# Environmental Management in the Ghanaian Artisanal and Small-Scale Gold Mining Industry: An Analysis of Institutional and Grassroots Perspectives

by

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# Abstract

**"Environmental Management in the Ghanaian Artisanal and Small-Scale Gold Mining Industry: An Analysis of Institutional and Grassroots Perspectives"**

**Gavin M. Hilson**

The environmental impact of artisanal and small-scale gold mining in Ghana is now well rehearsed in the domestic and international literature. Since legalization of this informal sector in 1989, the Government has instituted a series of laws and policies designed to provide administrative oversight to the industry's operators and to bring them under institutional control. There is growing evidence that many of these interventions, legalistic in character and top down in their mode of implementation, have failed to address the interrelated economic, social and environmental challenges of artisanal gold mining in Ghana. Most significantly, although the extent of the industry's environmental problems has yet to be fully determined, individual studies confirm that intensified ecological damage has accompanied the expansion of the sector.

This thesis aims to present an extended critique of government efforts to regulate and manage a sector characterised by informality and marginal engagement with official institutions and extension services. In an attempt to determine the main causes of the industry's environmental problems, the thesis undertakes a tripartite assessment, deploying a qualitative analysis to explore the perspectives of resident (industry) experts, institutional actors, and miners themselves. The resulting analysis of the data suggests that industry support and regulation has been inherently *ad hoc*, and that institutional actors perceive the industry's operators as environmentally destructive and law evading. Miners, on the other hand, maintain an ambiguous position with regard to regulation and industry support. Paradoxically, there is consensus among miners that efforts *have* been made to adhere to what they see as rigid regulations and registration procedures, and to improve environmental management at sites. In spite of these attempts, miners indicated that the regulatory environment is now procedurally complex, designed to further marginalize them and their families.

# Acknowledgements

This project began as a highly ambitious idea that was going nowhere. I guess it is the same for most PhDs but my situation was an especially sad case. Fortunately, with key inputs from Professor John Monhemius, Dr Rita van der Vorst, William Sheate, Professor Jose Furtado, Professor Barbara Murck, Dr Gordon Hopper and Dr Arun Basu, I began to lay the groundwork for a dissertation. However, I am most thankful to my supervisor, Dr Clive Potter, for shaping this into a submittable piece of work. Without his guidance, patience, repeated editing, and tolerance of my slowness in grasping theoretical ideas and conceptualisations, I would never have made it beyond the MPhil transfer, and would likely still be working retail. I am also deeply indebted to the Institution of Mining and Metallurgy (IMM), the Social Science and Humanities Research Council (SSHRC) of Canada, the Overseas Research Award Scheme (ORS), the Imperial College Trust and the Royal Academy of Engineering for providing financial support at various stages of my PhD research.

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What a rollercoaster ride! Since arriving in London in September 2000, I have lived in six different places, most of which were in the "sticks", and have grown immune to train and bus delays, and the Circle Line.

This thesis is dedicated to Sophia, who tolerated my unorthodox habits (laptop in bars, the revising of papers at 3AM, repeated discussions of Structural Adjustment during dinners, etc.) throughout the course of the PhD and my largely poverty-stricken state. I have promised you much more after this exhausting but fulfilling experience, and I intend to deliver. Go Rams, *innit*!

Gavin M. Hilson
October, 2003

# Publications

**Elements of the research presented in this thesis have formed the basis of the following publications:**

**Hilson, G.** 2003 (ed.) The Socioeconomic Impacts of Artisanal and Small-Scale Mining in Developing Countries. A. A. Balkema, a division of Swets & Zeitlinger Publishers, Rotterdam, 739 pp. ISBN 90 580 9615 7

**Hilson, G.** 2003 (ed.). "Environmental management in the small-scale mining industry". Organizer and editor of a special issue of the *Journal of Cleaner Production* 11(2): 91-227.

**Hilson, G.** 2003. Gold Mining as Subsistence: Ghana's Small-Scale Miners Left Behind. *Cultural Survival Quarterly* 27(1): 74-76.

**Hilson, G.**, Potter, C. 2003 Why is illegal gold mining activity so ubiquitous throughout rural Ghana? *African Development Review* 15(2): 237-270.

**Hilson, G.** 2002. Land use competition in developing countries: profiling the struggles of Ghana's galamsey miners. *Minerals and Energy* 17(3): 2-14.

**Hilson, G.** 2002. Delivering aid to grassroots industries: a critical evaluation of small-scale mining support services. *Minerals and Energy* 17(1): 11-18.

**Hilson, G.** 2002. Land use competition between small- and large-scale miners: a case study of Ghana. *Land Use Policy* 19(2): 149-156.

**Hilson, G.** 2002. Small-scale mining in Africa: tackling pressing environmental problems with improved strategy. *Journal of Environment & Development* 11(2): 149-174.

**Hilson, G.** 2002. Small-scale mining and its socioeconomic impact in developing countries. *Natural Resources Forum* 26(1): 3-13.

**Hilson, G.** 2002. The environmental impact of small-scale gold mining in Ghana: identifying problems and possible solutions. *The Geographical Journal* 167(1): 57-72.

**Hilson, G.** 2002. Promoting sustainable development in Ghanaian small-scale gold mining operations. *The Environmentalist* 22(1): 51-57.

## Abbreviations

| | |
|---|---|
| AGC | Ashanti Goldfields Company |
| ASM | Artisanal and Small-Scale Mining |
| CEDECOM | Central Regional Development Commission |
| EIA | Environmental Impact Assessment |
| EPA | Environmental Protection Agency |
| ERP | Economic Recovery Program |
| GAG | Ghana Australian Goldfields |
| GNI | Gross National Income |
| ILO | International Labour Organisation |
| IMF | International Monetary Fund |
| ITDG | Intermediate Technology and Development Group |
| MeHg | Methylmercury |
| NGO | Non-Government Organisation |
| PMMC | Precious Minerals and Marketing Corporation |
| PNDCL | Provisional National Defence Council Law |
| SA | Structural Adjustment |
| SSMP | Small-Scale Mining Project |
| SSMU | Small-Scale Mining Unit |
| UN | United Nations |
| UNDP | United Nations Development Program |
| UNEP | United Nations Environmental Program |
| UNIDO | United Nations Industrial Development Organisation |

# Definitions

**Artisanal and Small-Scale Mining:** Although no universal definitions are available *per se*, both "artisanal" and "small-scale" are regularly used as classificatory terms in legislation and at conferences for the most rudimentary branches of the mining industry in developing countries. Both terms typically characterise low-tech, labour-intensive mining activities, based at the grassroots and community levels.

**Cedi:** The *cedi* is the official unit of currency in Ghana. There are approximately 8600 *cedis* in one US dollar.

**Galamsey:** A local label applied to the illegal, unregistered artisanal gold mining contingent in Ghana.

**Informal Industry:** For decades, policymakers and academics have debated over the possibilities of devising a concise definition of the informal sector. For the purposes of this thesis, however, the informal sector is recognised, in accordance with analysis put forward by the ILO, as the disorganised spectrum of economic activities in commerce, agriculture, construction, manufacturing, raw material extraction, transportation and services.

**Regularisation:** A concept frequently used when describing the challenge of bringing artisanal and small-scale mining into the legal domain. According to the Oxford Dictionary, "regularisation" means "to make regular and cause to conform". In the context of artisanal and small-scale mining, and, for the purposes of this thesis, regularisation refers to action taken to regulate, and improve the efficiency and organisation of, operations.

**Structural Adjustment (Policies):** Are economic policies which countries must follow in order to qualify for World Bank and International Monetary Fund (IMF) loans and help make debt repayments on the older debts owed to commercial banks, governments and the World Bank. Each is designed for an individual country but has common guiding principles and features, including include export-led growth; privatisation and liberalisation; and the efficiency of the free market. Structural Adjustment requires, *inter alia*, countries to devalue their currencies against the dollar; lift import and export restrictions; balance their budgets and not overspend; and remove price controls and state subsidies.

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# Chapter 1 – Introduction and Background

"While the contribution of the benefits to the economy of a country by small-scale mining may not be as great as that from large-scale mining projects, the benefits are significant. Therefore, the examination of small-scale mining...will serve a most useful purpose in extending and explaining knowledge of the characteristics and problems of small-scale mining ventures."

– *H.E. Hon J.A. Omanga, Former Minister of Natural Resources in Kenya, commenting at the opening of a AGID Workshop on 'Strategies for Developing Small-Scale Mines and Mineral Industries", April, 1980*

## 1.1 Introduction: profiling the artisanal gold mining challenge in Ghana

In a recent speech to the Ghana Chamber of Mines, Mr. Kwadwa Adjei-Darko, Ghana's Minister of Mines, publicly called for the participants of the indigenous illegal artisanal gold mining contingent to stop their illicit activities and begin registering operations with the relevant authorities. The speech follows a long line of public complaints, emanating mainly from senior Government offices, about the nature of artisanal and small-scale gold mining, which is commonly associated with poor living conditions, transient activity, and high levels of environmental degradation. Today, members of the local press and major mining bodies continue to talk exhaustively about this informal sector of industry and its societal impacts, in the process, perpetuating a negative image of its operators overall.

As has been the case in most developing countries with flourishing artisanal and small-scale mining (ASM) sectors – *i.e.* grassroots mineral excavation and processing industries situated at the grassroots[1] – the report of the UNDESA Seminar (UN, 1972), "Small-Scale Mining in Developing Countries" (1972), prompted the Government of Ghana to begin strategising to regularise its artisanal and small-scale gold mining industry. The Seminar both highlighted important socioeconomic issues in the industry, and, as a result of extensive economic highlights, legitimised ASM as an industry for the first time in history. In particular, it cemented the notion that ASM potentially provides important employment prospects in the rural areas of the developing world, and that collectively, operations, if effectively regulated, can make important contributions to foreign exchange earnings.

[1] The definitional issues surrounding ASM are introduced in Chapter 2.

The Ghanaian Government responded by establishing its Small-Scale Mining Project (SSMP), which has coincided with an ambitious plan for Structural Adjustment (SA) that has largely targeted the divestiture of its minerals sector. Under the SSMP, the Government has enacted legislation that has officially legalised small-scale gold mining, requiring prospective artisans, like large-scale miners, to register with the relevant authorities and adhere to a series of streamlined, bureaucratically-driven procedures to secure land concessions. Moreover, and, as documented in a number of case-specific texts (e.g. World Bank 1995a; Iddirisu and Tsikata 1998), efforts were made throughout the 1990s under the auspices of the Project – with notable inputs from the World Bank and GTZ – to provide artisanal gold miners with appropriate technology, hands-on technical and managerial training, and environmental education and expertise.

In its quest to continue improving conditions in the industry, the Ghanaian Government faces the challenge of having to balance socioeconomic needs with environmental issues. On the one hand, ASM activity accounts as much as 8% of national gold output, and provides a livelihood to tens of thousands of Ghanaians (Labonne *et al.* 2000; Aryee 2003). On the other hand, resident gold artisans are responsible for a plethora of environmental damages, in particular, pervasive mercury pollution and widespread land degradation (see e.g. Yakubu 2002; Ayree *et al.* 2003). The needs of society, the economy and the environment must therefore be addressed unequivocally in indigenous ASM policies.

## 1.2 Challenges to regularising informal industries in developing countries

To date, a range of environmental regulatory strategies have been proposed and adopted worldwide, including permitting systems, various command and control instruments, and market-based strategies (Lotspeich 1998; Fryxell and Lo 2003). As Pargal and Wheeler (1996, p. 1314) explain, "under [such] regulation, the government acts as an agent for the community in controlling industrial pollution". However, effectively addressing an industry's environmental problems whilst simultaneously promoting its economic growth requires the adoption of legislation that is "compatible with existing administrative, technical, and economic capabilities for implementation and enforcement" (Lovei and Weiss, 1998, p. xv).

This has proven exceedingly difficult throughout the developing world (Ryan and Mothibi, 2000), where generally "a host of financial, institutional and political factors hamstring environmental regulation" (Blackman, 2000, p. 2067-2068). These include, but are not limited to, the following (after Blackman, 2000):

1) A short supply of fiscal and technical resources for environmental protection;
2) Weak regulatory institutions, as well as complementary judicial, legislative and data collection institutions;
3) The fact that public sentiment typically supersedes environmental development; and
4) Low levels of environmental advocacy.

A proliferating informal economy has compounded the challenge. As explained by Canagarajah and Sethuraman (2001, p. 3) "a distinguishing feature of employment in the developing countries is that it varies in terms of quality and other characteristics compared with the developed countries". More specifically, a substantial proportion of the developing world's people are based in rural areas, where they engage in small and subsistence activities. Although three decades of research have failed to yield consensus on a definition or *razon de ser* of the "informal sector" (Maloney, 2003, p. 1), in addition to being semi-legal and generally minimally productive, its activities are characterised by the following set of criteria (Baah-Nuakoh, 1996):

1) Relative ease of entry;
2) Reliance upon indigenous resources;
3) Family ownership of enterprise;
4) Small scale in operation;
5) Labour-intensity and adapted technology;
6) Skills acquired mainly outside the formal system of education and training; and
7) Unregulated and competitive markets.

Informal operations are, moreover, generally pollution-intensive; associated with innumerable safety hazards, environmental problems, health risks, localised traffic congestion, and poor visual impairment; and feature squatter settlements and ex-urban developments that typically occupy land indiscriminately with minimal regard for intrinsic quality and sustainability (Briassoulis 1999; Perera and Amin 1996; Blackman 2000).

Several governments have worked diligently to regularise segments of the informal economy because of a growing realisation of its societal importance: namely, its resilience and ability to provide employment with little real or human capital, as well as its potential contribution to national export and foreign exchange earnings. As is explained by Levenson and Maloney (1998), from the standpoint of governments, the benefits of regularising informal industry practices, whilst numerous, are often overlooked. They can be summarised as follows:

1. Impersonal contracts and credible signalling – namely, improved accessibility to social relationships and services;
2. Improved access to capital through credible financial institutions; and
3. Increased access to public-risk pooling mechanisms, such as workers' compensation and health insurance.

There is wealth of anecdotal evidence illustrating the importance of the informal industry sector. For example, Maldonado (1995) estimates that the industry accounted for 83% of the 10.1 million jobs created in Latin America between 1990 and 1993, and currently provides a livelihood to two out of every three African city dwellers. Blackman (2000) further estimates that the informal sector provides over half of non-agrarian employment in Africa and Latin America; in sub-Saharan Africa alone, the informal economy contributes between 20 and 50% of non-agricultural output (Charmes, 2000).

In regularising the informal economy, developing world governments are confronted with the dual task of bringing its various strands into the legal domain whilst concurrently addressing often-profound environmental aspects. Initial effort must be paid to modifying regulations for the purpose of facilitating increased adherence to legislation, a challenge which is four-pronged. The first dimension concerns *actual* registration, as informal enterprises are not officially registered or are operating without a permit; the second dimension concerns the payment of taxes; the third concerns the regulation of working conditions; and the fourth involves a host of other institutional practices that are legally binding (Mead and Morrison, 1996). In short, and as summarised effectively by Sanyal (1996, p. 161), the logic underlying informal sector regularisation policy stems from the following argument originally articulated by Abrams (1966), Turner (1970) and others: because the sector has performed remarkably in providing housing and employment opportunities to the impoverished –

amid government harassment, discrimination, and indifference – its performance would improve considerably if governments change their attitude and grant legal recognition and subsequent assistance. It is furthermore argued that under formal regulation, a government can serve as the agent in the community controlling the pollution emanating from the sector (Pargal and Wheeler 1996; Blackman 2000).

The literature (e.g. Peattie 1987; Loayza 1994; Lagos 1994; Mead and Morrison 1996; Blackman 2000; Leonard 2000; Eilat *et al.* 2002; Olmedo *et al.* 2002) suggests developing world governments have struggled to both legalise segments of the informal economy and effectively regulate its operations environmentally. The latter task has proven to be exceptionally challenging for the following four reasons (Blackman and Bannister, 1998, p. 2):

- By definition, informal firms have few pre-existing ties to the state;
- Such firms are difficult to monitor because of their widespread abundance;
- Intensely competitive informal firms are under considerable stress to cut costs, regardless of environmental impacts; and
- The informal sector comprises the poorest of the poor, and, as a result, appears to both regulators and the public as inappropriate targets for regulation than larger, wealthier firms.

There is indication in the same body of literature that authorities have a poor understanding of the intricacies of the informal economy, and have therefore advocated *ad hoc* regulation and policy. Sanyal (1996, p. 166), however, argues that the "piecemeal formalisation [of the informal sector] does [] offer one advantage for research: it provides the opportunity to isolate the impact of the formalisation process".

In this research, the Ghanaian artisanal and small-scale gold mining industry was analysed *a priori* to gain an improved understanding of the difficulties and contradictions that arise when developing country governments attempt to regularise an informal sector of the economy, and the implications of this for the environment. Such an analysis warrants investigation beyond the policies and programmes currently in place in developing countries, which "focus mainly on the economic and legal aspects of informality – provision of credit supplemented by technical assistance in production methods, marketing and management and by some infrastructure"

(Briassoulis, 1999, p. 231). In accordance with Harayan and Petesch (2002, p. 3), who maintain that "local people act as partners in problem identification, data collection, analysis, and follow-up action", the strategy adopted by the Ghanaian Government to regularise and improve environmental management in the industry was critiqued using the surveyed opinion of actors occupying different positions in the system; these included government bureaucrats, local experts (e.g. consultants and academics) and the miners themselves. Such an approach – namely, that which solicits the inputs of local actors – has become "an accepted part of 'bottom-up' poverty alleviation efforts [that] seek to re-orient the development process away from top-down, technocratically-planned interventions in favour of finding ways for donors to enhance already-existing modes of making a living and managing human and natural resources" (Gladwin *et al.*, 2002, p. 524).

## 1.3 Framing the debate: an analysis of the ASM policy stance

The grounds for undertaking the proposed investigation are justified in the literature. For economic reasons, many developing governments have begun to legalise resident ASM activities by implementing a series of policies aimed at facilitating improved organisation and operational efficiency. There is growing consensus that the legalisation of small-scale mining is a vital step toward addressing the various issues and concerns that are related to the sector (Bugnosen, 2000), especially in tackling its negative impacts whilst optimising potentially positive contributions (Bugnosen, 2003). As explained by Jennings (1999, p. 3), "the legalisation of small-scale mining is an important step towards transforming it into a sustainable activity. The simple awarding of titles and licenses and making them transferable, renewable and long-lasting are the bedrock of viable legal small-scale mining activity". The notion of legalising small-scale mining was first etched in stone at the World Bank Roundtable in Washington, 1995, which sought to establish enabling conditions and a clear set of rules for effective industry monitoring and compliance. It was concluded by the seminar's delegates that in order to make the entry process orderly, governments must move toward legalising artisanal mining, and begin streamlining registration and licensing procedures (after Barry, 1996). Many countries (e.g. Zimbabwe, Ghana, and the Philippines) have since responded by enacting small-scale mining legislation, licensing schemes, various codes of practice, and regulations.

Policymakers at the World Bank profess that once a sound institutional framework is in place, further action can be made "to give legal recognition to security of tenure and to ensure the transferability of mining titles [as well as] other incentives to regularisation", including liberalised pricing, marketing arrangements, an appropriate taxation regime, and the strengthening of small-scale mining institutions (World Bank, 2003a). More to the point, it has been recognised that "an institutional and legislative scheme would be favourable to the operation of subsistence miners [and] to facilitate formalisation, registration procedures and regulatory compliance can be simplified" (UN, 1996b, p. 219).

However, in recent years, numerous concerns have been voiced over the policy treatment of ASM, in particular, the procedures adopted by governments to facilitate industry formalisation. An emerging argument is that regulatory frameworks and accompanying support frameworks are commonly incomplete, and, therefore, have the tendency to perpetuate the disorganised practices of "bare-foot prospectors" (Hollaway, 1991). Davidson (1993), for example, argues that the lack of clear sets of laws and regulations, combined with the migratory practices of many operators, contribute to the unaccountable nature of ASM – a policy environment which fails to provide the security and stability necessary for its development. Similarly, Bayah *et al.* (2003) suggest that many governments have failed to implement legislation that effectively empowers artisans, thereby *guaranteeing* them transferable mineral prospecting and mining rights. The authors furthermore maintain if artisanal miners possess few *legal* opportunities to mine, they will likely revert to illegal mining methods.

Generally, regulators perceive the industry regularisation process as a simple exchange: for improved access to the health, insurance and employment-related amenities that allegedly come with registering a business, an operator must contribute to taxation, comply with fiscal obligations imposed by the state, and make social insurance payments (Canagarajah and Sethuraman, 2001). Whilst there is an emerging literature maintaining that informal entrepreneurs are openly resistant to adhering to legislation, and, therefore, participating in the formal industrial segments of the economy, what is often overlooked by authoritative bodies is that the informal operator must "make calculated decisions as to which rules they will respect or violate

based on what they can afford without going out of business, what they expect to receive in return, and the probable cost of non-compliance" (Kutchta-Helbling, 2000, p. 5). Specifically, "the extremely high costs and time involved in registration, the complexity of administrative procedures and the inadequacy of the regulations to meet the informal sector's needs [can] all act as major deterrents keeping micro-entrepreneurs from legalising their activities" (Maldonado, 1995, p. 711).

Whilst regulators typically view non-compliance on the part of the informal artisan as an intentional infringement of regulations, as Kuchta-Helbling (2000, p. 5) further explains, "in some cases, informality is not because entrepreneurs are unwilling to abide by laws and regulation, but rather because they lack the necessary resources to do so". In such instances, "the cost of compliance precludes profit making and threatens entrepreneurs' ability to make ends meet", and individuals therefore "have little choice but to operate informally". However, as Canagarajah and Sethuraman (2001, p. 5) point out, informal operators' compliance with industry regulations would likely be greater if they were granted greater access to resources and markets such as land and credit; because "of a frequent absence of organised markets, or due to imperfection of existing markets, these individuals who own and operate small and micro enterprises often find it difficult to access non-labour resources, especially credit". More to the point, there is now "overwhelming evidence that informal sector participants face a variety of constraints including limited or lack of access to resources and markets as well as to land and physical infrastructure" (Blunch *et al.*, 2001, p. 14).

Such appears to be the case with ASM. Certainly, there is evidence suggesting operators are evading newly-introduced legislation that governments claim provide security of tenure and permits registered claim-holders to prospect for ore (Cramer, 1990). In an effort to prevent smuggling and capture output from resident operators – particularly those from the artisanal gold, diamond and gemstone circuits – and simultaneously increase foreign exchange and export earnings, certain governments have enacted a series of codes and procedures mandating that artisans first register with the appropriate authority before engaging in mineral excavation and processing activity. However, there is consensus (e.g. Davidson 1993; UN 1996a; UN 1996b; ILO 1999) that many of the legislative procedures enacted specifically for small-scale

mining are procedurally complex, and have done little to facilitate the intended goal of increased formalisation. As Jennings (1998, p. 3-5) further explains, generally, "small-scale mining is bedevilled with too many regulations that are mostly designed to constrain it and too few inspectors to ensure that they do", thereby providing "little incentive for small-scale miners to conform, particularly if the risks of being caught and sanctions applied are minimal". Moreover, it has been reported that many support-related projects have had "relatively short-lived success [because] of the low priority given by a number of governments to this sector" (Jennings, 1998, p. 3). Thus, "once a project has been left to stand on its own, it has often gently wound down due to a lack of continued government support or supervision" (Jennings, 1998, p. 5).

Experts are in general agreement that these problems have arisen because the sector has been, and continues to be, both predominantly regulated and managed by bureaucrats who are geographically and psychologically distant from ASM sites. Researchers working for the UK-based Intermediate Technology and Development Group (ITDG), an NGO long involved in numerous ASM projects, particularly in Africa, make the observation that "few countries have recognised what a small scale mining industry can yield for their economies [an ignorance] manifested by a lack of government support both in the form of legal frameworks and in financial assistance" (ITDG, 2003). Similarly, an observation made by UNDP experts was that "although an increasing number of countries have recognised small-scale mining as a significant sector of the economy, there are still those who regard it as a misnomer to mineral sector development... activities are simply ignored and, as a result, no institutional, technical, financial or legal and regulatory support is extended" (UN, 2002, p. 5).

More specific to the present investigation, there has been considerable debate that such approaches – manifested as an impoverished policy environment and *ad hoc* support – have perpetuated poverty in the ASM industry, which, in turn, has exacerbated environmental and interrelated socioeconomic problems. As is the case with much of the informal sector, from a livelihoods perspective, ASM is intimately associated with poverty, its operators being generally unskilled and the recipients of low wages (Hentschel *et al.*, 2002, p. 17). The ASM sector is, moreover, "largely driven by poverty [that] has grown as an economic activity, complementing more

traditional forms of rural subsistence earnings" (Labonne, 2003a, p. 131); it continues to be isolated "from the mainstream of economic development [thus] preventing it from becoming a recognised economic activity with wide benefits to the people concerned, their region and the country as a whole" (Jennings, 1998, p. 3). Frequent reference is made to how, in sub-Saharan Africa and Asia in particular, escalating poverty and unemployment levels, coupled with overpopulation, have prompted an increasing number of people to turn to ASM for their livelihoods (UN, 1996a).

As implied by Woller and Woodworth (2001), bureaucratic-driven approaches, which are concerned minimally with day-to-day interactions, the views and needs of people on the ground, have inherently failed as environmental and developmental strategies in the developing world. In the context of ASM, "due to lack of adequate support and regulation, most artisanal mining activities are carried out in an uncontrolled manner [as] miners and regulatory agencies play a 'cat and mouse' game with negative consequences to the environment" (UN, 2002, p. 5). Woller and Woodworth (2001,p. 267) further explain that the failure of such top-down regulation and control in the developing world "has given rise to a variety of grass-roots, or bottom-up, development strategies to combat the severe poverty that continues to plague developing countries".

The need for grassroots policy intervention in ASM rooted in a better understanding of the motives, aspirations and situations of operators themselves, has become increasingly apparent. Given that little research has been conducted *hitherto* to elicit views from experts, government officers and target mining populations *before* passing legislation and implementing extension services, it has come as little surprise to experts such as Jennings (1998), Jennings (1999), Hentschel *et al.* (2001) and others that activities "have become synonymous with inefficiency, poor health and safety standards, negative impact to the environment and smuggling" (UN, 2002, p. 5). Experts have advocated that policies and support-related ventures have failed to enhance technical "know-how" and financial support in mining communities. Whilst *a priori* praise was given to many governments (e.g. Ghana, Philippines and Chile) in a series of earlier publications (e.g. Davidson 1993; UN 1996b) for their efforts to enact legislation and implement support measures for ASM, there is growing concern that these interventions have contributed to a policy environment characterised by a

shortage of "even-handed" legislation and support, and which fails to provide prospective miners security of tenure for reasonable periods of time (Jennings, 1998, p. 3).

Unless studies are undertaken to gain an improved understanding of the perspectives of different actors, pressing questions will remain unanswered. For example, are governments uncommitted to formalising informal industry sectors of the economy such as ASM because of associated costs? Industry formalisation can potentially be an enduring and expensive procedure, involving everything from legally constituting an individual or group of miners, to obtaining mining rights and securing a commitment to comply with all labour, mining, tax and other legal obligations; this would require prolonged commitment on the part of governments and aid agencies. Formalising artisanal mining essentially involves subjecting operators to the same obligations as an international mining company, whether it may be procedures, deadlines, or demanding payments for the renewal of a mining concession. On the other hand, are informal operators deliberately evading laws – as many governments have contended – or are they striving to be absorbed into the legal domain? Joshi and Ayee (2002, p. 90) argue that many informal sector participants long to become legitimate legalised entrepreneurs simply because of their desires to avoid corrupt public officials; yet, their struggles seem to go unnoticed. Similarly, according to a number of studies (e.g. Hart 1970; ILO 1972; Baah-Nuakoh 1996), the key problem in the informal economy of the developing world is not employment *per se* but rather, a case of the vast number of the working poor "struggling to produce goods and services without their activities being recognised" (Kutchta-Helbling, 2000, p. 4).

Insufficient knowledge of the opinions of key actors can give rise to the following potentially-problematic situation: "They [the government] may know less than ever about what is going on in their economies (jobless rates, for instance, will overstate the true level of unemployment) – and will have an increasingly difficult time taxing it" (Ihrig and Moe, 2000, p. 331). It is against this background that in a case study of Ghana, the present thesis attempts to provide perspectives on the current policy stance taken towards artisanal and small-scale gold mining by surveying the opinions of a range of actors with markedly different industry stakes.

## 1.4 Lead-in to the Ghana case

### 1.4.1 Further portrayal of the problem

As political, socioeconomic and environmental conditions vary throughout the developing world, the adoption and subsequent implementation of generic legislation and support-related measures can have limited effects. The Brundtland Commission has helped instil this realisation by stressing that the ways in which environmental management and interrelated social development is pursued will inevitably vary throughout the world, given that marked differences in national economic and political systems exist (NRC, 1995).

Along a similar line of reasoning, a credible case has also been made for analysing ASM on a country-by-country basis, with proponents highlighting how many of the generic policy measures implemented to date have failed to produce substantive improvements at sites because of marked differences in socioeconomic conditions. As explained in the recent Mining, Minerals and Sustainable Development (MMSD) publication, *Global Report on Artisanal & Small-Scale Mining* (MMSD, 2002), "solutions have more of a chance of success if they can be implemented with readily available material that is familiar to the cultural environment to the miners. Due to the differences between mining operations and local contexts, a single generic technical solution is normally inappropriate" (Hentschel *et al.*, 2002, p. 14). Beatrice Labonne, one of the leading ASM policy experts in the UN system, echoed these sentiments during a personal communication (Labonne, 2003b):

> "ASM is not solely a legal and technical issue...If you don't know the characteristics of your deposit, how can you plan investment, secure investment money, purchase proper equipment and apply suitable technique?...People should be placed first. ASM deposits may be similar across Africa, but people's approach to the trade is not".

Proponents furthermore point to cases of how an initiative successfully piloted in one country has not necessarily worked in another. For example, the assaying and processing services provided to artisans at Zimbabwe's Shamva Mining Centre in Zimbabwe has drawn week-long queues (Peak *et al.*, 1998), whereas an equivalent facility offered at the Tarkwa mining office in western Ghana "has been collecting dust" (Government of Ghana, 2002a). In another example, the very visual educational environmental management material used by various branches of the UN and the World Bank to train artisans and their families appears to have had minimal impact in

Brazil (Veiga and Hinton, 2002) but proved to be an indispensable aid during a recently-concluded, AusAid-coordinated ASM study in PNG (Crispin, 2003a).

This evidence underscores the importance of conducting in-depth case study analysis of institutional and field-level elements – through the eyes of different actors – in the ASM industry *prior* to engaging in comprehensive policy treatment of the sector. Operating conditions, government control, technological awareness, and financial availability is heterogeneous worldwide, calling for analysis and subsequent design of policy measures to be conducted on a country-by-country basis. However, as Jennings (2000, p. 17) explains, to date, "most of the emphasis has been placed on finding technical solutions, with little attention being paid to the underlying economic, social and labour issues".

### 1.4.2 A case study of the Ghanaian artisanal and small-scale gold mining industry

Ghana provides an appropriate *a priori* case for examining institutional and grassroots perspectives on artisanal and small-scale gold mining. First, and foremost, its government "believes in the development potential of the (informal) sector" (Britwum, 2002, p. 4), and, as a result, has made considerable progress administratively for a developing country towards regularising many of the informal segments of its economy (World Bank 1995b; Joshi and Ayee 2002). The implementation of the country's SA Programme resulted in a number of changes to tax administration policies, subjecting an estimated 2.7 million informal operators in the agricultural, mining and services sectors to comprehensive taxation. The recently-passed *Internal Revenue Act* (Act 592) of 2000 stipulates that most incomes earned in the informal sector are taxable, with the exception of situations where such salaries are judged to be below the minimum taxable level, or in the case of impoverished cocoa farmers (World Bank, 2003b, p. 5).

Secondly, the country's policymakers have long been confronted with developmental challenges such as impoverished healthcare and widespread poverty (Horton 2001; Hens and Boon 1999), which presents an ideal ground for investigating the effectiveness of the regularisation of an informal industry against the background of policy and regulatory challenges in the developing world. For example, as is the case throughout much of Africa, corruption is now a serious – and well documented –

problem in Ghana, particularly within governmental circles. Despite declaring a "zero tolerance for corruption" in his inaugural address, President J.A. Kufuor continues to battle corruption nationwide, much of which developed during the 20-year tenure of his predecessor Jerry Rawlings (Sarpong, 2001); according to resident expert economist Kwame Pianim, "corruption is expensive and needs to be minimised" because it has reached its highest level in the country's history (AMO, 2002). The debilitated state of the economy – in which, annual per capita GDP income is a paltry US$300 – is fuelling the widespread bribery of officials. Not only have salaries stagnated *vis-à-vis* a devalued *cedi* but two distinct poverty lines are also emerging in the country, described by Adu-Asare (2002) as 1) the "upper" poverty line, namely, people who live on less than US$100 annually; and 2) the "extreme" poverty line, or people surviving on less than US$75 per annum.

This economic hardship and associated corruption is manifested in national environmental regulation and control, reinforcing the claim put forward by Damania (2002, p. 408) that "the emerging literature on environmental performance indicates that corruption is one of the main sources of environmental damages in several countries". In countries such as Ghana, environmental legislation is piecemeal and impoverished, and national environmental protection and enforcement bodies are still in an infancy stage, lacking the adequate resources for effective monitoring (Hens and Boon, 1999). As Brownbridge (2002) notes, the resulting corruption or environmental regulatory complacency is reflected by a weak enforcement of regulations, and the fact that most environmental laws contain numerous loopholes.

Thirdly, and, more central to ASM, the Government has both implemented a regulatory and policy framework for managing artisanal small-scale gold mining (See Appendix I), and has reportedly overseen the launch of a number of support-related activities for industry operators. As is discussed at greater length in the chapters that follow, the sector is comprised of as many as 200,000 men, women, and children, and is managed under a decentralised regulatory regime featuring specialised officers and an array of extension services. However, the current impoverished state of the country administratively (Acquah 1994a; Hens and Boon 1999) raises additional concern over how effective the Government has been at regularising operations and suppressing industry problems. Despite once being "acknowledged as a leader in the

promotion of small-scale mining enterprises" (UN, 1996b), there is growing concern over the nature of general environmental legislation in Ghana, let alone the environmental laws and codes of practice enacted specifically to bring artisanal gold miners into the legal domain. As indicated by Anane (2003), "the dearth of environmental legislation in Ghana is perhaps one of the biggest problems militating against attempts at environmental protection and sustainable development [as] it is evident that the body of legislation on the various aspects of environment is inadequate and most provisions have no direct bearing on present-day realities or on the aspirations of the people of this country". The author cites the example of how there is currently no coordinated and comprehensive land use or management policy in place in Ghana, and furthermore identifies some 20 agencies dealing with various administrative aspects of land policy.

During a recent presentation for a proposal on mining legislation review to the Ministry of Mines, Lands and Forestry, Ghanaian human rights lawyer Augustine Niber argued that associated mining-induced problems stem "from the unsatisfactory nature of the legal framework governing the extractive sector particularly the legislation governing minerals and mining operations in the country, the *Minerals and Mining Law* of 1986" (Acquah, 2001). This particularly applies to the resident artisanal and small-scale gold mining segment, as indicated by a plethora of baseline reports (e.g. World Bank 1995a; Iddirisu and Tsikata 1998; Aryee *et al.* 2003), which collectively indicate that in spite of the efforts made to establish a regulatory environment (for artisanal gold mining), and the many multifaceted tasks undertaken to interface this informal sector with the Government, environmental and associated socioeconomic problems continue to be intense and widespread throughout the industry. According to these reports, rather than remediating problems, the regulations and alleged support services in place for Ghana's gold artisans appear to be propelling the expansion of illegal, environmental-damaging mining activities.

It is against this background that the following discussion presents a comprehensive analysis of policy, starting from the assumption that "the constructive reconfiguration of artisanal mining may mean different things to the various parties involved" (Davidson, 1993, p. 317). Inputs are elicited from experts, government officers, and artisanal gold miners themselves. The specific aims of the research are as follows:

1) To advance the understanding of the institutional context of ASM, and the different policy strategies that have followed;
2) To focus specifically on how the industry's environmental and associated socioeconomic problems are conceived in expert and regulatory groups; and
3) To compare the views of experts and government officers with perspectives from miners on the ground.

The underlying theme of this thesis is the policy treatment of the informal economy in a developing world setting, and the method adopted by a developing world government to bring a segment of the industry (artisanal and small-scale gold mining) into the legal domain for organisational and environmental purposes. The next section of the chapter briefly describes the organisation of the thesis.

## 1.5 Organisation of the thesis

Six chapters follow this introduction. Chapter 2 constitutes the main literature review of the thesis. It presents both pertinent socioeconomic and environment information on ASM, describes its poverty-driven nature, and provides relevant background information on the Ghana case. Regarding the latter, material is used to describe the state of the economy, the resident gold mining industry, and the socioeconomic impacts of the artisanal and small-scale gold mining segment. The environmental impacts of artisanal and small-scale gold mining in Ghana are then described, which builds the case for improving environmental management in the industry.

Chapter 3 provides an overview of the methodological approach adopted for the research. The nature of the aims of the thesis necessitated the use of a qualitative research methodology. As explained by Skinner *et al.* (2000, p. 165), "qualitative research focuses on people's experiences and the meanings they place on the events, processes and structures of their normal social setting". In order to address the foregoing research questions, key actors were interviewed; qualitative research methods provide an opportunity to obtain a holistic view through key participants' own words and perceptions of how they understand, account for, and act within, various situations (Miles and Huberman, 1994).

Chapter 4 integrates material from the development literature with feedback from semi-structured interviews conducted with industry experts and government officers.

The chapter examines in depth the efficacy of the approaches taken to address the industry's environmental problems. It surveys both expert and government opinion to determine indigenous conceptualisation of the industry's environmental problems and existing policy weaknesses. Chapter 5 also presents findings from interviews with key experts and government personnel to determine consensus around policy options. In a discussion driven by analysis of qualitative data, both expert and government opinion on possible ways forward is reviewed.

Chapter 6 provides an alternate perspective – that from miners on the ground. Specifically, feedback is presented from interviews conducted with artisanal and small-scale gold miners based around the towns of Tarkwa, Bibiani and Assin Fosu. In a quotation-based discussion, the chapter provides, *inter alia*, miners' views of government support, environmental problems, adaptation strategies, and barriers to improvement. Chapter 7 presents the conclusions of the thesis and, against the background of the ideas put forward in Chapters 4, 5 and 6, makes recommendations for possible ways forward for ASM in Ghana.

# Chapter 2 – Artisanal and Small-Scale Mining: The Environmental-Socioeconomic Divide

> "It is now widely recognised that small-scale mining can benefit developing societies by providing employment in rural areas, by substituting for certain minerals now being imported at the cost of valuable foreign exchange, by increasing export earnings, by providing a base for local mineral industries, and by increasing self-reliance, especially in the rural sector. It is also generally acknowledged that small-scale mining operations are very difficult to control and manage, that they can involve the vicious exploitation of labour, and that they can be wasteful, dangerous to health and safety, and damaging to the environment".
>
> – *A.R. Berger, Chair, 'Small-Scale Mining and Mineral Industries', Mombasa, Kenya, April 14-25, 1980.*

## 2.1 Introduction

This chapter expands upon a number of the issues raised in Chapter 1 – in particular, the poverty-driven nature of ASM, and the pressing environmental and associated socioeconomic problems in need of attention in the sector. It furthermore introduces the case study of Ghana, providing pertinent background information on its now-flourishing artisanal and small-scale gold mining sector. The chapter lays the groundwork for the research undertaken for the thesis.

The chapter is organised as follows. Section 2.2 provides a general overview of ASM, defining both "artisanal" and "small-scale mining", examining its intimate association with poverty, and highlighting its socio-economic importance in developing countries. Section 2.3 provides key background information on the case study of Ghanaian ASM profiled in this thesis, providing a historical account of its development and examining its importance to the (Ghanaian) economy. Section 2.4 describes more precisely the societal function of ASM in Ghana, outlining the characteristics of its operations and its socioeconomic importance. Section 2.5 describes the environmental impacts of the industry, thus underscoring the need for environmental improvement in the sector. Section 2.6 conceptualises the primary research problem against the background of information presented in Sections 2.4 and 2.5.

## 2.2 An overview of artisanal and small-scale mining (ASM)

### 2.2.1 What are artisanal and small-scale mines?

What is "artisanal" and "small-scale" mining (ASM)? For decades, experts have debated this question but have been unable to reach an appropriate consensus. As Hollaway (1997, p. 35) explains:

> "In the 1980s, a string of conferences largely sponsored by the United Nations spent a disproportionate amount of time trying to define what it was they were talking about. At what point does 'artisanal mining' become 'small-scale mining'? When does a small-scale mine become a 'medium scale mine'? The problem persisted across languages: In French the difficulty was defining between *'les operations artisanale, semi-industrielle et industrielle'*".

The literature is replete with individual interpretations, most of which have been defined according to criteria such as mine output, labour productivity, organisation of the enterprise, and levels of technology. For example, Peiter *et al.* (2000) provide a broad definition of "small-scale mines", suggesting that they are generally those (mining) operations that are both labour intensive and low-tech. Jennings (1997), goes one step further, arguing that small-scale mines, whilst low tech, can be placed into one of two broad categories: 1) high-valuable mineral extraction, in particular gold, silver, and precious stones; and 2) quarry mining or simply the removal of industrial minerals and construction materials on a small scale. More precise definitions have also been adopted by, for instance, Amavilah (1998), who defines a formalised small-scale mining operation in terms of number of employees, size, earnings, labour productivity and production capacity. Some countries have even formulated their own definitions for the purposes of including ASM in national policies.

However, as Solomon (1997) explains, no single definition has received universal recognition because:

1) Terms such as 'artisanal' (a label typically used for illegal mining) and 'small-scale' are used loosely in different contexts by different people.
2) The trade-off between capital employed and labour is generally not taken into account.
3) The relationship between production and value varies from sector to sector (e.g. high tonnage/ low value for commodities such as sand *vs.* low tonnage/ high value for diamonds, etc.).

4) The most easily discernable distinction – the degree of formality – is not necessarily related to size.

Using examples of ore grade and market price, Hollaway (1997, p. 35) further illustrates the point in the following passage:

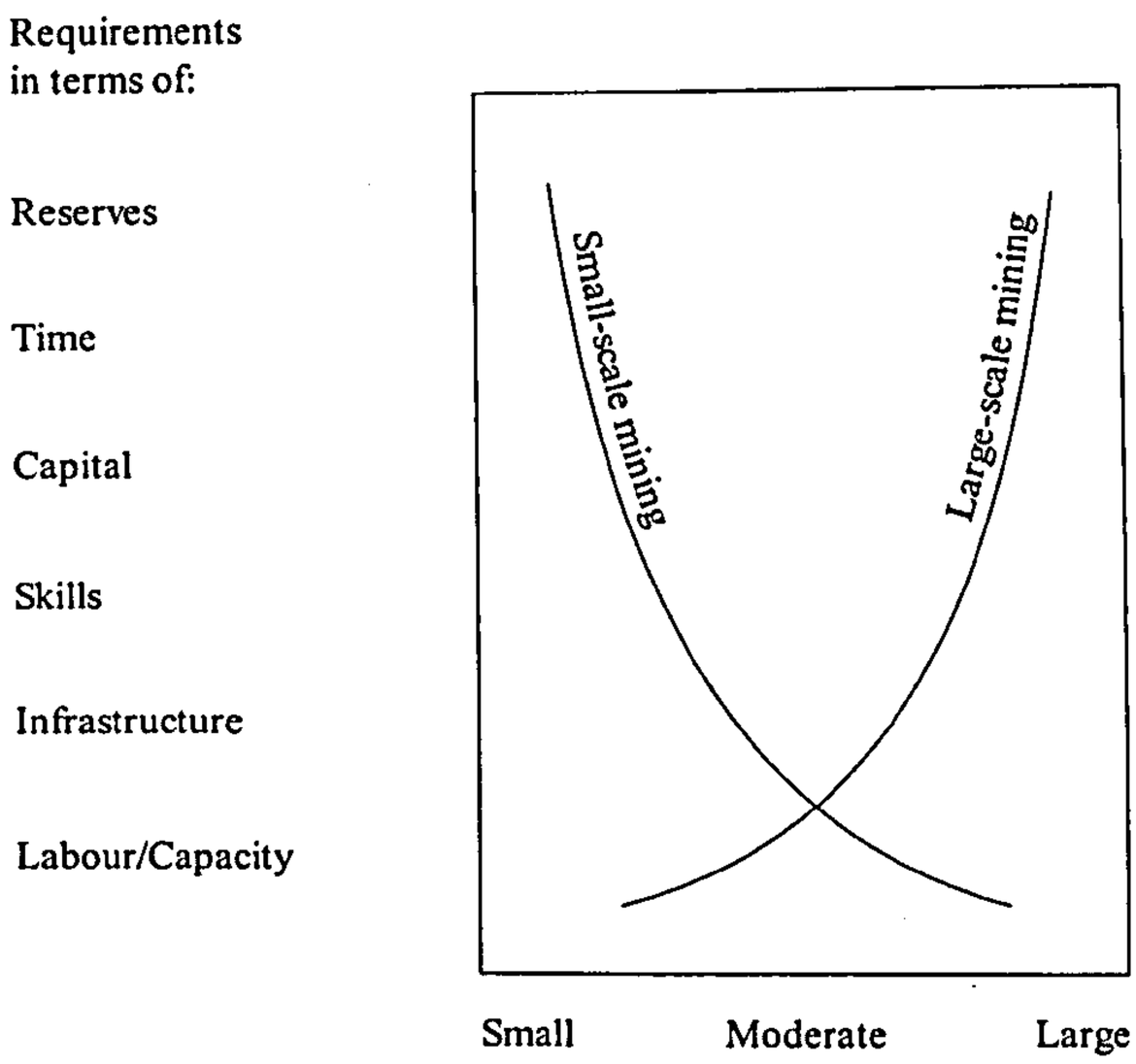
> "A gemstone mine treating one ton a day, a gold mine treating ten tons a day and a coal mine producing a hundred tons a day can all be artisanal/small-scale mines. Such mines may employ, or attract, a handful or tens of thousands of workers, so the size of the workforce is also an unsatisfactory criterion. The value of production may be enormous, as in Brazil's Serra Peleda which generated over $200 million in one year at its peak, or tiny, as with an isolated African woman panning a few specks of gold on a remote stream".

Over time, however, social scientists have come to recognise that both artisanal and small-scale mining, despite having been defined differently from country-to-country, are used in nearly every case as classificatory terms for the most rudimentary branches of the mining sector. Thus, ASM is now perceived as industrial activity involving the application of low, intermediate technology and universal prospecting methods, requiring low initial investments, and featuring high employment per-unit output. Most exhibit the following characteristics:

- An involvement with the extraction or processing of precious metals/gemstones on alluvial deposits or orebodies situated at, or near, the surface;
- Intense labour activity with fewer than 15 workers per operation;
- Remote and isolated location – situated well out of the reach of urban centres;
- Rudimentary techniques and low technological awareness;
- Low degree of mechanisation and a chronic shortage of capital; and
- Low levels of environmental, health and safety awareness.

In short, and, as Figure 2.1 depicts, a mine operating on an artisanal or small scale is a producer, often sporadically, of limited amounts of minerals from deposits with few known ore reserves, and of character not readily amenable to large-scale mining (after Carman 1987; Cramer 1990). Furthermore, from a technological perspective, representative activities encompass a broad range of operations, from informal micro-scale mining that utilises almost exclusively manual techniques to extract high value minerals from alluvial deposits and outcrops, to small organisations of semi-skilled entrepreneurs who employ mechanisation strategies and semi-advanced mineral processing techniques.

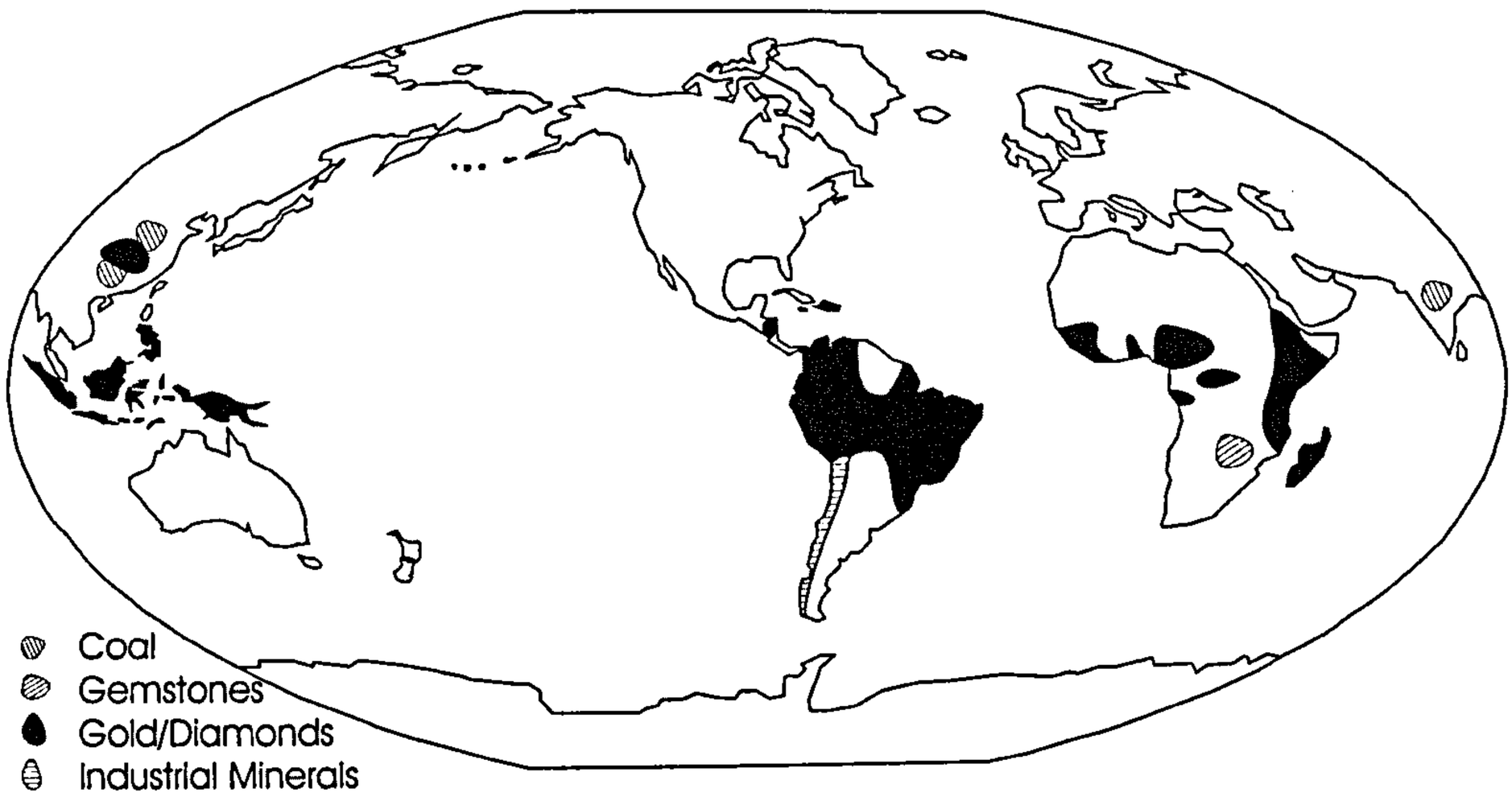
**Figure 2.1:** Small- vs. large-scale mining comparative profiles




*Source*: Nöetstaller, 1994, p. 4

ASM can only exist where mineralisation occurs near the surface or, in the case of precious metals, within unconsolidated rocks – namely, those contained in riverbed alluvions, eluvions and colluvions, and altered upper portions of quartz veins. Artisanal and small-scale mines, which are found scattered throughout Asia, Africa, and Latin America, are as diverse as the commodities they produce, engaging in the extraction of more than 40 minerals, including precious, semi-precious, heavy and industrial minerals, and construction materials (see Figure 2.2).

**Figure 2.2:** Locations of important ASM regions worldwide



### 2.2.2 ASM, poverty and its socioeconomic importance

Although this thesis is concerned primarily with the environmental impacts of ASM, it is imperative to first discuss its socioeconomic importance in developing countries. "Small-scale mining" was first recognised as an industry in 1972, following publication of the United Nations seminal report, *Small Scale Mining in Developing Countries* (UN, 1972). This document put into perspective for the first time the societal and economic importance of ASM by underscoring the state and function of global operations at the time, and by providing relevant historical production trends. Five major international meetings have since taken place in Jurica, Mexico (1978); Taxco, Mexico (1981); Helsinki, Finland (1983); London, UK (1987) and; Ankara, Turkey (1988), as well as two important regional seminars in Mombasa, Kenya (1980) and Calcutta, India (1991), all of which were devoted to analysing the prospects and problems of small-scale mining (Davidson, 1993). These meetings, however, primarily emphasised the environmental and health impacts of artisanal and small-scale mining, issues that have come to overshadow the important socio-economic contributions of the sector.

In mid-February 1993, at a weeklong international seminar on "Guidelines for Development of Small- and Medium-scale Mining" held in Harare, Zimbabwe, the socioeconomic importance of the industry was finally etched in stone when participants agreed that artisanal and small-scale mining operations, collectively, make important contributions to national economies, and provide economic stability to thousands of indigenous people residing in rural areas. The seminar reached a consensus on the following: (1) that the potential business benefits of small-scale mining outweighed its negative aspects; (2) small-scale mining was a motor driving entrepreneurship; and (3) equipment needed by small-scale miners could, in fact, be manufactured in developing countries (Labonne, 1994).

The ASM industry has provided employment opportunities to thousands of people because of its proven ability to flourish in many regions where there are very few industries. Perhaps the biggest stimulus to participation in the sector altogether is the lure of quick enrichment, and the financial and social independence that comes with this. This is particularly significant because many individuals employed are unskilled

labourers with little, if any, formal education, utilising inexpensive, locally manufactured equipment and tools, such as shovels, handcarts, hocks and mallets.

