUTIONAL CAPACITY

Name: Empresa Nacional Minera Ltd (MINERCOL LTD)

Aims:
- Legalise mining properties
- Organise the miners into co-operative societies
- Create efficiency in the production chain

Budget:

Employees:

Facilities:

Main Concerns: Limited competitive and skilled workforce
- Lack of security equipment
- Illegal mining – slow transactions
- Little control in terms of taxation
- Many marketing intermediaries
- Limited access to laboratory facilities
- Insufficient data
- Ethnic minorities

LEGISLATION

Name: Code of Mining,

Date: 23.11.88 (Rev. 30.05.90)

Minerals covered:

Area/duration: 1 Year (exploration), 10 years (exploitation)

Transferable: Yes

Taxation: Exploitation Law 141,1994

Penal provisions: Yes for illegal mining

Specific provisions: Use of explosives controlled by Army
- Maximum depth of workings 50m

Application requirements: Filing and processing fees required
- Working-Investment plan required
- Annual reports
- Written contract/guarantee

Licence management: Ministry of Mining (MINERCOL), covers licensing of operations and exploration
- Processed nationally
- Processing takes 1 to 6 months
### MINERAL POTENTIAL

**Extent:**

### MARKETING

<table>
<thead>
<tr>
<th><strong>Name:</strong> Domestic Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of minerals:</strong> At present only Coal</td>
</tr>
<tr>
<td><strong>Duration:</strong></td>
</tr>
<tr>
<td><strong>Taxation:</strong> Transferable</td>
</tr>
<tr>
<td><strong>Requirements:</strong> Licence management</td>
</tr>
<tr>
<td><strong>No. of Licences issued:</strong></td>
</tr>
</tbody>
</table>

### TRAINING

**Training undertaken:**

### CREDIT

**Schemes in operation:**

### TECHNOLOGY

**In operation:**

### ENVIRONMENT

<table>
<thead>
<tr>
<th><strong>Legislation:</strong> National Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific provisions:</strong> Environmental License (for exploration)</td>
</tr>
</tbody>
</table>
SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments: Labour Code provides relevant legislation

ESTIMATED PRODUCTION

SSM licenses issued:
Value of production:

OTHER INFORMATION

Project: Integration of Mining Areas (Small Scale Mining)
Duration 10 years
Proponents: Carbocol /Private Miners
Funders: Carbocol (US$1M to 1999), Local Government, Private Miners (US$ 0.2M to 1999)
Purpose: To integrate SSM in one SSM technical, economic, environmental and socially sustainable mine
Planned outputs: By 2003 40 sustainable mines
Actual results: 20
Problems: Legal and marketing
COUNTRY: ETHIOPIA

INSTITUTIONAL CAPACITY

Name:
Aims:
Budget:
Employees:
Facilities:
Main Concerns:

LEGISLATION

Name: Mining Proclamation No 52/1993, Mining Tax Proclamation No 53/1993
Date: 1993
Minerals covered: gold, platinum, precious minerals, metals, salt, clay and other similar minerals
Area/duration: Prospecting licence valid for 1 year, Exploration licence valid for 3 years may be renewed twice for 1 year each time surrendering not less than a quarter. Artisanal Mining licence valid for 1 year, renewable indefinitely.
Licensee pays annual surface rental for licence area.
SSM licence valid for 10 years or the life of the deposit whichever is shorter, renewable for 5 years.
Transferable: With approval of Licensing Authority
Taxation: Royalties payable for all minerals produced, rates set to encourage investment in minerals.
Penal provisions:
Specific provisions: Restricted to <15 metres deep
Application requirements:
Licence management: Licence required to mine or explore. Ethiopians may prospect without a prospecting licence.
Artisanal Mining Licences issued by Mine and Energy Bureau of National/Regional self-government.

MINERAL POTENTIAL

Extent:
MARKETING

Name:
Type of minerals:
Duration:
Taxation:
Transferable:
Requirements:
Licence management:
No. of Licences issued:

TRAINING

Training undertaken: Training required for mining operations

CREDIT

Schemes in operation:

TECHNOLOGY

In operation:

ENVIRONMENT

Legislation:
Specific provisions: Mining to be conducted in such a manner to ensure the health and safety of agents, employees and other persons and to minimise damage or pollution to the environment

SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments: Licence must give preference to Ethiopians
ESTIMATED PRODUCTION

SSM licenses issued:
Volume of production:
Value of production:

OTHER INFORMATION
COUNTRY: GHANA

INSTITUTIONAL CAPACITY

Name: Minerals Commission
Aims: Increase SSM’s contribution to national economy
To regularise and facilitate SSM’s access to mineable land and official market
To improve productivity, reduce negative environmental impacts and improve health and safety
Budget: Cedi 10.4 billion (1998)
Employees: 113 (1998)
Facilities: Transport available
Small Fire Assay Laboratory
Library
Main Concerns: Lack of adequate financial and technical support

LEGISLATION

Name: Small Scale Gold Mining Law - Codes of Practice for Gold SSM
Mining Act 1986 Small Scale & Building & Industrial
Date: 1989
Minerals covered: gold
Area/duration: Licence area 1– 4 people 3 acres, 5 – 9 people 5 acres, 10 + people 25 acres
Licence duration individuals - 3 years renewable -co-operatives – 5 years
Transferable: No
Taxation:
Penal provisions: Yes if infringements apply
Specific provisions: no explosives, no depth limit, no production limits and appropriate environmentally friendly mining method
Application requirements: Ghanaians only
  Filing and processing fees 105,000 cedi
  Sketch/survey plans 300,000 cedi
  Proof of financial capability
  E.I. survey by Mining Officer
Licence management: The District Centre of the area concerned.
Issued by Head Office (Accra)
Duration of processing: Two (2) months
SSM Licences issued:
  Diamonds 36Mct
  Kaolin 2t, Clay 16t, Talc 1t, Salt 27t, Sand 173t, Gravel 6t, Quarries (<= 25 acres) 103t
### MINERAL POTENTIAL

**Extent:**

<table>
<thead>
<tr>
<th>MARKETING</th>
</tr>
</thead>
</table>
| **Name:** Small Scale Gold Mining Law 1989  
**Type of minerals:** gold  
**Duration:** Annual Renewable  
**Taxation:**  
**Transferable:**  
**Requirements:**  
**Licence management:** Secretary for Lands and Natural Resources  
**No. of Licences issued:** |

<table>
<thead>
<tr>
<th>TRAINING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training undertaken:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CREDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schemes in operation:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In operation:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENVIRONMENT</th>
</tr>
</thead>
</table>
| **Legislation:** Code of Practice for Small Scale Gold Mining  
**Specific provisions:** No mineral dressing in a stream or river likely to cause pollution, unless with written approval of Chief Inspector of Mines.  
No stream or river to be diverted without the written approval of Secretary for Lands and Natural Resources  
No dumping of waste, gravel or tailings in or around streams or rivers. |

<table>
<thead>
<tr>
<th>SOCIO-ECONOMIC</th>
</tr>
</thead>
</table>
| **Studies undertaken:**  
**Schemes in place:**  
**Other comments:** |
## ESTIMATED PRODUCTION

### SSM licenses issued:

### Volume of production:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold (oz)</td>
<td>490,731</td>
<td>107,096</td>
<td>112,240</td>
<td>127,062</td>
<td>89,520</td>
<td>36,859</td>
<td>17,954</td>
</tr>
<tr>
<td>Diamonds (cts)</td>
<td>2,588,077</td>
<td>558,241</td>
<td>443,244</td>
<td>337,457</td>
<td>405,830</td>
<td>371,970</td>
<td>441,335</td>
</tr>
</tbody>
</table>

### Value of production:

|-------------|---------|---------|---------|---------|---------|---------|---------|

## OTHER INFORMATION

- Project: Mining Sector Information System
- Sponsors: World Bank
- Computerised database
### COUNTRY: GUYANA