As is explained in the recent *Mining, Minerals and Sustainable Development* (MMSD) Report (MMSD, 2002, p. 314):

> "Artisanal and small-scale mining is a livelihoods strategy adopted primarily in rural areas. In many cases, mining represents the most promising, if not the only, income opportunity available".

With so few employment alternatives, individuals are compelled to turn to ASM, which offers minimal access to qualified health care and educational services. Whether it is a gemstone mine treating one ton of ore per day, or a woman and her children collecting specks of gold dust from a riverside, as indicated in Chapter 1, a common element with virtually *all* artisanal and small-scale mining activities and many other informal industry practices worldwide (Roberts 1994; Neef 2002) is a strong association with poverty; it is uniformly undertaken by individuals from the most itinerate of groups in the developing world. The World Bank, UNDP and allied development agencies attest that the industry is poverty-driven, the former pledging it is "typically practiced in the poorest and most remote rural areas of a country by a largely itinerant, poorly educated populace with little other employment alternatives" (World Bank, 2003a).

An estimated 1.2 billion people currently live in extreme poverty in the developing world, possessing minimal access to health services and education, and rarely participating in the decision-making processes that affect their everyday lives (Pena and Bacallao, 2002, p. 242). According to Pena and Bacallao (2002, p. 241), this poverty entails the following:

> "A person, a family, or a nation is not deemed poor only because of low income. Little or no access to safe water, illiteracy or low education level and a distorted perception of rights and needs are also among the essential components of poverty".

As illustrated in Table 2.1, these countries, which generally score very low on the UNDP Human Development Index, typically have flourishing ASM contingents.

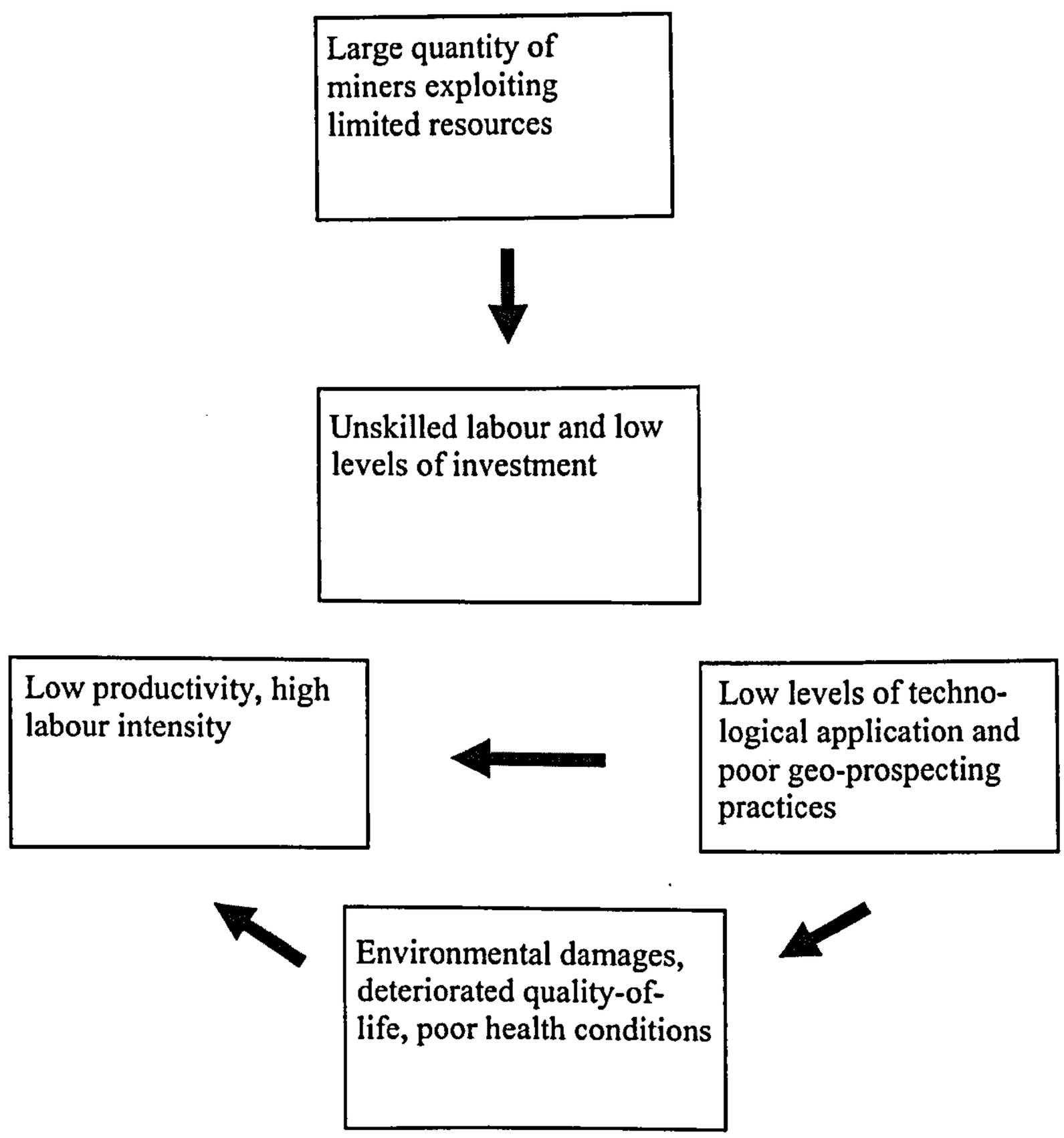
**Table 2.1:** Articulating the link between ASM and Poverty

| Country | Estimated Artisanal and Small-Scale Mining Population | % of Population Residing in Rural Areas (2000 data) | % of Population with Daily Income less than US$2 | Adult Illiteracy Rate (%) | % of Population not using Improved Water Resources | HDI rank (score out of 173) |
|---|---|---|---|---|---|---|
| *Burkina Faso | 60,000 | 84.5 | 85.8 | 76.1 | N/A | 169 |
| China | 3,000,000 + | 64.2 | 52.6 | 15.9 | 25 | 96 |
| Ghana | 200,000 | 63.9 | 78.5 | 28.5 | 25 | 129 |
| India | 500,000 | 72.3 | 86.2 | 42.8 | 12 | 124 |
| *Mali | 200,000 | 69.8 | 90.6 | 58.5 | 35 | 164 |
| PNG | 80,000 | 82.6 | N/A | 36.1 | 58 | 133 |
| *Tanzania | 600,000 | 67.7 | 59.6 | 24.9 | 46 | 151 |
| *Zambia | 30,000 | 60.4 | 87.4 | 21.9 | 36 | 153 |
| Zimbabwe | 350,000 | 64.7 | 64.2 | 11.3 | 15 | 128 |

*Sources*: Quality-of-life data extracted from UNDP, 2002; ASM census data obtained from United Nations (1996a), ILO (1999), Ávila (2000)
* Denotes "Low HDI"

The message conveyed repeatedly in the literature is that ASM operators remain trapped in a life of poverty largely because of a combination of community and institutional-side elements. This poverty issue was initially broached in the ASM context by the Austrian academic Richard Nöetstaller, who, at the World Bank-coordinated International Roundtable on Artisanal Mining, May 17-19, 1995, argued that, both informal artisanal miners and corresponding developing world governments are trapped in negative cycles of cause and effect. As Barry (1996) explains, Prof Nöetstaller specifically attributes the cycle of poverty omnipresent in ASM to a combination of futility on the part of regulators and an inability to innovate on the part of miners. At the grassroots level, inefficient processing techniques and technologies are typically utilised that prevent miners from accumulating funds for future investment. The subsequent lack of finances, in turn, traps artisanal miners in their crude, often-inefficient modes of operation, thereby causing irreversible environmental damages (Figure 2.3). On the institutional side, Nöetstaller maintains that the authorities regulating artisanal miners are usually trapped in a similar cycle of causality, which restricts their ability to regulate. Lacking the adequate operational resources to enforce existing regulations, authorities are often unable to prevent illegal activity, environmental damages, and revenue losses (after Barry, 1996).

**Figure 2.3:** Depiction of the Artisanal Mining Poverty Trap, a cycle exacerbated by legal and regulatory failures and social instability




*Source*: Modified from UN, 2002

Irrespective of the state of impoverishment of most artisans, what cannot be overlooked is that at least 100 million people both indirectly and directly rely upon the incomes generated in the ASM industry (ILO, 1999, p. 6). *Precise* data of those employed are often difficult to obtain because labour statistics for the flourishing illegal mining segments of the sector, are, for the most part, unavailable, as well as employment totals for the complementary industries – blacksmithing, trading, polishing and catering – that surface as a result of prosperous ASM activity. Many (e.g. Borla 1996; Bugnosen *et al.* 1999), however, are in general agreement that artisanal and small-scale mining employs some six million men and women *directly*, although researchers at the International Labour Organisation (ILO) suggest that a more precise estimate is 11.5-13 million (ILO, 1999, pg. 25). In China, five million people are employed at small-scale coalmines alone (Ziran, 2003), and, in Africa, between three and 3.7 million are involved in the sector, the majority, in gemstone

and gold extraction. The importance of artisanal and small-scale mining in Latin America from an employment perspective is best exemplified by Brazil, where, within the Amazon region alone, a human contingent of at least 500,000 relies on artisanal gold mining for economic survival (Meech *et al.*, 1998, pg. 93). Table 2.2 provides additional estimates of ASM employment worldwide.

**Table 2.2:** Artisanal and small-scale mining operations and employment totals in selected developing countries

| Country | Number of Mines | Estimated Employment |
|---|---|---|
| Argentina | 670 | 5,800 |
| Bolivia | 1000 | 70,000 |
| Brazil | 10,000 | 1,000,000 |
| China | 250,000 | 3,000,000 |
| Columbia | 9600 | 100,000-200,000 |
| Ecuador | N/A | 92,000 |
| Ghana | 400-700 | 30,000-200,000 |
| Guyana | 3500 | 10,000-20,000 |
| Haiti | 50 | 4,500 |
| Indonesia | 77,000 | 465,000 |
| Malawi | N/A | 40,000 |
| Mexico | 2000 | 20,000-40,000 |
| Pakistan | 2400 | 90,000-370,000 |
| Peru | 1550 | 20,000 |
| Philippines | 700 | 200,000 |
| South Africa | 5500 | 15,000-20,000 |
| Viet Nam | 500-600 | 35,000-40,000 |

*Sources*: United Nations (1996b), ILO (1999), Ávila (2000)

Output from ASM – particularly that of the precious metals and stones segment – contributes significantly to foreign exchange earnings and national mineral exports. As previously explained, artisanal and small-scale miners are engaged in the extraction of more than 40 minerals (Tráore, 1997), and total production is estimated to account for 15-20% of global non-fuel mineral production. What *truly* makes ASM an indispensable economic activity is that in many instances, it is financially viable where mineral deposits are only marginal for large-scale mining companies (Kumar and Amaratunga, 1994). Smaller deposits require less time to develop, and, therefore, have a faster payback on investment *vis-à-vis* large-scale operations. In short, the sector is responsible for extracting and processing minerals that would otherwise not be mined.

Several regional estimates of industry production and earnings have been made. In countries such as Guinea and the Central African Republic, for example, mineral

production is almost entirely confined to ASM. In Guinea, the share of artisanal and small-scale mining in national gold production rose from 66% in 1990 to almost 100% in 1993; in the Central African Republic, where diamonds and gold account for nearly 100% of national mineral exports, 90% of diamond and 100% of gold production is carried out by artisanal and small-scale miners (Bocoum and Samba 1995; UN 1996a; UN 1996b). In India, some 3000 small-scale mining operations generate 50% of the country's non-fuel mineral output (Jennings, 1997), and, in the Philippines, it has been estimated that the small-scale mining sector produces as much as 150 tons of gold each year. Indonesia also has a thriving small-scale gold mining sector comprised of some 77,000 operations that generate a combined US$58 million in earnings annually (Hollaway, 1997), and, in China, over 93,000 coal mines distributed over 1,258 counties with a workforce of at least five million, account for well over 50% of total national coal output (Ghose, 1994). Brazil is by far the largest regional producer of gold in Latin America where, at any given time, as many as one million people are involved in artisanal and small-scale gold mining, producing between 75 and 90% of national gold output (Buntenbach *et al.*, 1995). However, other Latin American countries have flourishing small-scale mining industries as well. In Bolivia, for example, where, at the beginning of the 1980s, 95% of foreign currency was earned via the exportation of mining products, some 4,000 small-scale operations were engaged in the extraction of tin and tungsten alone (Priester *et al.*, 1993), with many miners earning, on average, US$3000 per year, well above most income-earning alternatives (McMahon *et al.*, 1999). In Suriname, where small-scale gold mining has been practiced widely since 1876, it is estimated that today, as much as 3,000kg of gold (some 30% of national production) is produced annually in the sector by some 8,000 workers (de Kom *et al.*, 1998).

In each of these countries, ASM provides employment to thousands of men, women and children, and contributes significantly to national mineral outputs.

## 2.3 An introduction to the Ghana country case study

Of West Africa's gold producing nations, Ghana is the most significant, responsible for some 70% of the region's (gold) output (Utter, 1993). The favourable geology of Western Africa has given rise to the country's legacy of gold mining, which long predates the European colonial era. It is the intention of this section of the chapter to

lay the groundwork for the case study of Ghanaian artisanal and small-scale gold mining being examined in this thesis.

### 2.3.1 Ghana: background and culture

Ghana is located on West Africa's Gulf of Guinea, and borders Cote d'Ivoire, Togo and Burkina Faso. The country covers an area of 23.9 million ha, and spans two major ecological zones (the "High Forest" in the southwest, and the Savannah Woodlands in the North and Coastal areas), within which, average annual precipitation ranges between 900 and 2100 mm (Hens and Boon, 1999). Table 2.3 provides a summary of Ghana's basic socio-economic composition.

**Table 2.3:** Ghana development summary

| | |
|---|---|
| Population | 18.9 million |
| Fertility Rate | 4-6 |
| Life Expectancy | 56.6 years |
| Adult Illiteracy Rate | 29.7% |
| School Enrollment | 42% |
| Health Spending (% GDP) | 1.8 |
| Health Spending Per Capita ($) | 85 |
| Physicians/100,000 people | 6 |
| Infant Mortality Rate (per 1000 live births) | 63 |
| Adequate Sanitation | 63% |
| Births with Skilled Staff | 44% |
| Malarial Cases/100,000 | 11,941 |
| TB cases/100,000 | 53 |
| Adults with HIV-AIDS | 3.6% |

*Source*: Horton, 2001, p. 2141

European interest in West Africa began to grow in the fifteenth century, fueled mainly by the acute shortages of gold supplies in continental Europe at the time. The arrival of the Europeans in Ghana[2] altered West African trading patterns tremendously, stimulating a shift in trade from the continental interior toward the Gulf of Guinea

[2] Ancient Ghana was, in fact, centred in the east of modern Mauritania, its capital of Kumbi located some 200 miles north of present-day Mali. Strictly speaking, *Ghana* was the title given to the king of the ancient empire, although Arab traders tended to apply the term to the capital and state as well. The fact that the country of Ghana takes its name from the Ancient Kingdom of Ghana is based on a presumption that a connexion exists between Ancient Ghanaian cultures and Gold Coast cultures, a phenomenon that has become known as "The Ghana Hypothesis". The first Europeans, however, landed within the boundaries of present-day Ghana.

coastlines[3]. Though the French claim explorers from Dieppe landed in Liberia in 1364 and reached Elmina, (present-day) Ghana, by 1413, it has never been proven. Indigenous historians are in general agreement that the Portuguese were the first Europeans to land on Ghanaian shorelines. Under the patronage of Prince Henry the Navigator, Portuguese adventurers Juan de Santerem and Pedro d'Escobar reached present-day Ghana in 1471, and, within a few years of settlement, gained control of the West African gold trade.

The earliest Portuguese accounts of West Africa portrayed the locals as primitive hunters and fishermen who survived on diets of millet, beans, beef, goat's and dog's flesh, fish, water, milk and palm wine (Junner, 1973). In spite of these subsistence livelihoods, the indigenous peoples of early colonial West Africa had a strong affinity for gold. One of the most detailed observations was made by Portuguese navigator Cado Mosto, who, on his voyage to West Africa in 1456, remarked that the-then natives of Gambia appear to "value their gold as a very precious thing" and that the Portuguese "had it very reasonably, since they gave them for it things of very little value" (Astley, 1745, p. 594).

Gold remained the chief item of trade in Ghana up until the sixteenth century, when the growing international slave trade began to take international precedence. Specifically, the opening of European plantations in the New World during the 1500s precipitated an escalated demand for slaves in the Americas. Slaves soon overshadowed gold as the principal export of the area, as the west coast of Africa became the primary source for the New World. The seemingly insatiable market and substantial profits to be gained from the slave trade attracted adventurers from all over Europe. However, following the ban of slavery in the eighteenth and nineteenth centuries, gold once again became the country's major item of trade[4]. Ghana declared its independence from Britain in 1957, before which time it took the name of the "Gold Coast" Colony. In doing so, it became one of "the first African countries to help usher the era of post-colonial development on the continent" (Labonne *et al.*,

[3] The Islamic World was the only external influence in West Africa for 700 years. During the sixth and seventh centuries, Arabs were active in the trading of black slaves, traveling via camel across the Sahara to the continental interior. Trade routes soon expanded, and gold trade commenced *C* 750 AD. Early Arabic sources confirm the existence of a 700-year West African gold trade.

[4] Much of the factual information presented in this paragraph was excerpted from http://www.ghana.co.uk/history/presidents/heads_of_state.htm

2000, p. 7). Dr Kwame Nkrumah became Ghana's first president in March 1957, after his Convention People's Party received 57% of votes.

There are approximately 100 distinctive cultural groups in Ghana, all of which can be further subdivided into linguistic units. Prior to colonialisation, these ethnic groups or "tribes", which now constitute the people of Ghana, were independent nationalities; politically, some were acephalously organised, whilst others experienced varying degrees of centralised authority. Asamoa (1980, p, 42) captures the essence of Ghanaian tribalism in the following passage:

> "Tribalism, a colonial product, is intra-nationality solidarity forged and used by an ethnic group existing side by side with other nationalities within one and the same country as a defensive and offensive weapon against the rest of society...Tribalism steadily developed as colonialism consolidated its political and economic power. The Mamprusi, Dagonbe, the Gonja, the Kokomba, the Ewe, the Ashanti, the Fante, the Akim, etc. all formerly independent nationalities had to be suddenly brought together by force under one centralised colonial authority. British colonialism superimposed certain aspects of British way of life on the colonised nationalities now bundled together in a colony".

Today, the country's major ethnic groups are the Akan, Ewe, Mole-Dagbane, Guan and Ga-Adangbe. The Akans constitute the largest ethnic group in Ghana, accounting for some 50% of the total population, and inhabiting almost the entire area south and west of the Black Volta, as well as neighbouring Cote d'Ivoire; the Mole-Dagbanis, who account for some 16% of the Ghanaian population, reside in the northern regions of the country as well as southern Burkina Faso; the Ewe group, which forms 13% of the population, occupies southeastern Ghana, and southern portions of Togo and Benin; the Ga-Adangbe constitute 8% of the population and inhabit the Accra Plains; the Guans, who are believed to have migrated from the Mossi Region of Burkina Faso some 3000 years ago, constitute the remaining 4% of the native population (Fred-Mensah 1999). The country is presently divided into 10 regions that constitute a total of 110 administrative districts, each of which has a District Assembly headed by a District Chief Executive.

### 2.3.2 Structural adjustment (SA) in Ghana

The fact that the recent divestiture of the Ghanaian gold mining industry – its ASM branch included – has coincided with the inauguration of the country's Structural Adjustment (SA) campaign cannot be overlooked. The Ghanaian economy began

exhibiting accentuated signs of deterioration in 1978 at the conclusion of the rule of General I.K. Acheampong's Supreme Military Council (SMC) II (Panford, 1997). By 1983, the country was in a state of economic crisis, later described by the *Economist* as "an extreme case even in Africa" (Owusu, 2001, p. 53): cotton production was down to 25% of its average during the 1975-77 period; tobacco production was 20% of the average level recorded in the 1974-76 period; export levels had halved; per capita income had declined 30%; and import volumes fell to 50% of 1970 levels. Thus, in April, 1983, then-president Jerry Rawlings followed the advice of Finance Minister Kwesi Botchwey and launched Africa's first – and undoubtedly, most ambitious – SA Programme (Bratton *et al.*, 2001), with the hope of curbing a three-year GDP growth rate of -14.9%.

Between April and June of 1983, negotiations were made with the IMF and World Bank for financial assistance, which resulted in the formulation of a set of reforms of economic policy under the label of the "Economic Recovery Programme" (ERP). The aim of the first phase (ERP 1, 1984 6) was to control inflation; restore overseas confidence; reverse declines in production, particularly in the agricultural sector; rehabilitate the country's decayed social infrastructure; stimulate exports; curb the consumption of luxury imports; and mobilise domestic and external resources to restore living standards (Bawumia, 1998, p. 57). Despite strong opposition from labour and student groups, a second phase of negotiations occurred shortly after the launch of the ERP, resulting in the official initiation of the country's SA Programme.[5] Its main objective was to provide the "market friendly" incentives expected to reverse more than a decade of economic decline and "blaze new paths of accelerated economic growth and development" (Awanyo, 2001, p. 92). It is still under the guidance of the Bretton Woods institutions (Panford, 1997), and proved to be a major paradigm for development in the 1980s.

Opinions about SA in Ghana vary. Experts at both the IMF and World Bank profess that the implementation of SAPs "almost invariably lead to poverty reduction and bridges gaps between the rich and the poor, and between the rural and urban areas, and that countries that adjust tend to be better off than the non-adjusting ones"

[5] As explained by Owusu (2001), SA Programmes are simply packages of neo-liberal free-market economic policies and prescriptions aimed at addressing the structural problems confronting the ailing economies of the developing world.

(Konadu-Agyemang, 2001, p. 530). Bawumia (1998, p. 59) argues that as a result of SA, the Ghanaian economy has recorded "a remarkable recovery", its GDP growth rate averaging 5% per annum, with the output of cocoa, minerals and timber recording significant increases. Proponents further maintain that SA appears to be achieving its objectives in the agricultural sector. For example, senior officers at Ministry of Agriculture believe that "agricultural growth has renewed under the ERP" (Awayno, 2001, p. 92).

There is another school of thought, however, that maintains SA has further debilitated the country's rural economy and marginalised its participants. For example, as explained by Puplampu (1999), the adoption of World Bank-prescribed SA policies for agriculture has impacted differentially on large and small-scale farmers. The author highlights how, in the case of cocoa farming in the Ashanti Region, the net income per acre for the two largest farm size groups was nearly 60% higher than for the two smallest farm size groups. In fact, there is mounting evidence indicating that SA in Ghana has adversely impacted a number of industries at the grassroots, in turn, exacerbating rural poverty. Panford (1997), for example, notes that organisational changes made to the state-owned Cocoa Board under the auspices of SA, despite leading to an initial 25% savings in expenses, have resulted in the loss of some 80,000 jobs. Dordunoo and Sackey (1997) add that under the adjustment era and the Public Service Reform Programme, 65,000 posts were abolished, and, as a result, public sector employment declined by 50% (464,000 to 230,000) between 1985 and 1990. Moreover, workers' salaries have not kept pace with currency devaluation and inflation, both of which have been pronounced since the launch of the ERP. As Owusu (2001) explains, the *cedi* depreciated from 2.75 = US$1 at the beginning of the Programme to 3,800 = US $1 in early-2000, and the national inflation rate, which experienced a reduction during the first decade of the ERP, more than doubled from 24.7% in 1993 to 58.6% in 1995.

As a means of escaping poverty, an increasing number of Ghanaians have taken up gold mining and sister occupations (on-site merchants, stall operators, mercury agents, etc.) as professions, entrenching themselves in a life of artisanal and transient activity, and residing in impoverished, unsanitary areas.

### 2.3.3 Gold mining in Ghana

Under the Ghanaian SA Programme, the redevelopment of the mining and minerals sector has been particularly targeted, its rapid divestiture perceived as an all-out cure to the country's economic woes. Whereas the country's agriculture and logging industries began exhibiting signs of progressive deterioration in the 1970s, its gold mine production commenced stagnation during the middle of the 20th century. As Acquah (1995) explains, in about 1950, most of Ghana's remaining 11 operating mines at the time began to deteriorate, and although requests were made to the Government for loans and grants to promote mine development and/or maintain operations at prevailing levels, assistance was denied, thus forcing most to close down. In what was undeniably a move of desperation, the Government attempted near-complete State control of the mining industry: it purchased all equity shares of mines threatening to close; established the Ghana State Mining Corporation in 1961; and obtained shares in Ashanti Goldfields, the country's largest gold producer at the time. By 1961, all mines, with the exception of those based in Obuasi and Konongo, were nationalised (Konongo was nationalised in 1966 and the State took a controlling interest in Obuasi in 1972); investment in exploration and the refurbishment of mines remained at a minimum.

The passing of the *Minerals Act* (Act 126) in 1962 represented another important move by the Government to gain further control of the mining sector. As Tsikata (1997) explains, in 1958, within a year of the attainment of independence, the Government appointed a Commission to enquire into a number of mineral rights, equity, profitability, and concessionaire issues. Following an 11-month investigation by the Commission, it was recommended, *inter alia*, that:

1) The Government take over mineral rights from the landowning communities;
2) The royalties to be paid by mining companies be calculated as a percentage of net profit;
3) Landowners be entitled to a percentage of royalties determined by law;
4) More stringent rules be implemented to restrict the area over which mineral rights could be held; and
5) The Government investigates the advisability of acquiring 51% of the shares in mining companies, and to give consideration to the advisability of establishing a state monopoly for the export of minerals.

The *Minerals Act* vests the ownership of minerals in "the president on behalf of the Republic and in trust for the People of Ghana" (*Section 1*), and granted the executive a great deal of power to decide upon the use and management of land.

The efforts made to nationalise Ghanaian mining, however, did little to revitalise the sector, and by 1982, gold production declined to 277,000 oz, less than one third of the 915,000 oz output of 1960 (Jackson 1992; Acquah 1994a; Acquah 1994b). Out of sheer desperation to revive its gold mining sector, the Government appointed a Committee on Gold Mining, which, following months of research, identified the following as the reasons behind the decline in national production (Mireku-Gyimah and Suglo, 1993):

- A noncompetitive investment climate, created by a long period of political instability;
- A general deterioration of the economy;
- An unfavourable mineral policy (tax and mining laws);
- Out-of-date technology for the mining and/or treatment of low-grade ores;
- Declining gold price from 1934 to 1972, which placed severe constraints on new mines and hindered the expansion of existing properties;
- Mass emigration of experienced personnel from the country; and
- Deterioration of the physical infrastructure, especially transportation and telecommunication.

In short, the Committee concluded that a series of policy, economic, managerial and technologic factors were causing gold production to stagnate in the country. It then made the following recommendations to the Government:

1) To establish an investment code and create a favourable investment climate in the country;
2) To review existing mineral laws to make it easier for potential investors to acquire mineral concessions to explore and mine gold for up to 30 years;
3) Review taxation laws to make taxes payable by companies comparable to those in other gold-producing countries;
4) Review the remittance quota for expatriates in the industry to allow them at least 40% of net salary after tax; and
5) To legalise small-scale mining.

These recommendations were used as the basis of a strategy aimed at revitalising the mining sector, and incorporated within the context of the ERP (Tsikata, 1997); the accompanying financial support from the World Bank and the International Monetary Fund (IMF) for SA boosted the minerals industry. The IMF also agreed to finance the rehabilitation of a series of state-owned mines in Tarkwa, Prestea and Dunkwa (Mireku-Gyimah and Suglo, 1993).

The Government subsequently targeted improving investment and production in the industry. In 1986, it passed a new minerals and mining law, *PNDC Law 153*, in an attempt to create a favourable investment climate in the mining sector. It stipulates, *inter alia* (after Utter 1993, pgs. 570-571):

- That the Government is entitled to 10% of the equity in all new mining companies, and has the option to purchase an additional 20%;
- That corporate tax is 45%, and additional profit tax is applicable if the rate of return exceeds agreed levels;
- An investment allowance of 5% be in place during the first year of operation;
- Complete capitalisation of all pre-production expenses;
- Provision of favourable amortisation levels (75% the first year; 50% thereafter), elimination of import duties on capital equipment, and generous retention allowances on foreign exchange profits; and
- That the mining of precious metals and gemstones on a small scale is completely legal.

With these changes, the Government successfully promoted increased foreign investment, effectively triggering the country's latest gold boom. During the period 1983-1993 alone, an estimated US$900 million was invested in the Ghanaian mining sector and today, a wide range of companies from Australia, Canada, the Netherlands, South Africa, the United Kingdom and the United States hold controlling interests in most of the country's operating mines (Addy, 1998). A more recent assessment made by Aryee (2001) suggests that during the 1983-1998 period, a total of US$4 billion in private investment capital was injected into the mining sector for mineral exploration purposes, the development of new mines, and the expansion and rehabilitation of existing sites.

Up until 1988, only two companies had operating mines (four in total) in Ghana: Ashanti Goldfields and the State Gold Mining Corporation. The picture, however, has since changed remarkably. Today, production is concentrated within eleven privately-owned and controlled operations, and three state-owned operations; output from the large-scale mining sector accounts for some 90% of national gold output. Since the late-1890s, the biggest miner of gold in Ghana has been Ashanti Goldfields, its Ayanfuri, Bibiani, Asikam, Iduapriem, Tarkwa and Obuasi properties accounting, in most years, for well over 50% of national production. Ashanti is jointly owned by the Government of Ghana and Lonrho Ltd., although the Government recently reduced its stake (from 55% to 31.3%), in turn, raising some US$400 million in transactions and causing an upward ascension of the company's stock on both the Accra and London Stock Exchanges (World Bank, 1995a). The company's main mine, which is located in Obuasi and has been in operation since 1897, produces close to 50% of national gold (37,651 of 81496 kg in 1999). Other significant producers of gold in Ghana include Abosso Goldfields and Ghana Goldfields. Table 2.4 provides production totals for major gold mining companies with operating mines in Ghana.

**Table 2.4:** Gold production in Ghana (troy ounces)

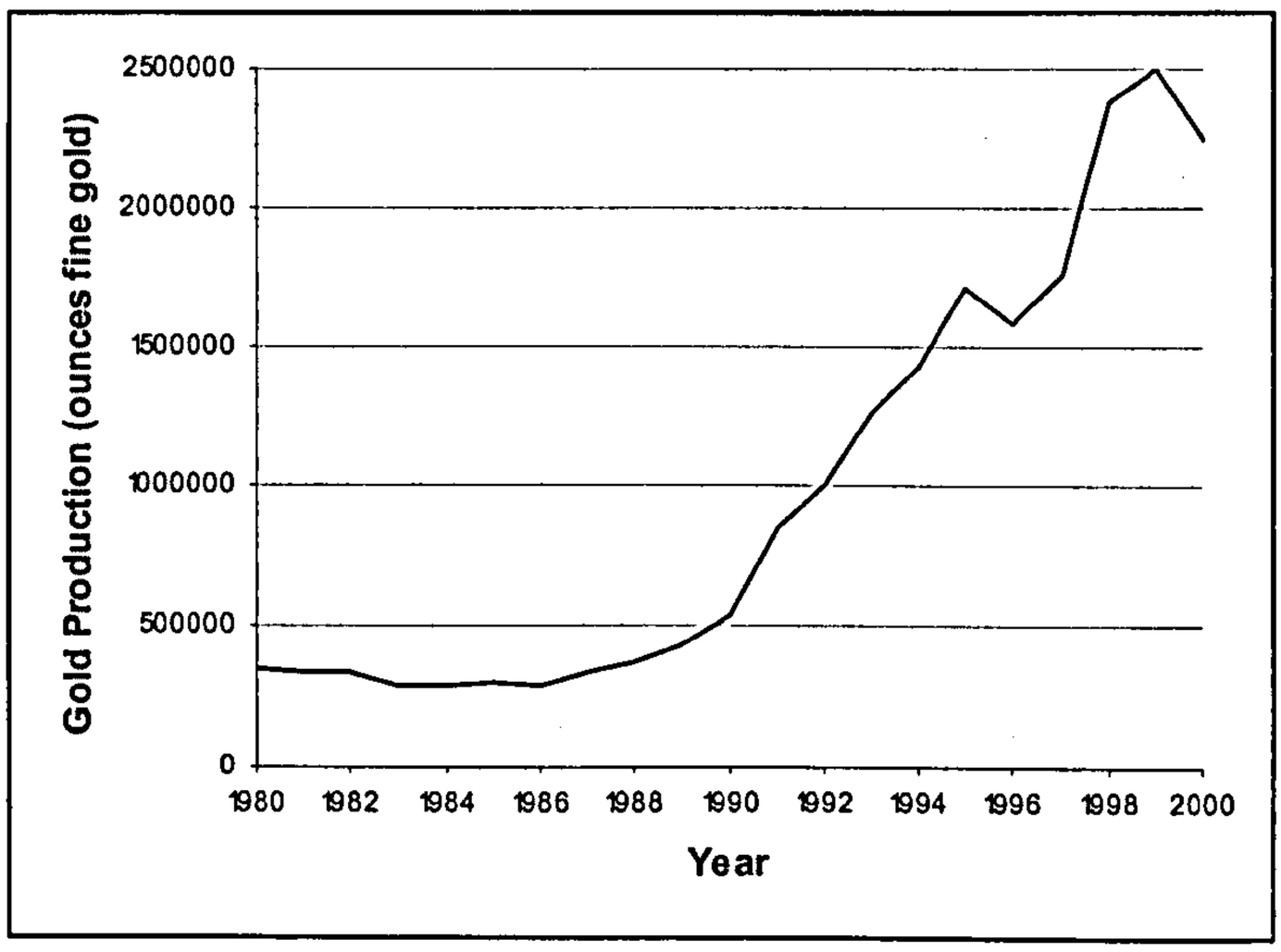
| | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| Ashanti Goldfields Company (AGC) | 1,154,497 | 1,355,932 | 1,317,850 | 1,144,952 | 1,002,636 |
| Teberebie Goldfields (Now owned by AGC) | 284,984 | 275,708 | 300,245 | 29,494 | N/A |
| Billiton Bogosu | 121,246 | 125,201 | 145,747 | 108,657 | 87,122 |
| Obenemase Gold | 6160 | N/A | N/A | N/A | N/A |
| Dunkwa Continental | 4130 | 1295 | 35 | N/A | N/A |
| Bonte Gold Mines | 30,766 | 38,221 | 52,432 | 68,139 | 65,293 |
| Ghana Goldfields | 58,522 | 146,062 | 278,473 | 349,775 | 527,011 |
| Prestea Sankofa | 21,911 | 16,275 | 12,495 | 11,922 | 8,257 |
| Barnex Prestea | 35,386 | 16,730 | N/A | N/A | N/A |
| Resolute Amansie | 70,073 | 192,439 | 146,062 | 134,202 | 108,827 |
| Abosso Goldfields | N/A | 294,854 | 330,626 | 330,375 | 302,563 |
| Prestea Gold Resources | N/A | N/A | 31,291 | 11,922 | 8,257 |
| Satellite Goldfields Ltd. | N/A | N/A | 94,819 | 97,689 | 69,809 |
| **Total** | **1,906,405** | **2,602,450** | **2,852,502** | **2,447,590** | **2,369,906** |

*Sources*: Aboagye, 2000; Coakley 2000; Ghana Country Profile 2002

National gold production has increased by 700% since 1980 (Figure 2.4). After experiencing a partial decline from 1980 to 1986, during which time output fell from 342,904 oz to 287,124 oz, annual production began increasing incrementally, reaching 373,937 oz in 1988, and 429,476 oz the following year. By 1993, however, output

(1,261,424 oz) was more than double that of 1990 (541,408 oz), and since 1998, production has exceeded two million ounces annually. In 1998 alone, Ghanaian gold exports generated sales in excess of US$687 million, which accounted for some 38% of total exports and 96% of mineral exports (Aryee, 2001). Industry investment continues to increase, as a growing number of companies – both foreign and domestic – are applying for prospecting and excavation permits. Records available at the Minerals Commission indicate that over the period 1983-1998 alone, some 237 companies (154 Ghanaian and 83 foreign) prospected for gold, whilst another 23 had been granted mining leases.

**Figure 2.4:** Annual gold production in Ghana, 1980-2000




*Source*: Minerals Commission

Ghana does not fully conform to the UN definition of a "mineral economy"[6] but its mining sector nevertheless contributes some 40% of gross foreign exchange earnings (Aryee, 2001, p. 61). Although economically, its most important industrial sector is agriculture, which contributes to 44% of GDP and employs approximately 47% of the country's labour force, as a foreign exchange earner, no individual commodity is more important than gold. For decades, cocoa was Ghana's leading export (in terms of earnings) but a series of economic conditions has caused its share of export earnings to decline from more than 50% in 1983 to 30% in 1997; over the same period, gold's share has risen from 15% to 39% (Plowden *et al.*, 1999). As Acquah

[6] A "mineral economy" is that which generates at least 10% of gross domestic product from mining and at least 40% of foreign exchange earnings from mineral exports (UN, 1998, p. 2).

(1995) explains, the majority of the hundreds of millions of US dollars invested in the Ghanaian mining sector to date have been used to develop, mine and process gold, which accounts for 80% of foreign exchange earnings from mineral exports (See Table 2.5 for an overview of key gold economic data). The value of total production exceeds US$400 million – corresponding to 6% of total GDP – and the sector employs over 35,000 people.

Notwithstanding this production, what continues to be overlooked in national gold tabulations and sectoral analyses is the contribution made by artisanal and small-scale miners to national gold output. Although the ERP, SA, and the majority of recently-implemented mineral policies have primarily targeted the redevelopment of Ghana's large-scale gold mining sector, the much-neglected ASM segment, as a collective unit, is the country's fourth largest producer of gold behind Ashanti Goldfields, Abosso Goldfields, and Ghana Goldfields. The discussion that follows examines the sector in greater detail.

**Table 2.5:** Key Ghana gold data

| Variable | 1990 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Average annual % growth 1993-98 |
|---|---|---|---|---|---|---|---|---|
| Output (tonnes), GFMS | 17.3 | 41.4 | 44.5 | 53.2 | 50.3 | 55.7 | 73.3 | 12.1 |
| Output (tonnes), national source | N/A | 38.6 | 43.3 | 51.3 | 48.6 | 52.9 | N/A | N/A |
| **Exports** | | | | | | | | |
| Volume of exports (tonnes) | 16.4 | 37.6 | 44.6 | 52.5 | 46.2 | 50.7 | N/A | N/A |
| Value of exports (US$ millions) | 213 | 479 | 549 | 657 | 627 | 503 | 693 | 7.7 |
| Gold exports as % of total exports | 22.5 | N/A | 44.4 | 45.2 | 39.4 | 39.2 | N/A | N/A |
| Gold exports as % of debt service | 81 | N/A | 150 | 163 | 131 | 97 | N/A | N/A |
| Average gold price (US$/oz) | 383.59 | 359.82 | 384.15 | 384.05 | 387.87 | 331.29 | 294.09 | N/A |

*Source*: Plowden *et al.*, 1999

## 2.4 Artisanal and small-scale gold mining in Ghana

This thesis examines the current state of affairs in the Ghanaian small-scale gold mining industry, providing both institutional and grassroots perspectives on its performance and environmental management needs. In doing so, it solicits the inputs of both those regulating the industry's operations, and those participating in its

activities. Although large-scale operations continue to dominate Ghana's gold mining landscape, the much-overlooked ASM mining segment – both its legal and illegal channels – produces as much as 8% of the country's gold. In what follows, an overview of Ghana's artisanal and small-scale gold mining industry is provided.

### 2.4.1 The informal industry sector revisited: the case of Ghana

Artisanal and small-scale gold mining is a major branch of Ghana's informal economy. The World Bank uses the following characteristics to define the informal sector in the Ghanaian context (World Bank, 2003b):

- Highly unregulated and disorganised;
- Consisting of predominantly cash transactions;
- Having non-existent or poor record keeping;
- Possessing few, if any, barriers to entry;
- Having a relatively high rate of illiteracy;
- Non-conformity to state rules and regulations;
- High poverty levels;
- Illegal activities associated with a black economy;
- High risk and risk rewarding; and
- Itinerate in nature.

Locally, the informal sector is perceived as "an array of precarious economic activities which have become the haven of people seeking to eke out a living because they are unable to secure wage or salaried employment in the capitalist sector" (Ninsin, 1991).

It was estimated in the early-1990s that 68% of working Ghanaians were employed in the informal sector (World Bank, 1995b), including agriculture, gold and diamond winning, at garages, repair workshops, and as street vendors, *tro-tro*[7] drivers, food processors and hawkers. Yankson (1992) further argues that the typical informal sector enterprise operating in Ghana is individually-owned and operated, generally for less than five years, and, in most cases, employs low or intermediate technology.

As explained by Barwa (1995, p. 5), although "the contribution of the informal sector to [Ghanaian] GDP is difficult to measure due to insufficient information", it likely

[7] A local term given to a local driver of a "group taxi".

"accounts for nearly 22% of the gross domestic product of the total Ghanaian economy". More recently, Charmes (2000) estimated the country's informal economy to account for 58.3% of non-agricultural GDP and 31.4% of total GDP. Overall, some 40% of employment in the sector is provided by trade, about a third is involved in manufacturing, and approximately 18% in services. The illiteracy rate in the sector is especially high (60%), particularly within artisanal farming and trade groups (World Bank, 2003b). On the issue of earnings, operators based in informal commerce, construction, restaurants, repair and metal work trades generally earn over 20,000 *cedis* monthly, but the majority of the sector's participants earn a weekly wage of less than 5000 *cedis* (Yankson, 1992). Whereas in Tema and Accra, respectively, 82% and 73% of informal industry participants are earning a monthly wage greater than 20,000 *cedis*, only 39% of Kumasi's operators earn such a salary (Barwa, 1995).

### 2.4.2 Context: poverty and artisanal and small-scale gold mining in Ghana

Ghana's informal industries are populated by the most poverty-stricken of people, who, in most cases, have taken up profession in the sector in the first place because there are few employment alternatives. The country's impoverished are described by Hulme and Shepherd (2003, p. 408) as follows:

> "...chronically hungry...extremely poor, the perennially needy and pathetic. This category was divided into two broad groups, first is "God's Poor," a group which includes factors for which there is no obvious remedy – disability, age, widowhood and childlessness. The second group is the "resourceless poor"; this includes...immigrant widowers and other landless poor".

Today, the majority of the Ghanaians live below the poverty line (Anane, 2003). Gallardo (2002) furthermore attests that at least 43% of citizens live on a annual salary of less than 900,000 *cedis*, and that poverty is higher in rural areas (51.6%) than in urban areas (22.8%); an estimated 30% of the country's 18.8 million people could not meet their basic food needs in 1998-99 (Narayan and Petesch, 2002).

The fact that Ghana scored 129 out of 173 countries on the most recent UNDP-commissioned Human Development Index paints an inaccurate picture of the country's quality-of-life[8], as it is in an even more deteriorated state than indicators and matrices portray: its GNI per capita has declined 25% in the past five years, from

[8] Despite being one of the poorest countries in the world, Ghana has been placed under the category "Medium Human Development". Admittedly, the UNDP concedes that "although the HDI is a useful starting point, it omits vital aspects of human development" (UNDP, 2002, p. 34), which is clearly the case here.

US$390 to US$290; its illiteracy rate (28.5%) remains excessive; only one quarter of its 40,000 km of roads are paved, most of which are riddled with potholes; its minimum daily wage has been set at less than one US dollar; and some 36% of its population does not use quality water sources. Thus, it is frequently labeled "one of the 25 poorest countries in the world (with) the most impoverished 30% of its population (being) rural dwellers with a mean per capita expenditure of US$186 per annum including the value of home produced food" (Gyasi, 1996, p. 93).

As Sarris and Shams (1991) report, with the exception of the Greater Accra and Upper West Regions, there are more than 200,000 rural inhabitants living below the poverty line in each of Ghana's 10 political regions, with the largest concentration found in the Ashanti Region. Among the country's most impoverished groups are rural small farm holders, some 66.8% of whom were reportedly living below the poverty line in 1986. To provide an indication of the low income earning professions in Ghana, in 1996, the monthly salary of the typical high school teacher was 110,000 *cedis*, which "was barely enough to provide the basic needs of an average household for only three weeks", given that the average price of chicken was between 8000 and 12,000 *cedis*, and a bowl of *fufu* and meat for lunch at a local *chop bar* was between 1500 and 3000 *cedis* (Owusu, 2001).

However, detailed statistics are not needed to understand why, country-wide, the employment problem is severe and deteriorating. Not only have low crops yields, combined with the fact that urban prices have increased more rapidly than rural prices, adversely affected numerous farmers in recent years, but there are also significant urban-to-rural disparities, with the provision of services – including health, water and sanitation – being decidedly poorer for rural communities. Ohene-Konadu (1996) captures the essence of this reality in the following passage:

> "There is great disparity between the rural and urban areas of Ghana. The rural people are bedeviled with many seemingly insurmountable problems; because of this they have achieved so little. The rural sector provides most of the economic resources of the country and serves as a dwelling place for the majority of the population. Paradoxically, it is the sector which is almost neglected in development policy...In fact, official approaches to poverty alleviation have been piecemeal and fragmented".

Although the 1970 and 1984 censuses estimated unemployment rates to be 2.2% and 2.8% respectively, each was judged to be unrealistically low, failing to accurately

reflect the problem (Baah-Nuakoh, 1996, p. 3). Thus, on the basis of the 1984 census, the Manpower Redeployment Study revised the data, determining national unemployment in the 1990s to be between 12.5 and 15%.

To escape a life of poverty, an increasing number of men, women and youths are participating in artisanal and small-scale gold mining countrywide. As previously explained, artisanal and small-scale gold mining is recognised as one of the most important channels of the country's informal industry sector, and for the impoverished, it holds the promise of immediate economic relief. As Davidson (1993, p. 316) explains, "in diverse areas of the world, artisanal mining has become the principal livelihood for millions of miners and their families and the mainstay of local rural economies". This appears to be the case in Ghana, where the industry – in particular, its gold segment – has become a safe haven for thousands of poverty-stricken nomadic people, retrenched workers and seasonal farmers in recent years. As Yakubu (2002, p. 7) put it:

> "In view of the low capacities of the public and private sectors to absorb their numbers, illegal mining becomes the most attractive alternative because of perceived remuneration they expect to get".

Although farming continues to be the mainstay of the country's rural economy, an increasing number of inhabitants are beginning to participate in artisanal and small-scale gold mining because of the possibility of earning higher wages than most sectors of industry. Specifically, in a country where annual incomes can be as little as US$151 (Dorduno and Sackey, 1997), operators are lured by the prospect of extracting gold, which yields a substantial, and immediate, return on the market. Referring specifically to the payback factor in small-scale gold mining, a government officer in Tarkwa, one of Ghana's chief gold producing regions, told this story (Government of Ghana, 2002b):

> "Do you see that beautiful house on that hill, surrounded by all the dilapidated homes? The owner built it from scratch...He firstly acquired the land through the district council, intending to build a small home for his family. But once beginning its construction, he discovered parts of an alluvial deposit on the hill which would be his "yard"...So, he 'silently' began mining the gold, selling it 'quietly' to a local buyer and *voila*: financing for a beautiful home".

By working in inhumane conditions, it is claimed a small mine worker in Ghana can earn as much as US$7 each day (Appiah, 1998), which, for a five day work week, amounts to US$1820 annually.

### 2.4.3 Organisation of artisanal and small-scale gold mining in Ghana

Ghana's *Small-Scale Gold Mining Law* (PNDCL 218) defines a "small-scale gold mining operation" as that engaged in "the mining of gold by any method not involving substantial expenditure by an individual or group of persons not exceeding nine in number or by a co-operative society made up of ten or more persons". In technical terms, however, it is defined in terms of *concession size* – specifically, as (gold mining) activity that occurs on a land plot of no more than 25 acres. Other major characteristics of the industry include the following:

- Operations are generally low-tech.
- By law, operations can only be manned by Ghanaian nationals.
- Operators are licensed to mine between three and five years, subject to renewal.

As Figure 2.5 indicates, Ghana's artisanal and small-scale gold mining sector consists of the following two streams of individuals: 1) registered operators ("official sector"); and 2) the "unofficial sector". Registered small-scale gold operators are individuals who have been awarded licenses by the Government to mine a designated area (again, not exceeding 25 acres, for between three and five years). Typically, a licensed operator employs between five and 20 groups of tributers consisting of five to 10 workers each who excavate ore and process gold. Tributers usually retain two-thirds of the profits, and the remaining third is given to the concessionaire (Appiah, 1998). The most common equipment utilised at registered sites are basic hand tools such as picks, axes, sluice boxes and shovels, although occasionally, Honda water pumps, explosives and washing plants are used. However, even the sites that feature machinery are, for the most part, rudimentary in design. The most advanced of setups have separate "stations" or locations for performing the necessary activities of the gold production process. First, ore is crushed into pebbles by hand or machine and is then placed in sacks, which are stored in sheds. Next, pebbles undergo primary, secondary and tertiary grinding in preparation for washing. Carried to the riverside in cloth bags, the finely-crushed sediment is laid along washing blankets or is hand-

washed along riverbanks to separate valuable gold particles. It is then panned using mercury, and the resulting amalgam is roasted over a charcoal fire in the open air.

The second group of artisanal and small-scale gold miners operating in Ghana, the illegal segment ("unofficial sector"), is comprised of clandestine operators referred to locally as *galamsey*[9]. For a variety of reasons, including expenses, an unavailability of adequate land, and ignorance of laws and regulations, *galamsey* have elected not to register their operations with the Government. Their inevitable nomadic existence is exemplified by the perpetual "hit and miss" nature of their activities. Most of the viewpoints expressed toward the *galamsey* in the local press and within government circles are demeaning, condemning their lifestyles and personalities. It is estimated that as many as 85% of the country's artisanal gold mine operators are *galamsey*.

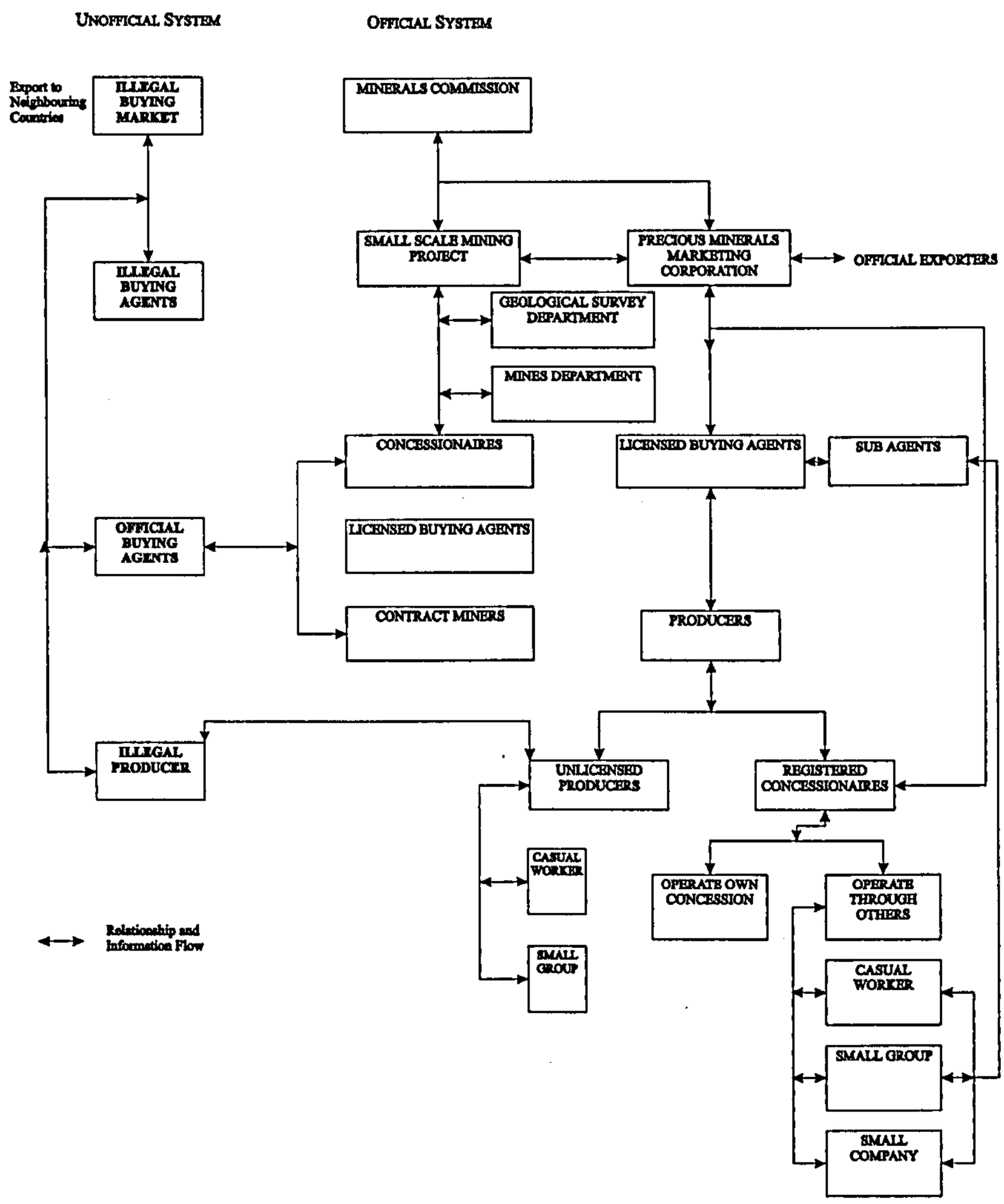
Presently, no precise artisanal and small-scale mining employment figures exist for Ghana. One of the earliest assessments was made by the World Bank, which, in a technical paper entitled *Strategy for African Mining* (World Bank, 1995a), estimated that some 30,000 people were employed within the "legalised" segment of the industry. More recently, however, Appiah (1998) estimated that at least 200,000 people were directly involved in the extraction of gold and diamonds on an artisanal and small scale in the country. Researchers at UNDP are in general agreement, noting that there are at least 50,000 legal small-scale gold miners and 80,000 *galamsey* operating in Ghana. Benjamin Aryee, director of the Ghanaian Minerals Commission, agreed that the *exact* employment figure lies between 50,000 and 300,000, arguing that, "the rather wide range of estimates bears testimony to the lack of readily available accurate and reliable data due to the furtive nature of a large part of such workings in rather remote areas" (Aryee, 2003, p. 395). What *is* fact, however, is that at least 60% of the country's mine labour force is employed within the artisanal and small-scale sector.