#### INSTITUTIONAL CAPACITY

<table>
<thead>
<tr>
<th>Name</th>
<th>Guyana Geology and Mines Commission (GGMC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aims:</strong></td>
<td>To provide assistance to and promote the minerals industry. To regulate and monitor small, medium and large-scale mining. It is the agency responsible for prospecting and mining permits.</td>
</tr>
<tr>
<td><strong>Budget:</strong></td>
<td>Derived from (a) royalties on Au (b) rent from mining licenses.</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Facilities:</strong></td>
<td>Offices in Georgetown with library and laboratories.</td>
</tr>
<tr>
<td><strong>Main Concerns:</strong></td>
<td>Inability to effectively police the small-scale miners due to insufficient funding for transport. The remoteness of many of the sites is a major problem with the majority of the SSM activities being deep into the interior (rainforest). Environmental damage, mercury misuse, malaria migration with the SSMs, influx of non-Guyanese miners (primarily Brazilian and Venezuelan).</td>
</tr>
</tbody>
</table>

**Name:** Guyana Gold and Diamond Miners Association (GGDMA).

**Aims:** To provide an official NGO vehicle for the promotion of small and medium scale miners in Guyana.

**Budget:** Derived from membership fees and donations.

**Employees**

**Facilities:** A Georgetown office.

**Main Concerns:** Ensuring that the small/medium scale miners are fairly represented. Lobbying government (GGMC) to recognise and assist their members in various ways (e.g. publishing a leaflet on the harmful nature of Hg, specifying areas for SSM, road building to remote SSM areas).

#### MINERAL POTENTIAL

**Extent:** Principally gold and diamonds worked throughout the interior of the country. Other minerals include silica sand, kaolin, feldspars, agate/jasper, green quartz, amethyst, rose quarts, agates, clays, black pearls and colombo-tantalite.
LEGISLATION

**Name:** The Mining Act (No. 20) Part IV  
**Date:** 1989  
**Minerals covered:** All (gold, diamonds, industrial minerals, etc.).  
**Area/duration:** 1500ft x 800ft (27 acres) or 1 mile of river. SSM with a maximum production of 500t or 300m³ bank per day.  
**Transferable:** Yes  
**Taxation:** Royalty (Au 5%, Diamonds 3% (or Guy$150/ carat and quarrying 3%), Income Tax 2%, Claim owner 10%.  
**Penal provisions:** If conditions are violated then the GGMC can impose fines or cancel licenses. Illegal activities are dealt with by the GGMC with the occasional assistance of the Police.  
**Specific provisions:** Work permits required for Brazilian/Venezuelan miners.  
**Application requirements:** Guyanese (require a national ID card) to obtain – Mining Privilege (Guy$500). Dredge licence (annual) from GGMC fees dependent on size of dredge. In 1998/99 all fees halved because of El Nino reducing water levels making mining very difficult.  
**Licence management:**  
Need a prospecting permit once a claim is located (1500’ X 800’) and then given 60 days to give notice to GGMC and pay Guy$500. The claim is then advertised in the Mining Gazette for 3 consecutive weeks. (End of April a list of all claims published including those in existence or those abandoned).  
The Government has a real problem monitoring and regulating the SSM areas. They see the concept of aggregating the SSM peoples and earnings to report to finance Minister to get any form or recognition and assistance. Would like to see a ‘holding company’ for the SSM rather than the GGDMA that acts like a union.  
Production book must be kept and daily outputs recorded (110,000oz recorded by SSM in 1998) most only declare enough production to appear to break even and do not declare their true turnover. Most gold sold to dealers and shops, and these people only declare what they want.

TRAINING

**Training undertaken:**  
GGMC undertake training of the mines officers who patrol the interior,  
The CIDA project has the objective of training the SSMs with respect to technology and environment. 
GGDMA see training as a very important area to organise miners to form co-operatives
CREDIT

Schemes in operation:
No schemes in operation or attempted.
Common for bartering systems to be used in the interior with shops owners requiring a licence to trade in gold.

MARKETING

Name: The Gold Board
Type of minerals: Gold
Duration?
Taxation: see below
Transferable: Bartering recognised in the interior as a legitimate form of trade – although very difficult to monitor or police the gold price is usually
Requirements: Price fixed on London price and then reduced depending on purity (either assayed if above 10oz or visually inspected) and an exchange rate factor (average bank selling price minus Guy$3 for administration costs) and lastly is an amalgam then a further Guy $4 is subtracted.
Licence management: Guy$2000-8000 less than world price. Gold also sold through Government authorised agents at about the same price as the Gold Board. In 1997 attempted to license private dealers to sell gold to the Board or export in an attempt to bridge the gap between production and declaration – this venture was not successful. This concept was also attractive to money laundering by the various drug cartels that use Guyana as a transhipment point from Colombia.
The Black-Market is highly lucrative because of the 7% tax/royalty rates.
Recent study on jewellery market showed the huge differential between jewellery production and gold sold by the Board indicating that only 40-50% of the gold production is officially recorded.
No. of Licences issued: ?

TECHNOLOGY

In operation:
DFID funded (BGS/MERN) project for technical assistance to SSMs. In particular looking at the efficiency and methods of improving productivity from conventional Guyanese and Brazilian dredges. The recently started CIDA project has also a phase that will provide technical assistance to SSM. GGDMA recognises the need for improved technology – varying degrees of knowledge between Brazilians and Guyanese.
ENVIRONMENT

**Legislation:** New in September 1998

**Specific provisions:**
Particular problems with river dredging and the mining of the riverbanks (river mainly sand/gravel so minimal silting of the rivers compared to the clay of the river banks).
Currently reviewing new draft EPA Mining Regulations via a workshop.


UNIDO – 1992 Status report on Small/medium scale mining.

CIDA projects (a) small demonstrations of SSM techniques and technical assistance (b) mining environmental best practices and monitoring (c) policy guidelines and develop regulations.

SOCIO-ECONOMIC

**Studies undertaken:** DFID funded (MERN) project looking at the socio-economic implications of SSM (in comparison with Zimbabwe).

**Schemes in place:** None

**Other comments:** Migrant workers from Brazil and Venezuela compound the problems. Remoteness in the interior is another major problem. The preservation of the indigenous Amerindians/Maroons is also a concern.

ESTIMATED PRODUCTION

**SSM licenses issued:** 1998 – Permits – 727, Privileges 4,148, Registrations 576, Dredge licences 660 – revenue collected Guy$252,438,582.

**Volume of production:** 112,672oz Au, 33,481 cts Diamonds, 217,221t sand and 213,540t stone

**Value of production?**
Seasonal variations due to river levels in wet/dry seasons which dictate movement in the interior, flooding of pits and water availability for hydraulic mining.