Although the Economic Commission of Africa estimates that between 40 and 45% of Africa's artisanal and small-scale miners are female (ILO, 1999), women account for

[9] Activity undertaken by highly migratory, unregistered, Ghanaian small-scale miners is referred to locally as *galamsey*, which, according to native people, originated from the English expression "Get them and sell". During the colonial period in Ghana, the Syrians and Lebanese engaged in the illicit trade of gold constantly worked to persuade locals to "get and sell" gold, and because the local pronouncing of this phrase was "Gal-am-sey", Ghanaians soon referred to Syrians and Lebanese as "galamsey". Over time, the expression slowly became a label for illegal artisanal mining activity.

only 15% of the legalised branch of the Ghanaian small-scale and artisanal mine labour force. They account for only 6% of licensed buyers, 10% of concession holders, and 15-20% of the sponsors of work groups, members of cooperatives or mining groups. Some 80% of Ghana's female artisanal and small-scale miners are aged 40 or below; 93% do not have secondary education; and 33% are illiterate (Offei-Aboagye 1995; ILO 1999; Aryee 2003).

**Figure 2.5:** Organisation of small-scale mining in Ghana




Significant revenues have been generated in the sector since its legalisation. Ghanaian artisanal and small-scale miners have produced over US$300 million worth of gold in the past 14 years (Table 2.6), a commendable feat considering that operations are known to be only 20% efficient (Iddirisu and Tsikata, 1998). Between 1989 and 1994, 30,000 small-scale miners reportedly produced and sold to

governmental offices some US$68.56 million in gold and US$71.5 million in diamonds (UN, 1996a). As Davidson (1993) explains, during the first four years of operation, an estimated 400 properties registered under the newly-introduced legalisation scheme, producing over 45,000 oz of gold. Gold output from operations, which are scattered primarily within the southwestern regions of the country (Figure 2.6), accounts for approximately 5% of national production, and increased nearly 25% over the period 1997-99, rising from 3,331 to 4,069 kg (Aboagye, 2001). Annual small-scale gold mine production has risen nearly tenfold in the past decade, from 17,234 oz in 1990 to 145,662 oz in 2000.

Box 2.1 summarises the key characteristics of Ghana's artisanal and small-scale gold mining sector.

**Table 2.6:** Comparative gold production and revenue figures in the Ghanaian artisanal and small-scale gold mining sector

| Production | | | | | Revenue | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Small scale (oz)** | **Total Ghana (oz)** | **% Small Scale to Total Ghana** | | **Small scale (US$Mill.)** | **Total Ghana (US$Mill.)** | **% Small Scale to Total Ghana** |
| | A | B | C = A/B | | D | E | F=D/E |
| 1989 | 9,272 | 429,836 | 2.2 | | 3.4 | 159.9 | 2.1 |
| 1990 | 17,234 | 534,630 | 3.2 | | 6.3 | 201.6 | 3.1 |
| 1991 | 15,601 | 847,560 | 1.8 | | 5.3 | 304.4 | 1.7 |
| 1992 | 17,297 | 999,950 | 1.7 | | 6.1 | 343.4 | 1.8 |
| 1993 | 35,145 | 1,257,489 | 2.8 | | 11.5 | 434.0 | 2.6 |
| 1994 | 89,520 | 1,428,011 | 6.3 | | 34.7 | 548.6 | 6.3 |
| 1995 | 127,025 | 1,717,654 | 7.4 | | 48.7 | 647.3 | 7.5 |
| 1996 | 112,349 | 1,597,575 | 7.0 | | 36.0 | 612.4 | 5.9 |
| 1997 | 107,094 | 1,755,240 | 6.1 | | 28.4 | 579.2 | 4.9 |
| 1998 | 128,334 | 2,382,339 | 5.4 | | 36.6 | 687.8 | 5.3 |
| 1999 | 115,784 | 2,557,315 | 4.5 | | 35.2 | 710.8 | 4.9 |
| 2000 | 145,662 | 2,447,591 | 6.0 | | 40.9 | 702.0 | 5.8 |
| 2001 | 185,596 | 2,369,909 | 7.8 | | 39.3 | 617.8 | 6.4 |

*Source*: Ayree, 2003

**Box 2.1:** Key characteristics of the Ghanaian ASM industry

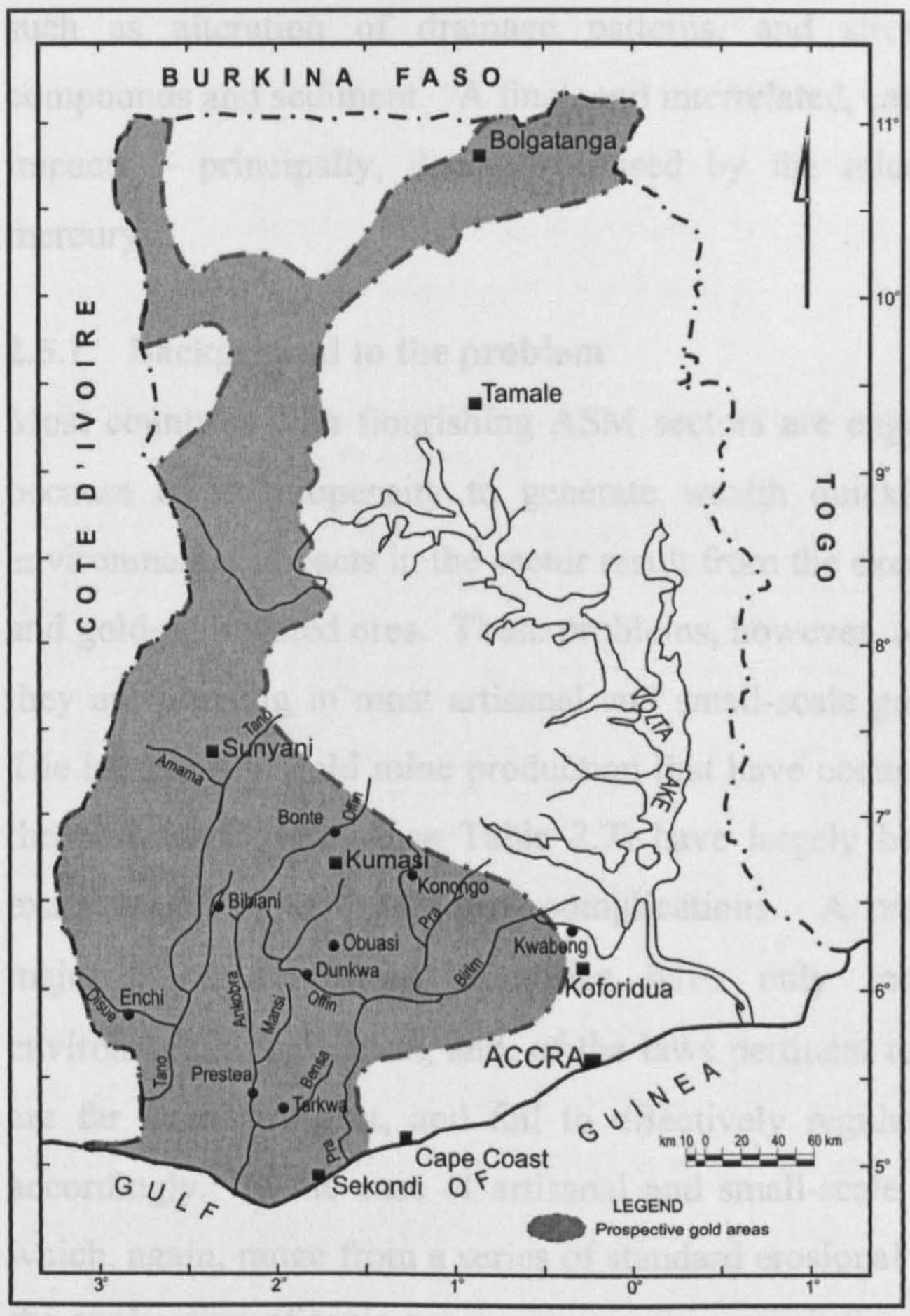
**Employment Statistics**

- Estimated 30,000 working on registered plots; as many as 170,000+ illegal galamsey.
- 15% female participation in legal segment; 50% female participation in illegal segment.
- 60% of the known Ghanaian mining labour force is employed at small-scale mines.

**Revenue Statistics**

- Approximately two-thirds of the Ghanaian small-scale mining industry is engaged in the extraction of gold, with most of the balance involved in diamond mining.
- Over US$117 million in gold and US$98 million in diamond product has been obtained from small-scale mining operations since complete legalisation of the industry in 1989.
- Gold production from the Ghanaian small-scale gold mining industry has increased nearly tenfold since 1989, from 17,234 oz in 1990 to 107,093 oz in 1997.

**Figure 2.5:** The gold producing region of Ghana and rivers associated with major placer gold deposits



## 2.5 Environmental impacts of artisanal and small-scale gold mining in Ghana

Despite contributing positively to rural employment and national mineral exports, artisanal and small-scale gold mining activities have caused significant environmental damages in Ghana. This stems from the fact that "the environmental costs of ASM are generally higher than those of other types of mines" (Hentschel *et al.*, 2002, p. 36), simply because "[it] is dirtier per unit of output than medium, large and modern mining operations [and] the great individual number of polluters [typically] concentrated in a determined area [cause] significant local impact" (Henschel *et al.*, 2001, p. 34). In Ghana, the "environmental problems associated with the small-scale mining of precious minerals can be broadly grouped into three categories" (Aryee *et al.*, 2003, p. 135). The first includes all impacts to the lithosphere, the main problem being excessive land degradation, which is particularly common at many uncontrolled and unmonitored sites. The second category includes all impacts to the hydrosphere, such as alteration of drainage patterns, and stream pollution from mercuric compounds and sediment. A final, and interrelated, category includes all atmospheric impacts – principally, damages caused by the release of particles and gaseous mercury.

### 2.5.1 Background to the problem

Most countries with flourishing ASM sectors are engaged in the extraction of gold because of its propensity to generate wealth quickly. Thus, the most pressing environmental impacts in the sector result from the excavation and processing of gold and gold-aggregated ores. These problems, however, are in no way unique to Ghana; they are pressing in most artisanal and small-scale gold mining regions worldwide. The increases in gold mine production that have occurred in the developing world in the past 10-15 years (see Table 2.7) have largely been responsible for the recent exacerbation of environmental complications. A part of the problem is that the majority of developing countries have only recently implemented national environmental legislation, and, of the laws pertinent to mining-related activity, most are far from stringent, and fail to effectively regulate all aspects of the industry accordingly. In the case of artisanal and small-scale gold mining, complications – which, again, range from a series of standard erosional problems to impacts related to the application of toxic processing agents – result from a shortage of mechanisation;

low safety standards and levels of training; poor exploitation of available resources due to selective extraction of rich ores; low wages and chronic shortages of capital; an absence of environmental standards; and utilisation of highly inefficient equipment (Priester *et al.*, 1993).

In Ghana, artisanal and small-scale gold mining operations have been responsible for significant environmental damages. This, in large part, is attributable to both a general lack of knowledge and disregard for safety and environmental regulations, and the rudimentary nature of operations, which, as explained earlier, are of poor and simple design, and feature the most basic of tools. Operations are generally inefficient, capable of recovering only 20 to 30% of the gold contained in mined ore. As Iddirisu and Tsikata (1998) explain, sluice boxes usually measuring 2' by 12', and placed at an angle of 25 degrees, are employed at most sites, and jute bags are used for recovery. Pulp is washed down the sluice, and gold particles and other heavy minerals are trapped on jute mats. The amalgamation process is then initiated, as mercury is applied to "trapped" gold particles. Most operations are also highly disorganised, and, as implied earlier, operate with minimal safeguards in place. This, in turn, has caused significant pollution and environmental degradation in the country, particularly within the Western, Central and Ashanti Regions.

**Table 2.7:** World gold mine production and annual production increases in selected developing countries

| Country | 1986 Production (tonnes) | 1998 Production (tonnes) | Approximate Production Increase (%) |
|---|---|---|---|
| Bolivia | 6.0 | 14.0 | 133 |
| **Ghana** | **11.5** | **60.6** | **427** |
| Indonesia | 8.4 | 119.2 | 1319 |
| Mexico | 8.3 | 29.9 | 260 |
| Papua New Guinea | 36.1 | 55.6 | 54 |
| Zaire | 8.0 | 8.2 | 2.5 |
| Zimbabwe | 15.4 | 27.9 | 81 |

*Sources:* American Metal Market 1998; Murray *et al.* 1996

Although impacts occur throughout all phases of operation (see Table 2.8), there are two main environmental problems associated with artisanal and small-scale gold mining activity: 1) mercury pollution; and 2) land degradation. These problems have intensified in Ghana because of the recent growth in artisanal gold mining. Again, complications have been driven by economic inequalities that have left people little

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choice but to engage in the exploitation of marginal mineral deposits, often subjecting themselves to harsh and dangerous working conditions. Each of these environmental problems is examined in the discussion that follows.

### 2.5.2 Pollution from mercury

A combination of gaseous mercury released from gold amalgamation and toxic aqueous mercury discharged to streams and soils represents the most serious of environmental threats posed by artisanal and small-scale gold mining. During amalgamation, mercury is used to pan gold and is added to gold-aggregated sediments, which then "wet" and adhere to metallic gold, forming pasty amalgams. These are subsequently panned, filtered and burned to produce the final gold product. In the process, significant quantities of both gaseous and metallic (aqueous) mercury are dispensed into surrounding environments.

**Table 2.8:** Common environmental impacts resulting from artisanal and small-scale gold mining activity

| Environmental Problem/Issue | Potential Impact |
|---|---|
| ***Exploration*** | |
| Deforestation | The geological deposits of gold are fixed, and intensive gold prospecting activity leads to massive clearance of forest and vegetation cover. |
| Erosion | After vegetation is cleared from exploration activity, soils are left exposed to erosional agents; land is typically not productive enough to support future industrial activity, namely agriculture. |
| Pitting | Pits are dug haphazardly throughout prospective gold mining communities; they often fill with water and attract malaria-infested mosquitoes. |
| ***Extraction and Ore Processing*** | |
| Mercury | Mercury emissions to both land and water are regarded as the most serious environmental problems in the artisanal and small-scale gold mining industry. In sufficient quantities, the mercury is deleterious to a variety of organisms and plant life, and is hazardous to human health. |
| Acid Mine Drainage (AMD) | Improper tailings disposal causes AMD on a micro-scale, which in turn causes significant damages to resident water bodies and organisms. |
| Environmental Stress | The agglomeration of people at small-scale gold mines causes significant damage to the local environment. Examples include deforestation, and excessive pitting. |
| ***Closure*** | |
| Reclamation | Without proper reclaiming of mined lands, additional water pollution, heavy metals contamination and AMD can occur uncontrollably after abandonment. |
| Erosion and Landscape deformation | Landscapes are also scarred – often described as "moon-scaped" with numerous holes and pits after abandonment of small-scale gold mining activity. |

Up until the 1970s, most of the world's gold was produced at large-scale operations, with amalgamation being responsible for the production of just over five tons of gold annually. However, because gold prices have increased more than five-fold in the past three decades, a number of small-scale gold mining rushes have occurred throughout the developing world. Since amalgamation does not require the application of advanced techniques, it has been used almost exclusively for processing; it has been responsible for the production of well over 100 tons of gold (Lacerda 1997; Lacerda and Salomons 1998). It is an inexpensive, reliable, and portable means of concentrating and extracting gold from low-grade ores, which is why it is now so widespread throughout a number of artisanal and small-scale gold mining regions.

It is well known that mercury is harmful to human health and potentially deleterious to a wide-range of ecological entities (Matlock *et al.* 2002; Zeitz *et al.* 2002). A change in mercury speciation from an inorganic state into stable toxic methlymercury (MeHg) by non-ezymically and microbial action is the principal cause of these ecological impacts. As Wolfe *et al.* (1998) summarise, MeHg toxicity in mammals is primarily manifested as central nervous system damage. It is readily transferred across the placenta and concentrates selectively in the fetal brain. Acute exposure causes animals to initially become anorexic and lethargic, after which, muscle ataxia, motor control deficits and visual impairments develop, with convulsions preceding death. Similarly, for birds, acute MeHg poisoning can lead to chronic weight loss, progressive weakness in legs and wings, and kidney disease (Scheuhammer, 1987).

Moreover, MeHg has proven to be a pressing health threat to man, causing nausea, headaches, dizziness, and weight loss (Ikingura *et al.* 1997; Lacerda and Marins 1997; Appleton *et al.* 1999). Furthermore, it is also one of the few metal pollutants that have caused human death through ingestion of contaminated food (Lacerda, 1997). Some of the known major (artisanal and small-scale gold mining) mercury "hot spots" include Brazil (120 t/y), Venezuela (40-50 t/yr), and the Mindanao Region of the Philippines (26 t/y). Table 2.9 provides additional mercury emission estimates for selected artisanal and small-scale gold mining regions.

**Table 2.9:** Estimates of present day annual (t/y) and total (t) emissions of mercury from selected small-scale gold mining regions

| Site | Period | Annual Emissions of mercury (t/y) | Total Emissions of mercury (t) | Source |
|---|---|---|---|---|
| Amazon, Brazil | Since 1979 | 180 | 3000 | Pfeiffer and Lacerda (1988) |
| North Slavesi, Indonesia | Since 1988 | 15 | 120 | James (1994) |
| Victoria Fields, Tanzania | Since 1991 | 6 | 24 | Ikingura *et al.* (1997) |
| Jia pi Valley, China | Since 1938 | 2 | 116 | Ming (1994) |
| Guyana Shield, Venezuela | Since 1989 | 45 | 360 | Nico and Taphorn (1994) |
| Southern Brazil | Since 1985 | 1 | 10 | Lacerda and Salomons (1998) |

*Source*: Reproduced from Lacerda (1997)

For humans, the maximum daily intake of mercury has been determined to be 0.2 micrograms per gram of blood (OECD, 1974). In addition to direct exposure, a major source of mercury in humans is fish. In estuarine environments, inorganic mercury enters the food chain and is absorbed by fish, which readily transform it into MeHg; it then bio-accumulates as it travels upward through the food chain (French *et al.*, 1999). Thus, mercury concentrations within many of the fish species humans consume are typically high. The maximum weekly diet intake of mercury-contaminated fish, if present in concentrations of 1mg mercury/per kg, is less than 210 grams (OECD, 1974).

Numerous studies verify that MeHg is both ecologically destructive and a threat to human health. Early works (e.g. IAEA 1972; Friberg and Vostal 1972; D'Itri 1972) used the results of laboratory experiments to illustrate the potential lethality of mercury in the environment. More recent studies (e.g. Burger 1997; Downs *et al.* 1998; French *et al.* 1999), however, confirm the severity of these impacts in the natural environment. In the past 10-15 years in particular, there have been numerous mercury-related projects piloted in a number of artisanal and small-scale gold mining regions worldwide to determine the severity of mercury pollution. For example, in a study undertaken in Brazilian gold mining regions by Malm (1998), it was determined that people working in gold dealers' shops are at major risk from atmospheric mercury and people from riverside communities are susceptible to contamination from MeHg. In a similar study conducted by van Straaten (2000a), it was shown that

high mercury losses of 70-80% were occurring in and around small-scale gold mining regions in Zimbabwe. De Kom (1998) *et al.* surveyed forest-dwelling Maroons in Suriname, and determined, from blood and urine samples, that concentrations of mercury – released from local artisanal and small-scale gold mines – were exceedingly high within the sampled native populations. The findings from other significant mercury studies are described briefly in Table 2.10.

In locations where few mercury studies have been carried out, there is also strong indication of persistent contamination. For example, in a number of African countries such as Chad, Guinea and the Central African Republic, where few *official* environmental studies have been undertaken in prospective small-scale gold mining regions (UNIDO, 2000), there is visible evidence of mercury contamination at sites. The same applies in Ghana, where, with the exception of a small group of basic toxicology studies, few have sought to ascertain the impacts of mercury in small-scale gold mining regions. Nevertheless, of the research that has been undertaken in this area, all strongly point to mercury being a growing problem in need of immediate attention.

**Table 2.10:** Results from additional mercury studies conducted in artisanal and small-scale gold mining regions

| Location | Study Results | Source |
|---|---|---|
| Tanzania | Some 36% of sampled gold miners have concentrations of mercury in urine exceeding the WHO guideline of 50 μg mercury/g | Van Straaten (2000b) |
| Sulawesi's Minahasa Peninsula, Indonesia | Fish sampled from waters in close proximity to illegal small-scale gold miners had 30 times the mercury concentration to those of the reference site | Kambey *et al.* (2001) |
| Beni River, Bolivia | Some six of eight persons sampled had elevated concentrations of mercury in hair | Maurice-Bourgoin *et al.* (1999) |
| Mount Diwata, Philippines | High concentrations of mercury found in the blood of miners and people residing downstream from gold mining activities | Drasch *et al.* (2001) |

In Ghana, the *Mercury Law, 1989* (PNDCL 217) grants small-scale gold miners the right to purchase and utilise mercury for processing purposes. Paragraph 4 of the

Law, which is entitled "Small-scale gold miners authorised to possess mercury", specifically states:

> "Notwithstanding anything contained in any enactment to the contrary licensed small-scale gold miners may purchase from licensed mercury dealers such reasonable quantities of mercury as may be necessary for the purpose of their mining operations".

However, some 85% of the industry remains unlicensed – thus, is *unauthorised* to purchase mercury for use at operations; a multitude of illegal mercury traders supply these *galamsey*. As one government official put it in a personal communication, "controlling the environmental damages of the *galamsey* is one thing but a major cause of the industry's environmental problems overall is this mercury *mafia*, which continues to supply these operators with their mercury through 'underground' channels" (Government of Ghana, 2002a). Given that a significant share of the mercury marketing and usage in the Ghanaian artisanal and small-scale gold mining industry is likely clandestine, it is often difficult to determine precise patterns of contamination.

The World Bank conservatively estimated that between four and five tons of mercury is released into the environment in Ghana each year as a result of resident artisanal and small-scale gold mining operations (World Bank, 1995a). As Ntibrey (2001, p. 32) explains, (in Ghana) "for every tonne of material fed into the mill, 400-500g of mercury are used, but only 6-8% of it *is* used...[In the process] over 90% of the mercury used is lost in the tailings as atomised mercury and flakes of amalgam". Of particular concern are the processing techniques utilised by the prototypical Ghanaian artisanal gold miner. Although the extent of resulting pollution has yet to be determined, notable quantities of mercury have reportedly been dispensed into the environment because artisanal and small-scale gold miners typically roast amalgam over open fires and kitchen stoves in "bush-like" surroundings. In addition to featuring exorbitantly inefficient mining and mineral processing techniques (Iddirisu and Tsikata, 1998), careless handling of mercury was witnessed during personal visitations to sites; even at the most sophisticated of setups, miners were observed to be using mercury without appropriate skin and respiratory protection (Hilson, 2002a).

Pioneering research undertaken and reported by NSR Consultants (NSR, 1994) revealed that regional artisanal and small-scale gold miners occupationally exposed to

mercury, are, in fact, contaminated. Analysis of hair samples obtained from miners in Tarkwa and Accra showed a mean value of 7.4 μg/g; to reiterate, it is recommended by the World Health Organisation (WHO) that, the average weekly intake of mercury be no more than 5 μg/kg of body weight, of which, no more than 3.3 μg/kg should be MeHg.

Golow and Adzei (2002) studied mercury contamination in soil on twenty-three farms within the vicinity of Dunkwa-on-Offin, a major small-scale gold mining area in the Western Region. Loadings within sampled soils, which ranged between 0.5 - 50 ppb, were found to be higher than typical mercury-contaminated soils. It was determined from the findings that the majority of the environs of Dunkwa-on-Offin were contaminated with mercury, with the South-Eastern portion the most heavily affected. A more recent study (Golow and Mingle, 2003) revealed that the high levels of mercury presently found in the Offin River have likely resulted from the dredge mining and artisanal mining activities that occur along the riverbanks. Currently, contamination levels along the river range between 0.1 μg/l and 3.092 μg/l; it also likely that the contaminated "feeder" rivers – namely, the Oda and Fum – are contributing to these high loadings.

A more comprehensive study undertaken by Adimado and Baah (2002) involved sample collection from four towns: Asawinso (upstream) and Sahuma near Axim (downstream) in the River Ankobra Basin, and Tanaso (upstream) and Elubo (downstream) in the River Tano Basin. In collaboration with the Ghanaian Ministry of Health, blood, urine, hair and nail samples were collected from 217 subjects; fish samples were also taken from two rivers at the corresponding locations. None of the Asawinso residents possessed blood levels below the 3 μg – the recommended limit for unexposed persons. Moreover, subjects in Tanoso registered high mercury concentrations in hair and nails, and fish samples registered high levels of contamination. The authors attributed this excessive mercury contamination to the activities of the local *galamsey* operators, who, they explained, release mercury uncontrollably.

Two unpublished studies recently undertaken by UNIDO serve as further indication that a mercury pollution problem exists within major artisanal and small-scale gold

mining regions in Ghana. The reports present preliminary findings from Phase I of the UNIDO Project, *Assistance in Assessing and Reducing Mercury Pollution Emanating from Artisanal Gold Mining in Ghana.* The first study (Rambaud *et al.*, 2001) involved analysis of hair, urine, blood and nail samples from 187 adults residing in an artisanal gold mining community. Some 40% of the participants claimed to have health problems, and clinical examinations identified 13 men as having slight neurological disorders brought on by acute mercury exposure; many gold washers having elevated concentrations of mercury in their bloodstreams; and a potential exposure pathway to mercury in the community through contaminated food. The aim of the second study (Babut *et al.*, 2001), which was carried out in the small-scale gold mining town of Dumasi in the Western Region, was to ascertain the environmental impacts of mercury *prior* to the introduction of retorts (technologies used for mercury recycling – described more in detail in Chapter 4). Soil, sediments, fish, chicken, vegetables, surface water and groundwater were sampled in April 2000 in order to determine levels of mercury contamination. As reported in a follow-up article by Babut *et al.* (2003), mercury concentrations in groundwater ranged between 0.12 and 0.27 $\mu g/g\ l^{-1}$, and mercury concentrations in fish were found to be between 0.55 and 1.59 $\mu g/g\ l^{-1}$; concentrations in river water samples were more variable, ranging between 0.18 and 0.76 $\mu g/g\ l^{-1}$. Results suggest although surface water and groundwater have mercury concentrations below WHO standards, sediments are heavily polluted and that fish have been contaminated to the point where they should not be consumed.

The results of these, and similar studies, are summarised in Table 2.11. Although the magnitude of the mercury problem in Ghana remains largely under-investigated, the studies that have been undertaken to date, combined with inefficient practices currently used by resident artisans, suggest that mercury is being used uncontrollably and has contaminated the rural environment.

**Table 2.11:** Selected mercury studies conducted in gold mining regions in Ghana

| Description of Study | Summary of Findings | Source |
|---|---|---|
| Samples of soil, fern, elephant grass, mudfish and cassava collected around Obuasi | Plant samples exhibited high concentrations of mercury, showing persistent bioaccumulation. | Amonoo-Neizer *et al.* (1996) |
| Water pollution study in Prestea, Ghana | Determined that small-scale gold mining operations in the Prestea area were emitting substantial quantities of mercury into local streams. | Amegbey *et al.* (1994) |
| World Bank Mining Sector Development and Environment Project, Ghana | Conservatively estimated that between four and five tons of mercury is released into the environment as a result of small-scale gold mining in Ghana. | World Bank (1995a) |
| Various mercury studies Conducted in Tarkwa and Accra | Determined that regional small-scale gold miners occupationally exposed to mercury were contaminated. | NSR (1994) |
| Tarkwa | From a sample of 187 adults from a gold mining community, it was discovered that several had mercury-related health problems. | Rambaud *et al.* (2001) |
| Dunkwa-on-Offin | Determined mercury contamination within soil on twenty-three farms, and in the region overall. | Golow and Adzei (2002); Golow and Mingle (2003) |
| River Tano basin. | Sample collection from four towns: Asawinso (upstream) and Sahuma near Axim (downstream) in the River Ankobra basin, and Tanaso (upstream) and Elubo (downstream). | Adimado and Baah (2002) |
| Dumasi | In a small-scale gold mining community in Dumasi, it was determined from samples of soil, sediments, chicken, vegetables, surface water and groundwater, that the region is heavily contaminated with mercury. | Babut *et al.* (2001); Babut *et al.* (2003) |

### 2.5.3 Land degradation from artisanal and small-scale gold mining activities

As geological deposits are fixed, the extraction and processing of gold on a small scale commonly results in the excavation of numerous pits and trenches, the removal of vegetation cover, and mass deforestation. In many cases, defaced areas are not reclaimed, and, following episodes of erosion, become unsuitable for any other industrial purpose. As Douglas and Lawson (2000) explain, artisanal miners remove an average of one tonne of ore per day, and even greater quantities in areas with lower mineral yields. Though perhaps negligible in real terms, affecting less than 0.01% of the world's land, artisanal and small-scale mining activities have significant geomorphic effects on a local scale.

Artisanal and small-scale gold mining activity has been responsible for a large percentage of land degradation not only in Ghana but in other countries as well, including Sierra Leone (Michalski, 1996), Suriname (Peterson and Heemskerk, 2001),

Zambia (Kambani, 2003) and Zimbabwe (Maponga, 1994). During initial exploratory stages, vast quantities of vegetation are removed and a number of pits are dug haphazardly in areas believed to contain gold-aggregated ore bodies. The locations selected as exploration sites are determined largely from regional expertise. An absence of scientific and geological instruments for efficient prospecting makes community opinion and public knowledge the most reliable sources of guidance, which can result in large tracts of land being left with potholes and exposed to erosional agents. Compounding this problem are the practices deployed during operation, when land is rarely re-graded and pits are not reclaimed.

There are several detailed examples that help to illustrate the seriousness of this problem. The first is the Choco region of Columbia, where gold production has increased 7.2% each year, resulting in an estimated annual deforestation rate of 1000 hectares (Lacerda and Solomons, 1998). Intense gold prospecting is also contributing to mass deforestation in Zimbabwe, where an estimated 100,000 hectares of land are cleared each year in small-scale mining regions (Maponga and Anderson, 1995). Because sites are highly congested, sanitation is typically poor, leading to further contamination of potentially productive soils. This is also the case in the Liptako-Gourma region of West Africa – which includes Burkina Faso, Mali and Niger – where, artisanal and small-scale gold mining has intensified since 1984, and, by the early-1990s, as many as 10,000 people were found on a single site (Traoré, 1994). In fact, because artisanal and small-scale gold mining rushes occur in an anarchic manner, with little regard for ecological entities, excessive vegetation clearing has occurred and numerous pits have been trenched, leaving several "moon surfaced" terrains virtually devoid of vegetation (Lacerda and Solomons, 1998).

Land degradation in the Ghanaian artisanal and small-scale gold mining industry has deep cultural, economic and administrative roots, and is closely interrelated with the issue of land tenure. Asabere (1994, p. 282-283) describes the situation in the following passage:

> "In Ghana, as in most of sub-Saharan Africa, "land" has several dimensions – economic, religious, and political. As an economic asset, land is a significant resource and a factor of production...land has religious connotations as well, which are very meaningful. This concept is expressed in the saying 'Land belongs to a vast family of which many are dead, a few are living and countless numbers are still unborn and that the living derive their right to use it – holding

> as it were, as tendencies at will from the dead and as being the trustees of the latter'...As in every society, land has political ramifications. In the past, tribal warfare resulted in the creation of large empires. Land became an expression of territorial sovereignty and thus an important political tool".

The author adds that "the whole system of chieftaincy revolves around the land tenure system [under which] a chief is supposed to 'sit on the stool of the ancestors' and swear to protect the land for his people". Today, "stools" and "skins" are referred to as the royal or chiefly families of Ghana's pre-colonial states who, during the colonial period, attained legal status within those areas somewhat akin to that of the Crown in English law (Kasanga, 2001). In short, the Ghanaian land tenure schemes are communal, whereby a customary authority, such as a tribal chief, grants claims and regulates transfer of land, and may also play a role in regulating related investments.

Gradually, however, these land tenure systems have been supplanted by individualistic property rights and systems characterised by excessive government control of land use. The turning point came shortly after the passing of the *Lands Act* in 1962, which "empowers the Central Government to acquire any lands in Ghana 'in the public interest'" (Sarris and Shams, 1991, p. 71). Botchway (1998, p. 527) captures the essence of the situation in the following passage:

> "The president may authorise the occupation and use of any land to which this act applies for any purpose which, in his opinion, is conducive to the public welfare of the interests of the State, and may pay into the appropriate account out of moneys (SIC) granted by vote of parliament such annual sums as appear to him, having regard to the value of the land, and on the other hand, to the benefits derived from the people of the area in which the land is situated in the use of the land, to be proper payments to made to the land".

After passing the Act, the Government established the Lands Commission[10] to handle major land management activities (Kasanga, 2001), including (as per Article 258(1) of the 1992 Constitution) the effective management of public lands; to advise the authorities on key land use policies; to formulate and submit to government recommendations on national land use policy; and to advise on, and assist with, the execution of a comprehensive programme for the registration of title to land throughout the country. Coinciding with the recent increased management of land, and, an initiative more central to mining, was the enactment of parliamentary PNDCL

[10] The Lands Commission first came into existence on the strength of the consequential enactments of the 1969 Constitution under the *Lands Commission Act 1971* (Act 362).

153, *Parliamentary Article 156* of the 1992 Constitution, which, in effect, vested all minerals to the State irrespective of the geographical regions in which they are located. The sweeping provision also grants the State the right of compulsory acquisition of land for the purpose of mining. In recent years, efforts have primarily emphasised the redistribution of land to large-scale mining parties, which, as already explained, has been a major goal of the country's SA programme.

The Government's excessive control of land has precipitated notable land degradation in many of the country's artisanal and small-scale gold mining communities. Specifically, prospective artisans are finding it increasingly difficult to secure viable land through legal channels, as vast portions of gold fields have long been allocated to both foreign and domestic large-scale miners and mineral exploration parties. Consequently, land degradation is now a common phenomenon at many uncontrolled and unmonitored ASM sites (Aryee *et al.*, 2003). According to Dr Peter Acquah, former director of the Ghana EPA (Acquah, 1994a, p. 225), land degradation is now "the most serious environmental problem" in the country today, with resident mining and mineral processing activities responsible for the alienation of some 1,166 $km^2$ of land (0.5% of the country's total area) in 1990 alone (Acquah, 1995). Using the Western Region as an example, Aubynn (1997, p. 6) argues that "increased mining activities, largely engendered by SAP, have led to the alienation of local communities from both their settlements and sources of livelihood on a scale never seen before in the district". One-third of the Western Region (and over 60% of the Wassa West District) has already been granted as mineral concessions; substantive alienation has occurred as a result, as well as the loss of subsistence farming activities. An acute shortage of land, in turn, prompts thousands of artisans to exploit, *inter alia*, ecologically-sensitive forested regions and many of the concessions awarded to large-scale miners.

During small-scale mining processes, vegetation is removed, thus accelerating water erosion and sediment compaction. Moreover, soils are normally left contaminated with mine pollutants, and, as a result, lose their fertility, rendering areas unsuitable for farming. Large tracts of agricultural land have already been destroyed in Ghana, most of which is now incapable of sustaining plant growth (Aryee *et al.*, 2003). Agyapong (1998), who conducted fieldwork in Tarkwa, a major gold mining area in the Western

Region of Ghana, reports that vast tracts (of the Region) have been deforested as a result of artisanal and small-scale gold mining activity. Artisanal miners, who allegedly "clear the vegetation" and then dig "for mineral-bearing ore", have scarred the landscape with "excavated pits and trenches", which, in turn, has left "land unsuitable for any other purpose". Many pits left un-reclaimed have long since filled with water, and now serve as breeding grounds for malaria-infected mosquitoes. Moreover, as Iddirisu and Tsikata (1998) explain, in Ghana, it is quite common for prospective sites to be stripped bare of vegetation and topsoil, and, where deep underground mining has occurred, pits are normally left uncovered and abandoned outright.

The prolonged use of inefficient equipment has also contributed to the problem. Government records dating up to 1992 reveal that, whilst large-scale miners have affected an estimated 6000 ha of land in Ghana, at least 15,000 ha of land have been disturbed by small-scale miners, of which 10% (1500 ha) is under active disturbance (World Bank, 1995a). This has since increased by over 100%, although it has been estimated that illegal operations could be stressing as much as three or four times as much land (NSR, 1994). Presently, total surface area for all *valid* small-scale gold mining concessions stands at 3032 ha (Government of Ghana, 2002c). The land degradation problem in the artisanal and small-scale gold mining industry is further propelled by the practice of prospective miners' acquiring concessions without knowledge of the mineral content of the area; when it is realised, following extensive pitting and trenching, that areas contain insufficient mineral wealth, concessions are abandoned, and operators look to encroach on local large-scale mine concessions or end up relocating to more ecologically-sensitive areas (Yakubu, 2002).

In summary, the research undertaken in Ghana to date to ascertain the environmental impacts of resident artisanal and small-small gold mining operations suggests there are pressing land degradation and mercury pollution problems in the industry. The next section of this chapter describes the degree to which these issues have been debated and examined internally, in the process, framing the central research problem to be investigated in this thesis.

## 2.6 Conceptualisation of the research problem

At the groundbreaking *International Round Table on Artisanal Mining* convened by the World Bank in Washington in 1995, some 80 delegates from 25 different countries determined that if improvements are to be achieved in the sector, artisanal miners must be given fully legal and transferable mining titles to their claims (Suttill, 1995). It was agreed, "artisanal and small-scale mining is here to stay [and that] the challenge is not how to get rid of it but how to help it become more productive, less polluting, and socially beneficial in the most cost-effective way" (McMahon and Davidson, 1995, p. 1). The Ghanaian Government initially embarked on this path in 1989, when it legalised small-scale gold mining, implementing sector-specific legislation for the first time, a licensing scheme, and, shortly after, a decentralised industry support system comprised of seven government offices based within the country's gold belt. The move was made in an attempt to improve the organisation of resident artisanal gold mining activities, and control of mineral outputs to ensure maximum benefits to the economy.

However, efforts made to formalise various segments of its informal economy – including ASM – have been perceived as makeshift and *ad hoc*. Specifically, the largely bureaucratically-driven policy approaches deployed appear to overlook the capabilities and needs of informal operators. Presently, "informal sector work [is] largely uncounted in labour force and national income accounts [and] despite its importance, is generally ignored in national human resource and economic policies" (Gibb, 1999, p. 5). Most such entrepreneurs "are generally ignorant of the existence of the different institutions set up for facilitating their operations" (Barkwa, 1995, p. 5), and are more "concerned with their basic survival rather than worrying about taxation" (World Bank, 2003b, p. 9). Compounding this problem is the "lack of political will to create an adequate enabling framework for legalistion [which] can be explained by personal interests related to the possibilities for corruption, money laundering, and similar illegal practices, enabled by the informal status of the sector" (Hentschel *et al.*, 2002, p. 31). Moreover, for the artisanal miner, in the context of environmental management, "where to get the next meal is much more important than any problem of desertification or wildlife depletion" (Anane, 2003). A growing school of thought maintains that informal enterprises are more damaging to the

environment because of their lower technical efficiency, integration into residential areas, dispersion, and unlikelihood to ever adopt abatement apparatuses (Kendie, 1998). These, and related, issues raise the question of how the sector's environmental and associated socioeconomic problems, and possible solutions, have been conceptualised and debated both institutionally and on the ground.

Ghana's artisanal and small-scale gold mining industry, which is currently under considerable stress, provides a credible *a priori* case for exploring the perspectives of different actors toward the current policy stance and possible ways forward. As Yankston (1992) indicates, in Ghana, only an estimated 10% of informal industry operators have *ever* approached a bank or a government agency for financial assistance because of existing formalities/conditions and a lack of information regarding existing facilities. This is largely a direct consequence of the highly centralised system of administration that continues to loom in Ghana, which has weak representation within each of its nine districts outside of the Greater Accra Region. A highly inflationary economy (>40%), the requirement to adhere to a plethora of regulations, and, the fact that the tax system does not recognise the revenue potential of grassroots and artisanal operations, have further contributed to poor regulatory compliance in the informal sector; the majority of its operators have failed to register and file returns with the Internal Revenue Sector. Because of the high illiteracy rate among operators (approximately 60% across the sector), the preparation of simple records on receipts, sales, and costs are generally beyond their capacity (World Bank, 2003b). Moreover, from an environmental perspective, "(environmental) policy and management are at an early stage of development" (Hens and Boon, p. 349), and "District Environmental Management Committees[11] are falling far short of the role government supposedly envisaged they would play in decentralised environmental management" (Porter and Young, p. 522).

More specific to artisanal and small-scale gold mining, referring to the overall state of the industry, Jennings (1999, p. 2) argued that "the failure of much of the existing legislation and institutional arrangements to differentiate between and accommodate the different types of small-scale mining has been a major factor in preventing the

[11] District Environmental Management Committees are regional environmental government offices implemented as part of a decentralised governmental scheme in the early-1990s.

effective delivery of assistance to small-scale mining, leading to its continued isolation and marginalisation in many countries". In the case of Ghana, a number of researchers (e.g. Iddirisu and Tsikata; Aryee *et al.* 2003; Babut *et al.* 2003) have attested that despite its alleged regularisation, the industry has been poorly managed to date, and that its operators are subjected to rigorous, bureaucratic regulations, which are dissuading registration and propagating perpetual "hit and miss" activity. There is also growing consensus that the majority of technological and financial measures adopted to improve efficiency at sites have either lacked institutional support, been abandoned after some time, or have proven unappealing or "user unfriendly" to miners. Researchers maintain that environmental and accompanying socioeconomic problems have intensified in the industry in the past 15 years as a result of bureaucratic legislation and inappropriate support services. There are additional claims of these factors precipitating the chaotic expansion of the sector, as evidenced by both its unprecedented rapid increase in annual production (2000% increase in annual output achieved since legalisation) and that 85% of the sector's miners continue to operate illegally.

The current state of the Ghanaian artisanal and small-scale gold mining industry can therefore be described as follows (NSR, 1994):

- A large number of mines still operating outside of the current legal framework;
- Consisting of perpetual "hit or miss" activities;
- Operational practices that are largely unsafe and environmentally degrading, despite the provision of government extension and inspection services;
- Featuring several artisanal and small-scale miners, families and gold buyers exposed to toxic mercury; and
- A lack of concern on the part of operators, toward environmental matters, and an associated lack of rehabilitation at sites.

To summarise, over the past 15 years, the Ghanaian Government and facilitating bodies appear to have relied upon legislation and complex technical solutions to resolve pressing environmental problems in an industry long perceived – and thus treated – as an informal sector of the economy. According to the literature, such a procedurally complex regulatory environment has not boded well in Ghana, given that

operators, who allegedly possess limited environmental awareness and technical expertise to begin with, have not fully embraced the changes.

As explained by Hentschel *et al.* (2001, p. 40), the "implementation of technical changes, modifications and improvements" in the ASM industry requires "in almost any case detailed knowledge of the cultural, social, economic and organisational context of the miners". Given the widespread documentation of problems in Ghana's artisanal and small-scale gold mining industry, it is imperative to gain an improved understanding of the cultural values and perspectives of operators. Specifically, there is a need for research that can link an analysis of the policy and institutional changes required to put in place a transition toward improved environmental management in the industry, with an analysis of the barriers preventing the adoption of these measures on the ground. The majority of the industry's operators, who produce gold but without legitimate permits and legal status, appear to lack the resources and incentives to comply with the excessive rules and regulations necessary to become a part of the formal economy. There is emerging consensus (e.g. NSR 1994; Iddirisu and Tsikata 1998) that these miners require assistance if they are to raise their standards of living and abandon their transient, environmentally-damaging modes of operation – "problems [which] cannot be solved by technical approaches alone" (Hentschel *et al.*, 2002, p. 38).

The purpose of this thesis, therefore, is to provide an overview of the current state of affairs in the Ghanaian artisanal and small-scale gold mining industry, with emphasis on indigenous conceptualisation of organisational and environmental problems and possible solutions. The thesis has the following three aims – as identified in Chapter 1 – and corresponding research questions:

1) To advance the understanding of the institutional context of ASM, and the different policy strategies that have been followed.
   - How have governments viewed, and addressed, the problems of ASM historically?
   - What is the expert opinion on government approaches, ASM problems and possible solutions?
2) To focus specifically on how the industry's environmental and associated socioeconomic problems are conceived within expert and regulatory groups.

- How have the sector's problems and possible solutions been conceptualised in traditional policymaking circles in Ghana?
- What is the degree of consensus/disagreement on issues and types of solutions?

3) To compare the views of experts and government officers with perspectives of miners on the ground.
   - What are the structural and situational problems (e.g. organisational, financial, cultural, etc.) faced by miners themselves?
   - What are the pressing needs of miners, and how do they perceive the industry's problems?
   - What is the level of environmental awareness at prospective mine sites?
   - What is the attitude of miners towards government support and state action?

The overriding objective of the thesis is to identify policy needs and solutions in the context of the Ghanaian artisanal and small-scale gold mining industry, which has long been treated as an informal segment of the economy.

In response to the foregoing aims, three hypotheses were put forward. First, it was posited that interviewed government officers and experts were well aware of the environmental problems associated with ASM, and were therefore in a position to evaluate the current policy stance (of the government) and provide recommendations on possible ways forward. Although the environmental legislation and institutions in the developing world are generally in a piecemeal state, there has been considerable momentum over the past decade to raise levels of environmental awareness in even the most impoverished of countries (after Lovei and Weiss, 1998); it is unlikely that Ghana's policymakers are ignorant of these issues.

It was further hypothesised that the Ghanaian Government has not effectively addressed the problems of the artisanal and small-scale gold mining population, and has failed to raise livings standards among industry participants because it has responded inappropriately to their needs and situations. This hypothesis was based upon the well-documented problems associated with the country's infrastructure, which were seen from the outset of this study as potential impediments to monitoring, auditing and policy design for artisanal and small-scale gold mining. The literature is

replete with commentaries documenting the efforts taken by sub-Saharan African governments to decentralise governance (e.g. Olowu 2003; Ribot 2003). However, it was posited that Ghana's "deteriorating roads arising from [a] lack of routine maintenance and rehabilitation" (Frempong and Tsidzi, 1999, p. 129), manifested by the fact that 60% of the country's "feeder roads" are in poor condition (Werlin, 2000, p. 447), and the impoverished state of its telecommunications – only three of 1000 citizens have access to land line communications, and some 1.9 of 1000 have cellular phones (UNDP, 2002) – have prevented effective execution of activities aimed at regularising and/or improving environmental management in the artisanal and small-scale gold mining circuit.

A final, and interrelated, hypothesis relates to the Government's ability to meet the needs of the industry's participants. Specifically, in view of the well-documented occurrence of clandestine mining activity, along with the disproportionately large segment of illegal artisanal gold miners currently operating, it was posited that the Government has failed to address the demands of the industry's operators accordingly. It was believed that a series of bureaucratic barriers prevent small-scale miners from registering, and that the Government has failed to deal with each because it is focused on promoting large-scale mine development through foreign investment.

The next chapter describes the methodological approach adopted for the research.

# Chapter 3 – Methodological Approach

"Artisanal mining encompasses social, environmental and economic issues and therefore, any strategy to improve the livelihoods of artisanal mining communities must necessarily be cross sectoral....The development of a strategy will involve stakeholder meetings at the local, meso, national and international level. To ensure representation and feedback the community must participate in these meetings. At the meso and national level representatives from the communities should be present at the meetings, at the international level there should be a person nominated by the local community to represent them at meetings."

– *Jon Gilam, "Artisanal Mining and Sustainable Livelihoods", UNDP*

## 3.1 The qualitative methodology

The research questions investigated in this thesis are designed to scope the nature of debate in the worlds of both policymakers and miners themselves. The methodology adopted is, therefore, based exclusively upon qualitative approaches, defined by Bogdan and Taylor (1975, p. 4) as "procedures which produce descriptive data: peoples own written or spoken words and observable behaviour". As explained by Straus and Corbin (1998, p. 11), a main reason for selecting qualitative methods altogether is "the nature of the research problem". Specifically, they can be used to gain novel understanding of the meaning or nature of experiences of persons by exploring substantive areas "about which little is known or about which much is known [by obtaining] details about phenomena such as feelings, thought processes, and emotions that are difficult to extract or learn through more conventional research methods".

Flick (2002, p. 9) argues that qualitative techniques are particularly effective when scoping the viewpoints of representatives from different stakeholder groups, indicating that, "all in all, qualitative research, in its theoretical and methodological developments and its research practice, is characterised by a more or less explicit building of schools which differ in their influence on the general debates". In short, qualitative methods enable the investigator to effectively embrace multiple world views of defined issues by surveying the opinions of different stakeholders. Over the past 40 years, such research, which "fundamentally depends on watching people in their own territory and interacting with them in their own language" (Kirk and Miller, 1986, p. 9), has become central to social science methodology. Whereas quantitative techniques emphasise the measurement of "things that can be counted using predetermined categories that can be treated as interval or ordinal data and subjected

to statistical testing" (Patton, 1997, p. 273), qualitative research "is primarily designed to describe processes as accurately as possible in *verbal* terms, not with numbers or quantitative measurements" (Nevid and Sta. Maria, 1999, p. 309).

The foregoing analysis applies to the current investigation. In accordance with Flick (2002) and others (e.g. Patton 1997; Weiss 1998; Miles and Huberman 1994), this thesis deployed qualitative research techniques in an effort to survey the opinions of multiple stakeholders in Ghana's artisanal and small-scale gold mining industry – namely, industry experts, policymakers and miners themselves. As the underlying premise of qualitative research is to obtain and analyse the perspectives of different parties, the narratives of different stakeholders were used to provide an overview of the current state-of-affairs in the Ghanaian artisanal and small-scale gold mining industry, with emphasis on environmental management. In short, qualitative research methods, which are particularly effective "in constructing or developing theories or conceptual frameworks" (Sofaer, 1999, p.1104), were adopted to address the aims of this thesis because opinions were being *surveyed* from of diverse group of stakeholders.

To date, most of the analysis of environmental and interrelated socioeconomic problems in ASM has been based upon findings derived from quantitative-based studies and data collection, giving rise to a series of technical publications (e.g. Lacerda 1997; Veiga and Hinton 2002). Despite growing consensus that the industry's "environmental problems cannot be solved by technically oriented approaches alone" (Hentschel *et al.*, 2002, p. 38), minimal research has been devoted to determining, *inter alia*, indigenous perceptions of environmental problems; industry needs; opinions of barriers to improvement; levels of local environmental knowledge; and possible ways forward. Governments are increasingly overlooking the integrality of such information, emphasising "finding technical solutions to mining and processing problems, with scant heed being paid to the underlying economic, labour and social issues" (Jennings, 1999, p. 5). Clearly, "the implementation of technical changes, modification and improvements require in almost any case detailed knowledge of the cultural, social, economic and organisational context of miners" (Hentschel *et al.*, 2002, p. 45).

As previously explained, qualitative research provides an opportunity to produce findings not arrived at by statistical means, technical analysis or methods of quantification (Strauss 1998; Strauss and Corbin 1998). It focuses on people's experiences and the meanings they place on the events, process and structures of their normal setting, and may involve prolonged or intense contact with people and groups in their everyday situations (Skinner *et al.*, 2000, p. 165). More specifically, qualitative research provides a holistic view, through participants' own words and perceptions, of how they understand, account for and act within the boundaries of everyday life (Miles and Huberman, 1994, p. 10). As little research has been undertaken to improve understanding of the ways in which environmental and associated socioeconomic problems in ASM and their respective causes have been conceptualised indigenously, this thesis proposes using qualitative research approaches to articulate resident expert, government and miners' perceptions of the problems surrounding Ghana's artisanal and small-scale gold mining industry.

Strauss and Corbin (1998, p. 11) indicate that qualitative research can include information "about persons' lives, experiences, behaviours, emotions, and feelings as well as about organisational functioning, social movements, cultural phenomena, and interactions between nations". One of the main means by which such data is gathered is through story, "the underlying premise of narrative inquiry [being] the belief that individuals make sense of their world most effectively by telling stories" (Bailey and Tilley, 2002, p. 575); subsequent analysis entails an examination of stories identified in interview data. In a case study of Ghana, this thesis solicits the stories of experts, government officials and miners alike.

## 3.2 Benefits of qualitative research and applicability to the proposed research

Social scientists in favour of qualitative research methodologies have frequently questioned "the usefulness of quantitative methods" (Hentschel, 1999, p. 69) because "the complex network of factors and human experience of illness is lost in the search for establishing empirical generalisations for the sake of presenting reliable results (Pedersen, 1992, p. 39). Ezzy (2001, p. 294) further argues that "qualitative methods are often misunderstood by researchers with backgrounds in science and positivist

methodology", largely because they mainly emphasise interpretation, rather than numerical data analysis.

As described by Cohen (1999), there are four advantages to utilising qualitative research methods *vis-à-vis* quantitative approaches, three of which apply to the proposed study of Ghanaian artisanal and small-scale gold mining. Cohen's claims are supported by a number of other academics (e.g. Kirk and Miller 1986; Straus and Corbin 1998; Hall and Rist 1999; Nevid and Sta. Maria 1999). The first benefit is that it can potentially be more *systematic.* As there is a wealth of approaches available for conducting qualitative research, as well as a lack of systematic frameworks for interpreting qualitative data, the researcher is compelled to eye critically the assumptions made, techniques deployed, and conclusions reached (Cohen, 1999, p. 352). The investigator must therefore use knowledge, imagination, skills and tools to elicit the "why" responses to proposed research; this requires adopting a *systematic* approach to exploring human motivation and behaviour. In the context of ASM, a bureaucratic, *ad hoc* regulatory environment, as documented by Bugnosen (1998), combined with the impoverished nature of (ASM) communities, as detailed in Chapter 2, requires the investigator to undertake work systematically, and, with a notable degree of precision.

A second benefit to undertaking qualitative research is that it provides insight into the life worlds and social practices of individual agents. The pioneers of qualitative methods stressed that they provide near-to-life perspective, as they are based upon "real world contexts, and real world motivations" (Cohen, 1999, p. 355). As stated by Kirk and Miller (1986, p. 9), "a qualitative observation identifies the presence or absence of something, in contrast to quantitative observation, which involves measuring the degree to which some feature is present". This is particularly pertinent to the proposed work, which aims to provide an accurate depiction of the current state of affairs in the Ghanaian artisanal and small-scale gold mining industry.

A third benefit of qualitative research relevant to the proposed research is its potential to be more *innovative*, as it integrates in-depth storytelling with complementary observations and existing data. As Cohen (1999, p. 355) describes, "for many people...the term *qualitative* is closely identified with terms such as *focus groups* and *in-depth interviews* [and] observation and document analysis". Cohen further notes

that "within these major approaches (to qualitative research) lie many dimensions or continua that may be accessed through the use of many different innovative, and for the most part, underutilised techniques (Cohen, 1999, p. 356); multiple themes run through interviews. As is discussed further in Section 3.3, the proposed research uses discussion groups and semi-structured interviews to solicit input from experts, policymakers and miners in Ghana on key industry issues. Interviewing – more specifically, the use of semi-structured interviews – enables "the respondent to formulate his own replies...in the course of which attitudes, opinions and information about underlying motives are elicited by means of the interpersonal reaction between the interviewer and the respondent" (Smith, 1972, p. 113).

A final, and often-overlooked, consideration relevant to the current investigation is the successful deployment of qualitative methods in the developing world, perhaps to an even greater degree than quantitative methods. Researchers have openly criticised the performance of statistical agencies in developing countries – particularly those based in the poorer regions of sub-Saharan Africa – for their lack of baseline data (Eele, 1994) but there are now a number of well-documented challenges associated with information collection in such environments. These include, but are not limited to, a lack of funding; a shortage of personnel, particularly statisticians and social scientists; poorly-developed infrastructure, including roads, communications, serviceable buildings and transportation networks; educational deficiencies; and a lack of computer networking and databases (Bulmer 1983; Grosh and Glewwe 1996; Babu 2000). Bulmer and Warwick's (1983) timely and influential text, *Social Research in Developing Countries*, was among the first to reflect upon how social scientists have both struggled to obtain reliable quantitative data in developing countries, and have experienced major difficulty carrying out robust questionnaires and surveys in such settings on their own. The authors argue that "the conditions under which social science research is carried out in the Third World differ in significant respects from conditions in the industrial world in North America, western Europe and Australia" (Bulmer and Warwick, 1983, p. ix). More specifically, as Bulmer (1983, p. 4) explains, "the social data available to governments in the Third World is often highly unsatisfactory [as] development officials often lack adequate data on basic population parameters and indicators of development such as agricultural production or infant

mortality". Excerpts from both Murthy (1978) and Goldstone (1977) further validate this point:

> "If a serious study of the availability of reliable data is undertaken, the situation in many developing countries is likely to found is quite alarming...It is not only a question of lack of data; in many situations, the position is more a case of poor quality data than of no data...further, there are situations where data are available, but minimal or no use is made of the same owing to lack of proper infrastructure or suitable opportunity". [Murthy, 1978, p. 232]

> "The official statistical collection system and infrastructure in many developing countries is much more fragile than in developing ones, and in social statistics, which have relied primarily on administrative sources, the collection system is particularly weak...The central statistical offices in many developing countries have not yet established a field organisation with a network of provincial offices and still rely heavily on the use of local administrators or *ad hoc* staff". [Goldstone, 1977, p. 758]

As is further articulated by Ward (1983, p. 139-140), "in developing countries, where transport, organisation and communications are difficult...qualitative research, assuming that one is using well-trained and experienced social scientists who clearly understand the survey's objectives, non-sampling errors can be reduced to a very low level [because] data is collected from respondent's own expressions and in a free atmosphere". Much of the more recent social science research conducted in developing countries has, therefore, emphasised the application of qualitative-based research methods (Crossley and Vulliamy, 1996), likely in response to the piecemeal nature of resident data collection institutions and the quality of the infrastructure in place to carry out research. For these very reasons, researchers such as Crossley and Vulliamy (1996, p. 443) have stressed that "qualitative research may be *more* appropriate in developing countries, where literacy and numeracy are less prevalent, than it is in the West".

To summarise, the use of qualitative research methods enables the researcher to undertake systematic, potentially innovative and descriptive studies, mainly through interviewing and storytelling. Moreover, and, perhaps most pertinent to the proposed case study analysis, they have become proven practices in developing world settings, where the investigator faces the challenge of undertaking research amid "staggering unemployment, urban overpopulation, rural stagnation, growing inequalities, poverty, political instability, economic insecurity, high population growth rates, environmental

degradation, high illiteracy levels, inadequate and/or outdated technology" (Ryan and Mothibi, 2000, p. 375).

## 3.3 The research approach

In accordance with Nevid and Sta. Maria (1999, p. 309), who note that "qualitative research methods range from the use of the clinical case study method in psychology and psychiatry to ethnographic studies in anthropology to case studies in marketing and management", an eclectic research strategy was adopted in this thesis. The work, which constituted a qualitative *case study analysis* of the Ghanaian artisanal and small-scale gold mining industry, with special emphasis on environmental and associated problems, featured a series of interlocking semi-structured interviews. This research approach was selected because of the well-documented success with deploying semi-structured interviews for qualitative case study analysis in developing world settings, as described in the foregoing discussion. It was also determined that the use of semi-structured interviews featuring open-ended questions would be an effective means of probing experts, government officials and miners in a non-threatening manner.

The overall approach was based largely on the methods prescribed by Yin (1994), who defines a case study as follows:

> "An empirical enquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used". [Yin, 1994, p. 13]

The case study is simply the "preferred (research) strategy when 'how' and 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" (Yin, 1994, p. 1). As Creswell (1994, p. 12) furthermore indicates, a case study explores "a single entity or phenomenon ("the case") bounded by time and activity (a programme, event, process, institution, or social group) and collects detailed information by using a variety of data collection procedures during a sustained period of time". Case studies are the preferred approach when attempting to improve understanding of a particular program or situation in greater depth.

Yin (1994) concedes that by utilising multiple sources of evidence, case studies allow a researcher to address a broader range of issues, which leads to the development of converging lines of inquiry. The process by which the credibility of informational resources is assessed is referred to as *triangulation*; when undertaking case study analysis, it is important to use multiple sources of information to corroborate findings, or to embrace methods for *data triangulation*. More specifically, case study analysis requires the researcher to embrace a multitude of informational sources for the purposes of corroborating facts (Hakim 1987; Creswell 1994; Yin 1994; Travers 2001). As explained by Decrop (1999), Ammenwerth et al. (2003) and others, data triangulation, which, again, involves the use of a variety of sources of data, requires the collection of both primary data obtained through interviewing or observation, and (published) secondary data.

Although numerous types of informational resources than can be drawn upon when carrying out case study analyses, as Hall and Rist (1999, p. 295) note, generally, "the three legs of [such] qualitative research methods are interviewing, observation, and document analysis". In terms of interviewing, one technique often deployed is the *focus group* or *focus interview*, "viewed by social scientists as a flexible and cost effective method for exploring attitudes, experiences, and responses of non-random samples of people who fit a particular profile" (Sofaer, 2002, p. 330). A focus group is defined as "a carefully planned discussion designed to obtain perceptions on a defined area of interest" (Krueger, 1994, p. 6). Comprised of selected individuals assembled by researchers, focus groups seek to generate qualitative data by capitalising on the interaction that occurs within the group setting (Sim, 1998, p. 346). The aim is "to discuss, and comment on, from personal experience, the topic that is the subject of the research" (Powell and Single, 1996, p. 499). Focus groups generally consist of between six and 10 individuals, and are coordinated by facilitator or moderator.

Focus groups are often complemented by in-depth *structured interviews or surveys*. These types of interviews can be open-ended and assume a conservational manner but are more likely to feature "certain set of questions derived from the case study protocol" (Yin, 1994, p. 85), or simply the application of, and adherence to, a structured questionnaire, as the label implies. Structured interviews, which are

typically used to corroborate certain facts that researcher interprets as established, "are considered by many to be an essential element of testing the reliability and validity of survey instruments, in particular to determine whether or not items and response options are understood and consistently interpreted by potential respondents as intended by the investigator" (Sofaer, 2002, p. 330). Apart from being conducted face-to-face with the respondent, structured interviews also provide the benefit associated with interaction, up-close observation of body language, tone of voice, reaction to distractions, reaction to interview setting, and personal appearance, all of which can assist the researcher in analysis of collected data (Hall and Rist, 1999, p. 298).

To reiterate the position of Yin (1994), interviews represent one of the most important sources of case study information, if not the chief source. However, focus groups and accompanying structured interviewing techniques represent *one* of the two major groups of "methods for collecting and analysing [qualitative] data" (Flick, 2002, p. 9). The second group of techniques, which featured prominently in this thesis, includes "semi-structured or narrative interviews and procedures of coding and content analysis". Although it beyond the scope of this thesis to provide a comprehensive critique of focus groups and structured interviews, it is important to clarify that the rigid settings in which each are carried out can result in the omission of potentially important topics for discussion (after Morgan, 1996). De Jong and Schellens (1998) furthermore indicate that focus groups tend to identify acceptance problems, rather than comprehension of the issues. As the primary emphasis of this thesis to survey the opinions of stakeholders, it was determined that the application of less rigorous research tools – more specifically, the semi-structured interview and the discussion group – was needed. Bulmer (1983, p. 9) lends credence to this position, arguing that when using the case study method in developing countries, "the researcher, rather than briefly interviewing a large number of respondents using a standardised instrument, relies on a repertoire of methods to gather data including informal interviewing, the use of knowledgeable informants in the *locale* being studied and participation in and observations of events in the setting as and when they occur" (Bulmer, 1983, p. 9). This point is further reinforced by Goma *et al.* (2001, p. 180), who argue that the information or "methods" used for collecting information for a case study can include semi-structured interviews...analytical games, and stories and

portraits, diagramming and workshops that provide information which is usually supportive, being anecdotal or figurative".

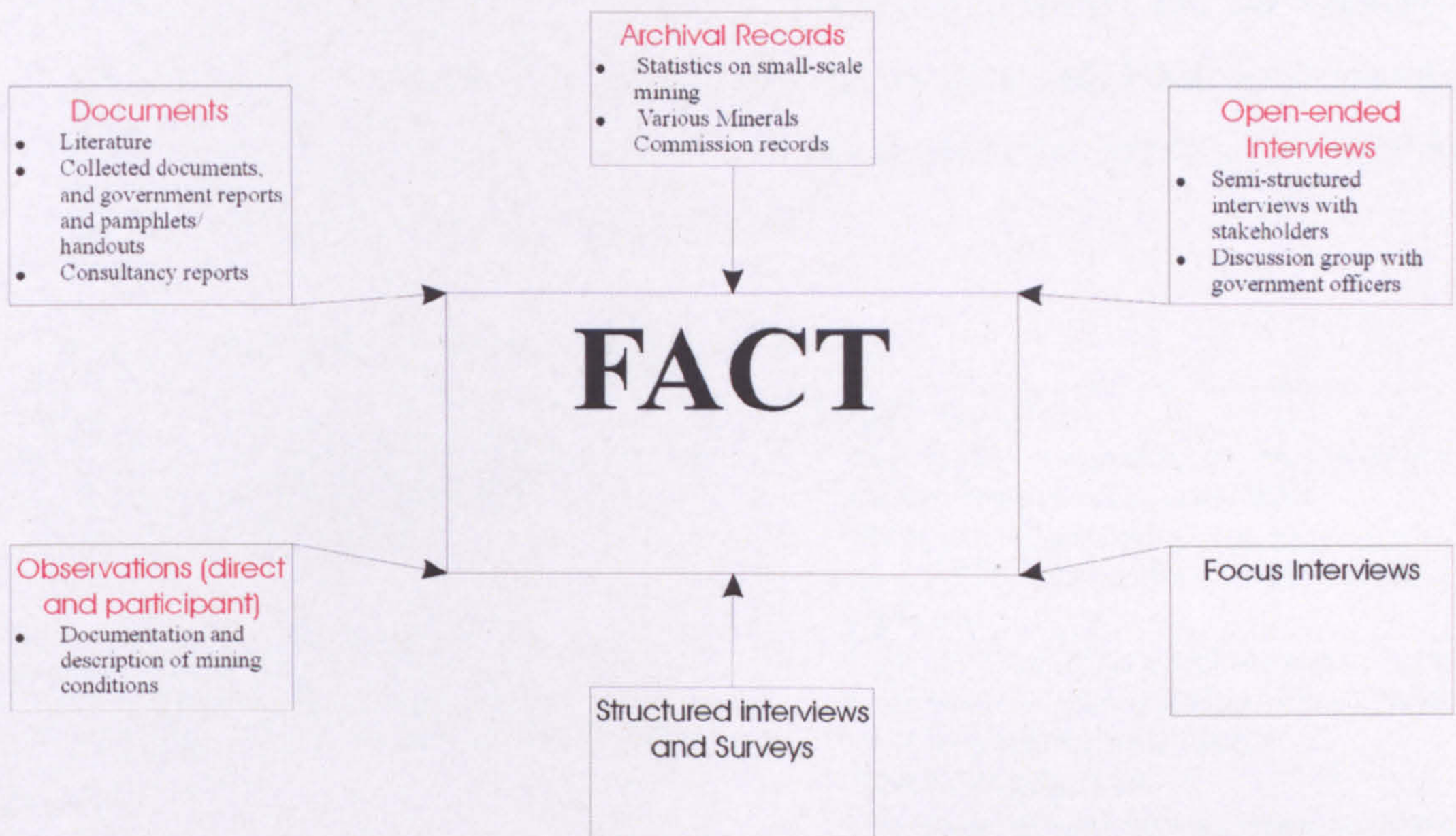
Although semi-structured interviews and discussion groups were the main research tools used to fulfill the aims of this thesis, the information garnered from observation and collected documents provided a foundation for essential complimentary analysis. As Sofaer (1999) explains, *participant observation* requires the investigator to become a part of the setting or phenomena under examination – specifically, analysis of the characteristics of a setting and/or the interactions or individuals within that setting. Zikmund (1982) categorises observation techniques in qualitative research as "unobtrusive" and "visible", the former being motivated by "the intent to collect data on behaviour or interactions without the subject's knowledge", and the latter being untaken when "the subject is aware of the observation being taken place" (Hall and Rist, 1999, p. 300). This thesis relied heavily upon visible observation, particularly when the conditions of mining operations were described; several photographs were taken and included in Chapter 6.

Documents and archival records were also used as corroborating evidence. The merits of extracting and utlilising the information from documents in case study analysis is described at length by Hall and Rist (1999). Often, thematically-significant reports, letters, newspapers, books, diaries and email messages are produced which can be used to reinforce issues raised and claims made by individuals during interviews. Document analysis "aims to take information stored in such sources as noted above and abstract from it key themes, strategies, values, messages, and the like" (Hall and Rist, 1999, p. 302). During visits to Ghana, unpublished government reports and pamphlets, posters, consultancy reports, unpublished university documentation, and unreported statistical analyses were collected, and used to complement the analysis of interview feedback provided in subsequent chapters.

To summarise, multiple sources of data – *i.e.* data triangulation – were collected to corroborate the conclusions drawn in this thesis. In addition to taking note of conditions in the field (through observation) and drawing upon the information contained in local documents, a series of interlocking interviews were undertaken with different stakeholders – namely, industry experts, government officers, and miners. In accordance with Ammenwerth et al. (2003), interviews were conducted

with the different actors at different times to gain perspective on key industry issues, as "the weight of evidence suggests that if every stakeholder, who is looking at the issue from different points of view, sees an outcome then it is more likely to be a true outcome" (Guion, 2002, p. 1). The next section of the chapter describes of interviewing techniques adopted in this thesis.

**Figure 3.1:** Sources of case study evidence (highlighted red) used in this thesis




*Source*: Adapted from Yin, 1994, p. 93

## 3.4 The semi-structured interview

To recapitulate, in this thesis, an attempt is made to integrate expert opinion rooted in collected documents and records about the environmental state of the Ghanaian artisanal and small-scale gold mining sector, with feedback from interviews with expert practitioners, government officials and miners on pressing industry issues. An attempt is also made to highlight the degree of consensus and/or disagreement about industry problems and possible ways forward, using a multitude of information sources (Figure 3.1). This section details the main interviewing techniques used in this thesis.

### 3.4.1 Scope

To address the aims and corresponding research questions of this thesis, which are again highlighted in Table 3.1, a tripartite study of the Ghanaian artisanal and small-

scale gold mining industry was undertaken. Following Yin (1994), Smith (1972) and Stone (1984), Thomas (1992) and Hussmanns (1996), and, as previously explained, the research methodology adopted in this thesis is based largely on the semi-structured interview. As previously explained, "one of the most important sources of case study information is the interview", and is mainly "of an open nature, in which you ask key respondents for the facts of a matter as well as for the respondents' opinions about events" (Yin, 1994, p. 84). Smith (1972) further indicates that, "in this type of interview the interviewer formulates her own questions and the respondent formulates her own replies". For Stone (1984, p. 9), open-ended interviews are most useful "when the questions which need to be asked can be formulated in advance but when greater flexibility of response is required".

**Table 3.1:** Aims and research questions of this thesis

| Aims | Research Questions |
|---|---|
| To advance the understanding of the institutional context of ASM, and the different policy strategies that have followed. | • How have governments viewed, and tackled, the problems of ASM historically?<br>• What is the expert opinion on government approaches, ASM problems and possible solutions? |
| To focus specifically on how the industry's environmental and associated socioeconomic problems are conceived in expert and regulatory groups. | • How have the sector's problems and possible solutions been conceptualised in traditional policymaking circles in Ghana?<br>• What is the degree of consensus/disagreement on issues and types of solutions? |
| To compare the views of experts and government officials with perspectives on the ground. | • What are the structural and situational problems (e.g. organisational, financial, cultural, etc.) faced by miners themselves?<br>• What are the pressing needs of miners, and how do they perceive the industry's problems?<br>• What is the level of environmental awareness at prospective mine sites?<br>• What is the attitude of miners towards government support and state action? |

Open-ended interviews feature open questions that enable interviewees to provide individual, pressure-free responses, and aid the researcher in "getting unanticipated answers and for describing the world as the respondent really sees it rather than how the researcher does" (Fink, 1995, p. 32); by standardising questions, it ensures that *exactly* the same ground is covered with each respondent. As further explained by Nachmias and Nachmias (1981, p. 211), "open-ended questions are not followed by any kind of specified choice, and the respondents' answers are recorded in full".

Although it is crucial for the interviewer not to violate the law of non-direction (Brenner *et al.* 1985; McCracken 1988), as McCracken (1988, p. 22) argues, it is also important to help the respondent "manufacture distance" – encouraging to reflect upon the very practices he or she otherwise takes for granted. Thus, a series of prompts were used at times to persuade respondents into reflecting more deeply on certain ideas. As furthermore explained by Yin (1994, p. 85), "overall, interviews are an essential source of case study evidence because most case studies are about human affairs". Yin's (1994, p. 85) claim that "a reasonable approach is to corroborate interview data with information from other sources" applies to the current case; as previously explained, complementary information extracted from indigenous documents, texts, photographs and reports are used to supplement interview findings presented in the analysis.

The use of open-ended interviewing techniques to investigate various aspects of social science research in ASM has gained wide acceptance in recent years (see e.g. ILO 1999; Jennings 1999). It is a featured research method of the recently launched UNDP-affiliated Sustainable Livelihoods Project currently being piloted in Africa, of which Ghana is a major country of study (see Labonne *et al.*, 2000). Independent ASM researchers, however, are also beginning to make use of the open-ended interview. Heemskerk (2003), for example, conducted semi-structured interviews with selected Maroon artisanal gold miners in Suriname to determine the industry's economic importance. Similarly, Seeling (2003), used methods of interviewing to determine the vulnerability of Peruvian artisanal mining populations to poverty, and Crispin (2003a) followed a semi-structured interviewing format to ascertain levels of environmental awareness in PNG small-scale gold mining communities. In effect, semi-structured interviewing offers a promising approach to conducting research on managing the environmental impacts of Ghana's artisanal and small-scale gold mining industry; it not only enables the investigator to explore institutional-side issues but perhaps more importantly, facilitates research aimed at improving the understanding of the capabilities, assets, and sources of vulnerability of artisanal and small-scale mine operators. It is also a means of elucidating the links between the micro and the macro-levels through study of the market and policy environments.

### 3.4.2 Networking from London, 2000-2001

The planning for this dissertation began in early-November, 2000. Initial contact was made via email with a senior research officer at the Ghana Chamber of Mines in Accra. The officer was informed that a literature review was being conducted with the intention of justifying research for a case study of environmental management in Ghana's artisanal and small-scale gold mining industry. The email, phone and fax contact details were provided for the main officials overseeing the regulation and management of ASM in Ghana. One of these contacts helped to organise subsequent meetings with local experts; he, in turn, informed local government staff about the proposed project and contacted officers on the ground to discuss the possibilities of future mine site visitations.

Through this contact, travels to Ghana, interview sessions and visits to the field were arranged. It was advised, based on the schedules of government officials and researchers, along with the long distances to mine sites, that the research be undertaken over three separate visits. It was decided that during the first visit in the summer of 2001, emphasis be placed on interviewing indigenous expert researchers in order to gain a broader knowledge of the pressing issues and organisational features of the industry. It was furthermore agreed that emphasis be placed on interviewing government officials and miners during the subsequent two visits.

### 3.4.3 Accra, Summer 2001

As an initial stage of the research, expert opinion was surveyed regarding the issues and problems surrounding the artisanal and small-scale gold mining industry and possible ways forward. Interviews were conducted with individuals based outside of government, each of whom, at the time of the investigation, was considered a foremost expert on ASM in Ghana. A total of eight "experts" were interviewed, including consultants, former government employees and academics (See Appendix II); because of prior commitments, two professors based at the Tarkwa School of Mines could not be interviewed. The questionnaire used was designed to elicit feedback on the industry's current state of affairs, Government responses to the ASM regularisation challenge, and perceived miner behaviours. The literature was used to formulate the questionnaire (Appendix III).

All such interviews were arranged via post and email during the months prior to the visit and were conducted during the first two weeks of June 2001, with the exception of a consultant, who was unable to meet for an interview at the time and was thus interviewed during April 2002. Certain government officials, particularly those based at the Minerals Commission, helped arrange these interviews and ensured transportation to, and from, the locations where they occurred. Further planning for the interviews took place at the Liberty Court Hotel in Osu, Accra. The interviews conducted at this stage lasted between 90 and 120 minutes each.

Upon completion of this round of interviews, preparations were made with key government officials for the proposed second and third stages of interviews, which would take place in 2002.

### 3.4.4 Accra, Spring, 2002

During the second stage of the research, a discussion group and follow-up semi-structured interviews were conducted with the Government officials overseeing the management and regulation of the artisanal and small-scale gold mining industry. The initial discussion group was held with policymakers at the Conference Room of the Minerals Commission in Accra; a circular was issued to each invitee during the first week of April, 2002. Numerous studies conducted in a wide range of disciplines (see e.g. Harrison *et al.* 1987; Burgess *et al.* 1988; Burgess 1996; Castaneda *et al.* 1996; Harrison *et al.* 1996) legitimise the use of discussion groups as a research tool in such a context. As Harrison *et al.* (1998, p. 310) explain, "group discussions have gained rapid acceptance in the last few years as a legitimate technique for ascertaining the meanings, values and knowledges of ordinary people". Broadbridge (2002, p. 176) furthermore notes that "group discussions" are often used "because the relaxed atmosphere and discussion-oriented approach provides a good environment for participants to explore the topic while emphasising their involvement in a project". The "major benefit of this technique is the group dynamics: one participant's views may spark experiences or ideas from others".

Another reason why the discussion group was selected at this stage of the research was that unlike focus groups, "the flow of discussion is directed by the members of the group rather than the conductor and there is considerable scope for the free association of ideas and experiences between group members" (Harrison *et al.*, 1996,

p. 220); it was important at this stage to gain the approval and cooperation of government officials. However, due to time constraints and the previous commitments of certain attendees, the discussion group lasted for only one half-day, which necessitated follow-up interviewing with individuals; these were conducted during late-April and July 2002, and lasted between 50 and 90 minutes each.

The individuals interviewed included three Environmental Protection Agency (EPA) officials; three Minerals Commission officials; an official from the Forestry Commission; a Geological Survey Department official; a PMMC official; and two Mines Department officials. Their involvement in ASM and key experience is described in Appendix IV. The officials interviewed were mainly asked questions concerning the action taken in Ghana to regularise and improve environmental management in ASM; additional questions were posed concerning the perceived state-of-the-art support services and remediation measures available for the industry, as documented in the literature (e.g. UN 1996a; UN 1996b; ILO 1999; Hentschel *et al.* 2002). The aim was to encourage the interviewed officials to provide perspective on the approach taken by the Government to regularise and improve the conditions of artisanal and small-scale gold mining, and to think progressively about potential strategies for environmental improvement, areas where previous efforts may have gone wrong, and possible ways forward. The questionnaire followed is included as Appendix V.

### 3.4.5 Tarkwa, Bibiani and Assin Fosu, Summer 2002

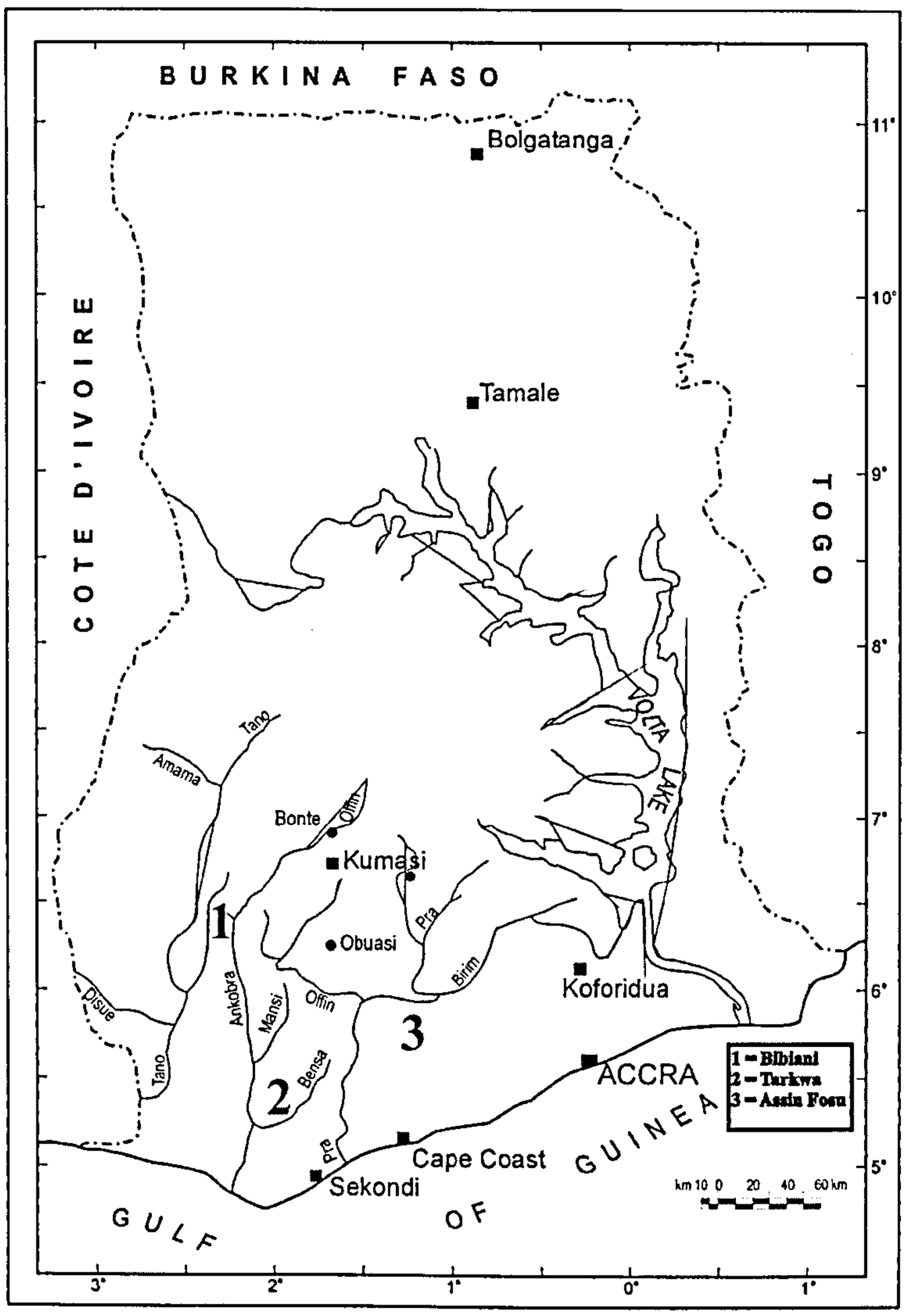
As a final stage of the research, interviews were conducted with artisanal and small-scale miners in the field. Interviews were designed to acquire a contrasting perspective from the artisanal and small-scale gold mining community on the current state of affairs in the industry; the objective was to obtain a representative view from resident artisanal gold miners, and to give voice to those usually silent presences in the small-scale mining debate.

During the initial stages of interviews, set questions were posed to elicit information about miners' backgrounds, including their marital status, number of years' experience in mining, legal status, financial status and place of birth. The second section emphasised environmental management and protection, whilst the third section sought to obtain their "future perspective" on the industry. Questions were

structured to gain an understanding of miners' experiences in the industry, and their perspectives on government, assistance, and environmental management. The questionnaire followed is included as Appendix VI.

A total of 51 operators of varying legal status, wealth and age were interviewed in the towns of Bibiani, Tarkwa and Assin Fosu (Figure 3.2). Each of the selected sites houses a small-scale mining district support centre with a four-by-four vehicle, which enabled many interviews to be conducted on-site. The interviews took place in a variety of settings, however. Whilst some were conducted at district office headquarters, others were conducted along riverbanks, in villages, dwellings, and various marketplaces; some interviews were as many as two hours' drive from the corresponding district centre.

**Figure 3.2:** Map of Ghana showing artisanal gold mining regions visited in this study



Although government officials were notified about the proposed research via email months prior to the visit, a signed letter (on Imperial College letterhead) was required by SSMP staff at the Minerals Commission headquarters in Accra prior to field visitations. All interviews took place during July-August 2002, and were conducted one-on-one with individual miners. There was no attempt made to interview a statistically representative sample; rather, emphasis was placed on a diverse group for the purpose of accessing a range of informative perspectives.

The conditions of roads made interviewing exceedingly challenging, particularly those conducted in both Bibiani and Assin Fosu, which are also without consistent electricity supplies, ample fresh water and serviceable desktop/computer facilities; whilst between three and five interviews were conducted daily in Tarkwa, because of the aforementioned problems and distances to sites, only 1-3 interviews could be carried out daily in both Bibiani and Assin Fosu. Both local district officers and mines wardens were present during interviews, and, when required, provided translation from *Twi* into English. Again, officers and wardens also provided transport to sites when required; wherever necessary, gasoline payments were given to representative officers in exchange for transport.

## 3.5 Analysis of interviews, data collection and transcripts

All interviews were recorded and later transcribed to computer in London. As noted by Hakim (1987, p. 27), "depth interviews and group discussions are usually tape recorded, so that direct quotations from respondents figure largely in the eventual report". The credibility of using a recording device as a research instrument is further validated by Smith (1972, p. 118), who notes that, "the use of a small cassette tape recorder has been found by the writer not to interfere with rapport in most types of depth interviews", provided that, "the interviewer explains to the respondent that she cannot write quickly enough to record everything that is said". To avoid creating a threatening atmosphere, all respondents were asked beforehand if it was possible to record interviews for this reason. All but one respondent agreed, and it is not believed that the recording biased the interview findings in any way.

The data for this thesis were therefore drawn from the verbatim transcripts of the interviews with respondents, supplemented with material from the literature and, on

occasion, statistics. All quotations in the thesis represent word-for-word transcriptions from tapes. Square brackets denote non-spoken information, and ellipsis points (...) indicate material that has been deleted for the purpose of emphasis and/or stringing together thematically similar quotations; full-stops are used to indicate significant pauses. At the request of both experts and government officials, pseudonyms were used in the analysis to ensure anonymity. Pseudonyms, were, however, not used in the case of miners because in every case, it was indicated that their "operating" or "field" name was not provided.

The interviews conducted during Stage 1 of the research encompassed approximately 15 hours of recorded conversation. In Stage 2, the discussion group and follow-up interviews combined produced 30 hours of recorded discussion. Whilst the majority of the transcribed material from both Stages 1 and 2 was used in the analysis, only 32 of the 51 interviews conducted with miners were used for the final cut of the analysis. A total of approximately 80 hours of conversation was recorded and later transcribed in London. Because of the heavily accented English, the ratio of tape time to recording time was approximately 1:20.

Following Straus and Corbin's (1998) schemata, data were coded in order to expedite analysis. As indicated by the authors, "coding [represents] the analytic processes through which data are fractured, conceptualised, and integrated to form theory". Thompson et al. (2004, p. 16) furthermore note that "though qualitative research deigns differ (for example, ethnographic fieldwork, grounded theory studies and phenomenological enquiry), they all need to interpret the raw data during analysis and convert these into theoretical categories". Coding categories were adopted for analysing interview data collected during all three stages of the research, and devised according to corresponding questionnaire themes. The qualitative data software package, *NUDIST*, was obtained specifically to assist with devising codes using node analysis. It was used primarily to string thematically similar quotations to build the analysis, although due to the simplified form of the coded text, the software was not utilised as much as originally anticipated. The final index of coding categories used is reproduced in Table 3.2 below.

**Table 3.2:** Index of thematic categories used to code the data

| Stage 1: Interviews with experts (Chapters 4 and 5) | |
|---|---|
| 1. Views on priority industry needs | 2. Identification of problems on the ground |
| 3. Institutional issues | 4. Marketing issues |
| 5. Proposed legislative and policy measures | 6. Education and training |
| 7. Proposed educational and training measures | 8. Land reclamation and land reclamation fund |
| 9. Proposed technological measures | 10. Implementation of policy-related measures |
| 11. Barriers and problems | 12. Relations between large and small-scale miners |
| 13. Views on the state of the industry | 14. Organisation of miners |
| 15. Opinions on purchasing system | 16. Opinions on funding |
| **Stage 2: Government analysis (Chapters 4 and 5)** | |
| 1. Improved interaction between institutions | 2. Institutional recognition of information shortages on the ground |
| 3. Opinions on environmental assessment/environmental permit | 4. Recognition/opinions of legislation and policy problems |
| 5. Opinions on land reclamation/land reclamation bond | 6. Opinions on cooperatives |
| 7. Opinions on mercury management | 8. Opinions on the advent of technology |
| 9. Opinions on sustainable mining | 10. Opinions on the support services on the ground |
| 11. Opinions on funding | 12. Opinions on land management |
| 13. Opinions on education and training | 14. corruption |
| **Stage 3: Analysis of miners (Chapter 6)** | |
| 1. Opinions on licensing | 2. Opinions on laws |
| 3. Opinions on environmental issues | 4. Opinion on finances |
| 5. Opinions on land reclamation/land reclamation bond | 6. Organisation |
| 7. Opinions on mercury management | 8. Opinions on technology |
| 9. Views of government | 10. Land-use issues |
| 11. Expertise | 12. Poverty |
| 13. Coping strategies | 14. Corruption |

## 3.6 Assessment of the research approach

Although there is a wealth of evidence advocating the use of semi-structured interviewing techniques in developing world settings, several noteworthy problems were encountered during the investigation. An initial difficulty occurred during the first round of interviews with experts in the summer of 2001. Several individuals who had agreed on a meeting time beforehand could not be interviewed because of work commitments. Consequently, six had to be rescheduled, and, because of time restrictions, two professors based at the Tarkwa School of Mines could not be interviewed.

A second – albeit, minor – problem occurred during the subsequent round of interviews with Government officials, in April 2002. Although notified about the

initial discussion group meeting months beforehand and visited at their offices only days before it was scheduled, rain prevented *all* officials from participating. The meeting was therefore rescheduled but had to be cut short, again, because of time restrictions; as previously explained, this necessitated the undertaking of follow-up interviews in April, May and July 2002.

In terms of the experts consulted, apart from those interviewed, there are few locally-based researchers specialising in ASM in Ghana. There are two professors based at the Tarkwa School of Mines who conduct, *inter alia*, research on artisanal gold mining but as previously indicated, could not be reached for an interview. There are also three researchers based at the University of Science and Technology in Kumasi who look at mercury contamination from small-scale gold mining but are not particularly active on the socioeconomic and environmental management research fronts. The benefit of utilising such a small circle of experts was that everyone was generally contactable. A possible drawback was a limitation of perspectives, and, potentially, a strong consensus of one view.

In terms of the interviews with miners themselves, district officers (from the Minerals Commission) were present during each. Although it was initially believed that miners would be reluctant to disclose personal information in the presence of government employees, it was discovered that district officers had a good rapport with ASM communities, and, therefore, were not perceived as threats or regulators *per se*. Certain miners – both illegal and registered – referred to both district officers and mines wardens as their "friends"; it is therefore unlikely that the presence of these officers during interviewing affected the results. Also noteworthy was that during visitations to certain *galamsey* sites, a number of miners became rowdy and demanded to be interviewed as a collective group. District officers were forced to explain in *Twi* to certain miners about the importance of soliciting *individual* assessments of industry issues. Eventually, all agreed to participate individually. Moreover, only one miner claimed to be illiterate but nevertheless responded to all questions in English.

A combination of ongoing land use disputes between artisanal and large-scale gold miners, inaccessible roads, and poor weather conditions restricted the fieldwork to Tarkwa, Bibiani and Assin Fosu, and prevented additional interviewing in Dunkwa, Asankragwa, Bolgatanga, and Oda – the four remaining areas in which artisanal and

small-scale gold mining is predominantly carried out in the country. Budget limitations, along with time constraints, further restricted the interviewing to the three aforementioned locations.

## 3.7 Summary and conclusions

A qualitative methodology was adopted to investigate the proposed case study analysis of the Ghanaian artisanal and small-scale gold mining industry. Specifically, using a series of interlocking semi-structured interviews, opinion was surveyed from indigenous industry experts, Government officials and miners on important industry issues and challenges. The selection of a qualitative methodology was based largely on the fact that, to date, few have surveyed opinion on environmental issues in ASM as a whole, as well as the past success of its deployment in developing world settings. The thesis used a system of qualitative semi-structured interviewing for the very reason that "we cannot change the world successfully unless we understand the way it works; but neither can we understand the world fully unless we are involved in some way with the processes that change it" (Edwards, 1989, p. 124-125).

# Chapter 4 – Perspectives on the Current Policy Stance

"The problems (of small-scale mining) are diverse and wide-ranging; they may be associated with lack of financial resources, lack of technical know-how, lack of management and marketing skills, or even social problems related to local attitudes or policies of the Government."

– *H.E. Hon J.A. Omanga, Former Minister of Natural Resources in Kenya, commenting at the opening of a AGID Workshop on 'Strategies for Developing Small-Scale Mines and Mineral Industries", April, 1980*

## 4.1 Introduction

In recent years many governments have acted to raise living standards in informal sectors of the economy by passing specific legislation and introducing various codes of practice. A major motive behind many such regularisation efforts has been a desire to improve the environmental and socioeconomic conditions of operations. The present chapter critiques the approach taken by the Ghanaian Government to bring informal artisanal and small-scale gold mining into the legal domain for this very purpose. In Chapter 2, following a general overview of ASM, the main characteristics of Ghana's artisanal and small-scale gold mining circuit were described, underscoring the challenge of formalising its highly disorganised and potentially damaging activities. This chapter builds from this discussion, using findings deeply rooted in the literature and surveyed opinion to provide perspective on how Ghana's largely informal artisanal and small-scale gold mining industry has been both managed and regulated for organisational and environmental purposes.

Section 4.2 provides an overview of the conventional approach taken to formalise informal segments of the developing world economy, the general response of governments to the ASM regularisation challenge, and the interventions taken both within Ghana and abroad to tackle the industry's environmental problems. Section 4.3 highlights the perceptions of the effectiveness of approaches take to regularise ASM, using opinion deeply rooted in the literature. It is against the background of this discussion that Section 4.4 uses the surveyed opinion of country experts based both outside and within government to provide indigenous perspective on the current policy stance taken toward ASM. Section 4.5 summarises the discussion, and offers concluding remarks.

## 4.2 Traditional conceptualisation of the ASM regularisation challenge

It has been argued that in the context of ASM, a government's central responsibilities are as follows (Hentschel *et al.*, 2001, p. 29):

- Managing the exploitation of national mineral resources in a socially acceptable, environmentally sound and sustainable manner;
- Promoting investment into the sector;
- Licensing mining titles; and
- Promoting the legalisation and normalisation of operations.

Experts (e.g. Davidson 1993; Labonne 1994) purport that successfully addressing each of the foregoing is a key to facilitating marked regularisation of this sector of industry's highly disorganised, informal activities. This section of the chapter outlines the global response to this regularisation challenge as well as the stance taken by the Ghanaian Government. The discussion aims to highlight perspectives rooted in the literature, against which, the Ghanaian case is later assessed using expert critique.

### 4.2.1 Informal sector regularisation and environmental protection

> "Most developing countries have long since established laws and formal governmental structures to address their serious environmental problems [but] few have been successful in alleviating those problems". [Bell and Russell, 2002, p. 63]

A number of methods have been proposed for bringing informal segments of the developing world economy into the mainstream. Scholars specialising in informal sector research have mainly emphasised the legislative angle, which governments have long viewed as a critical starting point for improving the organisation and efficiency of such activities. Following the implementation of laws, codes and regulations, industry-support systems, financial schemes and technologies are typically provided.

The major motive behind many of the recent efforts taken to regularise the informal sector of the developing world economy is that it is a considerable source of tax losses for governments (Fortin *et al.*, 1997). As described by Mead and Morrision (1996), instituting a framework to capture this potential tax money requires addressing four interrelated dimensions of legal policy: the first concerns registration, as a prerequisite to entering the formal sector of the economy altogether is the securing of a license or permit to operate; the second concerns the payment of taxes, as registered operations

are required to pay fees to authorities; the third relates to adherence to regulations in place for the labour force; and the fourth involves adherence to a host of other institutional regulations and requirements that are legally binding. Once an enterprise is registered, it is subjected to the foregoing, and interrelated, requirements and regulations.

Environmental concerns have also prompted many developing world governments to pay closer attention to regularising the informal sector, the operations of which are known for their pollution effects (Briassoulis 1999; Blackman 2000). Governments play an integral role in environmental management and protection overall, primarily through the provision of environmental standards and regulatory frameworks. As Lovei and Weiss (1998) explain, historically, environmental legislation has evolved from sporadic laws and regulations, the "piecemeal pattern" of the earliest laws often resulting in major legislative overlaps and policy contradictions. The more comprehensive regulations of the past 10-15 years have been implemented concurrently with newly-established environmental government agencies and national environmental policies, the latter addressing, *inter alia*, core elements of pressing (environmental) problems; strategies; plausible policy options; implementation methods; regulatory standards; and monitoring and evaluation needs (after Norse and Tschirley, 2000, p. 18). However, as Blackman (2000, p. 2000) lobbies, the use of "conventional regulatory approaches" to control the pollution emanating from informal sector operations "is bound to be problematic if not completely impractical", since most have few preexisting ties to the state, and are difficult to monitor because they are small, widespread and dispersed. Moreover, and, as already explained in Chapters 1 and 2, informal activities typically harbor the poorest of the poor, which makes the application of incentive-based laws and codes of practice all the more imperative.

It is typically the state's inadequate provision of goods and services that gives rise to informal economic systems altogether, as well as its frequent participation – conspicuous or inconspicuous – in the formation and functioning of that system (Briassoulis, 1999, p. 216). De Soto (1989) was among the first to argue that expanded input from the state into the regularisation of the informal industry sector has deleted, or, at a minimum, adversely affected, its development process. Reference

is made by De Soto to the propensity for state policies and regulations to be designed in a fashion to protect and maintain the privileges of certain societal groups. Thus, by regularising informal segments of the developing world economy, which are typically populated by the more *unprivileged* societal groups, the state, through implementing additional regulations and red tape, "straightjackets people's entrepreneurial spirit, becoming instead an obstacle to development" (Pena, 1999, p. 364).

Experts have attributed both the failure to regularise and effectively manage the pollution-intensive firms of the informal sector to inadequate institutional frameworks. As attested by Grosh and Somolekae (1996, p. 1885) and reinforced by De Soto (1989), "Byzantine and burdensome regulatory environments" have been adopted in the process of formalising the informal sector overall, which "inhibit firms from operating at medium and large scale, forcing them into the informal sector, where they have no access to formal capital markets or the legal system for the enforcement of contracts, with a resulting curtailment in their (and hence the nation's) growth". Similarly, Maldonado (1995, p. 708) notes that "the illegal nature of the informal sector is attributed to the widespread inadequacy of the existing institutional framework and its regulatory system". A number of other authors (e.g. Mead and Morrison 1996; Pena 1999; Blackman 2000) have echoed these views.

Evidently, in their quests to regularise informal segments of their economies whilst simultaneously addressing environmental aspects, most governments have relied upon legalistic and "heavy" institutional intervention, underpinned to a mindset strongly committed to top-down approaches. Maldonado (1995, p. 708) further comments that "in a good many countries, the tax and commercial law, investment and urban planning codes and rules governing the exercise of certain trades and apprenticeship clearly do not relate to local realities, which are marked by new forms of production and social organisation. The resulting exclusion and spatial segregation deprive the most disadvantaged population groups of their livelihood, and do not help solve the problems arising from the poverty in which these groups live". In the majority of cases, the regulatory approaches adopted for grassroots management are institutionally-driven, where "the initiative of setting the agenda and the onus of developing resultant plans of action falls upon the international or national institutions" (Iyer-Raniga and Trelour, 1999, p. 229). Moreover, they "involve the

use of major international institutions such as the UN, non-governmental organisations (NGOs) and national institutions in having specific agendas to reduce environmental impacts". Environmental regulation and management in developing countries is now regularly associated, and occasionally treated synonymously with, the development of large bureaucracies and an associated "top-down" approach to environmental problems (Bryant and Wilson, 1998, p. 328).

By emphasising mainly the needs of the state and providing services to people within a defined area, many such regulatory and management strategies lack incremental vision and are technocratic in scope, at the same time failing inherently to address primary needs at the grassroots level (after Redclift, 1992). There is growing consensus "complex relationships exist between human nature and needs, cultural evolution and ecological dynamics" (Downs, 2000, p. 601), which makes the tackling of pressing problems in the developing world from the "bottom up" all the more imperative. As King and Hood (1999, p. 49) explain, "it is at the local/community level that the connections among ecosystem health, the health of human communities and individual livelihoods are most apparent and critical". It was Chapter 28 of *Agenda 21* that initially "called for every local government to create its own agenda for sustainable development", the rationale being that "as the level of governance closest to the people [local authorities] play a vital role in educating, mobilising and responding to the public to promote sustainable development" (Bulkeley, 2000, p. 290).

### 4.2.2 How have governments responded to the ASM regularisation challenge?

Legislative instruments have also been heavily relied upon to bring ASM into the legal domain. As Bugnosen *et al.* (1999, p. 35) explain, a "number of international expert meetings in recent years have concluded that the introduction of appropriate laws and policies could enhance the industry's positive contributions and reduce its negative impact". These meetings have concluded that governments should assume the following responsibilities (ILO, 1999):

- Ensure the provision of simple, clear, understandable laws (Harare Seminar, February 1993);

- The legalisation of operations, and the streamlining of registration (World Bank International Round Table on Artisanal Mining, Washington DC, May 1995);
- Wherever possible, treat "small-scale mining" in mining codes (Conference on Small- and Medium-Scale Mining, Calcutta 1996); and
- To oversee the acquisition of fully transferable mining titles ("Introducing New Technologies for the Abatement of Global Mercury Pollution Deriving from Artisanal Gold Mining", Vienna 1997).

There appears to be agreement that effective execution of each of the foregoing initiatives requires a sound understanding of conditions on the ground, as well as having in place a reliable support staff to ensure compliance (ILO 1999; Jennings 1999). It has also been widely suggested that in order to regularise ASM effectively, authorities must "be prepared to move beyond the establishment of legal frameworks, and to identify deposits and areas amenable to small-scale development, including the preliminary evaluation of their technical and economic viability at different levels of operation" (Davidson, 1993, p. 317). Moreover, it has been argued ASM legislation should be designed in a fashion to "help to ensure that the negative social and environmental effects of the sector are better managed" (Hentschel *et al.*, 2001, p. 28). The first significant attempts made to regularise ASM through legislation did not take place until the late-1980s and early-1990s.

The majority of governments that have made an attempt to legalise resident ASM activity have identified better regulation of the development of the sector, control of its environmental problems, improved health and safety, marketing, decentralised regulation, and the establishment of penalties and incentives, as the principal drivers behind the adoption of ASM legislation (see Bugnosen, 1998)[12]. Tanzania and Ethiopia are recognised as having implemented the most advanced ASM legislation to date – namely, those embodied within the *Tanzania Mining Act (1998)* and *Ethiopian Mining Proclamation No 52/1993*, respectively. One of the few examples of legislation enacted *specifically* for ASM is the Zimbabwean *Public Streams Act* of 1991, which was passed to help control (gold) panning problems. A main aim of the Act is to decentralise power to local authorities, in turn, helping to stem the problem

[12] Bugnosen (1998) surveyed 18 countries, eleven of which were African, four Asian, and three Latin American.

of migration, and reducing and curtailing environmental degradation. Examples of legislation containing provisions for ASM are provided in Table 4.1.

**Table 4.1:** Small-scale mining legislation in selected developing countries

| Country | Description of Law(s) |
|---|---|
| Brazil | General mining code has provisions for small-scale mining; some individual States also have their own small-scale mining legislation |
| Burkina Faso | Mining Legislation (Kiti No ANVIII-0328TER/FP/PLAN-COOP) has provisions for artisanal exploitation |
| Chile | Mining Code of 1983 includes small-scale mining provisions |
| Ethiopia | Mining Proclamation No 52/1993 includes provisions for small-scale mining and artisanal mining |
| Guinea | Mining Law, 93/025/CTRN has provisions for artisanal mining |
| Guyana | Mining Act of 1992, as amended, provides claim system for small-scale mining operations |
| Indonesia | Basic Mining Law No. 11, 1967, has provisions for peoples mining, which refer to small-scale mining activities of local people and cooperatives |
| Lao PDR | Draft mining legislation has provisions for small-scale mining and artisanal mining |
| Mozambique | The Mining Law of 1986 includes provisions for acquiring Small-Scale Mining Certificates |
| Malawi | Mines and Minerals Act of 1981 does not specifically mention small-scale mining but does contain provisions applicable to small-scale mining operations |
| Namibia | The Mining Act of 1994 includes provisions for pegging and registration of claims as a mechanism for acquiring mining rights by small-scale miners |
| PNG | Mining Act of 1992, as amended, contains provisions for small-scale mining |
| Philippines | General Mining Law (RA 7942) of 1995 has provisions for small-scale mining; also has specific small-scale mining legislation (RA 7061, 1991 and PD 1899, 1984) and has special safety rules and regulations (RD 97-30, 1997) for small-scale mining |
| Tanzania | Mining Act of 1979 provides provisions for small-scale mining opportunities |
| Uganda | Mining Act of 1964 mentions small-scale mining rights |
| Zambia | Mines and Minerals Act of 1995 includes provisions for small-scale mining operations |
| Zimbabwe | Miners and Minerals Act (Chapter 165) provides simple mechanisms for pegging and registering claims |

*Source*: Bugnosen, 1998, pg. 4

The Ghanaian Government has also pursued a series of regulations in an effort to bring artisanal and small-scale gold mining into the mainstream. The initial motivation behind regularisation efforts was the industry's socioeconomic importance – particularly, its ability to provide employment in rural areas and its contribution to the national economy. As indicated by an official at the Precious Minerals and Marketing Corporation (PMMC), a government agency that provides purchasing services to artisanal and small-scale miners:

> "A lot of people are employed in the sector; before it was illegal, now it is legal... Before there was no policy; they used to be called illegal miners – *galamsey*. But there have been massive increases in the employment all around since complete legalisation. Lots of jobs were created. Apart from an increase in the number of people wanting to collect mined product, there has been an

increase in employment of women who are selling food to miners". [PMMC official]

As briefly explained in Chapter 2, the passing of the following three laws (Tsikata, 1997) in 1989 officially legalised small-scale gold mining in Ghana:

1. The *Small Scale Gold Mining Law* (PNDCL 218): provides for the registration of activity; the granting of gold mining licenses to individuals or groups; the licensing of buyers to purchase product; and the establishment of district assistance centres.
2. The *Mercury Law* (PNDCL 217): legalised the purchasing of mercury (for mineral processing purposes) from authorised dealers.
3. The *Precious Minerals Marketing Corporation Law* (PNDC Law 219): transformed the Diamond Marketing Corporation into the Precious Minerals Marketing Corporation (PMMC), for the purpose of authorising it to purchase and sell gold.

The objectives of the legislation are to create employment in rural areas and reduce rural-urban migration; absorb mine workers made redundant from SA; regulate small-scale mining activities to ensure that acceptable practices are employed with minimal damage to the environment; provide a ready market for minerals produced by artisanal and small-scale miners; and to reduce illegal mining activity (Yakubu, 2002).