OTHER INFORMATION

The UNIDO (1992) report undertook a very in-depth analysis of the SSM sector and produced a comprehensive report with recommendations.
COUNTRY: INDIA

INSTITUTIONAL CAPACITY

| Name:          |
| Budget:        |
| Employees:     |
| Facilities:    |
| Main Concerns: |

LEGISLATION

| Minerals covered: |
| Transferable: |
| Taxation: |
| Penal provisions: |
| Specific provisions: |
| Application requirements: |
| Licence management: |

MINERAL POTENTIAL

| Extent: |
MARKETING

Name: 
Type of minerals: 
Duration: 
Taxation: 
Transferable: 
Requirements: 
Licence management: 
No. of Licences issued: 

TRAINING

Training undertaken: Training is a statutory requirement under the Mines Vocational Training Rules 1966

CREDIT

Schemes in operation: Most finance obtained from family and friends

TECHNOLOGY

In operation: 

ENVIRONMENT

Legislation: 
Specific provisions: no adequate measures

SOCIO-ECONOMIC

Studies undertaken: 
Schemes in place: 
Other comments: Health risks; respiratory diseases, dysentery, diarrhoea, and endemic malaria. 100-150 SSM killed annually causes of accidents; lack of safety precautions, improper working conditions, lack of vocational training 
7-10% SSM operating illegally
## ESTIMATED PRODUCTION

**SSM licenses issued:**

**Volume of production:**

**Value of production:** Production increased 15% over last 5 years

<table>
<thead>
<tr>
<th>Employees</th>
<th>Men</th>
<th>Women</th>
<th>Young</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time</td>
<td>400,000</td>
<td>350,000</td>
<td>50,000</td>
<td>800,000</td>
</tr>
<tr>
<td>Part time</td>
<td>100,000</td>
<td>90,000</td>
<td>10,000</td>
<td>200,000</td>
</tr>
</tbody>
</table>

All mines 2 million employed

20% makes up informal sector

50% belong to TU's

## OTHER INFORMATION

10000+ SSM

SSM Mining Association

National Institute of Small Mines – Calcutta (represents Bihar – Orissa only)
COUNTRY: MOROCCO

INSTITUTIONAL CAPACITY

<table>
<thead>
<tr>
<th>Name:</th>
<th>CADETA (Centrale d'Achat et de Developement de la Region miniere de Tafilalet et de Figuig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims:</td>
<td>Provide: technical aid (mining equipment and mining works) administrative aid collection and marketing of mining products Insurance against working accidents</td>
</tr>
<tr>
<td>Budget:</td>
<td>7 Million Dinars</td>
</tr>
<tr>
<td>Employees:</td>
<td>40</td>
</tr>
<tr>
<td>Facilities:</td>
<td>laboratory, training venues, library</td>
</tr>
<tr>
<td>Main Concerns:</td>
<td>instability of the market (labour and employment, insufficiency of means *health and safety), the monopoly has not been respected (marketing), erroneous declaration of data productions (data collection)</td>
</tr>
</tbody>
</table>

LEGISLATION

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dahir No1/60/019 partout creation de la region miniere de Tafilalet et de Figuig et instituout la centrale d'Achet et de Developpment de la region miniere.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>1960 (Rev 1985)</td>
</tr>
<tr>
<td>Minerals covered:</td>
<td>lead, zinc, barytes</td>
</tr>
<tr>
<td>Area/duration:</td>
<td>max 10000m², 2 years, renewable</td>
</tr>
<tr>
<td>Transferable:</td>
<td>No</td>
</tr>
<tr>
<td>Taxation:</td>
<td></td>
</tr>
<tr>
<td>Penal provisions:</td>
<td>Penal Code</td>
</tr>
<tr>
<td>Specific provisions:</td>
<td>granting of authorisations, supplying mining equipment and mining works, insurance against working accidents, collect and market mining products.</td>
</tr>
<tr>
<td>Application requirements:</td>
<td></td>
</tr>
<tr>
<td>Licence management:</td>
<td>CADETA</td>
</tr>
</tbody>
</table>

MINERAL POTENTIAL

| Extent: | |

# MARKETING

| Name: |  
| Type of minerals: |  
| Duration: |  
| Taxation: |  
| Transferable: |  
| Requirements: |  
| Licence management: |  
| No. of Licences issued: |  

# TRAINING

| Training undertaken: |  

# CREDIT

| Schemes in operation: |  

# TECHNOLOGY

| In operation: |  

# ENVIRONMENT

| Legislation: |  
| Specific provisions: |  

# SOCIO-ECONOMIC

| Studies undertaken: |  
| Schemes in place: |  
| Other comments: |  

ESTIMATED PRODUCTION

SSM licenses issued:
Volume of production:
Value of production:

OTHER INFORMATION

April 1999 Development of artisanal Mining Activities in the Region.
Cost: 9.5m US$
Funders: BIRD (4.5m US$), Moroccan Government (2.1m US$)
To increase mining production capability
Reduce working accidents
COUNTRY: MEXICO

INSTITUTIONAL CAPACITY

Name: Mining Promotion General Direction (DGPM)

Aims: To strengthen promotion by means of closer relation between promoting organisations and state governments. To strengthen programs in co-ordination with other government institutions to provide technical assistance to meet the needs of exploitation and trade of small and medium mining.

Budget: US$ 62,280

Employees: 65

Facilities: one library

Main Concerns: Policy and legislation, licensing, technical services, recording of mineral production and to promote productive chain integration.

Name: Mineral Resources Council (COREMI)

Aims: The council provides professional counselling and support for the development of its mineral resources exploration of mining projects, the Council has the capacity to carry out such counselling under different schemes such as recognition visits to guide prospects: integral service contracts of geological and mining surveys; technical support agreements for the small and micro mining industry; certification of reserves computed by the private sector, that may supplement document support for obtaining credits

Budget: US$40 million

Employees: 801

Facilities: 3 aeroplanes and 4 helicopters; 3 laboratories; and library

Main Concerns: Training – agreements signed with national and international academic institutions. Not enough economic and technical resources to promote the development of new potential areas as well as carry on adequate capital and technological research programs

ENVIRONMENT

Legislation: Covered in mining act

Specific provisions:

Other:
**LEGISLATION**

**Name:** Mining Law  
**Date:** 26/06/93 revised 24/12/96  
**Minerals covered:** All  
**Area/duration:** exploration 3-6 years, exploitation 25-50 years  
**Transferable:** Yes  
**Taxation:** 0% tax on dividends expatriated, 0% on production royalties  
**Penal provisions:**  
**Specific provisions:** Exploration and exploitation permit of minerals previously reserved for the government (coal, sulphur, phosphorus, etc.)  
100% foreign investment  
**Application requirements:**  
**Licence management:**  
**Implementing Agency:** Ministry of Commerce and Industrial Development (SECOFI) is the federal executive ministry in charge of establishing and executing mining policies through the General Mining Co-ordination. Specifically General Mining Bureau (SECOFI agency) is in charge of assigning and issuing concession titles, updating the Public Mining Registry and mining cartographic charts, and preparing land release statements. Some tasks are supported by the Mining Sub-divisions and agencies operating at SECOFI’s Federal Delegations  

---

**MINERAL POTENTIAL**

**Extent:**

---

**MARKETING**

**Name:**  
**Type of minerals:**  
**Duration:**  
**Taxation:**  
**Transferable:**  
**Requirements:**  
**Licence management:**  
**No. of Licences issued:**

---

**TRAINING**

**Training undertaken:**
CREDIT

**Schemes in operation:**

**Name:** Mining Development Trust Fund

**Aims:** To undertake special programs for small scale miners

**Budget:** US$ 24.5 million (World Bank and Mexican Government)

**Employees:** 245

**Main Concerns:** To promote mining development and modernisation through credits and technical and administrative assistance to small and medium mining operations. In 1997 the Institution continued operating the Mining District Reactivation and Consolidation Program, which made satisfactory progress in three districts: Ocampo in Chihuahua, Choix in Sinaloa, and Guanaceví in Durango, through 1.0 million pesos investment in geological studies and 6 million pesos in Exploration State Funds, as well as US$1.3 million in foreign investment. Ore reserves in the order of 770,000 tons were identified in this group of districts, with a gross value of 315 million pesos.

As a result of the achievements attained in the three aforementioned districts, the program was expanded to eight other districts: Pilar de Morís, Cusihuiriachic, and Parral, in Chihuahua; Chalchihuites in Zacatecas; Concordia in Sinaloa; Zimapán in Hidalgo; and Tejocotes and Ixtepeji in Oaxaca.

Among the districts covered by the program expansion, the districts of Parral and Zimapán have shown outstanding results. At the Parral districts, FRISCO’s involvement in exploration work was formalised. As a result, small miners in the region were able to pay their overdue charges, totalling 3.4 million pesos. At the Zimapán district, the progress achieved was 72%, blocking out at least 1.2 tons of mineral. Approximately 12 small and medium mining companies expressed interest in obtaining the geological studies to reopen and/or develop mining units, including Beneficiadora de Zimapán, Minera Metalúrgica San Miguel, Minera Pal, Martínez and Minera El Espíritu.