Under the auspices of the foregoing, several administrative changes have been made to better accommodate small-scale gold mining. Most significantly, the Small Scale Mining Project (SSMP) was established using World Bank monies awarded as part of the *Mining Sector Development and Environmental Project*, the main objectives of which are "(i) to enhance the capacity of the mining sector institutions to carry out their functions of encouraging and regulating investments in the mining sector in an environmentally sound manner, and (ii) to develop techniques that will improve the small-scale mining operations" (World Bank, 1995a, p. iii). The following four institutional pillars comprise the SSMP:

1) The Minerals Commission: carry out priority studies on ASM, issue licenses, and implement relevant industry policies;
2) The Precious Minerals and Marketing Corporation (PMMC): assigned all mineral purchasing-related responsibilities;

3) The Mines Department: put in charge of the industry's health and safety issues; and
4) The Geological Survey Department: commissioned to undertake important prospecting and geochemistry-related tasks.

Shortly after establishing the SSMP, the Minerals Commission established its Small-Scale Mining Unit (SSMU), which was assigned administrative responsibility for ASM; a number of geologists, managers and labourers have since been transferred to the Unit.

It has also been recognised by many governments that the "main problem in legislating for small-scale mining operations appears to be in situations where the mining areas are already covered by other mining rights such as prospecting permits and exploration permits related to large-scale mining" (Bugnosen, 1998, pg. 16). The standard practice has been to introduce separate licensing schemes to assist with regularising operations through registration. As explained by Nöetstaller (1994, p. 6), "an indispensable initial step in replacing informal wildcat mining is the legalisation of the activity though recording and licensing". It is repeatedly argued, however, that to facilitate formalisation, "registration procedures and regulatory compliance must be simplified for subsistence miners in order for them to operate in a favourable institutional and legislative regime" (UN, 1996b).

The Ghanaian Government has established its own licensing process for small-scale gold miners, which mandates that prospective operators register their operations before engaging in mining activity. Specifically stipulated in the *Small-Scale Gold Mining Law* is the following: "Notwithstanding any law to the contrary, no person shall engage in or undertake any small-scale gold mining operation unless there is in existence in respect of such mining operation a license granted by the Secretary for Lands and Natural Resources or by an officer authorised on that behalf by the Secretary". Aryee *et al.* (2003) provide a detailed overview of the licensing procedure. Prospective licensees, who may only be Ghanaian nationals aged 18 years or older, must first submit ten copies of a completed small-scale mining application form, along with accompanying site plans of the proposed mining area, to the corresponding small-scale mining district centre. An inspection report is then forwarded to the District Chief Executive of the political jurisdiction in which the

activity is intended to be undertaken. Following the issuance of an environmental permit from the EPA, and payment of the requisite fees, the application is forwarded to the Minister of Mines for approval. If approved, an agreement is forged between the applicant and the Government of Ghana, after which, the signed documentation is taken to the Chief Inspectorate of Mines, who awards the official license to work on the allocated parcel of land.

A successful applicant is entitled to prospect and mine an area measuring no more than 25 acres. The following *additional* conditions apply:

- A license issued to an individual shall not exceed three years but can be renewed for a period of no more than three years for two consecutive times; a license issued to a cooperative group shall last for a period of five years but is renewable for a period of no longer than five years for two consecutive terms.
- A license granted to an individual or group of persons not exceeding four shall be awarded an area no more than three acres; a group exceeding four and no greater than nine shall be granted an area no greater than five acres; and a company or a cooperative society shall be granted an area not exceeding 25 acres.
- An applicant must complete the form fully and have it endorsed by district administration.
- Although all small-scale miners are exempted from the payment of taxes and royalties for the first three years of operation, they are not exempted from local imposts.

Following a successful application, the miner or landholder is required to construct concrete posts at the four corners of the awarded concession atop of four discs (with number engraved). The edges of the plot must be kept clear for concession purposes; successful applicants must also erect a sign post within the concession with their name and number engraved.

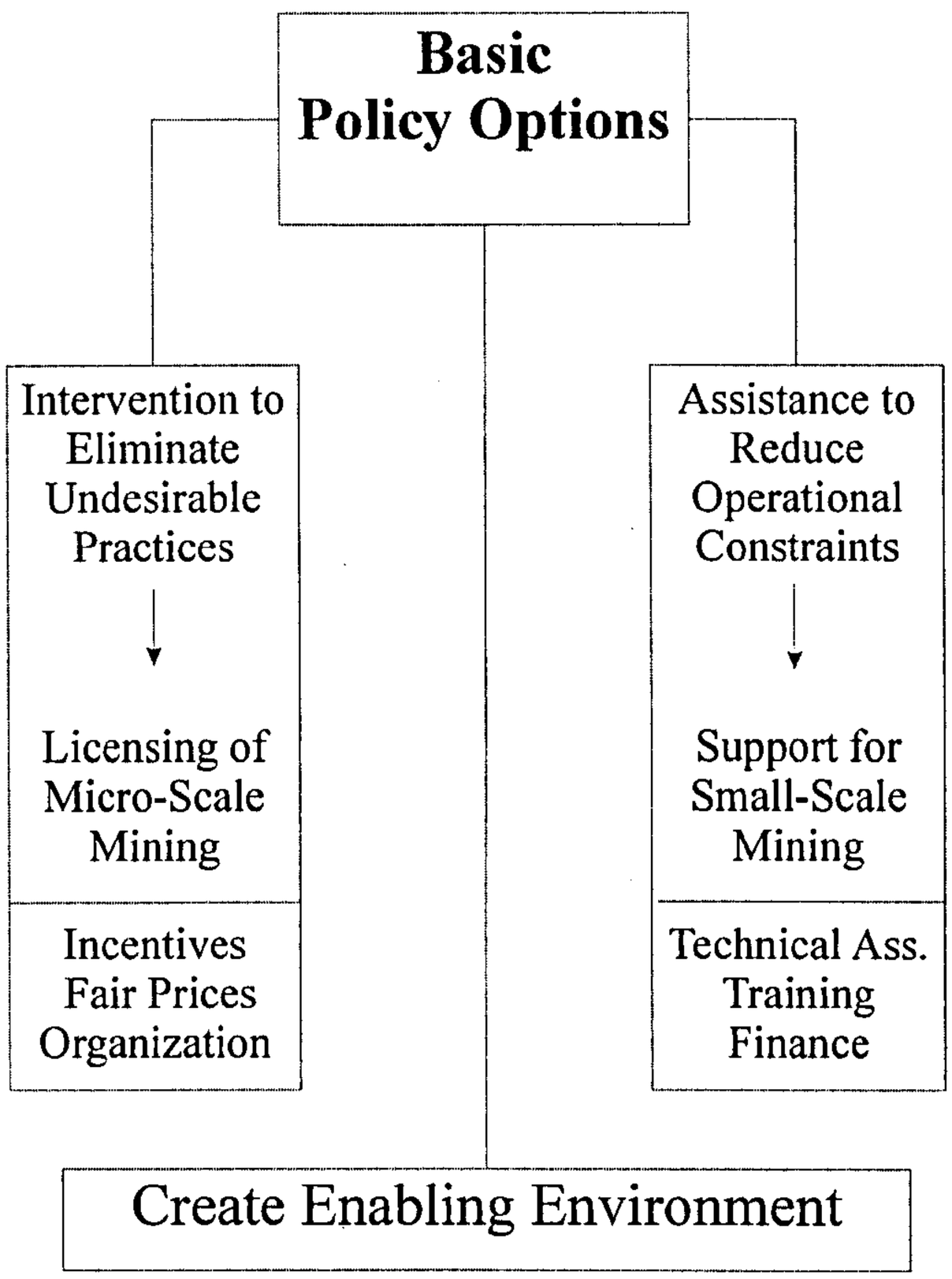
### 4.2.3 Interventions undertaken to improve environmental performance and efficiency in the ASM industry: an international perspective

As previously explained, improved environmental management is another major factor behind many developing world governments' drive to further regularise informal segments of their economies. In the context of ASM, Jennings (1997, p. 13)

argues that this requires "[raising it] from being an unorganised, unsupervised industry to one that is modernised, monitored, organised, and supported so that specific goals can be set and met". As explained more specifically by Nöetstaller (1994, p. 7), any policy aimed at promoting small-scale mining should combine the following two elements (Figure 4.1):

1) Intervention and control to eliminate unacceptable work practices; and
2) Assistance to remove operational constraints limiting productivity and competitiveness.

**Figure 4.1:** Elements of promotional policy for small-scale mining

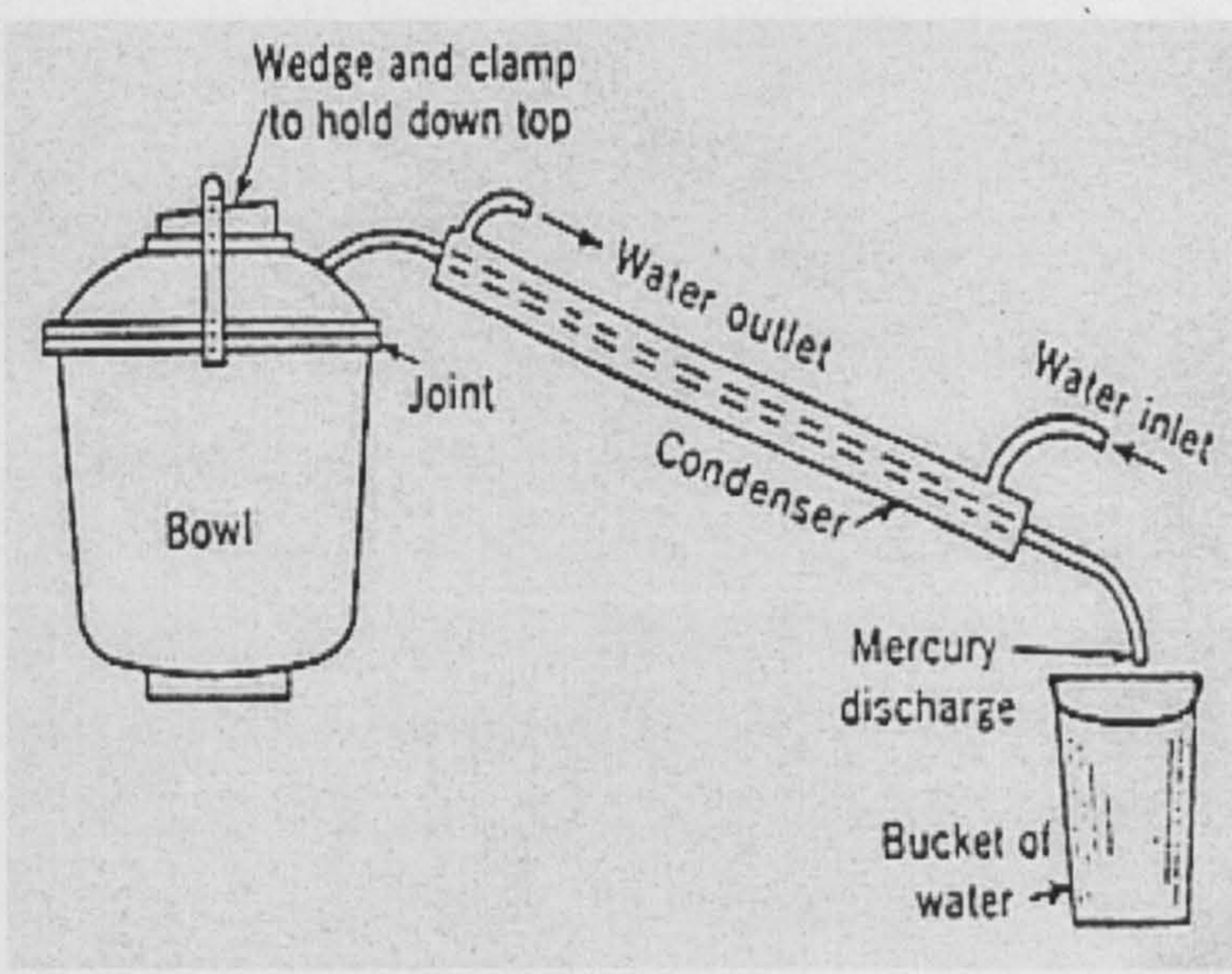



*Source*: Nöetstaller, 1994, p. 7

To address each, governments have aimed to deliver support to artisanal and small-scale miners in one of two forms: appropriate technology and finances. In the case of technology, because "a lack of equipment is a major constraint to the operation of artisanal mines" (Jennings, 1997, p. 13), "innovations in mining and processing equipment have occurred in a number of developing countries" (Davidson, 1993, p.

319)[13]. Hinton *et al.* (2003) review a number of such efforts, which include the adoption of cyanidation technologies, amalgamation barrels, protective mercury fume hoods, and the construction of stable tailings dams. However, the most significant technological innovation in the ASM industry has been the heightened adoption of the mercury retort in the gold processing circuit (Figure 4.2). Various models of retorts, which are simply containers in which gold-mercury amalgam is placed and heated, forcing volatile mercury to travel upward through a tube and condense in an adjacent cylinder, have already been introduced in several artisanal and small-scale gold mining communities around the world. Most enable the miner to capture at least 95% of spent mercury that would otherwise be dispensed into the natural environment. The London-based Intermediate Technology Development Group (ITDG) is currently promoting a cost-effective "homemade" retort constructed from standard plumbing pipe in Zimbabwe, Brazil and the Philippines (Figure 4.3). In PNG, a similar type of retort is also being disseminated, along with a "tin cans" method for mercury recycling that utilises damp sand to capture outgoing fugitive mercury fumes from burnt amalgam (Crispin, 2003b).

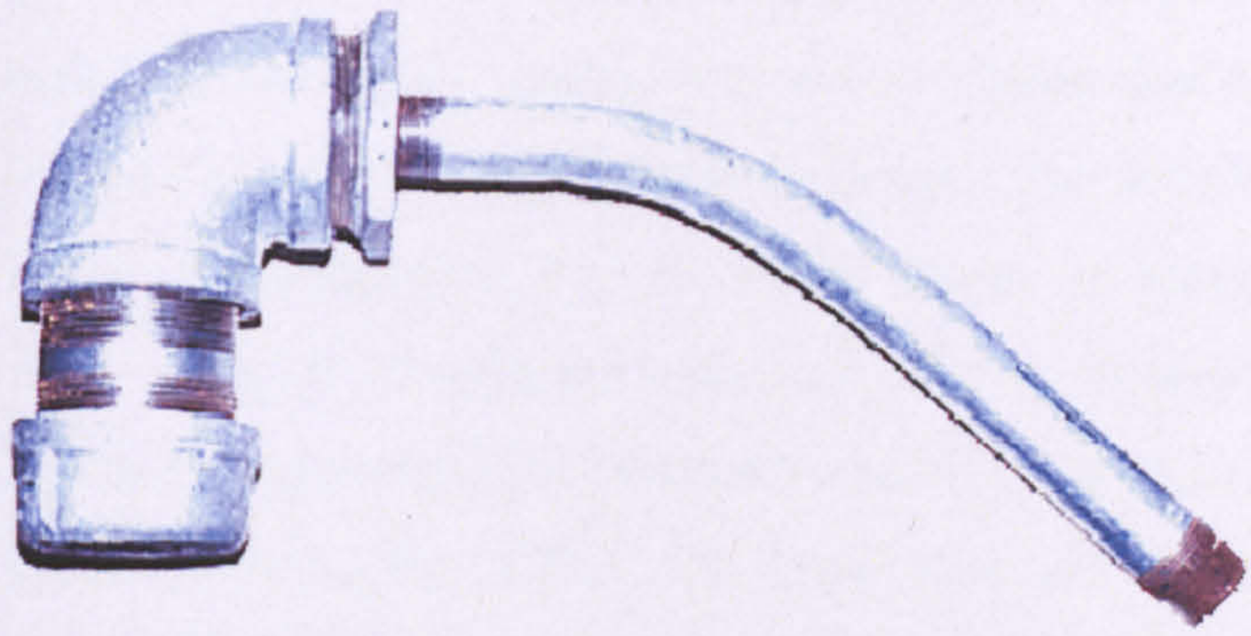
**Figure 4.2:** Standard mercury distillation retort




*Source*: Preister and Hentschel, 1992

[13] In the ASM context, there is a positive relationship between operational efficiency and environmental performance: when equipment is upgraded at sites, environmental performance improves. As the equipment used by artisanal and small-scale miners is generally only 30% efficient, miners are forced to upturn more earth and apply more mercury in order to obtain sufficient gold yields.

**Figure 4.3:** Homemade retort made of standard plumbing pipes



*Source*: Hinton *et al.* 2003, p. 167

In Ghana, UNIDO initiated a pilot study in 2000 to determine levels of mercury contamination in the environment as a result of artisanal and small-scale gold mining. Although not particularly thorough, having only been conducted in the mining town of Dumasi and replicating the efforts of scientists who undertook mercury contamination studies in the Amazon, Philippines and Indonesia 10 years prior, the study nevertheless provided insight on potential contamination pathways. Following completion of the project, UNIDO began introducing its transparent TherMex mercury retort, many of which are now stored at district centres and available to miners at discounted prices.

To facilitate the dissemination of appropriate technology, certain governments have implemented plant-hire purchase schemes. One notable example is Zimbabwe, where small-scale miners can now obtain mining equipment through a lease-to-own scheme managed by the Mining Department (UN, 2002, p. 29). Operating at three depots (Harare, Gweru and Bulawayo), the scheme provides miners access to crushers, stamp mills, concentrating tables, diamond drills and chain blocks. Applications are made to the Regional Mining Engineer's office, which produces a report to the Mining Commissioner of the region; an agreement is then made between the miner and the Ministry.

In Ghana, the majority of environmental and support-related measures implemented for resident artisanal and small-scale gold miners were made under the auspices of the World Bank and GTZ in the 1990s. Specifically, World Bank funding was used by

the Ghanaian Government to improve upon a number of areas of operation in ASM, whilst representatives from GTZ provided key training inputs, organised workshops for miners, and were instrumental in policy design. To date, the World Bank has launched two major mining projects in Ghana that have emphasised improving the equipment utilised in the ASM industry. The first was the US$40 million *Mining Sector Rehabilitation Project*, which began in June 1988 and ended in December 1996. One of its primary objectives was to improve the operations of small-scale miners through technical assistance, and to assist with the regularisation of operations. More recently (June 1995), the Bank launched the *Mining Sector Development and Environmental Project*, a primary objective of which is to support the development of the Ghanaian mining sector on an environmentally sound basis through strengthened mining institutions, the provision of appropriate technology, and increased organisational support to small-scale miners. Over US$12 million has been pledged to develop guidelines and standards for small-scale mining, implement pilot tested equipment, and rehabilitate damaged regions. The project is also attempting to coordinate the efforts of a number of governmental bodies, including the Mines Department, Minerals Commission and Geological Survey Department. The following initiatives (World Bank, 1995a) have been pursued during the course of the project:

- Identification and testing of improved equipment and processing (US$1.25 million allocation): Equipment packages were identified during study tours undertaken by a team of officials from the Minerals Commission and a small-scale miner; various sluices, crushers, pulverisers, pumps and amalgamators were tested.
- Dissemination of equipment and technology (US$1.29 million): A collaborative effort undertaken by the Minerals Commission and the Mines Department. In an attempt to disseminate recently-tested equipment to miners, workshops were held, field demonstrations were conducted, and an assay laboratory was erected at the Tarkwa district centre – the busiest of the seven regional offices.
- Improved geological information (US$1.88 million): A programme to make geological information available to small-scale miners, who

generally operate without reliable information regarding the extent of exploitable ores.

- Improved small-scale mining sub-sector framework and set-up (US$0.77 million): Studying the procedure of granting concessions and marketing minerals, with the intention of improving the process overall.
- Land reclamation for small-scale mining degradation (US$2.63 million): A project emphasising the reclamation and rehabilitation of high priority land areas as a pilot exercise, focusing on community involvement.

Another strategy used by many governments to disseminate appropriate technology to ASM communities is the use of district support centres, which can be used to provide training, education and licensing services to operators. The aim of such schemes is to decentralise assistance for improving governmental control and regulation of ASM activities. For example, in an attempt to assist resident coal miners with key technical and operations' issues, the Chinese government constructed the Changsha Training Centre in 1984. As Gunson and Jia (2001) explain, using funding from GTZ and the ILO, the Centre, which is located in the Hunan Province of Central China, has helped to educate resident coal miners on mine safety and environmental issues. Its accomplishments include the following:

1) The conducting of 72 term courses for managers, chief engineers, safety inspectors, and directors of coal bureaus (a total of 6800 trainees).
2) The organisation of lectures and ongoing training programmes for miners.
3) Providing general education to coal miners on mine safety.

With assistance from the ILO, additional "satellite stations" have been established throughout China, which has led to the education and training of many more thousands of managers and industry workers. Another notable example of a regional support centre constructed specifically for small-scale mining is the Shamva Mining Centre in Zimbabwe, a centralised unit that provides some 200 miners access to processing. As Peak *et al.* (1998) explain, motivation for the Centre stemmed from the proliferation of small-scale miners in the region, none of whom were in a financial or technical position to operate their own gold recovery plants. Individuals formerly used rudimentary methods to crush ore and mercury to recover gold, which resulted in significant environmental pollution. The Centre has, however, helped to introduce badly-needed technical knowledge and organisation to the region through the

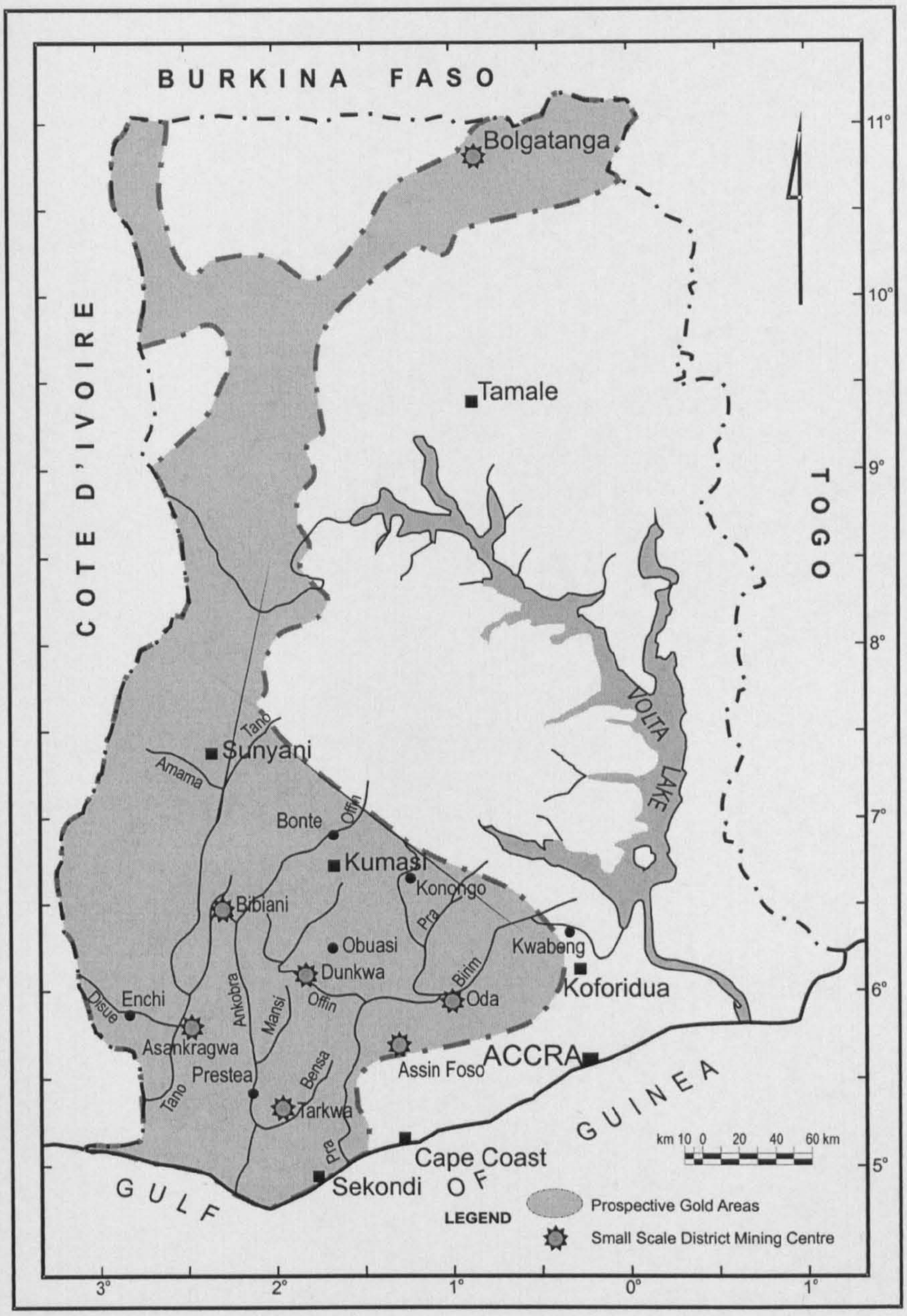
provision of training centralised (ore) processing facilities. Table 4.2 provides additional examples of small-scale mining support centres.

To help manage industry issues in a more decentralised fashion in Ghana, seven small-scale mining district centres were established in Tarkwa, Akim Oda, Assin Fosu, Bibiani, Dunkwa, Bolgatanga and Asankrangwa (Figure 4.4), all of which are considered to be the locations of the most intensified artisanal and small-scale gold mining activity in the country. It was originally envisaged that district centres would store important small-scale mining equipment, and, initially, a series of Honda water pumps, sluice boxes and pick axes were dispensed by district officers to needy miners. They subsequently provided a series of two-week training courses for miners, emphasising health and safety, business management, environmental management and technology. Each is staffed with a mines engineer (project employee) and a mines warden (provided by the Mines Department) who register claims, provide technical advice, and encourage the safe and productive operation of local mines (Davidson, 1993). As a result of successfully launching the SSMP, Ghana is frequently referred to in the literature as "a leader in the promotion of small-scale mining enterprises" (UN, 1996b).

**Table 4.2:** Examples of existing small-scale mining support centres

| Country | Name/Type | Summary |
|---|---|---|
| **Ghana** | **District Support Centres** | **A total of seven support centres exist in the southern part of Ghana, each of which provides both basic support and purchasing services to miners.** |
| Zimbabwe | Shamva Mining Centre | A centrally-located services and support facility for artisanal miners. |
| Venezuela | UNECA Centres | Provide a wide range of services to artisanal gold miners, particularly in the area of mercury management. |
| Chile | Empressa Nacional de Mineria (ENAMI) | Operates four regional concentrators, treating ores purchased from numerous small and medium copper miners.<br>Also maintains 16 mineral purchasing centres located throughout the country that serve the small miners as marketing outlets. |
| Morocco | CADETAF, a governmental agency | Offers a wide range of services to artisanal miners extracting high-grade lead and zinc ore in the Atlas Mountains.<br>Also operates seven regional ore purchasing centres that provide basic materials and essential services to miners. |

**Figure 4.4:** Small-scale mining district support centres in Ghana




Certain governments have also overseen the distribution of finances to small-scale miners; a lack of capital has long been identified as another major obstacle to improving mechanisation and efficiency at small-scale mines (ILO, 1999). Typically, a government body or independent agency is empowered with the authority to provide, albeit at their discretion, financial support to small-scale miners. In Bolivia, for example, funds are dispersed to small- and medium-scale miners from the *National Fund for the Environment* (FONAMA). In Chile, Empresa Nacional de Mineria (ENAMI) and Servicio Nacional de Geologia y Minas (SERNAGEOMIN) not only provide technical assistance to miners but also purchase their minerals and

concentrates, and grant credit and loans to needy parties (Castro and Sanchez, 2003). In another example, Peru, the Proyecto de Investigacio'n y Aplicacio'n de Technolgiá Apropriada has, through the provision of finances, helped miners improve their techniques and increase productivity.

Rather than provide loans and collateral outright, Ghanaian policymakers have elected to emphasise the provision of adequate marketing services to operators. The establishment of PMMC, which, as previously explained, is a robust mineral marketing agency for artisanal and small-scale miners, has helped reduce the illicit marketing of indigenously-mined precious minerals. A number of unsuccessful attempts were made to reduce mineral smuggling into neighbouring Togo and Burkina Faso but the Government later determined that the key to minimising the illicit marketing of gold and diamonds was to provide *competitive* purchasing services[14]. PMMC, which is a government-owned corporation consisting of a Board of Directors appointed by the Ministry of Energy and Mines – the main government agency responsible for mining policy matters – purchases the gold and diamonds produced by small-scale miners, and also has licensed buying agents and subagents in the field who are authorised to buy gold for resale. It was predetermined PMMC would pay a competitive 90% of world (gold) prices to artisanal miners.

Outside of GTZ, however, the provision of environmental training for Ghana's artisans has, for the most part, been sporadic. Yakubu (2002, p. 4) highlights the major government assistance packages awarded to resident miners over the past thirteen years. These include: regular on-the-job training of miners in appropriate mining and processing practices (conducted by field officers); provision of equipment to selected small-scale gold mine concession owners; and the institution of a pilot hire scheme to enable miners to acquire basic tools and equipment for their operations. Ayree *et al.* (2003) add that "since 2000, workshops covering environmental damage control, health and safety aspects of operations have been held for small-scale miners, as well as basic bookkeeping and cost calculation seminars". Moreover, "miners are increasingly being informed in each of the seven small-scale mining districts about pertinent environmental regulations and guidelines".

[14] Many maintain that the breaking point for the Ghanaian Government was when it was discovered neighbouring Togo was exporting notable quantities of gold without having any operational mines. This was a result of accumulated collections of gold obtained from Ghana through illegal smuggling channels. The Government, therefore, made a concerted effort to establish PMMC, and to provide purchasing services for miners.

As reported by Davidson (1993) and others, one promising environmental initiative was the implementation of the *Reclamation Fund*, which called for a certain percentage of revenue from small-scale mining sales to be "held" by the Government and used to finance reclamation programmes. The move was an immediate success, as some US$17,000 was contributed to the Fund between 1989 and 1991 alone. Another promising measure was the implementation of an EIA for small-scale gold mining. Specifically, as part of the *Environmental Protection Agency Act of 1994*, Form SMM1 (Small and Medium Scale Mining), the application for an "Environmental Permit to Undertake Small/Medium Mining" (Pursuant to LI 1652) was enacted, which made it mandatory for all individuals applying for a license to mine on a small scale to complete an environmental impact statement detailing how environmental problems would be mitigated during the course of operation. Standardised application forms, which contain a series of questions such as "give a brief overview of the likely environmental impacts of the mining activities?" and "describe briefly the mitigation measures proposed?" are to be completed by individual miners or the heads of mining cooperatives. Completed forms are submitted to representatives from the Environmental Protection Agency (EPA) and Minerals Commission, who ultimately determine on the basis of environmental management, whether or not to award the applicant a license to mine on a small scale.

To summarise, in their efforts to improve the environmental performance and efficiency of ASM, certain governments have not only sought to modify regulatory schemes but have also provided support services to indigenous miners in the forms of improved technology and finances. As explained in Chapter 1, the Ghanaian artisanal and small-scale gold mining circuit provides an ideal *a priori* case for further investigating the effects and effectiveness of approaches taken to regularise an informal industry for both organisational and environmental management purposes because an industry regulatory framework appears to be in place, and, over the past 15 years, a number of support-related and environmental management initiatives have been undertaken to improve conditions at sites (summarised in Figure 4.5). The discussion that follows provides perspective on how international experts view the traditional approaches taken to regularise, and improve environmental management

within, the ASM economy, after which, surveyed opinion is used to examine the Ghanaian case.

**Figure 4.5:** Environmental and support-related measures implemented to date in the Ghanaian small-scale gold mining industry

| Measure/ Initiative | Environmental Implication(s) |
|---|---|
| **Implementation of the *Small-Scale Mining Law, Mercury Law* and *PMMC Law.*** | Establishment of a legislative regime for small-scale gold mining. Stipulates industry regulations and provides a code of conduct small-scale gold miners must adhere to. |
| **Establishment of the SSMP), and construction of seven district support centres.** | The idea behind which was to provide institutional support for regulating and monitoring the industry in both centralized and decentralized forms. |
| **Implementation of a licensing scheme for small-scale gold miners.** | Licensing improves regularization and helps to facilitate improved industry efficiency, enabling the government to better regulate and monitor operations. |
| **Provision of geological information and implementation of a land reclamation fund.** | Enables the demarcation of suitable land plots to small-scale gold miners, in turn, preventing unnecessary land degradation; provides funding for additional land reclamation. |
| **Implementation of an Environmental Impact Assessment (EIA) procedure.** | Possible means of assessing environmental conditions prior to the commencement of small-scale gold mining, thereby providing opportunities to prevent problems. |
| **Equipment provision to small-scale gold miners.** | Improved equipment Enables miners to improve efficiency of operations, preventing unnecessary damages. Mercury retorts enable miners to reduce emissions of mercury. |

## 4.3 An overview of the general policy stance toward ASM regularisation

There is growing antagonism in the literature over the efficacy of the approaches taken to date to regularise ASM. Critics specifically indicate that the policy stance has been ineffectual overall, and have identified a range of weaknesses in the areas of 1) legislative intent, 2) institutional structure, and 3) policy delivery and design. It can be ascertained from findings in the literature that the general approach adopted in the developing world to both regulate and manage ASM mirrors those pursued specifically to bring informal segments of the economy into the legal domain. In regulating and providing assistance and support to ASM, it is often argued that governments frequently overlook the importance of ensuring that grassroots solutions are compatible with the economic potential of target artisanal and small-scale mining populations. It has been claimed that because the industry is poverty-driven and practiced within impoverished communities, the dissemination of inexpensive and simplistic techniques, rather than technically optimised and sophisticated processes, constitutes the basis of a more viable approach (Jennings 1999; Hentschel *et al.* 2002).

In terms of *legislative intent*, there is reference made in the literature to ASM being managed in a *laissez faire* fashion. Critics have suggested there is an acute shortage of bottom-up policy intervention in the industry – namely, approaches aimed at addressing problems in (policy) areas such as training, employment creation, crime prevention, and local community development through improved analysis of conditions at the grassroots (Wallis and Dollery, 2001, p. 249). Hjern and Hull (1982) were among the first to call for developing countries to adopt more "bottom up" management strategies, citing the following factors to justify their utility:

a) Help to identify the network of actors involved in service delivery in one or more local arenas;
b) Help to ask individuals about their goals, strategies, activities and contacts; and
c) Construct from this information an understanding of the network that links local, regional and national actors involved in the planning, financing and execution of the relevant government and non-government programmes.

Centralised institutions and their use of top-down management approaches have resulted in the disempowerment of communities, particularly those in developing

countries. As Iyer-Raniga and Treloar (2000) explain, although such approaches have proven important in certain cases, they almost exclusively ignore the role of the global citizen. Bottom-up approaches, on the other hand, call for decentralisation, and seek to address the needs of the community by targeting problems at the grassroots. More often than not, such approaches lead to the development of genuine, workable solutions, as different players are able to express their views on what they value. There are now a number of NGOs advocating the importance of programmes "to lift" the poor of the developing world "from the bottom up", by addressing such basic needs as literacy, health care, water, agriculture, and access to financial services (Woller and Woodworth, 2001).

There is repeated indication that the absence of bottom-up intervention in ASM is foremost exemplified by the majority of regulatory approaches adopted to date, which are described as being highly discriminatory, and having further marginalised the informal operator. The recent UN draft publication, *Compendium on Best Practices in Small-scale Mining in Africa*, states: "a sound mining policy should provide guiding principles, give directions for the development of the sector and set clear objectives and strategies for realising those objectives [which] should reflect a non-discriminatory development approach between large- and small-scale mining sectors" (UN, 2002, p. 8). The document concludes, however, based on a combination of factors that "it is perhaps difficult at this early stage of the transformation of the sector to identify a single legislation in any specific country, which qualifies in its totality as a best practice" (UN, 2002, p. 14). Specifically, there is growing consensus that ASM legislation is inherently bureaucratic, failing on many fronts to take into account the mindset of the subsistence artisan. As explained by Tráore (1994, p. 208), "because of the imprecision and inadequacy of much of the legislation [in place] there remains some legal grey areas, which brings confusion to the classification and procedure for managing small-scale concessions". Similarly, Jennings (1999) argues that the sector is now "bedeviled with too many regulations that are mostly designed to constrain it", emanating from a poor understanding among government bureaucrats of the behaviour and needs at the grassroots. Moreover, in terms of enforcement, the relevant authorities often find themselves caught in a cycle of causality that limits their ability to control activities. It has been further noted, "governments often lack [the] political will to legalise the sector", often resulting in the implementation of

"demanding bureaucratic procedures [to] become and remain a formal operation" (Hentschel *et al.*, 2002) that prove inappropriate for target subsistence populations. The resulting "erratic policy and decision-making has led to confusion among administrators and managers at large and small-scale mines" (Jennings, 2000, p. 3).

The complex character of the majority of licensing procedures, identified as burdensome for educationally-deprived, ignorant artisanal miners, is often used to highlight the bureaucratic, institutionally-driven nature of ASM regulations. It has furthermore been argued that the exorbitant amount of paperwork and costs commonly associated with obtaining a small-scale mining license is clear indication of governments' ignorance of miners' subsistence lifestyle. Bugnosen (2000) uses the Philippine situation to illustrate the problem. Over the past 10-15 years, the Philippine government has made a number of attempts to develop a plausible small-scale mining policy-framework. Operations are now governed by two laws: *PD 1899*, which contains the provisions for a small-scale mining permit; and *RA 7076*, which is based on the concept of production sharing with the Government. However, miners have expressed frustration over having to renew a small-scale mining license – which is only valid for two years – and with processing permits. Not only has the Philippines, as in many other countries, made it mandatory to apply for a license to *mine* on a small scale, but it has also made it necessary by law to apply for a separate processing permit for operating a gravity concentration plant or cyanide circuit[15]. Miners have specifically indicated that it is extremely difficult to comply with the various technical and environmental requirements of the application, and most find it illogical for the government to grant them a permit to mine, then, in effect, instruct them not to process their ores "because another permit is required" (Bugnosen, 2000, pg. 6).

It has also been argued that the duration of tenure for most small-scale mining rights is typically very short with no guarantee for renewal, making it an unattractive option to prospective "legal" miners (UN, 2002). Certain governments have refused outright to officially permit small-scale mining activity, whilst others continue to discriminate against operators by issuing leases or licenses for periods of two to three years (Andrew, 2003). As argued by Jennings (2000, p.3), in order to convince artisanal

[15] Although the main leach reagent in the small-scale gold mining industry is mercury, many Philippine gold miners have begun using cyanide and gravity concentration methods for processing.

miners to operate legally, "legislation must be (at least) even-handed in allowing (small-scale miners) access to suitable land", and must be "user friendly as far as the granting of licenses are concerned". Burke (1997, p. 13) suggests licensing can "be used more positively if it is seen as a policy tool for the sector rather than simply a form of revenue raising".

In terms of *institutional structure*, it has been indicated that, few government bodies have committed to fully resolving environmental and interrelated socioeconomic problems in the ASM industry. The problem begins with the government institution(s) assigned the administrative responsibilities for ASM. Typically, the unit itself is overstretched, inadequately funded and poorly staffed in terms of mine inspectorates to oversee operations (ILO, 1999). As Nöetstaller (1994) explains, because mining authorities are not provided with adequate operational resources to enforce regulations and exercise control, poor industry environmental, health and safety conditions persist, and fiscal revenues are lost as a result of minerals being smuggled via illegal channels. In short, a restricted allocation of funds and resources inhibits governments from performing regulatory functions effectively, and further perpetuates uncontrolled artisanal mining.

A series of publications (e.g. UN 1996a; UN 1996b Hentschel *et al.* 2002; MMSD 2002) suggest that the majority of mining governmental institutions in the developing world possess insufficient knowledge of ASM, including the locations of operations, technology usage and managerial practices. As briefly noted in Chapter 2, during the past 10-20 years, several developing world governments, in an attempt to revive slumping economies, have worked to encourage foreign investment in their large-scale mining sectors. Concessions of land have generally been leased (by the governments of these countries) to foreign mining companies and have subsequently been prospected to ascertain the locations of prospective mineral deposits. However, a number of artisanal and small-scale miners are often found operating "illegally" within the boundaries of the concession, and when asked by mine management to relocate, intense, environmentally-destructive disputes typically ensue. Occasionally, because of haphazard policy, minimal land is left available by governments for ASM purposes, as it has been allocated prematurely to large companies for prospecting or exploration purposes (ILO, 1999). Land (1994) describes the nature of ongoing

disputes between small- and large-scale miners over land rights in Papua New Guinea's Mount Kare Region, where claims have been made to preferential rights over alluvial gold by virtue of customary land title. Another more recent example is rural Suriname, where, as Andrew (2003) explains, in November 2001, 100 illegal small-scale gold miners were removed from a 16,800 ha land plot jointly owned by Golden Star Resources of the United States and Cambior Inc. of Canada. Here, artisanal miners claim their long history of mining in the area gives them foremost entitlement to the land, irrespective of what foreign mining companies or the authorities propose.

In terms of *policy design and delivery*, or, more specifically, the design and execution of extension services, an analysis of the literature revealed that the majority of interventions undertaken specifically to promote environmental improvement in small-scale industries in developing countries have also emphasised institutions, rather than the strategies and choices of the communities themselves. These, as explained by Jennings (2000, p. 3), have constrained efforts "to promote better organisation and work practices, increase the productivity of small-scale mines and lessen adverse labour and social effects". In the context of ASM, there is growing consensus that the majority of efforts taken to combat environmental problems to date have emphasised "finding technical solutions to mining and processing problems" (Jennings, 2000, p. 3), the obvious misconception being that their effective resolution requires an in-depth understanding of conditions on the ground (Hentschel *et al.*, 2001, p. 40). It is often argued that the drawbacks of ignoring the key underlying economic, labour and social issues when devising technical solutions to pressing problems is best exemplified by the mercury retort, which, according to industry specialists, has been implemented with marginal success largely because of a poor understanding of target mining populations. Specifically, it has been noted that governments have done little to solicit inputs from miners concerning the appropriateness of introduced retorts *prior* to implementation; this, in turn, has impeded their adoption. For example, in Peru, although the government distributed retorts to miners, their utility and efficiency had not been determined beforehand. Consequently, few miners use them at operations today (McMahon *et al.*, 1999). In Zimbabwe, the retorts introduced by ITDG, despite having been effectively demonstrated in the field, have proven to be "an expensive initial outlay for the

subsistence miners" (Maponga and Ngorima, 2003, p. 152). Wortuba (1997, p. 472-473) provides a detailed description of the Bolivian case, indicating that indigenous miners disapprove of the introduced models for the following reasons:

- The retorting takes much more time than burning in the open air;
- The heat source for a retort must be stronger than that required for free burning, which often results in a lack of heat sources;
- The amalgam and the gold ore is not visible during the process;
- Depending on accompanying minerals and other impurities, retorted Bolivian gold often has a dull, gray surface, which gold buyers pay less for; and
- Retorted gold often smelts or sinters into a lump that further detracts gold buyers.

To erase miners' fears of losing their gold – which stems largely from the inability to "view" the retorting process – UNIDO introduced the transparent TherMex retort in Africa and the Philippines. However, because of the design's low capacity (<30g of amalgam), high cost, and fragility, most miners have had reservations about adopting them as well.

Many of the financing efforts for ASM have also reportedly gone astray, with critics arguing that initiatives have proven unsuitable for the subsistence operator. Few operators have the assets to use as collateral for loans, nor are many capable of providing timely repayment of borrowed funds and interest. In Bolivia, for example, some one and a half years after launching the MEDMIN Foundation and APEMIN Project – two credit lines implemented for ASM – a number of problems were encountered. The requisites demanded by the Episcopal Commission for Bolivia (CEPAS), which had contributed 50% of the credit to the MEDMIN Foundation, made access to the fund extremely difficult. It opted to disperse funds gradually because it considered "it necessary to go through a process of getting to know the aptitudes and repayment capacity of the beneficiary [resulting in few] beneficiaries per year" (Jerez, 2001). Due to negative experiences with mining credit during previous years, CEPAS has requested for mining parties to provide, *inter alia*, details regarding proof of market (contracts for the period of the loan), mortgage guarantees, and a technical assistance contract (for the project) for the loan repayment period; miners have generally been unable to produce the requisite documentation, and thus, few have secured sponsorship. Moreover, of the small group of individuals who had

successfully qualified for credit under both projects, none have managed to repay debts because of the high interest rates attached. Failure to repay loans eventually caused the scheme to go adrift (Hentschel *et al.* 2001).

Gunson and Jian (2001) report that in China, "there is [also] very little in the way of (financial) support activities for artisanal miners". Few miners appear interested in securing loans from banks to purchase improved equipment because they require substantial collateral and excellent connections with bank officials to secure. In Peru, poor creditworthiness and management capacity has led to a subsequent lack of access to formal credit markets. Here, miners are forced to borrow from *quimbalateros*[16] and, in return, are required to use their concentration techniques, despite the availability of "cleaner" and cheaper methods (McMahon *et al.*, 1999).

Although heralded as one of the most successful ASM assistance projects launched to date, the Shamva Mining Centre, which, as previously earlier, was established to provide centralised support services to Zimbabwean small-scale miners, has experienced its share of problems. According to the literature (e.g. Peak 1998; Mugova 2001), these stem largely from a lack of foresight on the part of its designers. Despite providing miners with processing services at affordable rates, miscalculations have led to production problems; by the early-1990s, it became evident that the capacity of the ball mill installed was insufficient to meet the growing needs of miners. The mill had the ability to produce only one tonne ore/hr, thereby forcing many subsistence miners to wait between three and six weeks to have their ore processed. Additional problems have since resulted from poor business decisions. Not only does Shamva lack an experienced and competent manager, but it also continues to experience serious cash flow problems, which have further impeded its ability to provide timely support services to needy miners (Mugova, 2001).

In summary, a number of critics have pointed to ways in which inappropriate legislative aims and directives (*i.e.* legislative intent), institutional structure, and impoverished policy design and delivery have contributed to an ineffective policy stance toward ASM, in turn, preventing complete integration of the industry into the legal domain. The continued informal nature of ASM has made effective

[16] These are individuals who use huge mortars to process gold. They usually add milled ore into the mortar, add water to fine sand, and then add mercury to the mortar to recover the gold.

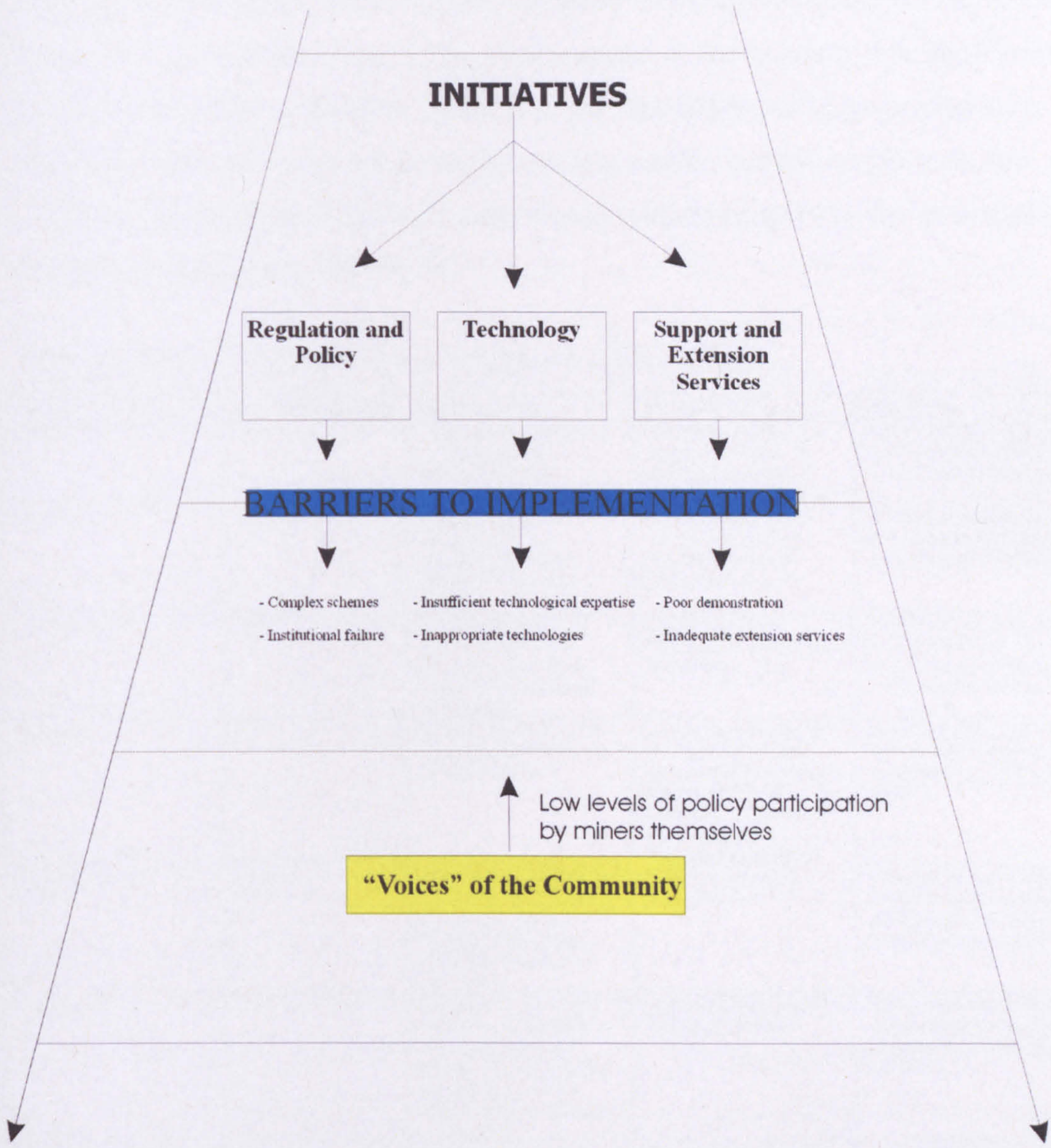
environmental management and regulation challenging. It has been argued that many of the interventions taken to provide support to artisanal and small-scale miners have emphasised finding technical solutions to mining and pressing problems, with minimal concern for underlying economic, labour and social issues. Consequently, support-related projects, most of which have been left to stand on their own, have often "gently wound down due to a lack of continued government support or supervision" (Jennings, 1999). According to the literature, it appears that neglect on the part of developing world governments to adopt bottom-up policy approaches that effectively address key community-side issues – *i.e.* the needs and attitudes of artisanal and small-scale miners – has contributed to a policy environment characterised by ineffective regulation and inadequate extension (see Figure 4.6).

It is against the background of this analysis that the policy stance toward artisanal and small-scale gold mining in Ghana is examined. The discussion combines excerpts from the literature with feedback from key government personnel and indigenous industry experts.

## 4.4 Environmental management in the Ghanaian artisanal and small--scale gold mining industry: indigenous conceptualisation of the current policy stance

As explained in the foregoing discussion, from the literature, major shortcomings have been identified with the conventional approaches taken to regularise ASM. Experts have identified, *inter alia*, inappropriate laws and codes of practice, equipment, and extension services as major reasons behind a lack of registration in ASM. In accordance with this analysis, the policy stance taken by the Ghanaian Government toward environmental problems in the resident artisanal gold mining circuit is analysed in terms of 1) legislative intent, 2) institutional structure, and 3) policy design and support. Expert opinion was surveyed to provide perspective on how artisanal and small-scale gold mining is currently being managed institutionally, and the efficacy of the approach taken to regularise the industry for both environmental and organisational purposes. The experts consulted are based in relevant mining ministries, academia, and local consultancies; each has over ten years' research experience on ASM. Excerpts from selected case-specific texts and documents (Table 4.3) are used to compliment the quotations presented in the discussion that follows.

**Figure 4.6:** Depiction of the regulatory and management approach toward ASM




**According to the literature, many developing world governments have implemented a series of policy, technology and support-related measures to improve the efficiency of small-scale gold mining operations. However, without having consulted or interacted with recipient mining communities beforehand, a number of problems have surfaced following implementation of these measures. In particular, policy schemes have proven too complex, technologies have proven to be unsuitable, and support-related initiatives have dissolved.**

### 4.4.1 Legislative intent

To revisit the purpose of environmental regulation, "law should provide a framework for regulating use of the environment", and is "crucial for environmental management in a number of ways" (Barrow, 1999, p. 41-42), including:

- Regulation of resource use;
- Protection of the environment and biodiversity;
- Mediation, conflict resolution and conciliation; and
- Formulation of stable, unambiguous undertakings and agreements.

Referring specifically to the institutional pillars of the SSMP and the EPA, a report prepared for the Minerals Commission entitled *Write-Up On Minerals and Mining Sector and its Agencies* states, the "government is fully aware that poor mining practices can cause excessive environmental degradation", and, in response, "a concerted effort is being made to put environmental controls in place so that the country's mineral resources may be developed with due regard to the environment" (Minerals Commission, 2001, p. 7).