The Trust Fund authorised lines of credit for four state governments: Baja California, Jalisco, Michoacán, and Puebla. In turn, they can grant credit to small and micro mining companies in their respective territories. There was active participation in the management of four exploration funds to assist existing small and micro miners.

**Comments:** Not enough economic resources to support financial requirements from the small miners; the operation rules are not flexible to the requirements needed by small miners.

**Name:** National Support Fund for Social Enterprises

**Aims:** To promote social sector mining development through credits and technical and administrative assistance to small companies.

**Budget:**

**Employees:**

**Main Concerns:** Three basics problems are characteristics in the social sector mining: training, markets to the products and not enough credits according to the small mining capacity.
TECHNOLOGY

In operation:

SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments:

ESTIMATED PRODUCTION

SSM licenses issued: Exploration concessions (ha) – 7.5 million (95), 23.9 million (98)
Exploitation concessions (ha) – 1 million (95), 1.3 million (98)

Total Volume of SSM Production

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold (kilograms)</td>
<td>4,503</td>
<td>1,091</td>
<td>1,107</td>
<td>844.5</td>
<td>1,460</td>
</tr>
<tr>
<td>Silver (kilograms)</td>
<td>685,923</td>
<td>172,086</td>
<td>159,204</td>
<td>143,775</td>
<td>210,858</td>
</tr>
<tr>
<td>Lead (tonnes)</td>
<td>21,534</td>
<td>5,148</td>
<td>5,221</td>
<td>5,565</td>
<td>5,600</td>
</tr>
<tr>
<td>Zinc (tonnes)</td>
<td>28,725</td>
<td>9,297</td>
<td>9,465</td>
<td>6,466</td>
<td>3,497</td>
</tr>
<tr>
<td>Copper (tonnes)</td>
<td>11,643</td>
<td>2,086</td>
<td>2,490</td>
<td>2,704</td>
<td>4,381</td>
</tr>
<tr>
<td>Cadmium (tonnes)</td>
<td>102</td>
<td>33.0</td>
<td>25.7</td>
<td>21.7</td>
<td>21.7</td>
</tr>
<tr>
<td>Iron (tonnes)</td>
<td>313,344</td>
<td>82,345</td>
<td>100,373</td>
<td>74,287</td>
<td>56,339</td>
</tr>
<tr>
<td>Coal (tonnes)</td>
<td>3,131,983</td>
<td>407,275</td>
<td>664,446</td>
<td>720,008</td>
<td>1,340,254</td>
</tr>
<tr>
<td>Manganese (tonnes)</td>
<td>523</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>523</td>
</tr>
<tr>
<td>Kaolin (tonnes)</td>
<td>28,894</td>
<td>6,149</td>
<td>7,964</td>
<td>11,696</td>
<td>3,084.6</td>
</tr>
<tr>
<td>Phosphorite (tonnes)</td>
<td>2,095</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,095</td>
</tr>
<tr>
<td>Graphite (tonnes)</td>
<td>16,935</td>
<td>4,954</td>
<td>5,483</td>
<td>4,919</td>
<td>1,579</td>
</tr>
<tr>
<td>Salt (tonnes)</td>
<td>2,158,822</td>
<td>546,784</td>
<td>511,918</td>
<td>531,405</td>
<td>568,715</td>
</tr>
</tbody>
</table>

Total Value of SSM Production (US$)
## Minerals Total

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td>50,894</td>
<td>10,355</td>
<td>11,810</td>
<td>10,532</td>
</tr>
<tr>
<td>Silver</td>
<td>114,606</td>
<td>30,335</td>
<td>25,109</td>
<td>23,970</td>
</tr>
<tr>
<td>Lead</td>
<td>21,689</td>
<td>5,135</td>
<td>5,363</td>
<td>5,996</td>
</tr>
<tr>
<td>Zinc</td>
<td>35,456</td>
<td>10,522</td>
<td>13,523</td>
<td>7,292</td>
</tr>
<tr>
<td>Copper</td>
<td>29,660</td>
<td>3,594</td>
<td>6,149</td>
<td>6,502</td>
</tr>
<tr>
<td>Cadmium</td>
<td>197</td>
<td>20</td>
<td>28</td>
<td>58</td>
</tr>
<tr>
<td>Iron</td>
<td>6,790</td>
<td>1,874</td>
<td>2,162</td>
<td>1,549</td>
</tr>
<tr>
<td>Coal</td>
<td>72,933</td>
<td>9,745</td>
<td>16,198</td>
<td>16,957</td>
</tr>
<tr>
<td>Manganese</td>
<td>1,319</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kaolin</td>
<td>2,887</td>
<td>624</td>
<td>817</td>
<td>1,133</td>
</tr>
<tr>
<td>Phosphorite</td>
<td>61</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Graphite</td>
<td>4,341</td>
<td>1,218</td>
<td>1,428</td>
<td>1,279</td>
</tr>
<tr>
<td>SALT</td>
<td>25,906</td>
<td>6,572</td>
<td>6,141</td>
<td>6,378</td>
</tr>
</tbody>
</table>

### OTHER INFORMATION

The DGPM claims not enough budget to collect data especially from SSM they have established WWW site.

COREMI - two exploration service contracts in private deposits were signed and 69 reconnaissance visits were made, 45 in metallic ores and 24 in non-metallic, with the possibility of conducting detailed exploratory surveys.

As part of the agreement signed with FONAES (National Support Fund for Social Enterprises), ten studies were carried out to support social sector communities: six on non-metallic ore projects located in the states of Baja California, Coahuila, Chiapas, Jalisco, Mexico and Tamaulipas; four or non-metallic ore located in Baja California, Durango, Guerrero and Nayarit.
COUNTRY: MOZAMBIQUE

INSTITUTIONAL CAPACITY

Name: National Directorate of Mines (DNM)
Aims: Planning, promoting, organising, supporting and supervising SSM
Enforcing mining safety
Ensuring adequate environmental preservation and protection.

Budget:

Employees:

Facilities: laboratory, library

Main Concerns: Health and safety, Environmental protection and pollution control, Data collection.

LEGISLATION

Name: Mining Legislation 2/86
Date: 16.4 86

Minerals covered: Gemstones, gold, industrial minerals

Area/duration: Area: unlimited
Duration: 25 – 50 years

Transferable: Rights transfer

Taxation: Income tax law 3/87 19.1.87

Penal provisions: Ministerial Decree No 96/81 16.12.81

Specific provisions: Explosives covered by Ministerial Decree No 96/81

Depth of Workings: unlimited

Mining method: open pit and underground

Processing methods: simple and sustainable

Production: no limits

Application requirements: Sufficient technical financial resources or experience

Letter of intention and payment of fees

Sketch/survey plans

Licence management: NDM  SSM Certificate

MINERAL POTENTIAL

Extent:
## MARKETING

| Name: |  
| Type of minerals: gemstones, gold and precious metals |  
| Duration: | 1 year |  
| Taxation: |  
| Transferable: |  
| Requirements: only for nationals |  
| Filing and processing fees |  
| Proof of financial capability |  
| Proof of technical capability |  
| Licence management: | DMG |  
| No. of Licences issued: | 1998 - 13, 1997 - 20 |

## TRAINING

| Training undertaken: | FFM provide training facilities? |

## CREDIT

| Schemes in operation: | FFM have credit schemes for SSM? |

## TECHNOLOGY

| In operation: |  

## ENVIRONMENT

| Legislation: | Law No 90/97 1.10.97 |  
| Specific provisions: |  

SOCIO-ECONOMIC

Studies undertaken:

Schemes in place:

Other comments:
Health and Safety covered by Ministerial Decree

ESTIMATED PRODUCTION

SSM licenses issued:

Volume of production:

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td>293kg</td>
<td>17kg</td>
</tr>
<tr>
<td>Bauxite</td>
<td>9140t</td>
<td>6.132t</td>
</tr>
<tr>
<td>Graphite</td>
<td>500t</td>
<td>5889t</td>
</tr>
<tr>
<td>Bentonite</td>
<td>1710.5t</td>
<td>685t</td>
</tr>
<tr>
<td>Marble</td>
<td>1492m3</td>
<td>117m3</td>
</tr>
<tr>
<td>Garnet</td>
<td>1046.2kg</td>
<td>1447kg</td>
</tr>
<tr>
<td>Emeralds</td>
<td>12kg</td>
<td>0</td>
</tr>
<tr>
<td>Beryl</td>
<td>374.6kg</td>
<td>0</td>
</tr>
<tr>
<td>Aquamarine</td>
<td>38.5kg</td>
<td>45kg</td>
</tr>
<tr>
<td>Tourmaline</td>
<td>5.3kg</td>
<td>18kg</td>
</tr>
<tr>
<td>Pink Quartz</td>
<td>60t</td>
<td>0</td>
</tr>
</tbody>
</table>

Value of production:

OTHER INFORMATION
Project: Institutional Support to Small Scale and Artisanal Mining
Proponents: DNM
Funders: The World Bank
Amount: 1,050,000 US$
Description: Institutional strengthening of sector to ensure training
Enhancement of environmental awareness and practices
Dissemination of small scale and manual skill technologies
Revision and updating of technical safety regulations opencast/underground
Co-ordinating with MICOA In the formulation and approval of proposed environmental regulations applicable to mining that takes into consideration local conditions
Circulation of information regarding effects caused by SSM and artisanal mining on the environment
Promotional campaigns to increase the awareness of artisanal and SS miners of safety and social issues.
Project Status: Negotiation phase.

COUNTRY: NAMIBIA

INSTITUTIONAL CAPACITY

Name: The Ministry of Mines and Energy
Aims: To facilitate and promote exploration, mining and processing by the private sector.
Budget:
Employees:
Facilities: Organised into 4 directorates; mining, energy, geological survey and administration/finance.
Main Concerns: Formulates and implements national mineral and energy policies.

LEGISLATION
Name: Mineral (Prospecting and Mining) Act, Constitution and Foreign Investment Act

Date: 1992

Minerals covered: Precious metal group, precious stones group, semi-precious stones group, base and rare metals group, dimension stone group, industrial minerals group, non-nuclear fuel minerals group, nuclear fuels minerals group.

Area/duration:

Transferable: Non-exclusive prospecting licence not transferable


Penal provisions:

Specific provisions: Non-exclusive prospecting licence limited to 12 months, no renewal. Small scale; claim pegged and registered gives exclusive right to prospect, limited to 6 months, maximum 10 claims. Mining claim valid for 3 years, if mined renewed 2 years at a time. New system distinguishes between large and small scale prospecting and mining with a simplified system for small-scale mining, aiming to promote prospecting and mining.

Application requirements: Mining claims restricted to Namibian citizens or companies in which only Namibian citizens may hold shares. Claim holder must ensure operations carried out in accordance with good mining and prospecting practices and ensure safety health and welfare of employees and prevent or minimise environmental pollution.

Licence management:

MINERAL POTENTIAL

Extent: Bedrock and sub-outcrop cover 60-70% of the country. Much of the northwest and north and east are under explored. Opportunities exist for gold, diamonds, base and minor metals, steel alloy metals, industrial minerals, dimension stone, semi-precious stones, coal and uranium.

MARKETING
### Name:

**Type of minerals:** Diamonds – government has exclusive rights to sell rough diamonds.

Uranium – controlled mineral export licence required.

Copper and other base metals sold overseas on the basis of international prices.

### Duration:

### Taxation:

Calculated by a formula based on the ratio of taxable income to turnover or gross revenues. A minimum tax rate of 25% applies.

- Diamonds: 2 tax schedules diamond profits tax payable at the rate of 15% on taxable income and diamond income tax levied at the rate of 50% plus a surcharge of 10%, giving an effective tax rate of 55%.

### Transferable:

### Requirements:

### Licence management:

### No. of Licences issued:

### TRAINING

Training undertaken:

### CREDIT

Schemes in operation:

### TECHNOLOGY

In operation:

### ENVIRONMENT

Legislation:

Specific provisions:

### SOCIO-ECONOMIC
### Studies undertaken:

### Schemes in place:

### Other comments:

Health, safety and welfare of employees covered by The Labour Act 1992

### ESTIMATED PRODUCTION

<table>
<thead>
<tr>
<th>SSM licenses issued:</th>
<th>Volume of production:</th>
<th>Value of production:</th>
</tr>
</thead>
</table>

### OTHER INFORMATION
COUNTRY: PHILIPPINES

INSTITUTIONAL CAPACITY

| Name: | The Mines and Geosciences Bureau (MGB) |
| Aims: | To assist SSM |
| Budget: | Under-resourced |
| Employees: | 3 Mining Engineers, 1 Community Development Officer |
| Facilities: | 15 regional offices |
| Main Concerns: | |

LEGISLATION

| Name: | PD 1899 (1984) (individual entrepreneurship), RA No 7076 (co-operatives), RA No 7942 (General Mining Legislation), Small Scale Mining Mines Safety Rules and Regulations, |
| Date: | |
| Minerals covered: | RA No 7942 sand and gravel, gemstones, mineral fertilisers |
| Area/duration: | |
| Transferable: | |
| Taxation: | |
| Penal provisions: | |
| Specific provisions: | |
| Application requirements: | Licence management: MGB manage SSM operations falling within mineral reservations, Local government manages SSM operations in non mineral reservation lands |
| | PRMB accepts, processes and evaluates applications and determines administrative charges for quarry, sand and gravel, guano, gemstone gathering and SSM permits |
| | SSM operations include sand and gravel extractions and quarries < 5 Ha |

MINERAL POTENTIAL

| Extent: | Director of MGB foresees SSM will contribute most of the output in selected mineral products (gold, quarry resources, non-metallic minerals and sand and gravel resources) |
## MARKETING

<table>
<thead>
<tr>
<th>Name:</th>
<th>Type of minerals:</th>
<th>Duration:</th>
<th>Taxation:</th>
<th>Transferable:</th>
<th>Requirements:</th>
<th>Licence management:</th>
<th>No. of Licences issued:</th>
</tr>
</thead>
</table>

## TRAINING

Training undertaken: Not clear whether training is taking place or just desirable

## CREDIT

Schemes in operation: No schemes
SSM not recognised as legitimate source of income by lending institutions

## TECHNOLOGY

In operation: Most SSM using crude mining methods, need technical training and support

## ENVIRONMENT

Legislation: Proclamation No 66 Declaring the Lahar affected Rivers and Embankments in the Provinces of Pampanga, Tarlac and Zambales as Environmentally Critical Areas
Specific provisions:
SOCIO-ECONOMIC

Studies undertaken:

Schemes in place:

Other comments: Issues of concern

environment – mine wastes have caused siltation, water and air pollution and destruction of low-lying farm land,
safety – absence of equipment, lack of training on safety and first aid,
obtaining permits – needs Environmental Compliance Certificate before application processed, cost of Initial Environmental Examination, required for ECC, prohibitive

Child labour extensive
SSM exhibit poor sanitary conditions
Occupational Hazards Toxic gas poisoning or poor ventilation
   Rockfall/cave-in
   Excessive exposure to toxic chemicals e.g. mercury, cyanide

ESTIMATED PRODUCTION

SSM licenses issued:

Volume of production:

Value of production:

OTHER INFORMATION

SSM mainly gold, silica, chromite, sand and gravel
80% SSM in informal sector
20% SSM have formal mining skills
COUNTRY: PAPUA NEW GUINEA

INSTITUTIONAL CAPACITY

Name: Department of Mineral Resources
Aims: To promote artisan SSM, through extension services provided by engineers and mining extension officers.
Budget: 3.8m US$
Employees: 116
Facilities: Commercial analytical laboratory and gold refinery
Library available
Main Concerns: Too many alluvial mining licences
Unsafe mining practices and unsafe handling of mercury
Pollution due to inappropriate handling of mercury
Illegal gold export
Inadequate resources and financing for extension services
Difficult to obtain accurate production statistics

TRAINING

Training undertaken: AusAid scheme

CREDIT

Schemes in operation:

TECHNOLOGY

In operation:
LEGISLATION

Name: Mining Act, Chapter 195 and Regulations
Date: 1980 (Revised August 1992)
Minerals covered: Alluvial and hard rock gold
Area/duration: Alluvial Mining Lease (AML) and Mining Lease (ML)
  Area: AML maximum 5 Ha, ML 60km²
  Duration: AML 5 years, ML over 5 years
Transferable: AML no, ML yes
Taxation: In accordance with PNG Tax legislation in respect of gold exported under gold export licence issued by the Central Bank
Penal provisions: In accordance with the relevant sections of the Mining Act 1992
Specific provisions:
  Machinery: Earthmoving equipment, processing plant and portable equipment
  Mining method: Open cut and underground
  Processing method: Gravity separation
Application requirements: Filing and processing fees
  Sketch/survey plans
  Proof of financial capability
  Supporting reports
  Surety/ performance bond
Licence management: Alluvial Mining Lease (AML) and Mining Lease (ML)
  Department of Mineral Resources
  Department of Lands and Survey
  Internal Revenue Commission
  Department of Environment and Conservation
  Central Bank (Bank of Papua New Guinea)

MINERAL POTENTIAL

Extent:
**MARKETING**

**Name:** Buying or selling within PNG is completely de-regulated and export to overseas markets is carried out under gold export licence

**Type of minerals:**

**Duration:** Renewable annually

**Taxation:** In accordance with PNG Income Tax legislation

**Transferable:** No

**Requirements:**

**Licence management:** Controller of Foreign Exchange

**No. of Licences issued:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Gold export licence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>7</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
</tr>
<tr>
<td>1994</td>
<td>3</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
</tr>
<tr>
<td>1996</td>
<td>5</td>
</tr>
<tr>
<td>1997</td>
<td>5</td>
</tr>
</tbody>
</table>

**ENVIRONMENT**

**Legislation:** Environment Act, particularly Water Resources Act, Chapter 205

**Specific provisions:**

**SOCIO-ECONOMIC**

**Studies undertaken:**

**Schemes in place:**

**Other comments:**

**ESTIMATED PRODUCTION**

**SSM licenses issued:**

- AML 1997 - 26, 1996 - 19, 1995 – 1

As of 31.12.98 the records of tenements, comprising of new applications, application for conversion of tenements pursuant to transitional provisions of the Mining Act 1992 and approved applications are as follows: AML – 113, ML - 367

**Volume of production:**


**Value of production:**

OTHER INFORMATION

Project: Technical assistance to promote small scale mechanised mining including staff training, environmental mitigation programmes and legislation

Duration: 2 years

Proponents: Department of Mineral Resources

Funders: AusAid

Components: training and education,
- technology introduction,
- financing, access to credit, loan schemes,
- health and safety,
- environmental protection

Problems: inadequate funding from Government
**COUNTRY: SENEGAL**

**INSTITUTIONAL CAPACITY**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Direction des Mines et de la Geologie du Ministere de L’Energie des Mines et L’Industrie du Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims:</td>
<td>Budget: 50,000,000 f cfa (100 f cfa = 1FF)</td>
</tr>
<tr>
<td></td>
<td>Employees: 23</td>
</tr>
<tr>
<td></td>
<td>Facilities: Laboratory available at DMG/MEMI</td>
</tr>
<tr>
<td></td>
<td>Library facilities for geological data at DMG</td>
</tr>
<tr>
<td></td>
<td>Main Concerns: Improvement of traditional gold panning techniques and recovery</td>
</tr>
<tr>
<td></td>
<td>Creating and strengthening existing SSM units to transform mining products (mini iron works producing cast pig iron, small production units for phosphate fertilisers etc)</td>
</tr>
<tr>
<td></td>
<td>Fight against pollution and the degradation of the mining environment</td>
</tr>
<tr>
<td></td>
<td>Creating gold buying counters and first necessity food stores.</td>
</tr>
</tbody>
</table>

**MINERAL POTENTIAL**

| Extent: | Siliceous sands: unexploited deposits north of Dakar |
|         | Diatomite: unexploited deposits at Tamna Lake north Dakar |
|         | Marble: 6 varieties of good quality marble awaiting exploitation in Kedougou District, eastern Senegal. |

**MARKETING**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Authorisation for crude gold exportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of minerals:</td>
<td>gold</td>
</tr>
<tr>
<td>Duration:</td>
<td></td>
</tr>
<tr>
<td>Taxation:</td>
<td></td>
</tr>
<tr>
<td>Transferable:</td>
<td></td>
</tr>
<tr>
<td>Requirements:</td>
<td>see mining code</td>
</tr>
<tr>
<td>No. of Licences issued:</td>
<td></td>
</tr>
</tbody>
</table>
LEGISLATION

**Name:** Code Miniere et le Decret D’Applicarion No89-907  
**Date:** 6 August 1988 (Rev 14 April 1996)  
**Minerals covered:** Precious metals and gemstones (gold and diamonds) ceramic and industrial clays, extra-siliceous sands, diatomite, heavy beach sands (limenite, rutile, zirconium), ornamental stones, building materials (marble, limestone, basalt, sandstone etc), Iron ore.  
**Area/duration:** Area: not defined for traditional gold panning  
Duration: 1 year renewable  
Area: 50 hectares for handicraft gold mining license  
Duration: 2 years renewable  
Area: 5km² for small mines license  
Duration: 3 years renewable  
**Transferable:** No  
**Taxation:** no taxation on traditional gold mining production but 2% tax for gold exportation will be applied soon.  
**Penal provisions:** Through mining and penal codes  
**Specific provisions:** Depth of operation: gold digging and SSM maximum 15 m depth  
Small mines no limit  
Mining methods: gold digging picks shovel and slight mechanisation  
Small mines mechanised  
Production limits: 100kg gold metal per year  
Operational schedules: Work to start no later than 2 months after license granted.  
Monthly report to DMG  
**Application requirements:**  
**Licence management:**  
For SSM: Ministry of Energy, Mines and Industry  
For gold: trade Minister of Economy, Finance and Planning

TRAINING

**Training undertaken:** Organising local diggers and panners to teach them to use more effective recovery techniques and better management capabilities.

CREDIT

**Schemes in operation:**  
Difficult to obtain

TECHNOLOGY

**In operation:**
ENVIRONMENT

Legislation:
Specific provisions:
Follow the mining and environmental codes regulations

SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments:
Health and safety covered by mining code regulations
Social assistance programme for populations of the working sector.

ESTIMATED PRODUCTION

SSM licenses issued:
Volume of production: No statistics but estimated traditional gold panners produce >700kg per year
Value of production: Estimated SSM 6,000,000 US$ per year

OTHER INFORMATION

Project: Assistance and supervision to traditional gold panners: “Orpaillage traditionnel” and small scale mining in the birimien area in eastern Senegal.
Location: Tambacounda region, Eastern Senegal.
Duration: 4 years
Cost: 167,000US$
Proponents: DMG
Funders: Government
COUNTRY: SRI LANKA

INSTITUTIONAL CAPACITY

Name: National Gem and Jewellery Authority
Aims: To promote and develop the gem industry, to exploit the market for the industry, to promote and sponsor technical training and to prevent unlawful activities.
Budget: US$ 1.16 million
Employees: 250
Facilities: Small lab in Colombo
Main Concerns: Mining without licences due to cost of acquiring land and licence. Environmental damage, particularly due to illegal mining. Lack of overseas market.

LEGISLATION

Name: National Gem and Jewellery Authority Act No 50- Gemming Licence
Date: 1993
Minerals covered: All gemstones except coral
Area/duration: 4 hectares, one year renewable
Transferable: No
Taxation: Nil
Penal provisions: If conditions are violated NJGA can impose fines or cancel licence. Illegal activities are dealt with by the NGJA with the assistance of the police.
Specific provisions: Explosives generally prohibited (allowed under special circumstances), depth unlimited, machinery restricted to pumps, processing to hand-held baskets, no production limits. Pits or opencast.
Application requirements: Sketch of location and payment of Rs 1000 (US$16) fee, restoration security bond.
Licence management: Licences dealt with at local level by NGJA Regional offices and take 1-30 days. Appeals are allowed for a fee of Rs 250 (US$4)

MINERAL POTENTIAL

Extent:
MARKETING

Name: Gem Dealers licence
Type of minerals: All gemstones including imported coral
Duration: One year, extendable
Taxation: Gem exports tax exempt, local trade subject to normal taxes
Transferable: No
Requirements: Marketing undertaken by auction or directly to customers. Licences granted based on experience. Fees based on the stock of gems held. Maximum fee is Rs 12000 ($180) to stock gems worth Rs 50 million (US$0.75 million)
Licence management: Licenses granted locally by regional offices and take one day.

TRAINING

Training undertaken: Inadequate lapidary training available on a regional basis

CREDIT

Schemes in operation:

TECHNOLOGY

In operation: Small laboratory in Colombo

ENVIRONMENT

Legislation:
Specific provisions: Licensee is held responsible and a security deposit, for restoration of the land, is held by NGJA

SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments:
ESTIMATED PRODUCTION


Volume of production: Volume of production is difficult to ascertain, as there is no requirement for gemming licensee to disclose figures. Estimated that illegal mining accounts for approximately 40% of total production. Estimated production of polished gems 45.4 (million carats)

Value of production: Conservative estimate made by adding 10% to the export figures, therefore US $273.9 million.

OTHER INFORMATION

Up to the early 1980’s SSM projects were operated jointly by the landowners, State Gem Corporation (predecessor to the NGJA) and miners. Environmental damage, pollution of waterways and stealing resulted in the discontinuation of such projects. Use of machinery was stopped in 1992 due to environmental damage and rapid depletion of reserves. Estimated that at least 150,000 people are involved in the legal and illegal mining of gemstones.
COUNTRY: SURINAME

INSTITUTIONAL CAPACITY

**Name:** Government Geological and Mining Services (GMD)

**Aims:** To provide assistance to and promote the minerals industry. To regulate and monitor small, medium and large-scale mining.

**Budget:**

**Employees:** 2 management (132 staff not redundant)

**Facilities:** Office in Paramaribo.

**Main Concerns:** Lack of resources to monitor and regulate the sector – they need strengthening to maintain a permanent presence in the mining areas in order to monitor, provide assistance and intervene when necessary.

Gold Committee to look after the interest of the SSM sector.

A Minerals Institute is to be established in the near future.

LEGISLATION

**Name:** SSM Not regulated at present. The Mining Act (Delfstoffenwet 1952) is still applicable to all mining concessions issued before July 1986 (eg Bilton Bauxite). The more recent Mining Decree (Mijnbouw Decreet 1986) is applicable to mining concessions issued after 1986.

**Date:** 1986

**Minerals covered:** Au

**Area/duration:** 200 hectares for two years (Sur. Guilders 1,500)

**Transferable:**

**Taxation:**

**Penal provisions:**

**Specific provisions:**

**Application requirements:**

**Licence management:** estimated that only 10% of miners have a licence.

MINERAL POTENTIAL

**Extent:** Principally gold

UNDP/UNRF funded exploration
MARKETING

Name: The Central Bank of Suriname started Au purchasing in 1995 – although much is still sold illegally.
Type of minerals: Au
Duration:
Taxation:
Transferable:
Requirements:
Licence management:
No. of Licences issued:

TRAINING

Training undertaken:
Estimated about 35,000 SS miners (10,000 Surinamese and 25,000 Brazilian) with only 10% having a licence.
Many years ago a training camp Loksi Ati (along the lower Saramacca River) existed – no self-supporting and now closed.
Proposals (1998) for the establishment of the Foundation for Experimental Mining (FEM) under the supervision of the GMD and funded by the GMD and IAS Special Mission (also gold recovered during the training sessions will be sold to the Central Bank of Suriname). Approximately 75% of the estimated cost of the project have been raised. The main objective of the foundation would be to establish training mines in the interior, in order to provide training and assistance to SS miners. Note that the Brazilians are organised but not the Surinamese.

CREDIT

Schemes in operation:
Bankers trust had postulated the concept of a small grants programme.

TECHNOLOGY

In operation:
Proposed training scheme (see training). Currently a mix of dredges with a large contingent of Brazilian technology.
ENVIRONMENT

Legislation: None specific – working on environmental framework.

Specific provisions:
National Council for the Environment – three priorities (including SSM)
NIMOS (National Institute for Environment and Development in Suriname) founded by Inter-American bank and the EU in 1998 – key objectives include promotion of environmentally sound mining techniques and sustainability, promotion of sustainable livelihood, conflict prevention and resolution, land use, and land reclamation.

Mercury abatement is also a key issue with NIMOS and GAC (N.V. Grassalco Mining Company) undertaking studies funded by the UNDP and one proposed by UNIDO.

SOCIO-ECONOMIC

Studies undertaken: OCS Special Mission to Suriname
Schemes in place: Proposed (see training)
Other comments: Suriname has particular problems with the inhabitants (Maroons and Amerindians) of the interior (e.g. the interior conflict (1986-92) which are to some extent in economic isolation. Problems include the lack of employment opportunity for uneducated men and women, lack of schools, the high cost of living in the interior, the lack of hard currency to purchase basics, Brazilian migration and the lack of policing in the interior.

ESTIMATED PRODUCTION

SSM licenses issued?
Volume of production: Unknown – the majority is smuggled over the border to Guyana or Brazil
Value of production: Unknown

OTHER INFORMATION

In general there is a lack of co-ordinated effort in the SSM sector, no land use planning (no designated mining/non-mining areas), lack of information and insight in mining concessions (institutional weakness of ministry), lack of executing capacity at ministerial level and a lack of environmental awareness amongst miners.
COUNTRY: TANZANIA

INSTITUTIONAL CAPACITY

Name: Mineral Resources Department. Regional and District Administrations not directly involved but are responsible for law and order and environmental control measures. Regional Mining Associations have now arisen but are poorly funded. Ministry of Energy & Minerals.

Aims: To improve the economic, social and environmental performance of SSM by gradual transformation of informal mining into formal mining.

Budget: Tanzania Shillings 2,600 million

Employees:

Facilities: Transport available. Laboratory, training venues and library available at Dodoma.

Main Concerns: Inability to undertake fieldwork due to inadequate staff, insufficient facilities and budget. Outdated legal framework that should now be superseded by new Mining Act. Increased number of operators since early 1990’s. Would like to see streamlined procedures and allow foreign participation to increase validity, enforcement of various regulations and help to formalise and source foreign markets for the products.