**Table 4.3:** Selected environmental reports on ASM in Ghana

| Author | Year of Publication | Document Title | Document Type | Description |
|---|---|---|---|---|
| Aryee *et al.* | 2003 | Trends in the small-scale mining of precious minerals in Ghana | Journal article; part of a recent special issue on small-scale mining and the environment, in press. | Provides the most recent up-to-date environmental information on small-scale mining in Ghana. |
| Babut *et al.* | 2003 | Improving the environmental management of small-scale gold mining in Ghana | Journal article, part of a recent issue on small-scale mining and the environment, in press. | Describes environmental management efforts in the gold mining region of Dumasi, Ghana. |
| Ntibrey, B.K. | 2001 | Small-Scale Mining of Precious Minerals in Ghana – A Strategy to Improve Environmental Performance | Academic thesis, University of Science and Technology, Ghana | Describes small-scale gold mining in Ghana, and recommends a course of action to improve the performance of the industry. |
| Hilson, G. | 2001 | A Contextual Review of the Ghanaian Small-Scale Mining Industry | A report prepared for the Mining, Minerals and Sustainable Development Project (MMSD), International Institute for Environment and Development, London | Uses a combination of research findings and literature to describe the state of small-scale mining in Ghana |
| Labonne, B. *et al.* | 2000 | Poverty Eradication and sustainable Livelihoods: Focusing on Artisanal Mining Communities, Mission to Ghana, 4-15 June 2000 | UNDP Country Case Study Report | Describes the state of artisanal mining in Ghana, and prescribes strategies to eradicate poverty in artisanal mining communities |
| Agyapong, E. | 1998 | Streamlining Artisanal Gold Mining Activities and the Promotion of Cleaner Production in the Mining Sector in Sub Saharan Africa: Ghana as a Case study | Academic Thesis, Lund University, Sweden | Uses survey data to describe the environmental performance of the Ghanaian small-scale gold mining industry |
| Iddirisu, A.Y., Tskiata, F. | 1998 | Regulatory Framework Study to Assist Small Scale Miners | Final Report prepared for the Minerals Commission, Ghana | Summarises the industry and provides recommendations for improving conditions |
| NSR Consultants (Part I) | 1994 | Environmental Impact Assessment of Small-Scale Mining in Ghana: Part I Physical and Biological Aspects | Part one of a three-part study on environment and mining in Ghana; commissioned by NSR Consultants, Australia for the Minerals Commission | Surveys the environmental impacts of small-scale mining in selected communities, and provides recommendations for resolving pressing problems. |
| Assimeng, M., Konadu, K.O. | 1994 | Environmental Impact Assessment of Small-Scale Mining in Ghana: Part II Socio-Economic Aspects | Part two of a three-part study commissioned for the Minerals Commission | Surveys the social and economic conditions in selected small-scale mining communities in Ghana. |
| NSR Consultants (Part II) | 1994 | Environmental Impact Assessment of Small-Scale Mining in Ghana: Part III Guidelines for Draft Regulations | Part three of a three-part study on environment and mining in Ghana, published under the auspices of the Minerals Commission, Ghana | Examines the policy and management framework for small-scale mining in Ghana and prescribes recommendations for improvement. |

Reinforcing claims initially put forward in the literature by Jennings (1999, 2000), Hentschel *et al.* (2002) and others, interviewees outside government indicated that the

regulations and codes of practice currently in place for ASM (in Ghana) are imprecise and poorly-designed. As explained by a senior engineer at Ghana Goldfields, the operations of which are based adjacent to small-scale mining plots, "the SSMP began with good intentions but is now plagued with managerial problems [but] there is no clear-cut difference between *galamsey* and registered miners [in laws], and [institutional] bodies are not properly enforcing legislation. There is also a problem with respect to who regulates small-scale mining, as there is a fundamental overlap in regulations". Legislation aimed at initiating increased regularisation has, according to experts, been marginally ineffective. As a senior engineer/director at Ghana Goldfields put it, "[the government] simply does not have enough people on the ground to enforce regulations accordingly".

In terms of the design of indigenous ASM legislation, a consultant/professor indicated that the Ghanaian Government has used the operations and existing legislation of large-scale mines as guidance to craft regulations and laws for small-scale operators, despite it being widely recognised that "the establishment of enabling conditions (specifically) for small-scale miners or legislation is very important for orderly conduct of small-scale mining" (Ntibrey, 2001, p. 64). The consultant/professor noted that as a result, "[ASM] laws are strict but not enforceable. For example, small-scale miners aren't allowed to use dynamite but still do". Some ten years ago, a team of Australian-based researchers began lobbying for the Ghanaian Government to significantly amend its *Small-Scale Gold Mining Law* largely because, in their view, it fails to both facilitate industry regularisation and improve environmental management at sites in its present form (NSR, 1994). A senior academic at the University of Ghana, however, argued that "the current problematic state of ASM regulations in Ghana" is a product of what is an ineffective environmental regulatory system overall:

> "Although Ghana has an act of parliament and subordinate regulations, both laws in place for mining and the *Environmental Protection Act* contain general statements. Thus, there is a need to put in place laws that are specific to small-scale mining and which stipulate requirements. A workshop could be held to identify precise industry standards involving members of the small-scale mining community". [Senior academic, University of Ghana]

There was similar opinion voiced in certain government circles over the design and efficacy of ASM legislation. As an official at PMMC put it, "legislation is not enforced, and people are paid poorly, and, therefore, do not enforce laws because of a

lack of motivation". Other key government officials interviewed indicated that the distribution of legislative tasks, rather than the laws themselves, is inhibiting regulation in the sector. As explained by an official (3) at the Minerals Commission, "The Minerals Commission is basically a policy-making body. The fact that it is [now] both implementing laws and assuming a promotional responsibility has put it in an awkward position". There was further indication from government officials that certain agencies are not enforcing legislation as required. For example, the Mines Department, which was established to enforce regulations pertaining to health and safety, was identified as complacent regarding its assigned ASM advisory tasks. As one source in the Ghanaian Ministries put it, "someone should tell them (Mines Department) to do their job because right now, its staff is simply sitting back, doing nothing and collecting their salaries" (Government of Ghana, 2002d).

Others based within government identified the absence of the EPA in environmental regulatory enforcement processes (for ASM) as an additional problem. Although it has been the intention of policymakers to implement laws and codes of practice to improve the organisation of, and environmental management at, indigenous artisanal and small-scale gold mining operations, the EPA – the national environmental regulatory body – plays a minimal role in monitoring and regulation. As an EPA official (3) put it, "*occasionally*, the EPA has undertaken environmental initiatives related to small-scale gold mining activity but generally, the EPA only becomes involved with (small-scale mining) matters *if* people break laws...most of the industry's responsibilities lie with the Minerals Commission".

One initiative undertaken by the EPA that has been criticised by other government departments is the EIA procedure enacted specifically for small-scale gold mining, which, as previously explained, was allegedly implemented to ensure that environmental issues are addressed at sites. As explained by EPA official (1): "We insisted...so that now at least some of them (*i.e* the miners) have to register, because about two-to-three years ago, they didn't even need to come and get an environmental permit, and, as you see, they currently come and get a concession and they disturb the whole thing. We have a little control now and the fact that we provide the Minerals Commission people with some environmental information, they can now monitor them". However, other government officials used the EIA process to underscore how

environmental legislation enacted specifically for ASM has failed to lay the necessary groundwork for environmental management in the industry. As a Minerals Commission official (3) put it, "[it was] a legislative afterthought. [It is a] ploy to generate funds for Government...Implementing an improved EIA for small-scale mining, ideally, we get all of the district officer staff and the mines wardens and the EPA to cooperate towards implementing an improved scheme...have a workshop, having people from the district centres and the EPA participate, and decide where to go with this EIA. At present, the footpaths or the proceeds may work on the ground but once it gets to the EPA, they say 'no, no', and it delays the licensing". Another official (2) at the Commission echoed these views.

> "The EIA...the only thing is that what happens, currently, is the miners do not even know where they are going to mine. So, the EPA must go to the field *first* before they issue them the permit. Then they can guide them within the guidelines. So what we do, our officers, we give them some instruction but there are no guidelines for the small-scale miners as such. On the Impact Statement (of the EIA form to be completed by the prospective miner), you describe environmental conditions and outline some mitigative measures but it must be improved! At the small-scale mining level, there are no EPA guidelines, as their guidelines exclude small-scale mining. The legislation does not necessarily have to be amended but other things can be done. You see, we have regulations for law and order, so some regulations can be done for environmentally regulating gold because even though they are excluded, they are still required to issue an environmental permit...If you go to the field, you would know this". [Minerals Commission official (2)]

Certain industry experts based outside of government echoed these views. As one consultant put it, "the EIA statement does not address the impacts on humans well and needs to emphasise remediation and reclamation more". Experts furthermore indicated that the application form for an "Environmental Permit to Undertake Small/Medium Mining" (Pursuant to LI 1652), which must be completed as part of the application for a license to mine gold on a small scale, is ineffective, as no indicator criteria are relied upon for evaluation purposes. Vague, open-ended questions are asked in the form, including, "give a brief overview of the likely environmental impacts of the mining activities" and "describe briefly the mitigation measures proposed" – probes that fail to provide significant and informative feedback, and, in all likelihood, require follow-up interviewing. Questions such as "how are you planning to prevent emissions of mercury" and "what measures are you planning to take to re-grade and reclaim abandoned land", which can assist in determining

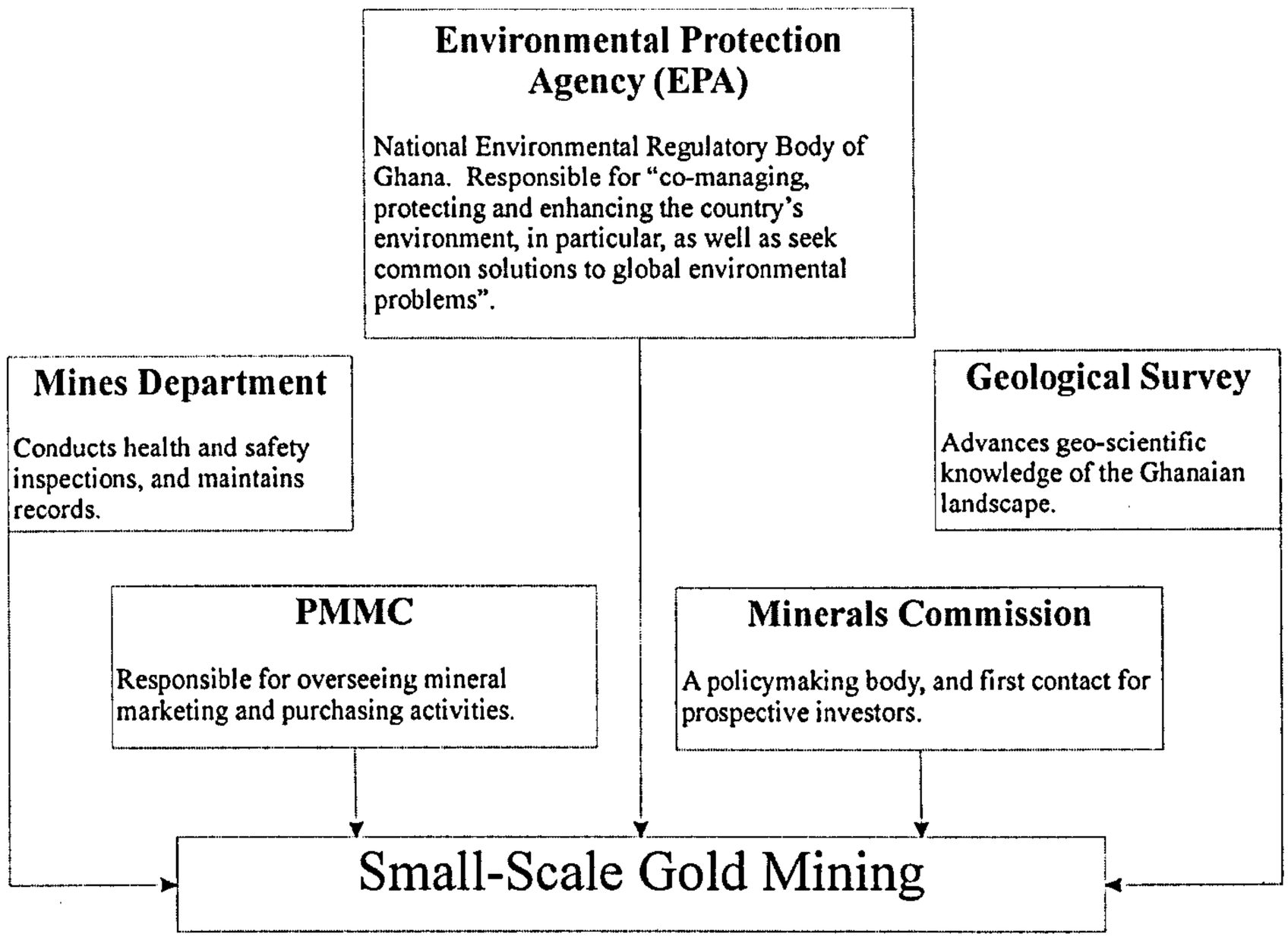
levels of environmental awareness and management in communities, are not asked on the form (Hilson, 2002a).

According to Lovei and Weiss (1998, p. 22), the effectiveness of environmental legislation is dependent upon a combination of the following four factors: 1) how well environmental legislation reflects environmental priorities; 2) how capable environmental legislation is with existing legislation and the general legal system; 3) how compatible it is with the existing administrative and institutional framework; and 4) how feasible its implementation and enforcement is. Although labeled an environmentally-destructive industry in a number of documents and reports, it appears that ASM has yet to be identified, legislatively, as a priority environmental concern in Ghana. Experts both outside of and within government indicated environmental legislation and codes of practice, despite being implemented for the purpose of persuading artisanal and small-scale gold miners to operate under a formalised scheme, have failed to lay the necessary groundwork for industry environmental improvement. There was further indication that laws lack the comprehensiveness and accompanying enforceability to achieve the desired organisational and environmental improvements at sites.

### 4.4.2 Institutional structure and commitment

The institutional pillars of the SSMP – *i.e.* the Mines Department, Minerals Commission, Geological Survey Department and PMMC – along with the EPA have been assigned various regulatory and policymaking responsibilities concerning ASM and mining in general (Figure 4.7). Those in occupations outside of government identified such widespread institutional commitment as a necessary first step toward tackling the environmental and interrelated socioeconomic problems in the industry. A senior academic at the University of Ghana, for example, argued that "institutional capacity is the biggest barrier to improvement. Clear and specific standards have not been set for miners, nor have articulated guidelines for institutional relationships been established in this context so that different bodies are supporting one another and working in areas of their strength."

**Figure 4.7:** Government agencies regulating and managing ASM in Ghana




One notable example provided was the Geological Survey Department's apparent inability to provide basic geological information to miners, and its negligence in providing assistance with property evaluation, supporting basic training, and providing laboratory and assay services – again, all of which were assigned responsibilities under the SSMP. According to Ntibrey (2001), Aryee *et al.* (2003), Aryee (2003) and others, concessions of land are, therefore, being awarded without appropriate knowledge of geological content; experts contend that this has led to unnecessary land degradation, as miners, using primitive prospecting tools, upturn vegetation and soils rapidly and carelessly in search of gold. As a consultant/professor put it, "most miners [still] do not have effective means of ascertaining ore values, and determining where rocks are located". Agyapong (1998, 54) argues that this "lack of systematic and scientific prospecting", combined with "the difficulty in obtaining concessions", in turn, has caused miners to "spend much time and energy to extract potentially gold-bearing materials which they later find to contain nothing". As explained by a senior mining engineer at Ghana Goldfields, as the situation now stands, "miners [continue to] migrate without reclaiming pits, and, as a result, as many as 200 potholes can [now] be found on a single hill". As furthermore explained by the consultant/professor, "most miners [still] do not have effective means of ascertaining ore values, and determining where rocks are located".

On the issue of institutional support for ASM, there was a dichotomy in perspectives among interviewed government officials. The majority maintained that as a result of PMMC, the Mines Department and the Geological Survey Department neglecting their responsibilities under the SSMP, the Minerals Commission has been burdened with tasks it is unable to execute effectively because of financing and resource problems. "Improving coordination among institutional bodies is very important, with the Minerals Commission, the Mines Department, and so on," explained a Minerals Commission official (2). As explained more precisely by another official (3) at the Commission:

> "Institutional strengthening is needed because the Minerals Commission has been put in the awkward position of having to both implement (small-scale mining) laws and assume a promotional responsibility...and despite undertaking all of the extension services of the SSMP, it does not receive any revenues (to use for other important small-scale mining activities) because it does not assume *any* purchasing responsibilities. In addition, because the Minerals Commission often has to liaise with the EPA to enforce industry regulations, many small-scale miners do not seriously view it as a regulatory body". [Minerals Commission official (3)]

An official at PMMC argued that problems include, "a shortage of cars and computers, personnel, papers, training, and the Internet in many departments, especially the Minerals Commission". Officials at the Minerals Commission used the following examples to illustrate how a surplus of tasks has resulted in a rapid deterioration of the district centre support system it has established for ASM:

1) District support centres are generally well out of the reach of miners, who are often forced to commute many kilometres to receive technical support and guidance. This also poses a formidable challenge to the employees of the centres themselves, particularly those in Tarkwa and Bibiani, where staff has been assigned the task of monitoring the day-to-day operations of mines located as much as three hours distance away by automobile.
2) The centres lack Internet and Intranet capabilities, and most are equipped with basic typewriters. Thus, a request to head office from district centre staff for a list of registered miners, or the details of a concession – a task that would normally take minutes via email communication – can take weeks, if not, months.

3) Of the computers that *are* operating, most are low on memory and use the obsolete WINDOWS 95 operating system. As of August 2002, the Dunkwa computer was broken.
4) The Dunkwa centre is staffed with only an officer and a driver.
5) The Oda and Bibiani centres do not have (telephone) land lines; both are on a "024" Motorola cellular phone extension, which is nearly impossible to get through to during the working day.
6) Petrol payments from Accra to the Bibiani and Tarkwa offices for the field vehicle are often untimely, thus preventing staff from visiting sites.
7) The Bolgatanga centre, despite having a centralised gold processing unit, can only process hardrock deposits. According to a number of government officers, the centre is also plagued by a plethora of managerial problems, largely because its design and function has been based upon that of the overrun, understaffed Shamva Centre in Zimbabwe.

"I think you first have to strengthen the regulatory agencies first – it's very crucial," explained a Minerals Commission official (1). "They provide direction, and, without direction, then nothing will function, and no progress will be made...we need to make sure the regulatory agencies who are to license them and who are ensuring that they are operating properly, are, in fact, functioning properly."

Officials based within the other institutional pillars of the SSMP voiced different opinions on the issue of institutional support for ASM. In the case of the Geological Survey Department, staff at the Minerals Commission also pointed to how, as a result of its abandonment of geo-prospecting responsibilities, concessions of land are essentially being awarded to miners without any accompanying information regarding potential mineral composition. As Commission official (3) put it, "this (*i.e.* the land degradation problem) is a result of a fundamental lack of geological information, which is causing unnecessary damages to land. Money should be concentrated on prospecting and proving areas, and then transferring the knowledge locally with the consent of the government... Fundamentally, there is a need for resource definition, as well as a need to improve the mining methods and processing methods". However, staff consulted at the Geological Survey Department *also* acknowledged that a shortage of institutional support is inhibiting industry regularisation and environmental protection efforts. As a Geological Survey Department official put it:

> "I think improved coordination among institutional bodies is very, very important because the Minerals Commission does not have the capacity to do the geological work, or the evaluation of the small-scale plots...So, the Geological Survey Department has to begin to do some of the work it undertook in 1997, 1998 and 1999...They have to sort of do the prospecting or the evaluation to know the areas which are viable for mining for the small-scale miners, meaning they have to demarcate areas so that when the small-scale miners go, they know to go there...I mean, not like previous, when they just go from here to here, and get a concession, and do their own thing, and at the end, they realise there is no gold there, so they destroy the environment". [Geological Survey Department official]

The EPA was also identified by Minerals Commission officials as another government agency providing minimal input to ASM regulation, monitoring and policymaking activities. Referring to the role the EPA has in administering EIAs to small-scale gold miners, Minerals Commission official (3) explained: "there is also a need for EPA to have some staff so at least they can go to the field and check what they are doing on the site plan. You cannot just assess it in the office. You must sit down with all of the key players". However, and although perhaps uncommitted to providing assistance, it appears that EPA officials also recognise the current shortage of institutional support in place for ASM. As official (1) at the EPA put it:

> "Improved coordination of institutional agencies is what we are asking for all of the time...the Minerals Commission cannot do it all on their own...they cannot be a promoter, and, at the same time, an inspector...Some of the environmental concerns need to be looked into, so they need a lot of collaboration from other government sectors. We should have a one-stop shop for small-scale mining at the government level, instead of going from the Minerals Commission to the EPA". [EPA official (1)]

Minerals Commission staff furthermore argued that the Mines Department has failed to fulfill its responsibilities under the SSMP. As one official (2) explained:

> "The Mines Department's shortage of institutional inputs is big – especially with the Chief Inspector of Mines...if he is not supposed to help you, he won't do it. Truly speaking, what happens is, the Minerals Commission is a promoting agency; it is not an enforcement agency...but the Mines Department is. You see, what the Minerals Commission is doing, is we are promoting the sector and advising the miners what to do...The Mines Department ought to have peoples who come around and if they are not doing it, they will sanction them. That is what it ought to be...And that was planned but they do not have it. The thing is to resource the Mines Department to have people to get to the small-scale mines...Currently, the Mines Department is only concentrating on the large-scale mines but even there, they are coming up short...They have to get people who can do that job...They can sanction miners, we cannot sanction them unless it is a criminal activity". [Minerals Commission official (2)]

Official (1) at the Minerals Commission echoed these views. "I don't think that Mines Department should be excluded from a discussion on small-scale mining policy for the fundamental reason that as far as health and safety are concerned, it is the preserve of the Mines Department irrespective of what mining we are talking about. Maybe the law does not discuss this or mention Mines Department but I believe that as far as health and safety in mines whatever mines we are talking about, Mines Department plays a very significant role." Although the Mines Department was assigned ASM responsibilities under the SSMP, there remains what Tráore (1994) describes as a legislative "grey area", as there is no indication in Law PNDCL 218 of the organisation having any clear-cut administrative as far as ASM is concerned. A Mines Department official was resistant to the idea of his agency providing administrative support to ASM, and justified his position using the language of PNDCL 218:

> "Ok. Looking at (possible ways forward), *I'm yet to see* the Mines Department listed here...technically, I think you're right, and I mean it, because I don't know if you've had a chance to study (PNDCL) 218. Because according to 218, it's the responsibility of the Minerals Commission. But if you've not, I don't think you know what you are doing. I'm also worried especially about the use of the Mines Department at this discussion. Unless of course we agree that there has been some fundamental mistake before we bring Mines Department on board...As I said, this exercise started some time ago. There has been some consultation before as I said, and, as I said, Mines Department doesn't have a part. I cannot see on any part of the initiatives here where the Mines Department would play a role". [Mines Department official]

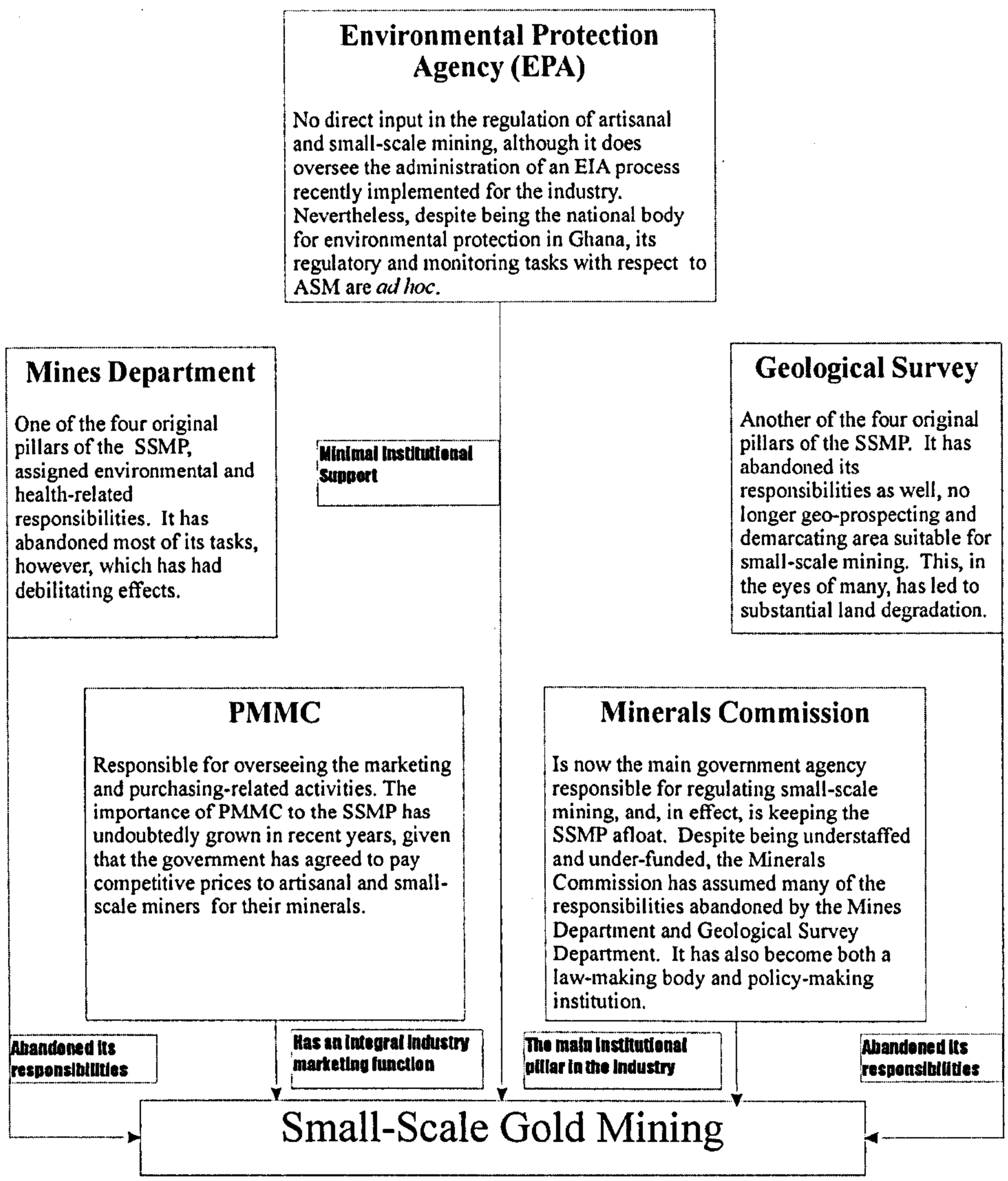
The Mines Department's position on the issue of institutional support for ASM – namely, its alleged contentedness with providing minimal input to the industry regularisation process – was an issue of concern among the officials of sister government departments. For example, representatives from the Geological Survey Department, who, as reported earlier, recognise the need for their agency to play an expanded role in providing assistance for ASM, called for the Mines Department to also assume an expanded role:

> "The Mines Department also have to come in because they sort of monitor, and they therefore have a part to play...Wherever there is mining, the Mines Department will have to come in...So I think, there is a need for coordination among the sister institutions – the Geological Survey, the Mines Department and the Minerals Commission". [Geological Survey Department official]

A Minerals Commission official (3) suggested the Mines Department's current position toward the issue of institutional support for ASM was a manifestation of its

view of the SSMP overall. "It is because of this lack of coordination that small-scale miners have not come to the point where they are properly functional as an industry. Mines Department has a very low opinion of the project overall, and initially, there was fighting when the project came about, which resulted in institutions battling over decisions."

**Figure 4.8:** Problems with institutional support for ASM in Ghana, based on interview feedback




To summarise, experts based within regulatory circles, academia and consultancy were in general agreement that there is presently a shortage of institutional support for ASM. According to interview feedback, it appears the Minerals Commission has been burdened with the majority of the administrative responsibilities abandoned by the Mines Department and Geological Survey Department originally inscribed within

the blueprints of the SSMP. However, whilst staff interviewed from the Geological Survey Department and the EPA acknowledged that there was a lack of institutional support in place for ASM potentially inhibiting industry regularisation, officials based at the Mines Department did not. "Overall, we need some consensus building around the institutions," explained a consultant. "I think at some point, the Minerals Commission has to tell other departments what to do." The Figure above (Figure 4.8) summarises institutional support problems in the context of ASM in Ghana, based upon interview feedback.

### 4.4.3 Policy design and delivery

The message conveyed during interviews was that poorly-designed laws and inappropriate institutional support have subsequently resulted in the execution of ineffectual policies and extension services for miners. There was further indication throughout both non-government and government circles that the current impoverished state of support services in place for miners is a manifestation of a poor understanding – on the part of the Government – of conditions on the ground.

Although at times resistant to discussing issues of institutional support, the majority of government officials interviewed argued the need for improving knowledge of ASM conditions and communities *before* ambitiously administering support. EPA officials, for example, implied that effective monitoring is not taking place because there is little knowledge of who is operating in the field. "The number of registered, etc...how many of these people have the Minerals Commission talked to, etc.," explained a EPA official (1). "If we have this information, then we can do things." As another official (2) from the EPA put it:

> "We have to find out how many miners are already registered with the Minerals Commission and the EPA, and how many are not...How many are outside this bracket? Then, we can analyse how many are outside the bracket and what is making them go outside". [EPA official (1)]

EPA official (1) argued the Minerals Commission was awarding concessions to prospective small-scale miners without knowledge of *what* was on the land. The following example was used to illustrate this point:

> "An individual approached the Minerals Commission with the geological information...and the concession was approved...It was later discovered by the EPA, however, that the location where the individual was proposing to mine was some 50 metres upstream from a primary school...We did not want mining

> activities interfering with the children's education and interrupting the teaching...Most of all, we did not want the children leaving school to work at these mines...The EPA therefore declined his application for a environmental permit to mine but it should not have come to this stage, as our basis for declining was not based on any environmental issue whatsoever...So I phoned the guy there at the Minerals Commission...and said, how do you plan to award this concession...I cannot award it unless you plan to relocate the school...so I told the miner that I can change the concession for you but I cannot allow him to mine in this area". [EPA official (1)]

A similar argument was put forward by Minerals Commission officials, who maintained that as a result of undertaking few preliminary studies of miners and practices inappropriate ASM policies have been designed, and inappropriate extension services have been implemented. Referring specifically to the absence of such preliminary analysis, Minerals Commission official (2) explained:

> "The issue in some of these gold mining countries is that they have accessible areas for miners. But ours especially is different. I mean, in these countries, you find that people walk thousands of miles before reaching another mining area. And so, you don't expect anybody there. But here in Takwoardi, anyone can dig in the ground for gold, which makes things much more difficult to regularise". [Minerals Commission official (2)]

Consultants argued that gold artisans as well as more advanced small-scale miners continue to use inefficient equipment that contributes to environmental degradation. In a consultation report entitled *Review of the Marketing Function Under the Small Scale Mining Project* (KAA, 1993), written by Kwame Asante and Associates for GTZ some 10 years ago, it was reported that technologically, the major problems encountered by Ghana's small-scale gold miners include a lack of working capital and credit facilities; a lack of mining equipment; unsatisfactory equipment; inappropriate wages; inadequate prices for produce; a shortage of technical expertise and support; and insufficient buying centres and agents. Iddirisu and Tsikata (1998) point more specifically to the inability of the Government to upgrade the industry's equipment, which, as previously explained, is only 20-40% efficient. A consultant/professor explained the problem in greater detail:

> "If techniques were researched and developed to improve daily yields from one to two grams using 10% of the revenue generated, it could mean doubling output. [There is a need] to secure financial support and modernise their equipment [and] acquire technical assistance so they can mine more healthily and safety...they have no safety – it's secondary, [they] keep digging down and down into pits. Sometimes, they bring water pumps down into pits, and are overwhelmed by carbon monoxide. It means that most of them do not understand the science in what they are doing. Some of the registered small-

> scale miners are mining a bit more practically because some have the experience and the funds to buy equipment, although the equipment is sometimes questionable". [Consultant/professor]

Consultants such as Assimeng and Konadu (1994) and NSR (1994) point to the Government's ignorance of the need to commission scoping studies to first determine *which* pieces of equipment are most suitable for use in artisanal and small-scale gold mining communities, as the principal reason behind its failure to improve the industry's exorbitantly inefficient production processes. As the consultant/professor furthermore put it, "people just propose technology as the solution. We had some Canadians that were pushing implementation of technology but things have to be step-by-step. We have to look at operations first, and then, after that, we can mechanise []." A senior academic at the University of Ghana, a consultant/professor, and two senior engineers from Ghana Goldfields used the case of the TherMex retort as a modern-day example to illustrate how the Ghanaian Government has disseminated *inappropriate* equipment to artisanal and small-scale gold miners. It was explained that the transparent TherMex retort continues to be beyond the budgetary means of miners, and many who have managed to purchase the device have experienced "burnout" problems, or have had units crack under heat stress and ground impact. As indicated by a senior engineer from Ghana Goldfields, the sporadic adoption of retorts is an issue in need of immediate attention as "mercury pollution has become a *visible* problem in Ghana, as it is often seen running into streams". It has also been reported that Ghanaian artisanal and small-scale gold miners repeatedly "expose themselves to mercury by consuming water or food [because it] continues to be released into the aquatic environment during the washing/squeezing stages of the gold production process" (Babut *et al.*, 2003).

The alleged widespread use of poor mining equipment at sites was also identified as a major problem in particular government circles. "Mining methods have to improve because they are inefficient, mainly because the (gold recovery) process is poor," explained a PMMC official. "Technical services must be enhanced, possibly through the establishment of a 'plant pool' that would provide additional services to labour." Minerals Commission official (3) described what he perceived as the major environmental implications of prolonged usage of inefficient equipment in the industry:

> "The industry's 'ordinary equipment' has been responsible for significant land degradation throughout the country...As miners do not have efficient technology, there is urgent need for increased mechanisation in the sector, and a system that supports the requisite technology. Miners especially need equipment for processing because the industry is virtually non-mechanised and presently, manual methods hinder production possibilities thus limiting profits. Improved mechanisation would help to improve output remarkably, enabling a miner to meet his needs". [Minerals Commission official (3)]

Government officials, particularly those interviewed from the Minerals Commission and EPA, also partly attributed the repeated implementation of inefficient inappropriate equipment to a poor understanding of conditions on the ground. As Minerals Commission official (1) put it, "what they are saying is that we need information – we need information collected on a monthly basis. If we get this evaluation for them from month to month, Ok. But there are people not registered at all. Do we have any idea of what proportion are unregistered? No. We have no idea". It was furthermore indicated by Minerals Commission official (3) that the assaying lab built in Tarkwa, which was designed specifically to provide miners with inexpensive geo-prospecting services, "[has] been gathering dust because it has not been used with regularity". Its failure, in turn, has supposedly put a hold on plans to construct additional assay laboratories at the other six offices. EPA officials described the importance of having people in place on the ground to study miners and their practices:

> "The people in the field, they need more help, as miners are so widespread. We need people with the background to be able to see the background and what is going on. We are currently handicapped by the fact that we do not have many outlets in the field...so we have to get people from Accra to go to these places. We do this when there is a conflict. We need to have an outlet...of course we could give them the guidance and then send them out to the field. The number of registered, etc....how many of these people have the Minerals Commission talked to, etc.? If we have this information, then we can do things. To start with, the people must go in there, and assess the area for the people... we have a group of companies already allocating land to small-scale miners but many of them have begun operating in the same area. If it can be done this way all over the place, the job can be easier for us government officials...there would be no need to dig places to find gold if we determine these places suitable for small-scale miners". [EPA official (1)]

> "For example, you had a programme to look at the mining processes. Fine. How many areas have you done that, and are the people still using that technology. That, we have to know. What are they not using? And that will form the basis for future action, other than that...is it functional, and if it's not,

> how do we make it, and once we get this information we can move ahead". [EPA official (2)]

Another example of inappropriate equipment provision cited by all interviewed government officials was the hiring of the Central Regional Development Commission (CEDECOM), which was consulted, under the auspices of GTZ in the mid-1990s, to help deliver assistance in the form of funds and equipment to small-scale gold miners (Hilson, 2002a). The Minerals Commission requested for CEDECOM to make recommendations for these provisions but the suggestions proved inappropriate, largely because the organisation, which had no experience with small-scale mining at the time, used information drawn heavily from experiences with small-scale fisheries. The Minerals Commission soon abandoned the scheme, sold equipment at discounted prices, and returned the funds to the Small Scale Mining Project (SSMP). Experts outside government as well as Minerals Commission officials also pointed to instances where teams of people were commissioned to pilot test equipment for operators but only tested devices on one sophisticated and educated small-scale miner, when the majority of operators are of the artisanal variety, unaccustomed to utilising heavy machinery and technology altogether. In the end, technologies, again more suitable for large-scale operation, were purchased, and, following extensive periods of nonuse, had to be sold at discounted prices (Hilson 2002b).

The senior academic based at the University of Ghana, as well as the consultant/professor, further argued that the land reclamation bond, once heralded as the solution to the widespread land degradation problem in the industry, has failed to address the issue of land degradation (Ntibrey 2001; Hilson 2002a). Both claimed that its initial success was cut short because market prices provided by the Government for gold harvested by artisans during periods of depressed market prices were uncompetitive when the 3% reclamation fee was included, thereby giving rise to widespread smuggling. Despite having been successfully incorporated into a marketing scheme, in turn, helping to eradicate illegal mineral marketing (by providing miners with more competitive prices), due to a variety of logistical factors, the bond has not been re-launched.

Government officials, academics and consultants were in general agreement that problems exist with the licensing system currently in place for ASM. Those based outside government indicated that the procedures in place to secure a license were not user friendly (e.g. Iddirisu and Tsikata 1998). As explained in detail by Ntibrey (2001, p. 65), "the licensing procedure is virtually long which discourages some prospective concessionaires from pursuing their licenses and thereby regularising their operations"; there was further indication that the small-scale gold mining license fails to empower an artisan (Amegeby *et al.* 1994; Agyapong 1998). As the consultant/professor put it, "even if the government cannot provide widespread financial assistance, a transferable license, and the integration of education into the licensing process could help to alleviate some of the industry's environmental problems. [There is] need for a law for tenure of security [as] existing laws relevant to small-scale mining activity are strict but not enforceable". It is stated in a recent UN report on ASM "best practices" (UN, 2002) that most African countries with legal frameworks in place for ASM have licenses with short security of tenure, which, according to experts interviewed outside government, holds true for Ghana, where small-scale gold mining licenses are tenable for only three-to-five years in the best of cases.

The majority of government officials interviewed also indicated that the licensing procedure was bureaucratic, featuring unnecessary stages. As Minerals Commission official (3) explained:

> "If you wanted to get a license for small-scale mining, it would take a month...You must inform the district officer first, and then the District Administration forwards it to Accra but when we didn't need an environmental permit, it took no time at all...but now, you have to go to the EPA and get an environmental permit, which at times can take more than a month...In fact, when I was in Bolgatanga, I was speaking to someone who said it has taken eight months and the environmental permit was not there, so I went to the environmental officer and asked him why his work should determine a miner's efficiency and so they phoned Accra". [Minerals Commission official (3)]

Other officials indicated that it has created a problem of intense land use competition with large-scale miners. As a PMMC official put it:

> "As a result of prioritising large-scale mining, a lot of land use conflicts occur. They are very, very common. The big concessions were more or less prospected by the small-scale miners who are highly migratory. They won't easily give up the land and don't have the money to buy a concession, so they are swallowed by the large scale miner. You always get a war. They prepare to be there, and

> the large scale miner comes and swallows them. The small miners mine illegally. The large miner acquires the land through the Minerals Commission. There is confusion between both parties but by law, the land is for the individual but the minerals belong to the government, which decides who get the land – which is normally the large-scale miner". [PMMC official]

As per Part IV, Section 31, Paragraph One of the *Minerals and Mining Law* (PNDCL 153), "where any dispute arises between a holder of a mineral right and the Government in respect of any matter under Part IV of this Law all efforts shall be made through mutual discussion to reach an amicable settlement". According to a number of Government officials, however, most of Ghana's gold mineralised lands are now under concession to large-scale companies. Officials at the EPA fault the Minerals Commission for this problem:

> "Another thing is with the big mining companies...they have been given huge areas...and it is only a small area they are using...this change needs to be made at the government level...the small miners do not have a place to go, that is the issue. Look at the Minerals Commission. They award these huge large-scale concessions and now you come back and ask them to free up the land...no way ... they have taken this land for future uses. This initiative should start at the Minerals Commission, which knows the areas that are being mined...so why do they not commission some studies to that before you even allocate those areas to people...but they just map the place out. Besides this whole thing, then, they just begin working". [EPA official (1)]

According to Aubynn (1997), vast quantities of land have been alienated as a result of large-scale mining in the Western Region, where, in Tarkwa (the Region's main mining centre) alone, at least six large-scale mine concessions have been granted since 1990; statistics indicate that some 32.56% (766.1 $km^2$) of the 2354 $km^2$ mining town has been awarded as mining concessions. The concessions of GAG occupy 220 $km^2$ of the allocated area, all of which was once the fertile homeland of local farmers. According to Asabere (1994), minimal policy support has come from the Lands Commission, which, as explained in Chapter 2, was constituted under 1994 legislation to manage all public and vested lands, and given consent to transactions of land held under customary tenure and managed by the chieftaincy ("stool lands"): politically, land in Ghana has traditionally been an expression of territorial sovereignty, on which a chief is supposed to "sit on the stool of the ancestors" and swear to protect the land for his people. As Besley (1995) furthermore explains, the problem in Africa is that land tenure schemes are communal, in which case, a customary authority, such as a tribal chief, grants claim and regulates transfer of land. This authority may also play a

role in regulating land investments. In the extreme case, the current cultivator of a field has no discretionary land transfer rights, which are referred to as usufructuary rights; Ghana roughly follows this mode. According to Kasanga (2001), the Lands Commission, which has been victimised by political interference and weak management, has been transformed into a patronage for the affluent and others with official connections, at the same time, doing little to preserve traditional lineages. Consequently, the communal land tenure systems that were once dominant have been gradually supplanted by individualistic property rights.

"Most of the miners do not register not because of the scheme but because the areas are incumbent," explained a Minerals Commission official (2). "If you get to an area like Dunkwa, there are hundreds of applications flying down, and although they are working illegally, they want to register but because the place is incumbent, it cannot be done." According to Andoe (2002, p. 7), the procedure for obtaining compensation for land is often cumbersome and subject to considerable delays, and, "the amount involved is considered inadequate and the system is accused of unfairness". The following examples were used to highlight this reality:

- Farmers who lose land to a mining project at a time when no crops are planted do not receive any compensation
- Payment for tree crops are given a one-off payment without taking into consideration the gestation period
- "Landless" hunters and palm wine tappers who have lost their means of livelihood as a result of mine expansion are not accounted for

"Miners will not easily give up the land and often do not have the money to buy a concession," explained a PMMC official. "They are swallowed by the large-scale miner, which results in a war because there is confusion between both parties over mineral rights. Problems have already occurred on the plots of a number of large-scale operators, including Ghana Goldfields Ltd., Ashanti Goldfields, Billiton Bogosso, and Abosso Goldfields."

## 4.5 Summary and conclusions

Interviews were conducted with individuals based both within and outside government in order to improve understanding of indigenous perception of the current

policy stance toward ASM. Opinion was surveyed across a range of people, many of whom are considered industry experts.

The academics and consultants interviewed, each of whom has hands-on experience in the field, maintained that inappropriate regulations have been enacted for artisanal gold miners. Having been involved in various ASM projects in the past and/or based in gold mining regions for extended periods, it is likely the individuals comprising this group base their views upon what they have witnessed on the ground. The main points conveyed by academics and consultants were that laws are poorly enforced and the SSMP "pillars" are laden with managerial problems, particularly the Minerals Commission. The group, moreover, maintained there is currently a shortage of institutional support for ASM, and used the Geological Survey Department as a case study to illustrate instances of abandoned responsibility. There was consensus within the group, which, again, has extensive experience working in ASM regions, that such a shortage of institutional support has adversely affected technological provision; a case was made of how inappropriate technologies are now widespread in several indigenous artisanal and small-scale gold mining communities.

Individuals consulted at the Minerals Commission – the government agency currently assuming the majority of ASM administrative responsibilities, and with staff actively liaising with miners on the ground – indicated that as a result of an inappropriate distribution of tasks among agencies, it has been forced to assume a dual role as industry policymaker and regulator. Both Minerals Commission officials 2 and 3 argued that the institutional structure in place for ASM is suffering from a lack of coordination overall. They, moreover, indicated district support centres, installed specifically to provide assistance to operators at the grassroots, are currently poorly equipped and resourced. The group maintained that inappropriate equipment is being used by miners, which is contributing to environmental degradation and, in accordance with the views of interviewed consultants and academics, believe conditions have not improved because of a poor understanding of the ASM communities themselves. According to both Commission officials 2 and 3, the Government is currently without sufficient knowledge of indigenous gold geology, and, therefore, is in a poor position to demarcate appropriate areas for ASM activity.

The majority of the *remaining* government officials consulted – who, at the time of interviewing, were based at the EPA, Mines Department, PMMC, and the Geological Survey Department – also voiced concerns over the current lack of institutional support in place for ASM, although according to staff at the Commission and interviewed local consultants, it is these very agencies that have abandoned their industry responsibilities. These agencies have few, if any, officials based permanently in the field to monitor and assist artisanal miners. The official interviewed from the Geological Survey Department, which was initially assigned the task of geo-prospecting and demarcating land for artisanal mining, conceded that his institution has abandoned its ASM responsibilities. The individual furthermore argued that the SSMP is suffering from a shortage of institutional support overall and indicated the Minerals Commission has been burdened with the majority of industry administrative responsibilities despite not being in a position to carry out associated tasks on its own. When EPA officials were asked to provide their perspectives on the current policy stance, they also indicated there was a shortage of institutional support in place, although they implied, in accordance with legislation, having no administrative responsibilities *per se* as far as ASM was concerned. Officials from the Mines Department appeared to have little concern with the overall distribution of ASM responsibilities, and indicated its role should be minimal given that laws also fail to define its specific role *vis-à-vis* the industry. The current position taken by the Mines Department toward ASM drew feedback from representatives from other government agencies, particularly the Minerals Commission and Geological Survey Department. The representatives interviewed from these agencies maintained that the Mines Department should assume the tasks it was initially assigned at the launch of the SSMP because it has an institutional responsibility for maintaining health and safety in the mining industry.

According to this expert opinion of the current policy stance toward ASM in Ghana, there is general consensus, outside of the Mines Department, that existing laws are poorly designed and unenforceable; institutional support for indigenous artisans is insufficient; and extension services and policies are inadequate to address operator needs. There was agreement that this shortage of institutional support has led to government officials, particularly those based at the Minerals Commission, placing many responsibilities in the hands of the subsistence miner. For example, according

to an EPA official (1), based on the existing system in place for ASM, the Government is calling for small-scale miners "to come up with their concession maps and then (the Government) will follow-up. What I'm saying that when they come, they will come to us with their maps, even though we don't know the deposits, we can help them from an institutional point of view...(they) have their *own* way of prospecting – I do not even know if they are using the Minerals Commission's assaying and laboratory services". Another EPA official (2) echoed these views:

> "What I am saying is that they (the miners) come with their concession maps, and then we will follow-up. But as for the institutional arrangement, we could even do it together...What I am saying is that let's say the person has come back 'I've found this area'...Recently we wrote to one complainer, managing eight people, who has 25 acres. What I'm saying that when they come, they will come to us with their maps, and even though we don't know the deposits, we can help them from an institutional point of view; the Minerals Commission, EPA and Mines Department can come together and even do the strategic assessment on their behalf. Then in that case we know that if we put your tailings dam here, it's going to affect this water, technology, we can put it here... collectively we can drive at that. And we can approve of it when it is good, and that can become a starting principle". [EPA official (2)]

According to a Minerals Commission official (1), the staff at district centres now depends on cooperation from prospective artisans as a means to overcome a shortage of institutional support for ASM:

> "We are proposing that the small-scale miner develops his own site plan...If we develop a grid system, assuming we have two blocks which we have demarcated, so if we decide to subdivide it, and they come to me, I can say that these are subdivided one, two, three up to eight and so on...So once he tells me he wants a certain block, we don't have to produce any site plan, we just print it out, and give him a license on the spot. That would cut down the problem". [Minerals Commission official (1)]

This chapter has provided perspective on the current policy stance toward ASM in Ghana according to feedback from both experts based both outside and within government. The conventional approach taken by governments to regulate and manage informal industries has been to introduce registration guidelines, and provide technological and financial support in various forms. This has also been the case in ASM, with most governments implementing licensing procedures and disseminating equipment and extension services to operators. Since the legalisation of Ghana's small-scale gold mining industry in 1989, prospective operators have been required to obtain a license from Government officials. The Government also attempted to decentralise support and extension for the industry by constructing district support

centres, and has pursued policy measures such as the land reclamation bond and EIA in order to facilitate environmental improvements at sites; officials and experts outside government identified several shortcomings with these initiatives (summarised in Table 4.4). The SSMP was established to carry out the foregoing but has also fallen short of expectations. It was against the background of these narratives that experts and officials were further probed about possible ways forward in the industry. With such varied industry stakes, it was expected that parties would provide equally wide-ranging suggestions.

**Table 4.4:** Problems associated with measures implemented to regularise and improve environmental conditions in Ghana's artisanal and small-scale gold mining industry, based on surveyed expert opinion

| Measure/Initiative | Problem(s)/community-side issue(s) overlooked |
|---|---|
| Construction of seven small-scale mining district support centres | • Poorly equipped<br>• Inadequately resourced<br>• Staffing problems |
| Implementation of a licensing procedure for small-scale miners | • Riddled with exorbitant delays<br>• Potentially costly<br>• As a result of insufficient institutional support, unexplored concessions are commonly awarded to miners |
| EIA procedure | • Slows down the licensing application procedure considerably |
| Equipment provision | • Issuance of inappropriate equipment<br>• In the case of retorts, implementation of fragile, costly models |
| Land reclamation fund | • Over time, the prices paid by the government for gold derived from small-scale mines *minus* the percentage taken for reclaiming purposes proved unattractive for operators |
| Establishment of the SSMP | • Abandonment of duties by two of its institutional pillars – the Mines Department and Geological Survey Department has put the entire scheme in disarray<br>• The Minerals Commission is now burdened with tasks, effectively preventing it from servicing miners one-on-one |

# Chapter 5 – Perspectives on Possible Ways Forward

"An ad hoc approach to small-scale mining has constrained efforts to: promote better organisation and work practices; increase the productivity of small-scale mines; and lessen the adverse labour and social effects. Erratic policy and decision-making has led to confusion among administrators and managers of both large and small and has sometimes caused conflict at mining locations – between large and small mines and between small-scale miners and regulators. A lack of coordination in the provision of external assistance has not helped. No wonder that bringing order to small-scale mining is a problem."

– *Norman Jennings, "Small-scale gold mining: Examples from Bolivia, Philippines & Zimbabwe", International Labour Office, 1999*

## 5.1 Introduction

To recapitulate, Chapter 4 surveyed expert opinion to provide a fresh perspective on the position taken by the Ghanaian Government toward regularising, and improving environmental management in, the ASM industry. Apart from Mines Department officials, all indigenous experts consulted indicated that as far as the current policy stance was concerned, there are problems in terms of legislative intent, institutional support and setup, and policy design and delivery. A number of corroborating recent reports (e.g. Appiah 1998; Iddirisu and Tsikata 1998; Aryee 2003; Aryee *et al.* 2003) also indicate that environmental problems in the indigenous artisanal and small-scale gold mining sector have intensified as a result of impoverished policies and institutional support services, which have failed to facilitate the desired industry improvements. It is against this background that the present chapter presents surveyed opinion on possible ways forward.

Although there was a narrow view among experts and government officials on what has happened in the past, there was a wider diversity of perspectives on possible ways forward, suggesting that there is active debate in this area. The opinions voiced by interviewees generally reflected the policy stance (taken toward ASM) of their respective institutions. Given their wide range of views on possible ways forward, results were categorised according to the following: 1) innovative thinkers were grouped under the heading "progressive environmental managers"; 2) intermediate environmental practitioners were categorised under "intermediate environmental managers"; and 3) the most reservist and conservative thinkers were grouped under the heading "prudent environmental managers".

## 5.2 Progressive environmental managers

Individuals interviewed outside government provided the most progressive recommendations on possible ways forward in the industry. The academics, consultants and industry people who comprise this group have been involved in several independent ASM support projects – both within and outside of Ghana – in the past, and are little exposed to the day-to-day bureaucratic activities of the Government. Drawing strictly from their experiences on the ground, the group is arguably most in tune with miner needs as well as in the best position, given their wide-ranging experience, to evaluate *which* support-related interventions are likely to have the most success in the field.

In accordance with Hentschel *et al.* (2002), Jennings (1999) and others, who call for governments to pay closer attention to underlying cultural and socioeconomic factors when addressing pressing issues in ASM, the group foremost emphasised the importance of adopting an interdisciplinary approach to resolving pressing problems. As a consultant/professor put it, "you cannot tackle the problem from one dimension. In Burkina Faso, where I am working, we have doctors, sociologists and people that specialise in health and safety. We need people to virtually be there (in the field) all of the time, not people policing them – people (miners) must be part of them, working with them, not people who are trying to penalise them (they must feel like they're part of a family) – small-scale miners are terrified of authority". It was against the background of this approach that the group proposed a hierarchy of tasks of varying complexity.

Progressives argued that it was important for the Government to adopt a streamlined approach for addressing the industry's environmental problems, with the modification of legislation as an initial task; it was recommended emphasis first be placed on simplifying the licensing system for the purpose of facilitating the formation of cooperatives[17], which were judged to be more easily quantifiable, and enable miners to raise finances with greater ease: rural banks are more likely to provide financial support to cooperatives than individuals, and, in most cases, governments are more willing to license their operations (after Davidson 1993; UN 1996a; Hentschel *et al.*

[17] Though defined differently worldwide, generally, "mining cooperatives" refer to organised groups of miners working together at the same site.