LEGISLATION

Name:

Date: 1998

Minerals covered:

Area/duration:

Transferable:

Taxation:

Penal provisions:

Specific provisions:

Application requirements:

Licence management: Average period to complete registration 2-12 months

MINERAL POTENTIAL

Extent:
MARKETING

<table>
<thead>
<tr>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of minerals:</td>
</tr>
<tr>
<td>Duration:</td>
</tr>
<tr>
<td>Taxation:</td>
</tr>
<tr>
<td>Transferable:</td>
</tr>
<tr>
<td>Requirements:</td>
</tr>
<tr>
<td>Licence management:</td>
</tr>
</tbody>
</table>

No. of Licences issued: Estimated 710 mineral brokers in 1996

Estimated that 60% of gemstones and 70-85% of gold is smuggled out of the country. This occurs due to excessive taxation and informal credit arrangements.

TRAINING

Training undertaken:

CREDIT

Schemes in operation: Centre for Poverty Alleviation aims to translate the aspirations of groups or individuals into bankable projects. Assistance is provided with producing project documentation. Main activity is setting up Credit Shops, a number of which have been established (although not in the mining sector). Main problems relating to SSM is the lack of collateral and the employment structure

Within SSM i.e. claim owners are often not the people working the claim.

National Investment Generation Programme that distributes aid funds to target groups. Aims are to relieve poverty by providing funds to suitable projects capable of generating employment and income.

Most of the funds have been distributed to agricultural projects. The NIGP has initiated a Mutual Guarantee Fund, jointly, with the banks to provide loans without collateral. The maximum loan would be US$50,000 and larger SSM projects would be eligible.

TECHNOLOGY

In operation: Phase 2 of the World Bank project on artisanal mining will be technology demonstration and training but it is not known if specific areas for this have yet been chosen. Apparently some work has been undertaken utilising different processing methods on various sites. The IDA (US$2,040,000) and the government (US$110,000) are funding this project. Its aims are Baseline survey (completed), Technology demonstrations and Training and Capacity Building.
ENVIRONMENT

Legislation:

Specific provisions:
Estimated that 10000 ha have been destroyed by formal SSM and 6000 ha by illegal activities. Mercury contamination of up to 1150 times WHO limits in rivers has been measured. Estimated that 2.3 to 2.7 t of mercury is lost per year. Air particulates 21 times WHO limits measured and 33% of people tested exceeded WHO standard for mercury in hair. Drinking water found to contain coliform bacteria, parasites and pathogens.

A UNIDO/UNEP project is underway to alleviate mercury contamination from SSM activities. The project team are working with a number of other agencies to progress work on a number of issues. One example is the Greenland Bank who wishes to assist SSM with loans for mining projects. They will use the SADC model to prepare bankable documents.

SOCIO-ECONOMIC

Studies undertaken: Tan Discovery SSM Baseline Survey 1996

Schemes in place:

Other comments: Gold miners earn $200-$1000/month while a gemstone claimholder will earn less than $400/month. Generally very little is reinvested into the property. Women barred from working underground but often undertake work on surface. They will earn $20-$400/month working on gold and some $5-$140 working on gemstones. Of the estimated 550,000 people working in SSM in 1995 some 140,000 are thought to be women.

ESTIMATED PRODUCTION

SSM licenses issued: 1991-425, 1995-4,123

Volume of production:

Value of production: Value of all mineral exports in 1992 – US$53.2 million. A formal gold and gemstone export in 1994 - US$32.1 million that is estimated to be one third of the actual amount produced. Formal gold exports rose from $1.1 million in 1989 to US$31.4 million in 1993. During this period gemstone exports did not increase significantly due to a) lack of export credit facilities, b) loss in exchange rates, c) inability to penetrate value added markets.

OTHER INFORMATION

Much of the information is based on baseline survey of SSM carried out in the country in 1996 by Tan Discovery. An underlying theme encountered in many of the completed questionnaires was a complete lack of co-ordination between various funding agencies that are undertaking projects or programmes.
COUNTRY: ZAMBIA

INSTITUTIONAL CAPACITY

<table>
<thead>
<tr>
<th>Name: Ministry of Mines and Minerals Development (MMD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims: Formulating policy; issue mining/exploration licences; health and safety regulation including use of explosives.</td>
</tr>
<tr>
<td>Budget: c.USD150,000pa</td>
</tr>
<tr>
<td>Employees: c.400</td>
</tr>
<tr>
<td>Facilities: Offices in Lusaka and Kitwe: laboratory; library (not maintained)</td>
</tr>
<tr>
<td>Main Concerns: MMD is severely under-resourced - cannot regulate SSM activities especially in remote areas; lack of trained staff due to poor remuneration</td>
</tr>
</tbody>
</table>

LEGISLATION

<table>
<thead>
<tr>
<th>Name: Mines and Minerals Act 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mines and Minerals (Environmental) Regulations 1997</td>
</tr>
<tr>
<td>Environmental Protection and Pollution Control Act 1990</td>
</tr>
<tr>
<td>Environmental Protection and Pollution Control (EIA) Regulations 1997</td>
</tr>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Minerals covered: Gemstone licence – gemstones only; Artisanal and SSM licence – other minerals (metals, industrial and construction minerals)</td>
</tr>
<tr>
<td>Area/duration: Artisanal licence – 5 hectares; SSM licence – 400 hectares; Gemstone licence – 400 hectares</td>
</tr>
<tr>
<td>Transferable: Yes</td>
</tr>
<tr>
<td>Taxation: No royalties; 15% corporation tax; export tax 3%</td>
</tr>
<tr>
<td>Penal provisions: Licences can be cancelled</td>
</tr>
<tr>
<td>Specific provisions: Only Zambian nationals can hold Artisanal licence</td>
</tr>
<tr>
<td>Application requirements:</td>
</tr>
<tr>
<td>Licence management: Artisanal licence is valid for 2 years; SSM and gemstone licences are valid for 10 years but have to be transferred to large scale licence if operation becomes substantial. Approx. 300 licences issued since 1995 (as of end 1998)</td>
</tr>
</tbody>
</table>

MINERAL POTENTIAL

| Extent: SSM activities are primarily in gemstones (emeralds, tourmalines, and aquamarines) in the Ndola, Mkushi, Lundazi and Kalomo areas. Industrial and construction minerals are worked throughout the country. Potential for SSM of small base metal deposits. Some gold exploration in progress. |
MARKETING

**Name:** Dealers holding Gemstone Marketing License  
**Type of minerals:** Gemstones only  
**Duration:**  
**Taxation:**  
**Transferable:**  
**Requirements:**  
**Licence management:** Large number of illegal dealers operating in the country.  
**No. of Licences issued:**

TRAINING

**Training undertaken:** Some training of undertaken by MMD in conjunction with University of Zambia. Main areas of training required: licence procedures; geology and exploration; health and safety; mining methods and mineral processing.

CREDIT

**Schemes in operation:** None at present

TECHNOLOGY

**In operation:** Generally SSM operations are very labour intensive. Some of the larger mines utilise hired in plant at very high rates. Some assisted plant-hire schemes have been attempted.

ENVIRONMENT

**Legislation:** Environmental Protection and Pollution Control Act 1990  
Environmental Protection and Pollution Control (EIA) Regulations 1997  
Mines and Minerals (Environmental) Regulations 1997  
MMD (Mines Safety Dept.); and Ministry of Environment and Natural Resources are responsible for EIA and permitting issues. Environmental Council of Zambia is responsible for enforcement.

**Specific provisions:** EIAs and environmental protection bonds can be requested from SSMs.
SOCIO-ECONOMIC

Studies undertaken:
Schemes in place:
Other comments:

ESTIMATED PRODUCTION

SSM licenses issued: c. 300 licences issued since 1995
Volume of production:

OTHER INFORMATION

Gemstone Industry Problems:
Lack of organisation
Lack of mining technology so high gemstones losses
Lack of capital
Poor quality and inappropriate plant facilities and machinery
Poor marketing of stones.
APPENDIX D – PROJECT SURVEY
APPENDIX E – LOGICAL FRAMEWORK