2001). Drawing upon recent experiences in Burkina Faso, the consultant/professor argued, "promoting the formation of cooperatives is an important key immediate undertaking (in Ghana)...small-scale miners...they want to be treated as business people, which is why organising them into recognisable groups is key. In Ghana, they (the government) are not organising miners into groups, but in Burkina, they are, under the guidance of the World Bank". The consultant/professor further explained that cooperatives improve miners' access to finances:

> "In Burkina Faso, they have been funding cooperatives in farming...bank representatives attended the financing mechanism workshop held for small-scale miners because miners needed to gain knowledge on what was needed to qualify for a loan (all banks have set criteria – refer to the Ghana small grants programme)...In the case of farmers, they have provided their crops as collateral...banks need not be concerned as no artisanal would go to a place without gold...they will test the land (for gold grain abundance) before mining...thus, the issue is to just delineate that deposit for them". [Consultant/professor]

The group, moreover, supported the prospect of strengthening the Association for Small-Scale Mining – an initiative they claimed would further facilitate cooperative formation. According to Davidson (1993, p. 321), ideally, (small-scale mining) associations are organised with the "aim of promoting, supporting, strengthening and protecting the rights, welfare and interests of small-scale miners in their respective countries". They are also "concerned to provide their membership with access to information and advice on technology, law, marketing, finance, management and safety; to organise training opportunities; to lobby and negotiate with the government on behalf of the interests of the membership; to identify, evaluate and promote new investment opportunities for their members; to provide a means for the peaceful resolution of disputes between members; and to secure better prices for the commodities produced by their members". Speaking in the context of Ghanaian ASM, a consultant echoed these views, noting that "the approach could be promising, provided that the Minerals Commission or Ministry of Labour develops partnerships with the Association, thus enabling these promotional or regulatory bodies to better disseminate policy and training". A more detailed explanation for strengthening the Association for Small-Scale Mining in Ghana was provided by the consultant/professor:

> "Strengthening the Small-Scale Mining Association gives miners a mouthpiece. Such is key to facilitating improved organisation in the sector, and improving

> environmental conditions. It involves encouraging miners to form cooperatives, and requires government notifying financial institutions that there must be a promoter or a recognisable body...If there is a recognisable body, one can begin to see they the essence of the cooperatives. In Burkina Faso, one can see the effects of cooperatives in the farming sector, which are well developed, and as a result, cooperative banks are providing the funding. In Burkina, financial workshops were also successfully organised and carried out...to help inform miners that their asset is the ground itself, and to strengthen the National Association of Small-Scale mining. If the Association is strong, the industry is in an excellent position to take up issues with government about their legal standing...Miners also become progressively aware of the importance of protecting their assets. I do not see the (Ghanaian Small-Scale Mining Association) as effective, and thus, its strengthening is a priority undertaking in the immediate term, as it could lead to similar improvements to those achieved in Burkina". [Consultant/professor]

The group maintained, collectively, that once cooperatives were formed and institutional support was strengthened, emphasis should be placed on land demarcation and geo-prospecting. Agyapong (1998, p. 56) was among the first to discuss the importance of defining miners' rights in Ghana – which he claims would increase their access to land – after which, the Government could readily demarcate areas as small-scale mining concessions, and possibly implement a tributer system. Specifically, he noted that undertakings should "begin with a conscious effort to delineate portions of mineral concessions [involving] the Geological Survey Department [to undertake the] prospecting of delineated small-scale mining sites prior to the issuance of the sites as concessions to artisanal miners" (Agyapong, 1998, p. 56). An earlier report published by NSR Consultants (NSR, 1994) echoed these views, explaining that in Ghana, "small-scale mining should be permitted only in designated areas", determined by Government parties who could carry out "an assessment of the availability of resources". The consultant/professor underscored the importance of geo-prospecting *prior* to demarcating land to artisanal miners, explaining that "no artisanal would go to a place without gold as they will test the land (for gold grain abundance) before going in". He furthermore argued that the pressing issue in the area of land management was the effective delineation of deposits for small-scale gold miners:

> "The Government must promote education and assist in the demarcation of deposits, which could be brought into the license, or, at the sales point...we [must train] them (small-scale gold miners) to do is to recognise that the ground is their asset and therefore each is handled accordingly, and they are

> appreciative of that. For this, we need institutional support in order to carry out...without it, there's no point.
>
> "When you are looking at small things, your perception of exploration has to change drastically. When doing alluvial, you can do auguring in any workshop. And, in the alluvial areas, you can use augers, and the miners can test it themselves. And then they'll pan it and determine the number of grains. Most people are experienced as well. In Burkina, we have set out compounds. We looked at twelve deposits, and we wanted to bring three to a level of 100 tons per day, and one of the sites we selected was an alluvial site. You can go right down to the bedrock and stop". [Consultant/professor]

In terms of additional land management measures, Aryee *et al.* (2003), Aryee (2003) and others advocate for the Government to re-launch the land reclamation bond, a move that the consultant/professor also supports:

> "You have to take (proceeds) off from the sales. But if you see the amount they pay to the gang leaders, they can also make a contribution. If you say, make a small 500 cedi contribution per day, it adds up over a period of time but we need a study. We can create a fund – that either takes finances at the end or the beginning – but it should be small at the beginning. If you look at the number they have in Burkina, it is a lot of money". [Consultant/professor]

In terms of possible policy-related measures, Labonne *et al.* (2000) describes research conducted in Ghana specifically aimed at evaluating possibilities for promoting re-skilling and alternative livelihoods among small-scale miners. Aryee *et al.* (2003) lists some of the efforts made by the Minerals Commission to pursue alternative livelihood or local economic development (LED) projects. Most notably, a recent study undertaken by the Commission described a number of such LED projects, which are now being organised by mining companies such as AGC (Bibiani) Limited, Resolute Amansie Limited, Abosso Goldfields Limited, Bogoso Gold Limited and Satellite Goldfields Limited. The mine-initiated projects have reportedly provided members of communities with access to skills and/or entrepreneurship training programmes (e.g. managing small-scale business enterprises, modern farming techniques in cultivation of food and cash crops, livestock farming etc.). A second stage of the project has been initiated to ascertain the feasibility and sustainability of alternatives. Interviewed academics, consultants and industry people maintained that such projects could be pursued once cooperatives were formed, institutional support for ASM was strengthened, and geo-prospecting and subsequent land demarcation was established as an ongoing task.

The group drew upon their experiences in recent projects undertaken in Ghana to propose possible ways forward in the area of mercury management. Initially, Agyapong (1998, p. 56) recommended that mercury management training programmes be implemented for miners, through possible use of "shared" mining technology – namely centralised ore treatment centres. A senior mining engineer at Ghana Goldfields also recommended implementing "a plant pool that provides services instead of manual labour, and which acts as a pool organised by government, providing needed services on demand instead of manual methods". The group, moreover, identified the increased adoption of the mercury retort as a viable option upon completion of the aforementioned tasks. As a senior academic at the University of Ghana put it:

> "A mercury retort would be useful, and one possibility for this would be the Ministry of Health, which has long been interested in mercury exposure. Speaking abstractly, the Tarkwa School of Miners is closer to the mining regions, and the geology department should assume such a role, because this is clearly an area where inputs are required from local universities, polytechnics or other types of research institutions. However, the priority as far as mercury management goes is that artisans need to be educated about mercury, which, broadly speaking, would improve their ability to mine overall. The key to mitigating this problem is through the deliverance of training". [Senior academic, University of Ghana]

The consultant/professor proposed promoting projects that encourage artisanal gold miners to move away from mercury altogether:

> "[I am] involved in two projects in examining alternatives to mercury extraction, the aim of which is to facilitate a move away from mercury altogether...The first project aims to initiate movement toward magnetic and gravity techniques, along with compressed air for refining. The second project involves studies to determine the feasibility of constructing mercury retorts using local materials...locals make retorts using local, familiar materials because at present, they use their bare hands, and do not wash before eating". [Consultant/professor]

In terms of excavation and mineral processing equipment, Aryee *et al.* (2003) also calls for introducing improved equipment *directly* to miners, indicating that such efforts are already in the process of being carried out by consultants in a number of small-scale gold mining regions in Prestea, Japa and Bonte. Stressing the economic importance of improving the inefficient small-scale gold mining equipment currently being used in Ghana, the consultant/professor echoed the views of Aryee *et al.* (2003):

> "If we can get them (operators) to recover 80% rather than the present 40%, it would have incredible benefits on the economy. For example, if techniques were researched and developed to improve daily yields from one to two grams, using 10% of the revenue generated, it could mean doubling output. Simply put, if we can get small-scale gold miners to recover 80% rather than the present 40%, it would have incredible benefits in Ghana". [Consultant/professor]

To summarise, according to the surveyed opinion of indigenous academics, consultants and industry personnel, the Ghanaian Government should tackle pressing industry problems by following a hierarchy of tasks. It was recommended the Government first organise working artisanal mining cooperatives and establish a credible Association for Small-Scale Miners. It was then indicated that land should be geo-prospected to determine ore content and appropriately demarcated to prospective small-scale miners. It was recommended, following completion of these tasks, that the Government pursues more comprehensive initiatives, including Alternative Livelihoods Projects, retort dissemination activities, and the re-launch of the reclamation bond.

## 5.3 Intermediate environmental managers

Although comparatively progressive *vis-à-vis* their government counterparts, Minerals Commission and Geological Survey officials made recommendations with a notable degree of reservation. Officials from both units have wide-ranging experience with ASM, both in terms of policymaking and field-related activities; many have been involved in ASM regulation and management for over 15 years. However, whereas the progressives are most reliable in assessing which support-related interventions are likely to be most successful in the field, the intermediate thinkers, who have a balance of industry and government experience, are in the best position to determine which measures *can* be implemented. Although the individuals comprising this group have lobbied for change in the industry, they indicated that additional institutional support is needed in order to facilitate marked improvements. Being employees of the Government, the intermediate thinkers are familiar with the agendas of other authoritative bodies and the willingness of their officials to provide assistance to ASM projects.

The group compartmentalised its recommendations, calling for incremental action to be taken to tackle the pressing problems in the industry. As a Minerals Commission

official (3) put it, "although presently, the small-scale mining industry [is] not [] particularly efficient [], effort must be made to *gradually* upgrade systems over time". The group, moreover, emphasised the need for increased interaction with miners on the ground. For example, as one official (2) at the Minerals Commission explained, "if you look at the people earning the money, we must go around in order to see how they use the money. People must be encouraged to invest it and need socioeconomic groups that would help lead and guide these miners – their lives would be much better if they are taught to manage their money".

Increased geo-prospecting and land demarcation was identified by the group as a fundamental initial task. Reference was made to how miners must be equipped with knowledge of the whereabouts of economic mineral, and how the Government must improve its awareness of areas appropriate for ASM activity in order to localise operators, in turn, improving the monitoring of their practices:

> "The Geological Survey and the Minerals Commission started about four years ago identifying the areas where small-scale mining can operate, and the geological survey would identify the areas through prospecting, so that the miners know that there is something there. And in that case, if a larger area is identified, many small-scale miners could go there, and can be better controlled". [Geological Survey Department official]
>
> "You can strengthen the Association but as long as we have not prospected, it will not happen. We need to have people on the ground working with them to strengthen them – to make sure they are doing the right thing. So, if you don't strengthen the institutions to do what they need to do, you can forget about the environment. The government needs to pre-finance prospecting somehow, because the Association will not do that...For the large-scale mines, you have the Chamber of Mines, which is viable simply, because the mines are there. Because the small-scale mines are not viable, and when the mines cease to be viable, it goes downhill. When we have the small-scale miners being viable, they will contribute positively to society, and then the Association can be strengthened. So, I think that the priority is for the regulatory agencies to be strong enough to ensure that they can carry out what they are supposed to carry out. And that is what I'd like to highlight more than anything else. It makes it easier for all of us. Once that is done, the small-scale miner becomes viable, and then he is willing to participate in activities to improve environmental performance in the sector". [Minerals Commission official (1)]
>
> A basic requirement for small-scale mining in Ghana, and it links to something like this, is proper exploration work. In fact, this forms about 80% of the problem. You see, the miners migrate from one area to another. As one area is exhausted, they move to another. So if they really wanted to start these cooperatives, it is possible, particularly those involved in hardrock, in which cases, it is easier to quantify their resources and therefore, payment is easier and

> safer than those involved in the alluvial operations. Alluvial miners are very erratic". [Minerals Commission official (3)]

Minerals Commission official (3) furthermore articulated a link between increased geo-prospecting and improved environmental management. "If small areas were prospected, the entire environmental degradation would go down because somebody would not just go and mine a place when he knows he will get nothing. He will go where he knows there is gold. So apart from those that go there illegally, then you are to demarcate a place and one of the reasons that our officers go to the field is to see whether that area falls within the area not subject to small-scale mining." Minerals Commission official (2) emphasised the importance of geo-prospecting and demarcating land to prospective artisanal miners before undertaking activities to dispense finances and equipment to operators:

> "In terms of improved equipment, the thing is, we need to do more before we get to that. Our licensing system has not yet improved. A guy goes for a concession without knowing the mineral content. So if we give money and equipment, it would be a waste. We need to attack the issue of getting areas that have mineral content for them...that would be more helpful. If you start providing these things – money and equipment – without improving their location, it would not be helpful. Initially, we have to improve getting them viable plots, so at least they can access them". [Minerals Commission official (2)]

A Geological Survey Department official furthermore indicated that increased prospecting and subsequent demarcation, and the resulting formation of cooperatives would facilitate expanded funding opportunities for artisans. "I think loans are possible. For example, if the individuals or groups of individuals forming the cooperatives are giving money to assist them, they will be sort of asked for the gold, so they can get their money back. If the gold is used as collateral in other words...So in that case, they know that they are able to repay. [As for] credit lines for miners? If they are organised in cooperatives, I think if there are larger companies or cooperatives, this is more credible, and banks would know they are going into this type of business, so they know they can recover their gold. So they would also look at it that way, so if we need the money, there is a possibility to recover, and if they have a guarantee, for example, if they know that the area has potential and they know they can get there money back, I don't see why they would deny you the credit facilities." As shown in Box 5.1, Minerals Commission officials echoed these views.

**Box 5.1:** Financial arrangements for ASM – a perspective from the Minerals Commission

The officials interviewed at the Commission underscored the importance of concentrating on the more simplistic measures for improving the industry before pursuing more ambitious tasks such as lending policies for miners. "To provide miners with loans, it depends on the type of cooperatives formed," explained official (3). "Because, I know already that there are mining cooperatives in existence: the miners come in together and work as a team and provide logistical support for themselves and then at times, they even get help from somebody. But, if it is the type of cooperative where they themselves are not involved in the mining, but that they would provide the means to the miners on the basis of loans and credit or whatever it is, then the difference could be significant...The current problem is that there are so many things that must be eliminated before making a case for miners to have access to loans." Official (2) was also in favour of improving the organisation of the industry before attempting to devise a lending policy for artisanal miners. "Loan arrangements could be possible but the cooperatives must come in...The major problem is finances...we need to strengthen the cooperatives...The question then, and something we must go back to, is how do you strengthen the cooperatives? An Association is needed but you cannot put it on them...we have to find a way to show them the importance – to bring them together and show them it is important. Since 1989, we have been trying to get them together but it has not worked because the minute you give the Association money, they take it and do not use it."

One option currently being explored by the Commission is the enactment of equipment lease-purchasing schemes. "In terms of a lease purchasing scheme, that is a good idea," explained official (3). "But there are miners who patronise it, and they want their money back at times. If some of the more immediate things are done, it can be done but there are always there that those that complain." Official (2) provided a more thorough assessment: "Lease purchasing schemes have to be done. We have to organise private companies to encourage them to get involved". Official (2) did, however, acknowledge the difficulty with such undertakings in the wake of an inflationary economy. "We tried this with a company in Cape Coast but it didn't work well. We don't have the capital right now to look at it again. That, you see, is dependent on the way the economy is going. With inflation, it makes it hard. First you put in to buy a pump at 500,000 cedis, and before long, it is 800,000 cedis, and you cannot buy another pump so your capital will erode. Our currency, though is stabilising again but at the time we did it, our currency was unstable so if you got a pump at 450,000 cedis for a miner, in less than three months, the pump would go to about 600,000 cedis...So if in three months, you cannot afford to pay for the pump as a miner, it makes it difficult. You cannot demand payments in gold because no miner likes to pay in gold. You see, the pump may not be his only debt because he wants to sell his gold and pay everybody, and then as I was saying, the Commission does not have the mandate to promote dealings in gold."

To summarise, a number of promising equipment-related projects have been identified that can potentially facilitate environmental improvement in the artisanal and small-scale mining industry. However, those interviewed from the Commission maintained that if equipment-related projects are to be explored, it is crucial to first investigate the financial aspects of proposed undertakings.

In terms of possible interventions to improve technology and mercury management, staff interviewed at the Minerals Commission also lobbied for emphasis to be placed upon intermediate activities – particularly, cooperative formation – before pursuing equipment provision and associated loan activities (Box 5.2).

**Box 5.2:** A perspective from the Minerals Commission on equipment provision for ASM

The argument put forward in ASM research circles is that the implementation of improved equipment leads to improved efficiency, and, inevitably, environmental management. The Commission has been involved in a multitude of equipment-related projects to date, beginning with the GTZ-sponsored efforts of the early-to-mid 1990s. "Currently, we are carrying out some experiments," explained Minerals Commission official (2), "and also trying out some processing equipment, such as improved sluice boxes. It's a path that the Minerals Commission has always followed... so, education has been continuous. The Geological Survey was also involved but no longer."

Officials furthermore indicated that effort has been made to equip miners with improved technology but that the majority of individual undertakings have failed. For example, in the absence of a reliable geo-prospecting service, the Commission attempted to equip miners with a centralised ore evaluation laboratory. As official (1) put it, "improving laboratory systems...that we tried to experiment with. You see, at the Tarkwa assay lab, the idea was to get the miners themselves to bring the samples to the lab to get them to analyse them but they are not interested...most of these things, if they are to be done, they should be done on a large scale, because right now, only the small scale miner can use such facilities and it does not work. It isn't economically efficient...it is a whole geological setup, so if you provide the services to all miners, it will be profitable but if used exclusively for small-scale miners, it won't".

As part of the recent Mercury Abatement Project coordinated by UNIDO, effort was made to introduce mercury retorts. "Originally, we really felt that the mercury issue could be resolved with retorts," explained official (3). "But they were metal retorts – they worked well but they weren't used and we lacked education." The effort, which had also been coordinated by GTZ in the early-1990s, reportedly lacked a preliminary study component that again, failed to evaluate "user-friendliness" – in this case, of the introduced retorts – before implementation. After supplying retorts to miners at an inexpensive rate, the Commission monitored their use. As official (1) put it, "We actually monitored miners. We put the Tarkwa office on them, and set up a committee in the village to see if they use it. So why did they not use it? I don't know. Community awareness is what we're emphasising...why they don't use it? They think something's magical and that they are losing part of their gold". The Commission is trying to build from this largely ineffectual project and improve upon the execution of the UNIDO effort. Official (3) explained: "you see...these people must be well educated before they can accept some of these things. In fact, when were trying it in the field, in 1997, we began this UNIDO project, and those who are here, know that we are in the second phase of that project. We had a training of trainers for one week for officers and selected small-scale miners".

Like many of the previous efforts made to disseminate equipment to miners, a major problem encountered with the current UNIDO project is financing – in spite of subsidisation efforts. Unlike artisanal farmers, subsistence gold miners are not eligible for funding from the rural banks, a problem the Commission recognises to be preventing the sustainability of the industry as a whole. "What does the government get from AGRIC (the rural bank fund)?" explained official (1). "Then you understand what I am saying. You don't pay anything, nothing, no taxes, nothing. AGRIC is generating so much. That's the thing. If we can get this viable thing going and everybody's operating appropriately, and are contributing their quota to taxes and so on. The Government must come out with a policy. Large-scale mining does not need a local bank, I mean the kinds of requirements they have are too huge for our banks."

The Geological Survey Department official emphasised the need to demarcate land to small-scale miners *before* attempting to improve their equipment:

> "In terms of disseminating improved equipment, I think it started after the Geological Survey had *demarcated* the area, I think another organisation tried to improve on the gold recovery...sort of like tables and sluice boxes etc...Because most of the small-scale miners were using jute sacks and that was causing the gold recovery to be around 30 or so percent. But if there is a way to improve the sluice recovery and the monitoring is also there to sometime check the gold is being lost, and is assessed – because the small-scale miners do not have the technical know how to do this – we can improve on the gold processing and assist them and provide them with the necessary gold traps so they can get improved recovery". [Geological Survey Department official]

On the possibility of providing increased extension services, Minerals Commission staff indicated that an increased number of district centres was not a viable solution. Officials, rather, proposed that existing district centres are further equipped:

> "One of our recommendations a while back was to construct additional centres...But the cost of running them...we have the Minerals Commission's budget, and bearing in mind everyone in the centre – the officers, the secretary, etc. – just from government, putting in additional centres would impact our budget. Secondly, what we are thinking of is passing a law to include other minerals...In that case, there would be justification in creating more centres because some of the minerals would not necessarily be in the gold area...For example, kaolin, which is currently in the Volta Region...we could build another. The Law is in the pipeline...we have enough centres for the time being, though". [Minerals Commission official (2)]
>
> "More district centres? OK, as of now, the problem is...Let's take Assin Fosu for instance, it is covered almost about 7/8 of Central Region and a little part of the Ashanti Region and a very little part of the Western Region...But the question is, the mineralisation in the Central Region is not as intensive as it is in the Western Region. So the Central Region, if you are going to go by mineralisation alone, then one centre is ok but if you to the Western Region, I think we need to break down because look at Bernard in Tarkwa – he looks from all the way from Tarkwa-Prestea down to as far as Pra. That is too much. So, if there will be a breakdown, they should come and engage in exploration work to see that whatever is down there can be supported by the centres". [Minerals Commission official (3)]

There was consensus from officials interviewed from both the Minerals Commission and Geological Survey Department that as an alternative to constructing additional district centres, emphasis should be placed on the construction of centralised processing centres for miners.

> "Centralised centres are an ideal thing to do...The idea was to let the people to know, and sell the idea to miners that a centralised service was being provided but it has not yet succeeded...The current setup in Bolgatanga, where it is, not

many people can go there...And that is only good for hardrock deposits, because with alluvial, you spend so much of your time loading the gravel...so that, we need to look at again because that will help...Zimbabwe, it was a ITDG that set up the Shamva Centre...We, the government, do not have the funds to do it...We need people from the outside to apply for grants and set up centres...The ideal locations for centralised facilities, we will have to undertake a study to determine where because some of the areas you see where people are pounding ore or digging, it may be that someone else hold that particular concession, and would only be driven away, so it would not be profitable to set up a centre...So we need a baseline study...Maybe one in Tarkwa, where we have hardrock occupations, or maybe Dunkwa...Cost would depend on whether or not ore mills or hammer mills are used...State-of-the art would cost US$60,000 but again, it depends on where you are setting it. If there is direct power, then it is OK but if not, you would have to buy a generator". [Minerals Commission official (2)]

"In terms of reskilling miners, this was tried with the large-scale miners years back. They had training schools attached to the small-scale mining cooperatives, and they provided training in mining, and how to blast properly, etc. We have recommended this to the Chief Minister of Mines many times, but instead of saying that small scalers could use these proceeds for planting and by and large small-scale mining, why don't you rather set up a means where we can train them, so they can go on and do the classes. So the idea of setting up a training centre is very, very important". [Minerals Commission official (3)]

"If the area has been well *demarcated*, it means a lot of work has been done, so that the evaluation and all of the assaying has been taken care of, so you can go in and mine...I think that centralised facilities are good as well, because I was thinking about these retorts, so miners can bring their gold to be treated...And if they are located in strategic areas where miners are concentrated in an area, and there is one there, for example, in Tarkwa region, the miners can get their ore recovered easily...It will also help assist them make a living. In the case of mercury getting into the water and land degradation, these are also important issues especially on the education side, and how the geological survey can work with the Minerals Commission *demarcated* areas for small scale miners, or organising the small scale miners that work in the larger areas to better manage their mercury". [Geological Survey Department official]

The issue of mercury management was described as a priority area by official (2) at the Minerals Commission, who identified a need to "educate miners to inform them that the moneys they invest in improving their livelihoods eventually come back to the community...if we could train these miners, and environmental awareness is increased, then it would work". He further proposed, "alternative livelihoods is a good idea, in the sense that we can make things available to them, because most miners go and mine as a last resort but if there is something we can do, we could encourage them to do it, so then we will have more money to deal with the small-scale

mining". The Geological Survey Department official indicated mercury management programmes could be installed effectively once miners were established and organised on parcels of land:

> "In terms of mercury management programmes, this is a major issue, and can again be tackled if the area is *demarcated* and the small-scale miners are concentrated within an area, so in that case, we can provide them with a retort or whatever. So if they are losing gold, it can be monitored but the mercury must not enter into the stream because if we don't implement retorts and the small-scale miners think we go there for sort of recovery, they will not be using the mercury...There will be specialised mining that retorts will be used for...And if it is done properly and they know that they are not losing their gold, it will be fine". [Geological Survey Department official]

The group recommended that a radical change be made to policy before re-launching the reclamation bond and undertaking pilot reclamation activities at degraded ASM sites. As Minerals Commission official (2) put it, "on the issue of pilot reclamation, it depends on the kind of involvement we are talking about. As I mentioned again, who constitutes the workers, ok, because when they are finished the winning activities, who do you employ to level the area, apply topsoil, etc. – maybe the local people? Except, they may feel that they are working for someone else, and that it is not a continuation of the previous job they had working in the small-scale gold mining community, and, second, the level of technology they used to re-grade the place – where do we get it from?" The Geological Survey Department official advocated the possibility of promoting tributer systems:

> "On the issue of tributer systems, I think this is another issue because some of the large-scale companies are not interested in the alluvial operation, and the small-scale companies are interested in the alluvial. They are not interested in the hardrock...So if there is some small arrangement or agreement between the small-scale miners and the bigger companies, they can even sort of have them working for them in some way because the bigger company *has* the concession, and this is an area where they do not have plans for working, for example some areas where you can only get alluvial gold, they should give to the small-scale miners...This is workable for both groups of miners". [Geological Survey Department official]

As shown in Box 5.3, Minerals Commission policymakers are particularly in favour of the re-launch of the Land Reclamation Bond for small-scale mining, which, according to official (3), "is a more doable measure at this stage, given our level of funding".

**Box 5.3:** Re-launch of the reclamation bond?

The reclamation bond was initially launched in the early-1990s, with the aim of collecting a small percentage of revenues from gold miners to finance mine closure activity. However, because PMMC offered uncompetitive prices to miners for their gold, the initiative was only marginally successful, and eventually abandoned.

Commission officials, however, are pushing for the re-launch of the reclamation bond, given that PMMC now offers competitive prices for artisanal gold. As Minerals Commission official (2) explained, "Originally, the reclamation bond was not good because the practice was to take a certain percentage from production. But it could be introduced in a revised form, whereby miners pay a small portion from the gold towards reclamation from their pockets. The thing should be targeted towards the pocket; otherwise they will lose their capital. If you look at their profits, then you could develop it effectively".

The success of a re-launched reclamation bond is dependent upon the hiring of dependable people. As indicated by official (3), "in order to re-implement a reclamation bond, we must hire trusted hands". Official (3), however, voiced a different opinion on how it could be executed. "The only way is to take a percentage off of minerals sold to PMMC, and to use that sum for reclamation purposes. Provided it is not going to affect PMMC purchases because if PMMC can buy gold at 4% below the world market price, and the other cooperatives will do the same, then no problem, and then maybe 1% could go toward reclamation. Or, the miner will have to pay directly, which can happen. This, however, will need a little bit of resolving."

One reason behind the controversy of re-launching such a fund relates to its place in the existing policy framework. On this issue, official (3) explained, "maybe the land reclamation bond can be included as part of the Mineral Development Fund but that will be very difficult because small-scalers are not contributing to the Mineral Development Fund. But if a portion is created for reclamation caused by small-scale miners, I believe that government would not agree".

For a government that is seriously hampered by cash flow problems and which, at the present time, can only commit limited funds to addressing environmental problems in the ASM industry, the land reclamation could help secure additional revenues for coordinating important industry support-related activities.

To summarise the surveyed opinion of both staff at the Minerals Commission and the Geological Survey Department on possible ways forward in the resident artisanal and small-scale gold mining circuit, there is consensus that policymakers must first emphasise tasks aimed at improving industry organisation before devising plans to carry out more complex equipment dissemination and training activities. The Geological Survey Department official repeatedly emphasised the importance of prospecting and demarcating land for ASM purposes, and indicated that the effectiveness of more ambitious regularisation activities was contingent upon the completion of this task; it was against this background that the official further proposed a streamlined blueprint for regularising the industry (Box 5.4). Officials at the Minerals Commission also emphasised the importance of first improving the

organisation of the industry's operators. The argument made by all officials consulted was that increased cooperative formation facilitates effective monitoring, and, inevitably, the execution of training and re-skilling programmes.

**Box 5.4:** A perspective on ASM regularisation from the Geological Survey Department

The official interviewed from the Geological Survey Department, who received his Masters degree in the Netherlands, and a PhD degree in Austria – both in geology – became an integral member of Ghana's SSMP management team in the early-1990s. "In 1992, there was a seminar education programme," he explained, "and I, from the Geological Survey, was asked to work with the Minerals Commission." With the assistance of World Bank monies, teams from the Geological Survey Department were able to undertake geo-prospecting activities in an effort to demarcate lands for small-scale miners.

Despite not having been directly involved in any ASM project *per se* for nearly five years, as someone involved during the embryonic phases of the SSMP, the official was in a position to provide constructive criticism on many of the earlier correctional measure implemented for ASM. "For starters, I think that we can reactivate the reclamation fund in the next year. I know that under the World Bank, we started this reclamation fund. I didn't even know it was abandoned. I believe that the company after exploration has to reclaim the land, and I think the reclamation bond is necessary but I'm thinking that the companies have not been doing what they are supposed to do. I mean, according to the impact assessment, they are supposed to reclaim the land but they are not doing it. So, I am thinking that if there is a way for them to pay some money for government to do it, that one would be another alternative but the company will not do it if it is asked after exploiting the gold. But once the company is in operation, and are paying the money to the government, it will be there for the government to reclaim the land after the company is finished."

The official also identified lease-purchasing schemes as one means for disseminating equipment to artisanal and small-scale gold miners. "Lease purchasing schemes...I think is another area we should look at because it is being used in the fisheries industry. The Government bought a bunch of nets at concessionary rates, and I know that they aren't paying all up front but when the fishermen get their proceeds, they sort of pay. So, you pay part, and then use your proceeds to finish paying, so if the small-scale miners lease equipment and pay some small part, and when they are mining their gold and they are selling it, they will be paying."

A final topic broached by the official was alternative livelihoods. "In terms of alternative livelihoods, I think it is good, and has been a reason why the government is thinking of introducing this cassava project so that in some of the areas, the chiefs can use some of the land for the youth who are interested. If they are sort of motivated, they can go into farming, not only for the government but for themselves – especially the oil palms – to motivate the youth and give them the necessary incentives. I am sure some of them will move from the small-scale mining into agriculture.

"Training miners in the area of prospecting goes hand-in-hand with alternative livelihoods. If that programme is expanded, then the miners will also learn a lot. If the mining engineer and geologist provide the correct assistance, it will undoubtedly be a start in the areas in which the Government is openly reluctant to commit, institutionally, to implementing the most basic of measures."

## 5.4 Prudent environmental managers

Officials consulted at the EPA, PMMC and Mines Department were categorised as "prudent" environmental practitioners, and are distinguished here from officials at the Minerals Commission and Geological Survey because of the reluctance of their institutions to provide support for ASM. According to legislation, both the Mines Department and EPA have no defined regulatory role *per se* in ASM regulation or management, although the former has industry responsibilities outlined within the blueprints of the SSMP. PMMC also has a well-defined marketing function regarding ASM but has rarely provided industry assistance outside of purchasing services.

The group mainly analysed the breadth of the industry's problems, without providing recommendations on possible ways forward. For example, the only indication from the group that action is needed in the interim to improve industry organisation and to execute more ambitious activities was made by an EPA official (1), who explained that "with cooperatives, there is a chance to implement improved equipment. I think that lease-purchasing schemes can then implemented, provided that cooperatives are formed, which would provide the basis for such an initiative".

According to a Minerals Commission official (3), "many of Accra's (small-scale mining) policymakers do not have any idea of what is happening on the ground, and it is affecting their judgment". Staff interviewed at the Mines Department admitted to having minimal knowledge of the intricacies of indigenous ASM communities:

> "There was supposed to be a trainee and there was sort of a satellite mine centre set up for small-scale miners, where educational ideas were to be put into place. It was supposed to educate the miners and even then put up a retort centre in Tarkwa, where the miners could bring their concentrates but I do not know whether the Minerals Commission took it up. I don't know whether it is ongoing or if they have stopped". [Mines Department official (1)]

The Mines Department appears to depend heavily upon mining studies compiled by independent researchers. For example, speaking on the issue of land reclamation, another official (2) explained, "the reports we have received indicate that some of the people in various small-scale mining areas are actually reclaiming the land, such as those at the Agyman concession. Part of the condition in giving them the equipment was that they reclaim. So it's working; they also have a resource base. Apart from that, we are showing them how to do filling".

As an initial starting point for improving the operating conditions of ASM, a Mines Department official (1) recommended disseminating visual media to artisanal miners:

> "I think that Posters, brochures, etc. are something we should look at. I am not underrating people in the field but posters, to me, go a long, long way, through the disseminating information. Brochures are good for training but if we want to have direct impacts on the people in the field, posters help to show everything to people just because there maybe literature on the topic but because of the environment in which the small-scale miners operate, they will not be able to secure or reach literature. But the posters will help disseminate key information. People are more inclined to read and follow a poster in the field than to borrow a book, read it, and then improve their operations. That is something that we need. Sponsoring people in that area is important. As far as I am concerned, you can have an issue, which can be addressed through poster media. We don't see why we should limit these information dissemination activities. They're important". [Mines Department official (1)]

Officials at the Minerals Commission, however, indicated that visual messages have failed to reach the more vulnerable and transient artisanal miners, who, because of the typical remoteness of their operations, neither visit the ASM district offices where such posters are on display, nor operate in close proximity to citified areas, where material can be posted on the walls of a building or distributed at shops and marketplaces. Moreover, as Minerals Commission official (3) explained, "colour printouts for posters and brochures are expensive, and miners do not even get the message if it is visual anyway...they rely more on word-of-mouth, through trusted sources".

Representatives from PMMC, which, to reiterate, has been empowered the responsibility of purchasing gold from artisanal miners, identified potentially progressive ways forward but are considered "prudent" here because the agency is also uncommitted to providing increased institutional support to ASM. The official consulted made two recommendations, first calling for the Minerals Commission to construct centralised processing plants. "Because many of the country's deposits are hardrock, it is a challenge to miners but if they can pay to have the stuff crushed and processed efficiently, this would be of enormous benefit. To (further) prevent problems with mercury, people must (also) be in the field at all times to monitor practices." The official, furthermore, recommended that training seminars should be held for small-scale miners that provide education on a wide-range of issues:

> "[PMMC does] occasionally hold seminars for managers, businessmen, and financers on managing risk and business finance. I admit that the scope of

> training would be seriously different than that of the mechanised small scaler...A programme for training (for the artisanal miner) would have to emphasise health and sustainability, avoidance of haphazard mining methods, and the importance of preserving nature". [PMMC official]

Officials interviewed from the EPA called for the Minerals Commission to re-launch the reclamation bond as a means of addressing issues of land degradation caused by ASM:

> "In the case of the reclamation bond, if they were to do it on a cooperative basis...what we trying to stress to the Minerals Commission was that we should get an environmental impact assessment of an area where we think small-scale mining can exist...maybe for the whole area...then we could enforce it upon the people...then we know...for the individual area, and individual miners – I do not know how who could institute a reclamation plan of bond for individuals". [EPA official (1)]

Interviewed EPA officials, moreover, drew upon their experiences to identify possible ways forward in the area of mercury management, discussing, *inter alia*, the feasibility of implementing retorts on a grander scale and adopting centralised ore processing facilities (Box 5.5).

In summary, experts provided a range of views on possible ways forward in the indigenous artisanal gold mining circuit. Individuals based outside government identified a range of innovative strategies, arranged in a hierarchy according to complexity. Officials at the Minerals Commission and Geological Survey Department also provided innovative recommendations but assessed each based upon anticipated cooperation from government agencies. Finally, officials at the EPA, Mines Department and PMMC, units currently uncommitted to providing increased institutional support to ASM, were the most prudent of interviewees, providing the most piecemeal recommendations, discussing mainly the industry's problems, and providing few detailed suggestions on possible ways forward.

**Box 5.5:** Mercury management in ASM – A perspective from the Ghanaian EPA

Drawing heavily from their experiences with UNIDO staff in 2000, two EPA officials provided their perspectives on improving the mercury educational and training campaign for resident artisanal and small-scale gold miners. Before detailing their UNIDO experiences, they commented on the general nature of the industry. As official (1) explained, "the idea was that if we could establish this small-scale thing properly. There would be no point to worry about illegal mining. But from an environmental point of view, small-scale mining is now so widespread in the country, it is out of control. The re-skilling of miners is too ambitious...miners are involved in mining in the first place because they feel that it is much easier to earn money, so convincing them to do otherwise will be difficult because the gold is there, you know. I know that where gold occurs, people will go and do the small-scale mining. And I think that training miners one-on-one is ambitious at the moment but it will come". The officials identified the shortage of data as a major impediment to the execution of the UNIDO project; a shortage of mercury data made the UNIDO exercise a pioneering effort of sorts. As official (2) put it, "from the UNIDO experience I had during the mercury abatement project, data was a problem, as it proved hard to come by. Basically, you go to the field, you ask, you have no info, you write to other institutions and they have no other information on mercury. But if we could get the data, we could do these things that have been proposed by experts".

Commenting on possible ways to mitigate problems with mercury in the industry, official (1) noted, "the study that we did two years ago showed quite high levels of mercury. We have gone to the second phase of the UNIDO project now, and from there, we can decide where to go. We will be attending a meeting in Vienna, and I suppose that the global bodies have decided that we should ratify our policies on mercury". As discussed in Chapter 4, the dissemination of the mercury retort – judged by many as the most effective technical intervention to minimise mercury emissions from small-scale gold mines – has proved elusive in a number of developing world settings, including Ghana. As official (1) put it, "They introduced this mercury retort here, and again, the problems which came back from people were that they were expensive and you cannot expect them to buy it. And the problem is that I have my visible amalgam, and people do not feel confident using it still. Ideally, it was envisioned that everyone would have a retort but it has not been possible because of the price".

On the possibility of constructing centralised mercury processing facilities for miners as an alternative to retorting, official (1) described the Government's experiences with the unit now in operation in Bolgatanga. "You can even go to the Northern Region, where people are asked to bring their amalgam for processing to a central processing unit. But how are you going to do that, as there are so many problems and complications: is it batch, how many tons do you have...these kinds of things happen...and therefore, it is not working because these things were not considered. The guy bringing ten sacks of ore does not have the confidence that he is getting the most out of the system, so the next time, he won't take it there at all. So we talked to a lot of people, and most of them said they would not use this central facility."

## 5.5 Increasing institutional support for ASM in Ghana

In Chapter 4, it was reported that the majority of indigenous mining experts surveyed in this study were in general agreement that the SSMP is suffering from a shortage of institutional support, which, in turn, is preventing the Government from providing timely extension and support services to artisanal gold miners. Opinion was, therefore, further surveyed to ascertain views on possibilities for increasing institutional support for ASM in Ghana. As was the case with prescribed ways forward, on the issue of institutional support, the opinions of interviewees generally reflected the agendas and stances of their respective institutions of employment.

The academics and consultants were again among the more progressive thinkers interviewed, indicating that institutional support for ASM was in an impoverished state, and calling for the remaining institutional pillars of the SSMP to provide assistance to the Minerals Commission. "Problems must be tackled step-by-step," explained a consultant/ professor. "[One] cannot tackle the industry's problems from one dimension, and must have doctors, sociologists, scientists, and social scientists analyse each before solutions are devised. In the immediate term, the key is to ensure that institutional groups are functioning properly but over the long term, processing centres and new equipment must be *progressively* upgraded, designed and implemented." As justification for such a move, the consultant/professor noted, "I've always maintained the point that the small-scale sector is contributing 11% of national gold, ranking them third. Small-scale gold mining could make even more money for Ghana with the proper guidance. The sector produces about 150 lbs of gold and if you compare this to the diamond sector, it far outweighs it. The most important thing is that this production is some US$37 million, which is kept *within* the country".

As a means for increasing institutional support for ASM, Iddirisu and Tsikata (1998, p. 32) proposed further emphasising the district centre concept as an initial starting point. The authors put forward the following three recommendations: 1) establishing additional centres to complement the existing seven; 2) establishing a district small-scale mining committee; and 3) undertaking environmental impact assessment in designated areas. They also provided important cost assessments for these undertakings, including the following:

- An estimated US$20,000 to establish and operate a small-scale mining centre;
- US$18,500 annually for maintenance;
- US$35 for the establishment of a small-scale mining committee; and
- Costs for an EIA based upon EIA costs for large-scale mines, which is in the order of US$400 to US$600 per $km^2$.

This group, however, mainly called for indigenous academic units to provide increased support, and identified the potential merits of such partnerships. As a senior academic from the University of Ghana put it:

> "An expanded academic involvement therefore could be very valuable, particularly on the technical side. Although the University of Ghana does not have a post-graduate programme dealing with mining, let alone small-scale mining, the University of Science and Technology has an engineering

department and a Tarkwa School of Mines, which could very much get involved in such mining environmental research. Such an approach, which allows people to use their expertise in a certain way, would attract many colleagues, and create graduate opportunities. There are many partnering arrangements already that can be used as guidance, the most promising of which have been sponsored by the World Bank and UN. Although these represent government-international agency partnerships, they serve as indication that domestic-international partnerships can be forged. Establishing such a dialogue is key because otherwise, people are talking past each other". [Senior academic, University of Ghana]

The consultant/professor also emphasised the importance of mining-academic partnerships in this context. "[We] should encourage an expanded involvement from academic units because the small-scale gold mining sector is generating some US$35 million in revenue using insufficient equipment, and improvements can only come about through research. Academic units can help (miners) improve their recoveries by designing improved equipment. At present, the systems being used are only 40% efficient. Academia would support graduate work in small-scale mining. One worker at my consultancy went back to Legon (University of Ghana) to do a post-graduate degree in small-scale mining...we should encourage this cheap research."

The group of academics, consultants and industry people interviewed, moreover, indicated that there continues to be minimal research input from academia into ASM matters overall, including the country's mining school, the Tarkwa School of Mines. As a senior engineer from Ghana Goldfields explained, "teams of academic researchers should be recruited and assembled into monitoring teams, and then sent out to different areas of the field. Similar training programmes to those organised by Gold Fields Ghana could be organised by universities under the guidance of the Minerals Commission. The Tarkwa School of Mines is not heavily involved in the research scene and needs to be, as it presently undertakes too many theoretical studies, and must therefore take the next step and provide graduate student studies in the area of small-scale gold mining and the environment". The consultant/professor echoed these views, explaining: "networking is needed because the universities (in Ghana) lack resources and they are running Ph.D. programmes. Presently, people carry out their analyses and professors are used from other universities, but there are plenty of opportunities for additional networking. Because of the understaffed nature of the local universities, they cannot collect the data alone, and must therefore partner with

other bodies". He, moreover, described the potential value of his consultancy to ASM:

> "I have been involved in small-scale mining research for over 25 years. Geological Consultants has been actively involved in small-scale mining research since 1990. They (Geological Consultants) have redesigned sluicing techniques (in Ghana), having introduced improved matting materials; have assembled and introduced panning materials; designed and implemented crushers (for ore); evaluated deposits; and have helped to improve processing methods...The experiences the consultancy has had with small-scale miners in neighbouring Burkina Faso could also be drawn from...here, the company has had an active role in capacity building for institutions, on-site demonstrations, HIV education, and in conducting socioeconomic and health security studies to come out with educational materials to sensitise the small-scale miners in appropriate working methods". [Consultant/professor]

A list of additional indigenous small-scale mining consultancies (reproduced in Table 5.1) was provided.

**Table 5.1:** Selected small-scale mining consultancies in Ghana

| Name of Consultancy | Key Contact | Location | Address |
|---|---|---|---|
| Geo Max Resource Development | Farouk Godma<br>Tel: +233 (020) 8136977 | Accra | PO Box TN 962,<br>Teshie-Nungua Estate |
| MIME CONSULT Ltd. | K.S. Manu | Accra | PO Box CT901,<br>Cantoments |
| Institute of Local Government Studies | Esther Oduraa Ofei-Aboagye | Legon, Accra | PO Box LG 549,<br>Legon |
| Quest Resource Development Consultancy Ltd. | Dr A. Agomor<br>Tel: +233 (021) 762775<br>Fax: +233 (021) 776504 | Accra | PO Box AN5867 |
| E.K.E. Williams Associates | Tel: +233 (021) 304633<br>Fax: +233 (021) 233961 | Accra | PO Box AN6729 |

Minerals Commission officials, many of whom have substantial experience working with miners in the field, called for increased support from the sister institutions of the SSMP. As explained in Chapter 4, the *raison d'etre* of the Ghanaian Minerals Commission, established under the *Minerals Commission Law* of 1986 as amended by the *Minerals Commission Act* of 1993, is to execute priority environmental studies of both large- and small-scale mining (World Bank, 1995a). Interviewed officials, however, implied that the SSMU is under-resourced and comprised of only some 13 professionals and 14 support staff. A Minerals Commission official (2) indicated that the government has hired a significant labour force to manage its artisanal agricultural sector, at the same time, overlooking the institutional needs of ASM. A study by Sarris and Shams (1991) reinforces this claim, reporting that the number of staff at the Ghanaian Ministry of Agriculture (MOA) now exceeds 9000, of which, 2500

personnel – including individuals from agencies and NGOs providing specialised services – are involved in extension activities for artisanal and small-scale farmers.

In accordance with individuals interviewed outside of government, Minerals Commission officials also called for expanded inputs from academia as a means of strengthening institutional support for ASM. One Minerals Commission official (3) was particularly descriptive about this possibility:

> "[Although the] Tarkwa School of Mines is situated in close proximity to one of the country's chief gold mining regions, Tarkwa, it pursues mainly independent projects, the reports from which are generally shelved in the school's laboratory for months or even years. Academics and their graduate students could make the greatest contribution in the areas of environmental workshop organisation and retort design. Academic researchers could also help design methods for training and training programmes, which must emphasise health, sustainability (i.e. planning, and avoidance of haphazard mining methods), and the importance of preserving nature". [Minerals Commission official (3)]

As a means of increasing government support for ASM, the official (3) furthermore called for both the Mines Department and Geological Survey Department, which he referred to as "two broken legs of government", to resume their responsibilities, as stipulated within the blueprints of the SSMP. Drawing from experiences in Zimbabwe, the same official (3) attempted to illustrate what he perceived was a lack of industry support on the ground:

> "When we were in Zimbabwe, the Mines Department and their EPA – they had officers who were regularly visiting the cooperatives, and they had own magazine where they store their explosives...they have everything: a manager who was overseeing everything, a mines engineer. So it was well organised and it was all based on the fact that proper prospecting was done before the areas were given out". [Minerals Commission official (3)]

On the basis of its alleged abandonment of tasks, officials at the Geological Survey Department, which presently employs 23 geologists, 37 technical officers, 37 drafting personnel, and a series of laboratory technicians, general labourers and drivers (World Bank, 1995a), were receptive to the prospect of providing assistance to the Minerals Commission with policy and technical tasks pertaining to ASM. As one Geological Survey Department official put it, "supposing that the Geological Survey Department demarcated the areas for small-scale gold miners, they would know the gold is there...in that case, if a larger area is identified, many small-scale miners could go there, and could be better controlled...You can also control their activities and the

environmental issues would sort of be solved". The official furthermore indicated that the Geological Survey Department was willing to collaborate to develop "workable" solutions for ASM alongside the Minerals Commission.

Staff interviewed from the Mines Department and EPA, on the other hand, were uncommitted to providing increased institutional support for ASM, although both groups did discuss the possibility of strengthening the Association for Small-Scale Mining – the representative body for ASM in Ghana – as a possible solution. As one EPA official (2) put it:

> "I think that given the idea of cooperatives or miners associations, this Association of Small-Scale Industries...they have this grant to the Government and funding is a part of it...you know, so long as you can get them to organise themselves, it should not be a problem...and at least once the association is there, it is an indication that this kind of thing can be done. We can say that as the process goes on, if we teach them to put one or two dollars aside, based on that, they can build a fund, they could even restructure the gold industry to suit this purpose". [EPA official (2)]

A Mines Department official (1) argued that a representative association for ASM would function effectively provided that institutions were "functioning well". The official (1) explained: "let's look at strengthening the Small-Scale Mining Association. It needs attention, sure, but if anything at all, the Association will not be functional if the institutions are not. If institutions are functioning well, then the Association will function, and play the role it is supposed to play, and I'm saying this because if you look at the regulatory problems, these institutions have the money but an Association does not have that kind of money".

Minerals Commission officials, however, argued that it (*i.e.* the Minerals Commission) does not have finances to strengthen the Association, citing it as a reason behind their requests for assistance from other government institutions. The Geological Survey Department official also indicated that his agency was in an impoverished state financially, as underscored by the following statement made on the website of the Geological Survey Department of Denmark and Greenland (GEUS):

> "Because of economic starvation the Geological Survey Department of Ghana (GSD) has for many years been unable to carry out many of its natural functions such as geological mapping. Under contract with the Minerals Commission of Ghana, GEUS has started a project 'Adviser to the Director of the Geological Survey Department', which aims at helping the Director in his task to restructure the Survey into a more effective organisation...The project started in October

> 2001 and will last until the end of 2003. Main emphasis is on geological mapping, electronic map production, digitising of old maps, creation and development of databases, and modern archive systems".

To summarise, on the prospect of strengthening institutional support for ASM, according to the surveyed opinion of indigenous academics, consultants and industry people, institutions must collaborate with the Minerals Commission to carry out priority industry tasks, and academia must play an expanded role in research, development and training. Minerals Commission officials echoed these views, with Geological Survey Department officials also indicating that there are possibilities for future collaboration with the Commission on ASM administrative and policy-related tasks. Conversely, staff interviewed from both the EPA and Mines Department implied that their agencies would be unwilling to commit to providing institutional support for the SSMP.

## 5.6 Summary and conclusions

In Chapter 4, opinion was surveyed from a consortium of indigenous experts – based within and outside government – on the current policy stance toward ASM in Ghana. The findings were presented according to "legislative intent", "institutional structure", and "policy design and delivery". Opinion was solicited from this group of individuals because they are both presently actively involved in ASM policymaking and/or are regarded as resident industry experts.

Against the background of perceived problems with the current policy stance, the current chapter has presented further surveyed opinion on possible ways forward in the industry; findings were categorised according to perceptions of environmental management. The more "progressive" and innovative environmental thinkers were identified as the consultants, academics and industry people. Officials at the Minerals Commission and Geological Survey Department were categorised as "intermediate" thinkers, providing personal assessments on the practicality of recommendations and compartmentalising their recommendations, often differentiating between immediate undertakings and more long-term undertakings. The more "prudent", reservist thinkers were identified as those based at the EPA, Mines Department and PMMC. As their institutions are largely uncommitted to providing increased support to ASM, representatives mainly assessed the problems, and provided recommendations for the

Minerals Commission to undertake. The findings illustrate the breadth of the ongoing debate among experts and institutional actors on possible ways forward in the industry.

Irrespective of their outlooks on possible ways forward environmentally, the majority of developing world governments hold a dichotomised view of ASM participants (after Davidson 1993; Kumar and Amaratunga 1994; UN 1996a; Jennings 1999; Hentschel *et al.* 2002). Typically, registered operators – namely, those who have been issued a license through legal channels – are considered legally entitled to mine, and are often provided governmental assistance and guidance based upon that entitlement. A second group of operators, "illegal miners", is comprised of individuals who are not legally entitled to mine on a small scale. In accordance with their legislation, governments rarely administer assistance to this group, which is perceived in many societal circles as promoters of clandestine and disruptive activity.

Such a categorisation has been made in Ghana, where, as explained in Chapter 2, the Government has arbitrarily divided artisanal and small-scale gold miners into one of two categories: the official (registered operators) segment, and the unofficial (*galamsey*) segment. Whilst registered operators receive an allocated plot of land and are under the continued direction of the respective district officer (Aryee *et al.*, 2003), *galamsey* are generally provided with little, if any, support from the Government. Despite recommending a number of innovative and progressive ways forward – as identified in the foregoing discussion – the current arrangement of legislative and policy frameworks prohibits government officers in Ghana from engaging in dealings with the illegal artisanal mining contingent (Hilson and Potter, 2003). As a consultant put it, "the way that legislation is set up now, when you are talking about *galamsey*, the Minerals Commission will not award a license to people operating on other peoples' lands". In fact, many officers perceive the industry's illegal operators as people seeking to "get rich quickly" (Yakubu, 2002).

Local media outlets have perpetuated a negative societal view of the *galamsey*, portraying operators as both criminals and perpetrators of environmental destruction. Consider the language of the following headlines:

a) "Galamsey operators on the rampage" – *Ghanaian Runner* 14/3/1996
b) "Minister launches attack on galamsey, child labour" – *Chronicle* 30/1/2002

c) "Illegal miners invade Teshie" – *GRI Newsreel* 22/4/2002

Based upon surveyed opinion, this very perception appears to exist within government circles as well. For example, speaking on behalf of the Mines Department, one government officer argued "[the] boss has not even been to the field in years but is still influencing many of the policy decisions regarding small-scale gold mining. He claims that he is afraid of *galamsey*...what nonsense...and his office isn't even in Accra – it's just around the corner in Takoardi" (Government of Ghana, 2002b). On the issue of the Government failing to provide indigenous artisanal gold miners with support, a Mines Department official (1) explained, "small-scale gold miners are contributing to the economy, yes. Why isn't the Government freeing up money to help them, I understand your question. But the Government views this activity as 'low down'". In the rare case where the Government has ignored rules and regulations in an effort to raise awareness in *galamsey* communities, officials report that their efforts have had little impact. For example:

> "Improving the education on mercury...No matter how many times we talk to the miners, they do not get it...when we show them again, they pretend like they are learning something new...There is no small-scale miner now that will tell us he knows nothing about mercury, especially those doing gold because the officers have gone there, organised seminars, and shown them videos on mercury pollution. In 2000, we had a seminar for training, and all of the officers were there, and we have an area of the Minerals Commission where they carry out these things. Those artisanal miners, at times, act like they don't know your questions, and they say 'no', thinking you have something you are bringing to them...You see what I mean? It doesn't make sense". [Minerals Commission official (2)]

According to Hentschel *et al.* (2002), however, there are three reasons why governments perceive artisanal small-scale mining as an inappropriate profession, and have subsequently failed to bring unregistered segments of the artisanal mining economy into the legal domain. The first is a lack of political motivation, or, as explained in Chapter 2, "a lack of political will to create an adequate enabling framework for legalisation [which] can be explained by personal interests related to the possibilities for corruption, money laundering, and similar illegal practices, enabled by the informal status of the sector" (Hentschel *et al.*, 2002, p. 31). According to one district officer interviewed in the field (Hilson, 2003):

> "They gave money...this World Bank money...and some was used for prospecting...But go and check...they claimed that they came and prospected but no one came and informed us...They told us they came to my territory and it

> was only a coincidence that I met them in the field...And when I did, I found that they had only dug a few holes anyway and not properly prospected the land".

A second possible reason is government prioritisation of large-scale mine development and associated foreign investment – a hypothesis put forward in Chapter 3. As further explained by Hentschel *et al.* (2002, p. 32), "it is also sometimes the case that the government is attempting to attract international mining companies to invest in the country and ASM may be seen as a disincentive". The authors indicate a manifestation of such an approach is the design of legislation to further marginalise artisanal miners. As explained by Tsikata (1997), Addy (1998), Aryee (2001), and others, and summarised in Chapter 2, the promotion of large-scale mine development has been a main goal of the Government since the launch of the SAP in the early-1980s.

A third, and final, reason, relates to the levels of awareness of the industry's participants, which Hentschel *et al.* (2002, p. 30) attributes as "knowledge" and "willingness". The authors state that miners "may lack knowledge of legal requirements [and] may also be reluctant to be legalised, particularly where there are no obvious incentives to do so and where legalisation involves paying taxes that they would otherwise not pay". Officials at the Minerals Commission appear to hold the view that the ignorance of artisanal miners has perpetuated environmental degradation in the sector:

> "We as the Minerals Commission and other institutional bodies believe that these miners typically cause a number of environmental damages because they are given land in which nobody has any idea what's on the land. They dig a few pits, don't find gold, then they abandon it. They then go on to other place causing more damages". [Minerals Commission official (3)]

Irrespective of their positions, the individuals interviewed mainly carry out their work in Accra. Each was essentially providing assessment and critiques of an industry whose participants have little, if any, input in policymaking activities. The next chapter, therefore, attempts to provide an accurate overview of the situation on the ground, presenting a comparative perspective of industry conditions, problems and needs using the surveyed opinion of miners interviewed in the artisanal gold mining towns of Tarkwa, Bibiani and Assin Fosu. Whilst both Chapters 4 and 5 have presented the perspectives of key government officials and experts on the current

policy stance toward ASM, the industry's operators and, against this background, possible ways forward, the following chapter uses a collection of miners' stories to provide, *inter alia*, a grassroots perspective on why people are involved in artisanal gold mining in Ghana, levels of environmental awareness in the industry, governmental support, and priority industry needs. Rarely have the voices of miners been heard in the policy debate. The discussion which follows illustrates how much more complex the organisational and environmental problems in the industry are than government officials, as well as the more progressive environmental practitioners interviewed in academia and local consultancies, have portrayed.

# Chapter 6 – The Voice of Ghanaian Miners: A Perspective from the Ground

> "The potential of small-scale mining is far from fully realised because of the many inadequacies of the process itself and of the regulations and practices that attempt to control it. Much of the potential benefit is lost due to the lack of a legal and fiscal framework, and because of inefficient production, processing and marketing arrangements...Small-scale mining is bedevilled with too many regulations that are mostly designed to constrain it and too few inspectors to ensure that they do... The failure of much of the existing legislation and institutional arrangements...has been a major factor in preventing the effective delivery of assistance to small-scale mining, leading to its continued isolation and marginalisation in many countries...There is therefore little incentive for small-scale mines to conform, particularly if the risks of being caught and sanctions applied are minimal."
>
> — *Norman Jennings, International Labour Office, "Small-scale gold mining: Examples from Bolivia, Philippines & Zimbabwe", 1999*

## 6.1 Introduction

As explained by Bose (1998, p. 265-267), a significant feature of less developed countries is the predominance of the small operator "whose low productivity is principally due to his lack of capital...compounded by the fact that financial institutions, such as banks, do not consider him credit worthy due to insufficient collateral, the high risk of (failure), and the enforcement problems associated with recovering loans from such persons". To reiterate, the motive behind regularising the informal economy is that it potentially creates a wealth of economic and political benefits, and, at the same time, transforms "squatters into citizens" by providing them with a "legitimate voice" in decision-making processes (Sanyal, 1996, p. 161). Have regularisation policies and accompanying support services effectively empowered Ghana's informal gold artisans? Although Minerals Commission officials, and various experts outside of government called for increased institutional support for ASM, staff at certain agencies – namely, the Mines Department and EPA – appear content with the existing approach, unwilling to commit resources to help sister departments amend industry policies and support services, and reduce widespread illegal mining activity.

In Ghana, Section 11 of PNDCL 218 makes the crucial link between regularisation and environmental management in the small-scale gold mining sector, stipulating that, "a person licensed to mine gold under this Law may win, mine and produce gold by any effective and efficient method and shall in his operations observe good mining

practices, health and safety rules and pay due regard to the protection of the environment". As reported in Chapter 5, the literature, press and government officials often portray artisanal miners as law-evading citizens. However, many gold miners consulted in Ghana expressed a willingness to acquire a concession through legal means. As explained by Michael Owusu, a *galamsey* working within the boundaries of GHG's concession in Tarkwa, "yes, I have contacted the gentlemen (Government officials) here in Tarkwa. They know about our activities, and though they do not support them, they are doing their best to find us an appropriate legal concession". Joanas Barboo, who has successfully acquired a license to mine gold in Tarkwa and Dunkwa, indicated that a license provides an element of security to the miner:

> "I have been registered since 1991. I registered because it is illegal, so the Government cannot get me. If you are not registered, they can pollute the environment, so there will be no one to answer for any charges when they come around, so you need to have a leader. The reason why I registered is because I want to obey the laws of this nation, and in doing so, we also assisted by if there is in any facility outside, they can sell there product to us...so by doing that, it is good". [Joanas Barboo, registered miner, Tarkwa]

Others who have planned to acquire a concession have completed the necessary documentation under the assumption that they will receive increased technical and economic assistance from the Government once registered. As *galamsey* Rolland Kyei put it, "we know those with license get some assistance but we have no license so we don't get any assistance".

Initial discussions with miners suggested that despite their intentions to acquire a land concession through legal channels, they are growing less confident in the ability of the Government to provide productive land. "I have never been registered," explained Edward Joseph Mensah, a *galamsey* in Bibiani. "When I had land in Bibiani, though, I approached [] the district office, and asked for his help. Can you believe that he is still trying to get me a concession? It's been almost four years." Richard Awe, a Tarkwaian *galamsey*, echoed Mensah's words. "The chance of getting a decent plot of land is little, and, at this point, the Government cannot guarantee me that. So that is why I remain unregistered but as I've said, I am trying to visit the officers to see if they can sort something out for me in the upcoming weeks".

A growing antagonism with Government was made clear at the most impoverished of sites visited, where *galamsey* such as Jon Yaw struggle to earn the required wages to

purchase food and clothing. "OK, it takes too long to get a damned license. The large-scale companies have to free up the land. How the hell can we possibly register if there is nothing to mine?"

This chapter provides an account of selected miners' experiences on the ground. Since "poor people's stories are a testimony to their resilience, their struggles against hopelessness, their determination to accumulate assets, and their will to live for their families" (Narayan and Petesch, 2002, p. 1), interviews were conducted with both registered and illegal artisanal gold miners in the gold mining villages of Tarkwa, Bibiani and Assin Fosu. The overall aim was to elicit miners' perspectives on a wide range of issues affecting operations, including the efficacy of the Government's role as a deliverer of support; environmental management; past assistance-related projects; and barriers to improving production and efficiency. The stories of 32 miners are used in the analysis.

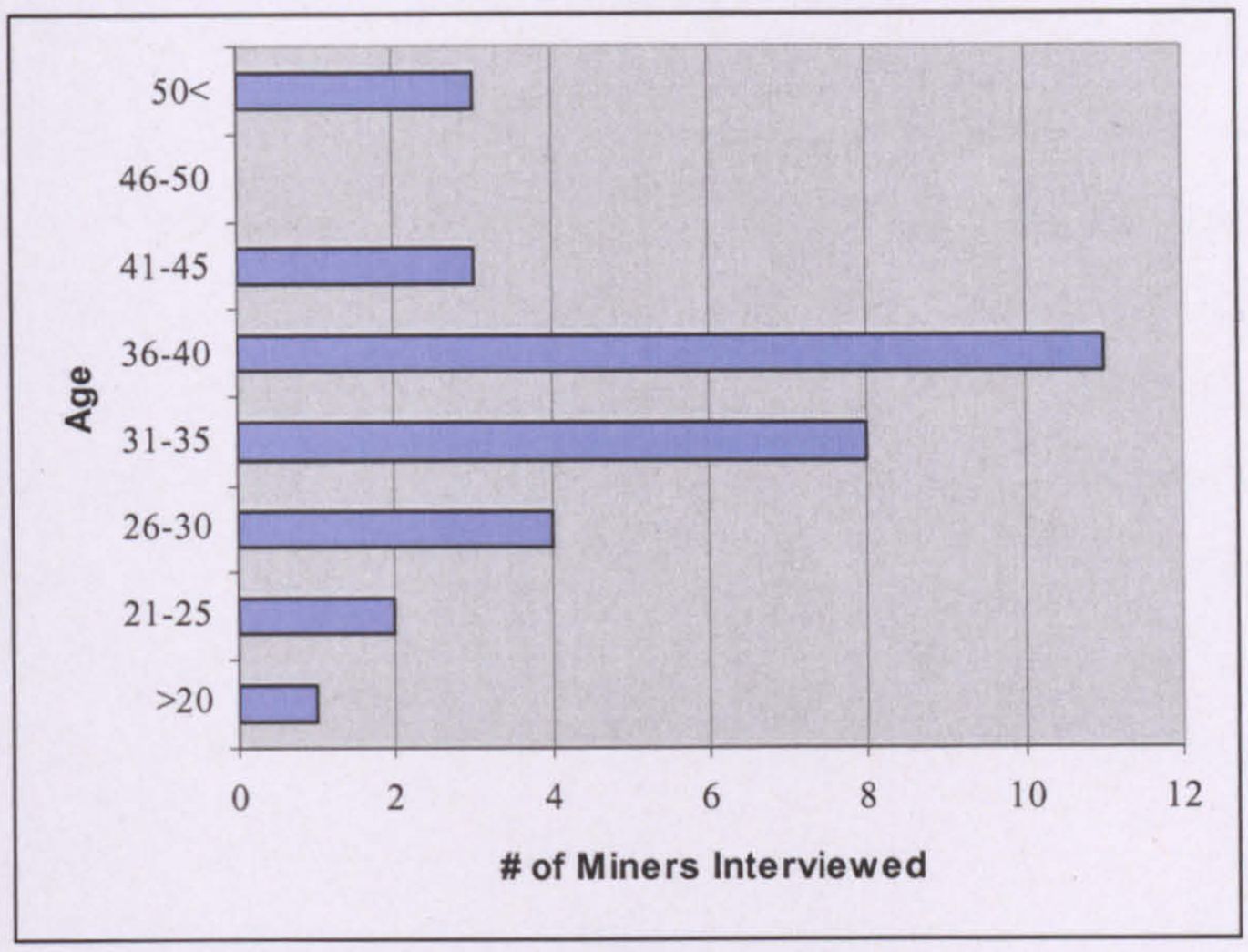
## 6.2 Who is mining gold on an artisanal and small scale in Ghana and for what reasons?

### 6.2.1 Background of miners interviewed

Who has taken up artisanal mining as a profession in Ghana? This section of the chapter describes the backgrounds of individuals currently practicing artisanal gold mining in Ghana by detailing the characteristics of the operators interviewed in Tarkwa, Bibiani and Assin Fosu. The majority (25 of 32) were aged 30 or over, with 19 aged between the ages of 31 and 40; only three miners were aged 25 or under, whilst another three were over the age of 50 (See Figure 6.1). With the exception of three individuals (two youths and one divorcee), all interviewed miners were married, and all but three had children[18].

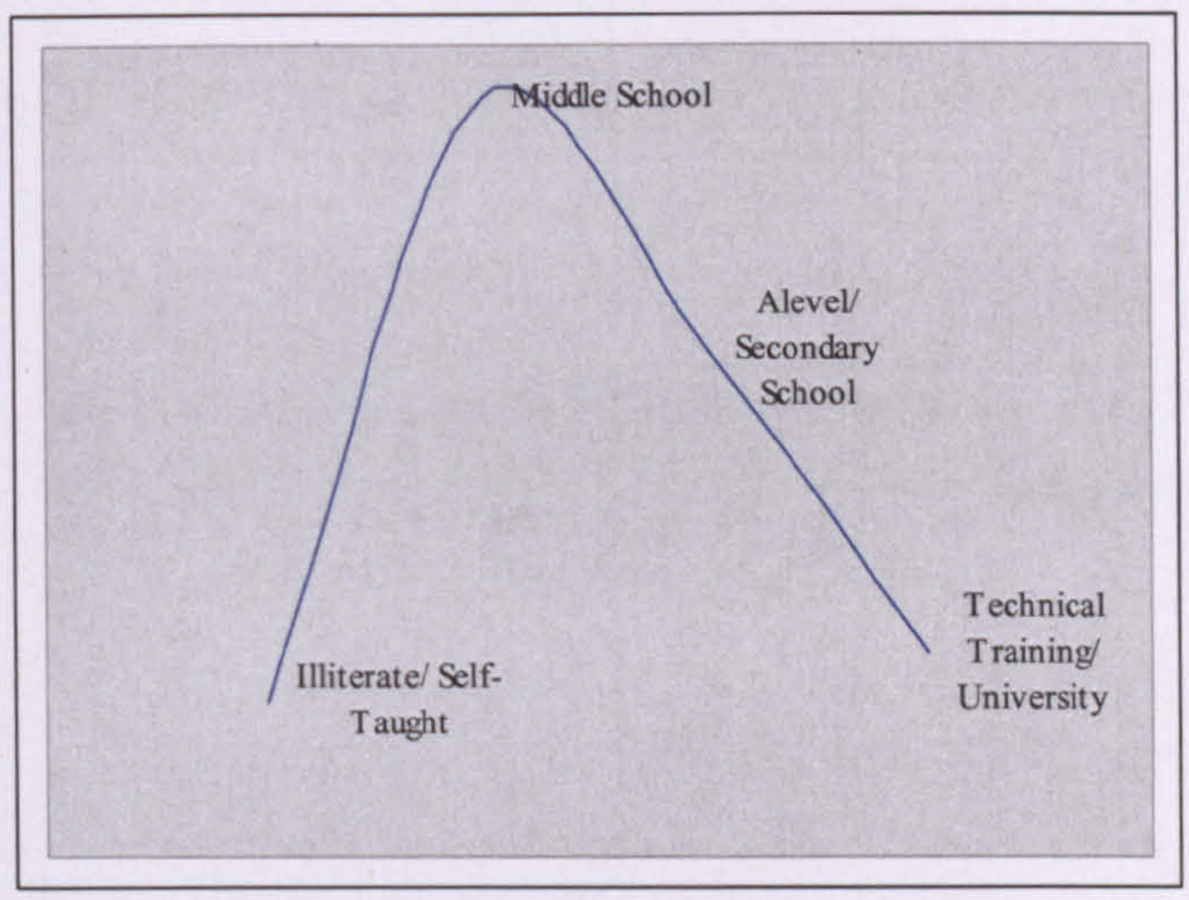
[18] The size of the interviewees' families ranged between three and 17 people, testimony to the ILO's claim that, despite only 10-12 million being directly engaged in artisanal and small-scale mining worldwide, as many as 100 million depend upon the incomes generated in the industry (ILO, 1999).

**Figure 6.1:** Age profile of artisanal gold miners interviewed




The United Nations (UN, 1996a, p. 215) describes "the people working in small-scale mining, particularly the artisanal miners [as] usually unskilled labourers with little, if any, formal education". However, the majority of the Ghanaian artisans interviewed *were* educated. All had at least a middle-school education, and only one indicated being illiterate. Ten artisans claimed to have A-level/high school education, and four have had university/technical training (Figure 6.2).

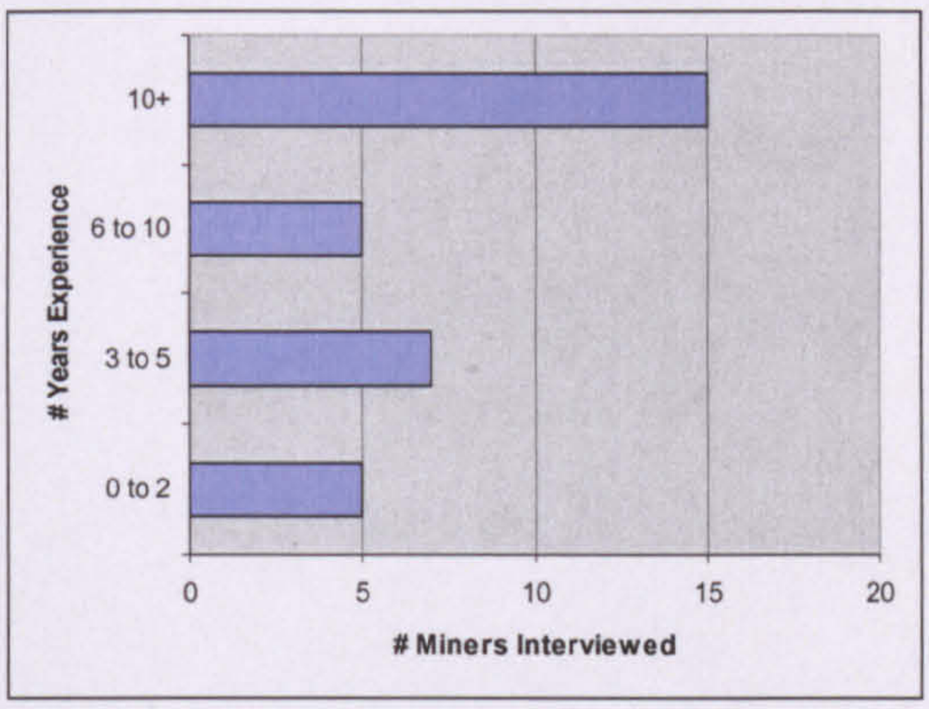
**Figure 6.2:** Educational profile of interviewed miners




The majority of the miners interviewed (15) have a middle school education, whilst another 10 have A-level/secondary school education. There were more (4) interviewees with university/technical college training than those with no formal education whatsoever.

The majority of the interviewed operators also possess many years of experience in the artisanal gold mining profession (see Figure 6.3). Nearly 50% (15) of the interviewees claimed to have been involved in artisanal gold mining for over 10 years, with another five possessing between six and ten years' experience. Only five claimed to have less than two years' experience in artisanal gold mining. Moreover, as depicted in Figure 6.4, several claimed to be non-natives of their respective gold mining regions, reportedly travelling hundreds of kilometres to take up employment in the industry. Notable commuters included Tarkwaian *galamsey* Fusekni Aruna, who travelled thousands of kilometres from Burkina Faso, and *galamsey* Francis Aryee and Simon Kojo, who relocated from the most Eastern stretches of the Volta Region to Tarkwa.

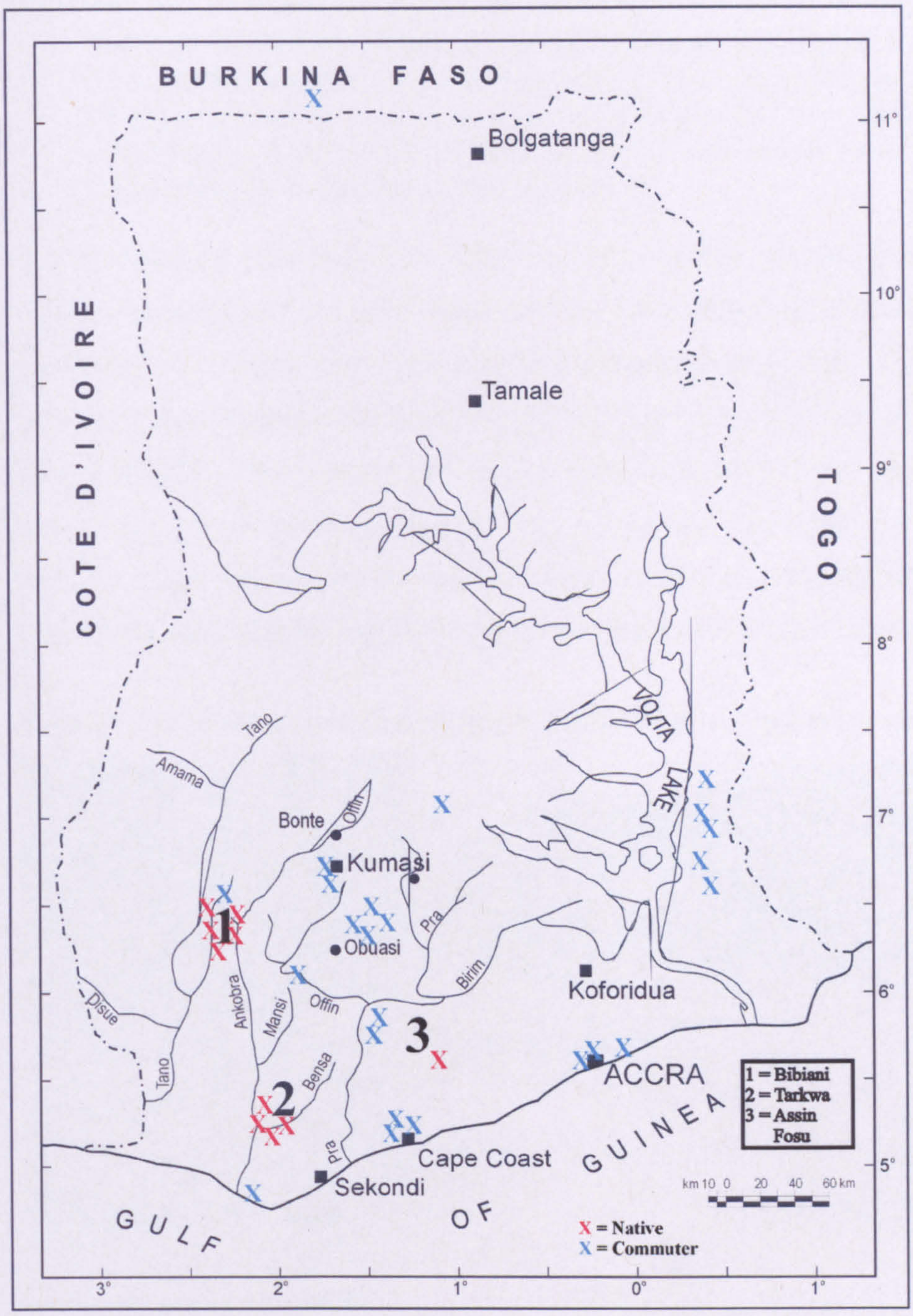
**Figure 6.3:** Years' experience of interviewees




### 6.2.2 Levels of mechanisation and scales of production

Many of the authors focused on the distinction between "artisanal" and "small-scale" mining discuss the issue of mechanisation in their arguments. The conclusion generally reached is, although precise definitions for either term are difficult to devise, there is undoubtedly a need to distinguish, categorically, between the more rudimentary, family-orientated operations, and semi-mechanised, organised mine sites. For this very reason, many experts deliberately refer to "artisanal mines" as the most basic of operations, and "small-scale mines" as those which exhibit some degree of mechanisation and sophistication.

**Figure 6.4:** Map of Ghana showing origin of artisanal and small-scale gold miners interviewed in this study




No such distinguishing factor was evident at the sites visited in Tarkwa, Bibiani and Assin Fosu. Even in cases where miners had registered operations, technology rarely extended beyond the Honda water pump and refurbished corn mill-turned-stone-grinding-machine. The most advanced site visited was that of the DAKEDE Company in Tarkwa, owned by a professor residing in the Volta Region. The 70 people employed on-site have been furnished with four hammer mills, an electric

pump and two diesel pumps. In terms of mineral exploration and prospecting, as explained by one of the foremen, Divine Mogey, practices are comparatively basic:

> "We take samples, and then we determine from these samples the gold content. But there has been some old mining here, so they rely on previous knowledge. The Government did help a bit (the district officer and the mines warden) with collecting the samples but for the most part it was us that found the deposits". [Divine Mogey, registered miner, Tarkwa]

It was observed throughout the fieldwork and verified through interviewing that miners – irrespective of their legal status – rely almost exclusively upon local knowledge and manual grain inspection for geo-prospecting (Plate 6.1). As Tarkwa-based *galamsey* operator Jon Cowbinh put it, "to prospect the land, we use the inner tube method[19]. We simply use this to determine how many grains are in an area…there are no trained geologists here and no one else to ask for advice on the rocks". Neighbouring artisan Rolland Kyei furthermore explained: "we use the sample tire…we take the inner tuber of the tire and use to wash the grains".

**Plate 6.1:** Concurrent gold exploration and excavation at a *galamsey* site in Tarkwa

[19] The "inner tube method" is the practice of using the black inner tube of an automobile tire. The black, smooth surface of the inner tube enables the trained eye of the miner to determine, with a fair degree of accuracy, the abundance of gold grains in a given sample of crushed ore.

Local knowledge is also tapped to ascertain further details of local ores. As explained by Bibiani-based Mieza Kyi, "we preserve the nature of the terrain, and in the swampy areas, some of them look yellowish, so you can see the nature of the ground, and those signs that people have worked here...these are what we use to determine the ore content." Assin Fosu-based operator Peter Kofur furthermore noted, "we take core samples and consult with the locals, as they are knowledgeable in this area". Tarkwa-based operators Kosi Asante and Michael Johnson, and Assin Fosu-based Haruna Addison and Simeon Kojo, shared more personal experiences on the issue of geo-prospecting:

> "I come with somebody, and the guy I came with knows how to do it...we just dug holes. If the gold was there, we dug...it is just local knowledge...no government help". [Kosi Asante, *galamsey*, Tarkwa]
>
> "This area was dug by the old miners...by the whites. So we just entered the pits, took samples, and did the sampling ourselves...we got no help from the government. We just consulted with local people, who did the initial prospecting for us". [Michael Johnson, registered miner, Tarkwa]
>
> "You see, when you have small mining, you employ about three "gangs" to prospect it for you...they are local people. Some of them, they have worked in cheap areas, and they can come here and determine where gold and diamonds are, like "trial and error". They know where deposits are and tell the miner". [Haruna Addison, registered miner, Assin Fosu]
>
> "We are lucky at this site because it is part of both the diamond and gold belts...So to prospect the gold, we use some local people, who tell us where the old mine shafts used to be. Then we take the inner tube of the tire and prospect the region. That gives us some measure of how much gold is here". [Simeon Kojo, *galamsey*, Assin Fosu]

As previously explained, there was little *visible* difference in mechanisation levels at registered and *galamsey* sites. Most of the equipment used by the interviewees appeared crude and homemade, confirming Iddirisu and Tsikata's (1998) initial argument *a priori* that the Ghanaian artisanal and small-scale gold mining industry's operators deploy exorbitantly inefficient technology across the board which, on average, is only 20-30% efficient. As Edward Joseph Mensah, the gang leader of an artisanal party of eight *galamsey* put it, "since we began, we have used the same rusty equipment since day one. I built the sluices, and the jute sack...well, they were recovered from rubbish and the shovels we bought in the next small town over towards Kumasi".

The majority of the groups interviewed – including the registered parties – reported using mainly manual methods to extract gold. As described by Bibiani-based registered operator Douglas Abekah: "we have just manual methods. No grinders, crushers...we are just testing to see if some pumps are needed...we bought the shovels and things we needed ourselves". Neighbouring licensed operator Francis Banoh also attested to having no mechanised equipment *per se*. "Now, we do not have any equipment. We started with some pickaxes, shovels, blankets, and small mortars...no pumps, grinders or crushers." Apart from the occasional pump, the operations of the *galamsey* were no less mechanised than those of the registered. For example, Jon Cowbinh of Tarkwa reported that his seven man *galamsey* team "use shovels" and "also have a petrol pump...and sluicing equipment" but "not much else, though". Similarly, Rolland Kyei, also of Tarkwa, indicated having "only a sluice box, shovels...locally made...no pumps, only manpower". It would appear that the securing of a small-scale mining license, despite granting a degree of legal entitlement to the minerals embedded within an allocated land plot, does little to facilitate upgrades in technology.

Although the size of the sample makes extensive quantitative analysis of Ghanaian artisanal gold mining difficult, the reported production data could prove valuable if additional industry calculations are being made. Similar production data were reported by all of the interviewed miners, who, again, were based in three isolated gold mining communities. Of the individuals who declared their production during interviews, 24 were *galamsey*, producing, on average, 2.65 oz of gold (monthly) during the estimated five month mining season[20], although this is likely an inaccurate representation of the *galamsey* population as a whole. When presented with this data, a Minerals Commission official (3) indicated, "these data are high, and it is likely they (*galamsey*) produce as little as 40% of this average...a more likely figure would be one ounce (per month)".

This apparent overestimate of average production can be attributed to a combination of two factors. First, few representatives were interviewed from the more

[20] Calculation based on the following. The 24 respondents spoke on behalf of 358 individuals, the collective number of people in the 24 *galamsey* gangs. Combined, the 24 gangs produce 191 oz gold monthly. Provided that production remains consistent over the five month mining season – a fair assumption given that, infusions of new technology in the industry have been sporadic in the industry over the centuries – the average *galamsey* produces 2.65 oz of gold per year. The length of the mining season is an estimated five months; the rainy season hinders year-round production of alluvial deposits.

impoverished gangs operating in inaccessible areas well out of the domain of major town centres. These groups, according to one source, are producing smaller quantities of gold but "cannot be reached because even we (the authorities) have no idea where they are based in the rural lands" (Government of Ghana, 2002b). Secondly, the current sample was affected by the high levels of production reported by two small *galamsey* gangs, who have been able to achieve higher levels of production because of increased financing through investors, which, according to another source, "is an extreme rarity in this business, with most of the registered, not the illegal, landing such funding" (Government of Ghana, 2002a). Joe Kojo, a 23-year old native of Assin Fosu who heads one of the gangs, an eight-man *galamsey* group, indicated that one buying agent financed the purchasing of a water pump and sluices to increase yields. However, the majority of *galamsey* interviewed claimed to produce little more than 1.5 oz gold per working season. If this figure and the recent conservative UNDP census forecast of 50,000 *galamsey* are both taken into account, it would be accurate to assume that at least 50% of the gold collected by the Government from small-scale miners originates from unregistered activities.

### 6.2.3 Artisanal and small-scale gold mining in Ghana: examining the poverty trap

In accordance with Nöetstaller's (1994) argument, many Ghanaian artisans who have turned to ASM because of poverty continue to find themselves in a difficult situation. Specifically, the recent mass allocation of land concessions to large-scale mining companies appears to be perpetuating poverty within gold artisan communities, most of which are already without adequate sanitation facilities, running water, electricity and paved roads (Plates 6.2 and 6.3).

**Plate 6.2:** Most artisanal gold mining communities, such as this Assin Fosu village, are without electricity, transport, sanitation facilities and clean water

**Plate 6.3:** Many of Ghana's artisanal gold mining communities are significant distances from towns, and highly inaccessible because of unpaved roads filled with potholes, such as this area just outside of Bibiani

Many miners complained of being unable to secure productive land through legal channels, as most is currently under concession to large-scale operators. As stated in a recent article published in *Drillbits & Tailings*, "two thirds of all Ghanaian land is under concessions [and] everywhere you go, you see huge cavities in the ground, discarded pits where thriving villages once stood and where nothing now grows" (Anon, 2001). One notable example is Bibiani, where, over the past two-to-three years, many gold artisans have been pressured from their lands because of the desires of the management of the local AGC mine to expand local operations. The majority of the registered small-scale gold mining concessions were therefore not renewed at the time of their expiration because of AGC's desire – as a PMMC official put it – "to swallow artisans' lands"; in the majority of cases, the displaced artisans claimed they were awarded paltry compensation and forced to mine well out of the reach of the Bibiani town centre. For example, Mieza Kyi, a 65 year-old *galamsey*, who despite being illiterate, elected to go through legal channels to obtain a concession, complained of being prohibited from renewing his license after its expiration. His concession was absorbed by AGC, and the father of six was forced to mine some 30 km to the west of Bibiani town:

> "I was registered. I did not want to violate the law. I wished to avoid troubles...it prevents you from getting arrested...because (the work) was manual, and difficult to take the hard rock from the ground and feed into the mortar. In the long run, the production was not so encouraging. We had a lot of people doing this, so at the end we had to share out the earnings, and it was just peanuts that everybody got...And just at the time the gold price was going up, at a time for us to make it big, the Ashanti Goldfields took over the concession, and therefore, we could not go further, and that resulted in where I am now...and the little we have left has been what we have been feeding on. I was supposed to get investment support from Wisinski Associates in the US, who confirmed with the Minerals Commission that I was a legitimate miner, but it was at that time the Ashanti Goldfields took over my concession. All I received in compensation was a small pump, which no longer works". [Mieza Kyi, *galamsey*, Bibiani]

Despite enduring the labours of applying for a concession, Mr. Kyi still possessed insufficient mineral rights to effectively handle AGC management at the time of their taking an interest in his plot and surrounding concessions. Francis Banoh, another small-scale gold miner now operating in Bibiani, told a similar story:

> "I have been in jail...I was having our concession...a licensed concession...a big large-scale company AGB...they started prospecting our concession because they had a bigger area...they wanted to include ours in their concession, so they

> came to our sites to prospect, and we would not allow them...and this resulted in a brawl, and we were thrown in jail for refusing to allow them to come on the land...they had a prospecting license, but we were registered to be there but we were the ones thrown in jail. Also...during the times in which I had the concession...I was kicked off by Ashanti Goldfields, which became interested in my concession one year before its renewal. They approached me and asked to prospect it, and I said no but they went to the government. Pretty soon, we were taken to the police station, while Goldfields staff prospected, then we came back and when it came time for renewal, I was not renewed and therefore booted off of the land". [Francis Banoh, *galamsey*, Bibiani]

The fear of being imprisoned appears to have put Bibiani *galamsey* in an uncomfortable position, as most find themselves scrambling for land in a region that now has few available plots. Those who have not resorted to working portions of forest reserves tens of kilometres away from the town-centre, such as Douglas Abekah, claimed to be searching frantically for unused parcels of gold-mineralised land, at the same time, carefully avoiding the authorities. As the 40-year old, father of five explained, "before, I was not registered, and it is only now that I have become keen to register because I have finally found an area after all of this time". Many artisans indicated that the solution to what Douglas Abekah described as "having to constantly look over your shoulder to see if the police or security were coming", was to simply secure a title to a land concession by whatever means possible. Abekah furthermore explained: "I have registered because we have found the place we are going now. And *we* do not want anyone to go to the place that does not have the right".

Displacement of this magnitude appears to be occurring throughout most gold mining regions in Ghana. Box 6.1 describes parallel experiences in Tarkwa.

**Box 6.1:** Community dislocation from large-scale mining: the Tarkwa case

In Ghana, large-scale miners have taken substantial quantities of land out of the hands of the indigenous rural populous, which is comprised mainly of seasonal farmers and artisanal miners. Tarkwa, which is one of Ghana's most important mining towns, has been particularly marred with community dislocation.

The catastrophic chain of events was initiated in 1990, when the American-Ghanaian gold mining company, Teberebie Goldfields Limited (TGL), acquired a concession in the Western Region that happened to be home to the peoples of Teberebie. The Teberebie chief was entrusted to negotiate with the management of TGL a compensatory package for his people. However, because the chief is illiterate, there were concerns that after finalising the agreement, he did not understand fully the schematics of the resettlement package. In exchange for their lands, each of the 2000 people of Teberebie received a paltry US$2 in compensation; relocated housing, which lacked individual kitchens and bathrooms (there are communal kitchens, where people must queue in order to cook) that took over eight years to construct; insufficient clean water; and no healthcare or employment (after Brande, 1998). The concession has since changed hands twice, acquired initially by GAG, and, more recently, AGC but both companies continue to provide minimal benefits to the Teberebie people.

The Teberebie case reflects what has happened in the Tarkwa region as a whole, and many of the local *galamsey* who have received inappropriate compensatory packages from large-scale companies have discovered that the task of securing unallocated land through legal means in and around Tarkwa is now near-impossible; this has forced many to encroach onto unused portions of large-scale concessions. As 30-year old Raphael Kuzo put it, "nobody cared at the time I came, and then they had security with Teberebie, which forced us from the land. I came here because it is safe and far away. Now, no one can bother us while I provide for my family". Kuzo is now a member of a team of seven *galamsey* based along a dirt road approximately 15 minutes from Tarkwa town centre. Another member of the gang, 26-year old Jon Cowbinh explained: "we are here because...we are *galamsey*. Where we were working, the large-scale operators pressed us back and chased us, so there was nowhere to go, so we came here". The portion of the large-scale concession being worked by the gang (Plate 6.4) has proven to be a suitable location, as its members are rarely in contact with the mining company's security forces. Cowbinh added: "we know the Government can license the place for them (large-scale miners) but this is GAG land, so how can we be licensed here? The security from Teberebie has chased us but recently, they have not been coming. This makes our job easier. They should leave us alone. They cannot mine here anyway because it is unsuitable for their machines, and, if they do kick us away, where will we go?"

As can be seen in Plates 6.5 and 6.6 below, the conditions of *galamsey* sites are generally very poor, and reflective of a transient group that must always be prepared to move swiftly in the event that they are approached by large-scale mining security forces and/or government officials.

**Plate 6.4:** Teberebie *galamsey* gang

**Plate 6.5:** Typical *galamsey* site

**Plate 6.6:** A barefoot prospector: because of few employment alternatives, many Ghanaians have been reduced to working barefoot in difficult conditions

A final point relates to the *quality* of what little land is now available to artisans. First, and foremost, the way in which the Government awards land concessions to miners – identified by many experts as a major problem in the land allocation process (Chapters 4 and 5) – appears to have had adverse effects on the livelihoods of many registered small-scale gold miners. To reiterate (Yakubu, 2002, p. 6-7):

> "Small scale miners acquire their concessions without knowing the mineral content of the areas. When the miners realise that the areas contain no mineral after several pits and trenches have been dug, they abandon their concessions and resort to encroaching on nearby large scale mining concessions. Actually abandonment of concessions due to non-viability is very rampant and has left many operators with huge debts to settle. Miners who work on such concessions either find other small scale concessions to work or resort to illegal operations".

A case in point is Jon Yaw, a 35-year old artisan based in Tarkwa, who, in reference to the very land he is operating on, explained:

> "This land belongs to the company and if we come to the (local small-scale mining district) office they will not license us. I can say that I can go to the centre to get a license but…the land is for the large-scale company". [Jon Yaw, *galamsey*, Tarkwa]

The inability of the Minerals Commission to consistently determine the gold content of concessions *prior* to their allocation to small-scale operators has led to a growing mistrust in the authorities, and ultimately, an increased dependence on "trial and

error" geo-prospecting. Tarkwa-based artisan Fusekni Aruna described the rudimentary mineral exploration process now used by most gold artisans:

> "We only do trial and error. There is no designed format we follow. It's simply finding a deposit by luck. No one helps us. I'm sure the Government knows where these deposits are but they don't ever tell us". [Fusekni Aruna, *galamsey*, Tarkwa]

However, not only is the Government admittedly awarding unproductive land (Chapters 4 and 5) for small-scale gold mining but it is also failing to protect artisans from the pollution released from neighbouring large-scale mines. A recent report published by the Structural Adjustment Participatory Review International Network (SAPRIN) argues that "reforms have allowed the expansion of large-scale mining without safeguards, causing adverse effects on the health of local populations" (SAPRIN, 2002, p. 145). Simply put, "the zeal which supports the policy reforms to attract foreign investment to the mining sector has not been marched with the desired environmental legislation to address the inevitable environmental impacts of mining" (Awudi, 2002, p. 6).

There is evidence that the livelihoods of the country's rural artisans have been particularly threatened by the recent cyanide spills emanating from a number of large-scale gold mining activities. These have contaminated many of the freshwater sources, fish populations and crops they depend on for their survival. In October 2001, two major leakages occurred in the Wassa West District of the Western Region. The first involved the release of thousands of cubic metres of mine wastewater – contaminated with cyanide and heavy metals – from a ruptured tailings pond belonging to GHG, after which, virtually all aquatic life in the River Asuman and its tributaries disappeared. A second spill occurred two weeks later, contaminating a swamp area that provides local people with mud fish, medicines and bamboo. A number of transient artisanal gold miners claimed they have been affected by this chemical pollution. As one operator in Tarkwa explained:

> "We have had some negative experiences with large-scale mining. We were harassed by them to get off their land but when I told them that their cyanide spills had killed the fishes we eat from the stream and caused skin rashes, they stopped bugging me. The spillage which occurred some time ago, some fishes in the stream died...sometimes, the water we use to drink causes rashes. We also drink the same mine water and get sick...the chemicals were harmful...ingested by our children. First, they were bugging us...they did not want to employ us, so we told them about the problems they were causing, and

> told them to stop bugging us, they did, and said they would allow us to make our own money even if they could not employ us. We were then told not to encroach on the large-scale plot, but we could mine the outer parts of the concession instead". [Fusekni Aruna, *galamsey*, Tarkwa]

Similarly, 40-year old Kosi Asante, who has been mining in Tarkwa for nearly 12 years, described the illnesses he and his people have endured as a result of largely unregulated large-scale mining pollution:

> "We are working to bring the production to the government, and, at the same time, we are suffering. The reason why is that formerly, we were able to work peacefully, but as of now Goldfields is around here. They have caused so much erosion, they have spoiled the land. Because of that, we have diarrhoea and skin rashes and tuberculosis". [Kosi Asante, *galamsey*, Tarkwa]

A neighbouring miner also commented on the extensive rashes contracted by his children, who have "played in the contaminated pools with their friends".

Large-scale mines have not only dispensed cyanide into villagers' waters but have also introduced sediment, additional mining reagents and spent chemicals to surrounding streams and soils (Awudi, 2002). Moreover, many of the artisanal gold miners who have been forced from their land by mining companies and have since secured employment in local farming channels continue to be affected by the environmental pollutants released by local large-scale miners. For example, in Tarkwa, because considerable quantities of land and vegetation "have been cleared to accommodate surface mining activities...agricultural lands are not only generally degraded, but the decrease in land for agricultural production has also led to a shortening of the fallow period from 10-15 years to 2-3 years" (SAPRIN, 2002, p. 46).

## 6.3 What is driving people into artisanal and small-scale mining in Ghana?

As has been discussed above, conventional wisdom regards artisans are defiant, law-evading citizens who are lured into gold mining by the prospect of "getting rich quickly" (Yakubu, 2002). Recalling the commentary of an EPA official (1), "you see, they (artisans) come and get a concession and they disturb the whole thing...miners are involved in mining in the first place because they feel that it is much easier to earn money". Yakubu (2002, p. 7) echoes a similar view:

> "Illegal mining becomes the most attractive alternative because of the perceived remuneration they expect to get. Many of them have high hopes of making quick money...they start moving from place to place either to make the money or to escape from their debtors".

Contrary to the views of a number of authors (see e.g. Jennings 1994; Nöetstaller 1994; Hentschel *et al.* 2002), the indigenous artisanal and small-scale gold mining industry is not exclusively populated by illiterates and law-evading citizens; rather, it has attracted many retrenched and poverty-stricken people, including 1) individuals from the educational system, 2) former employees of the public sector and large-scale mining industry, and 3) trained professionals. Reinforcing claims initially put forward by the UN (1996a), Davidson (1993) and others that ASM is poverty-driven, unemployment has pushed many Ghanaians to take up artisanal and small-scale gold mining as a profession. Of this group, certain individuals claimed to be the victims of the major employment purges that occurred in the large-scale mining industry in the late-1990s. For example, John Cowbinh, a Tarkwa-based operator, described how retrenchment at a local large-scale mine led to his inevitable participation in artisanal gold mining:

> "First I was working at a company, as a driver, as a rigger...I have been a (artisanal) miner for one year. When I was made redundant, I was forced to come here. Where I used to work, we could not get any jobs. The money was better where I was before but because I can't get any job there, I'm here now. I was given three million *cedis* as compensation (for my severance from the company). This was not good, because I was there for five years". [John Cowbinh, *galamsey*, Tarkwa]

Bibiani-based artisan Francis Asante also indicated having been a victim of labour cutbacks in the large-scale mining sector:

> "After school, I worked on a rubber plantation near Tarkwa for basically *chop*. I later got involved in mining in the Ashanti region as a machinist. I needed more money to support my family and to finance education for my children. So we moved to the Ashanti Region, and then I took up employment at AGC in Obuasi as a general part-time worker for *cash-in-hand*. Then I got a promotion and worked in the dumpster for nearly four years until 1997 but I was made redundant in 1997 summer because of deflated gold prices. Then, I got one week's compensation pay". [Francis Asante, *galamsey*, Tarkwa]

Neighbouring *galamsey* John Yaw, 35, was not as fortunate, as he experienced *uncompensated* retrenchment at the local Teberebie mine. "I was made redundant at Teberebie Goldfields, so now I am here. I did not receive any compensation (from them). I was a general labourer at Teberebie but was sacked because they did not

need me. I received no compensation because I was considered a temporary." Similarly, Francis Aryee, an artisanal operator based in Assin Fosu who earned A-level honours before turning to a life of seasonal farming, explained that "at first, I was with a gold mining company in Prestea Goldfields, where I was a blastman and a machine man but my job collapsed because of the world gold market around 1998...this drove me to small-scale gold mining". Tarkwa-based operator Rolland Kyei reported having been employed by the large-scale mining company, GAG, where, in his own words, he "was working in their survey department but then they laid (us) off". Peter Jubea, now a registered operator in Bibiani, was also driven to small-scale gold mining, motivated by the experiences of his great-grandfather:

> "That was when I was a small boy. My grandad's father, he was a mines' worker, so sometimes, we would be showing us this gold, so I became interested, and while I was in secondary school, we were doing this small, small, small *galamsey*. When I left school, I became involved in this...by 1987. I had to put my bid in, as it only became law in 1986. It is then I began operating as a small-scale miner. I worked in a large scale mining company for four years – Mutual Mining Company – after giving my concession to them". [Peter Jubea, registered miner, Bibiani]

Faced with bleak employment prospects in the private, public and manufacturing sectors, a growing number of Ghanaian professionals have also pursued gold mining as an occupation. The industry has provided a safe haven for a variety of peoples; the educational composition of the sector reflects the current poverty-stricken state of the economy. For example, 52-year old James Mensah, an unregistered *galamsey* based in Tarkwa, described his extensive educational background and experiences as an artisanal gold mining during a personal interview:

> "I am originally from the Ashanti region and have three years at the polytechnic course, two years in general engineering, and one year in a chemical technician course. I have been operating as a small-scale miner four years now... Before then, I taught briefly in Liberia...physics and mathematics...I thought about accruing capital to start my own business. My grandfather was a gold dealer some time ago...some time around in the nineteenth century. At the moment, I thought about stretching out to some business, that is why I am here. I have never worked in a large-scale mine but this (artisanal gold mining work) can be good money". [James Mensah, *galamsey*, Tarkwa]

Michael Owusu, 41, an Assin Fosu-based artisan, claimed to have similar experiences in the teaching profession before taking up mining as a full-time occupation:

> "I have finished A-levels, and spent one year in technical training in Kumasi towards an engineering certification. My teaching profession was only

> temporary, so I looked to find more stable employment. In the Ashanti and Central Regions, it is the gold industry that provides this consistency. So I turned to it, and made a living being a machinist at the AGC site in Obuasi. But I was interested in becoming more enterprising, so I applied for a concession on the side and waited. Eventually, they granted me a concession near Bibiani but they kicked me off when AGC became interested in it in say 1999 because they didn't renew the license. And I've been here ever since". [Michael Owusu, *galamsey*, Assin Fosu]

Tradesmen and redundant labourers have also taken up occupations as artisanal gold miners in Ghana. As explained by Assin Fosu-based *galamsey* Kwame Oppona, "I worked as a driver – any kind of commercial vehicle I could get my hands on – freelance work. I had been doing this for twenty years. Before, I was working near Dunkwa at a village called De'Siree. I did not have any car to drive, so I became a miner. Sometimes, it is better than the driving work because I do not have car (to finance)". Abraham Ajei claimed to have trekked hundreds of kilometers from Accra – where he worked at an automotive body shop – to take up artisanal gold mining in Tarkwa:

> "I was a car paint sprayer, my own workshop in Accra...it was, at one point money making a lot. Ok...my landlord of my workshop took control of the land in Accra, so I had to close the workshop. I had known work so I travelled here from Accra to make money quick. The mining can provide a lot of money...I have come to learn...This land is my grandfather's land. They have mined here, so I am continuing his work. I am working for a registered person. I am working for a registered person, so I do not know how long he has been registered". [Abraham Ajei, *galamsey*, Tarkwa]

Other miners reported that their experiences as a poorly-paid farmers drove them into the gold mining profession:

> "I was farming in the Volta Region for a time but only for a few months following secondary school. I did not have the money to continue at Cape Coast University, so I became a farm worker then came into mining over here". [Joe Kojo, *galamsey*, Tarkwa]

> "Before Obuasi, I worked on a cocoa plantation way to the west of here, near to the Ivory Coast Border – very, very low wages for picking the beans. After a few years in the poor cocoa plantations, we had to move...Originally, my wife and I and our first child went to Kumasi to look for work. I even had training in blacksmith and typing but couldn't get a job. So, I heard word that gold mining was beginning to boom to the west in Bibiani, so I came down". [Peter Kofur, *galamsey*, Bibiani]

> "First, I was a farmer and second, I was a rubber planter. The industries netted me no money, and plus, I spent so much time selling my stuff at market. I was

> involved in these trades for over 15 years on and off, throughout Ashanti Region, Central Region and the Western Region. I became a small-scale miner because of ease. You simply mine and sell the product to the gold buyer who comes to you. It is so simple compared to farming". [Edward James Mensah, *galamsey*, Bibiani]

Another factor contributing to increased artisanal gold mining activity is cultural ties to land. In countries such as Sierra Leone, the perceived invasion and installation of largely foreign-controlled large-scale mines has precipitated violence between grassroots communities, the authorities and multinationals. Although the animosity toward foreigners and associated conflicts is nowhere near as severe in Ghana, the adversity toward the so-called "white man" was nevertheless detectable during selected interviews with miners. This, in turn, has resulted in many more *galamsey* remaining transient and unregistered on the land they feel is rightfully theirs'. Bibiani-based *galamsey* operator Francis Asante and Tarkwa-based Benjamin Andoe described how recent experiences with foreigners were the main reasons why they were unwilling to register as small-scale gold miners:

> "I refuse to register as a miner because the white man continues to take our gold. Why should I have to go through the same process as a foreigner? I am Ghanaian, and deserve this right to mine, especially when foreigners do not allow me to work their fields, which are really our fields". [Francis Asante, *galamsey,* Bibiani]

> "I am not registered because I do not have a concession. This area is finally nice for us because there are no security running about. It is a large-scale concession but they (the company) are not using it, but we wouldn't get it from Accra because they have gone and given it to the company when it should be ours' to mine. We are the citizens of Ghana and the whites get to mine it...our brothers, the hired security guards, are chasing us happily from the land because they are now being paid by the white man and do not have to work hard to buy their bread like us". [Benjamin Andoe, *galamsey*, Tarkwa]

Francis Banoh, now a registered miner in Bibiani, also came to the defence of the *galamsey*, explaining: "why should they (the *galamsey*) be responsible for trying to earn money where white people are now occupying their previous jobs?"

Ghana's artisanal gold mining sector also appears to be attracting a mass influx of youth. As indicated by a group of *galamsey* boys who have dropped out of school in the Akwatia constituency, "we think we have passed the age of school going and being classified as such. School going means those who are below the age of 12 and

those who are not strong enough to dig for money" (Koforidua, 2003). Yakubu (2002, p. 7) captures the essence of the problem in the following passage:

> "The rush of our youth into illegal mining or *galamsey* can partly be attributed to the unemployment in the country. According to the Ministry of Labour and Employment (1997), between 150,000 and 200,000 school leavers enter the labour market every year".

An abundance of youth in the industry was observed during visits to *galamsey* sites, which, at the time, featured large groups of teenagers – mainly boys – engaged in a wide range of gold mining activities, including sieving, extraction, amalgamation and panning (Plates 6.7 and 6.8). Fusekni Aruna, who is married with three children and currently works shallow gold pits as part of a team of six artisans, recalled how appalling the job market was when he completed his A-levels. "OK, there was no job, and the land was there, so I started mining. I get something for *chop*, so that is all that matters." Another member of Aruna's team, 17-year old Benjamin Andoe, explained why he chose to relocate to Tarkwa to take up employment as a gold artisan:

> "I am a student but because of money I am at work here. That is why I have been transferred by my brothers. I need money to continue my BASS levels. I finished my basic education but because I want to continue I need money...the work is so hard for me too. I needed money for schooling like I said, so I asked a friend in Cape Coast where I could earn some extra money and he said to become a gold miner. So I travelled here to Tarkwa and looked into registering but was shown by another friend that this area was a good place for gold, so I joined the gang here and now I am making enough money for school but it is hard work". [Benjamin Andoe, *galamsey*, Tarkwa]

Other *galamsey*, such as 30-year old Raphael Kudzo, chose to join the artisanal mine labour force, rather than attempt further studies. "When I finished my O-levels, I moved from Volta region to Tarkwa. I basically began mining right when I finished my studies." Now-registered operator Michael Johnson told a similar story:

> "When we finished school, there were not enough jobs for us...at that time it was illegal mining. So we just came and were able to earn a little bit of money...you get money faster in this industry than in farming. We prefer the mining because we are likely to get money quicker...even if it may be more dangerous. At least we are able to put our children through school". [Michael Johnson, registered miner, Tarkwa]

Other operators, such as, 40-year old Kosi Asante, have relocated from Accra to gold mining towns like Tarkwa under the false pretence of an improved lifestyle:

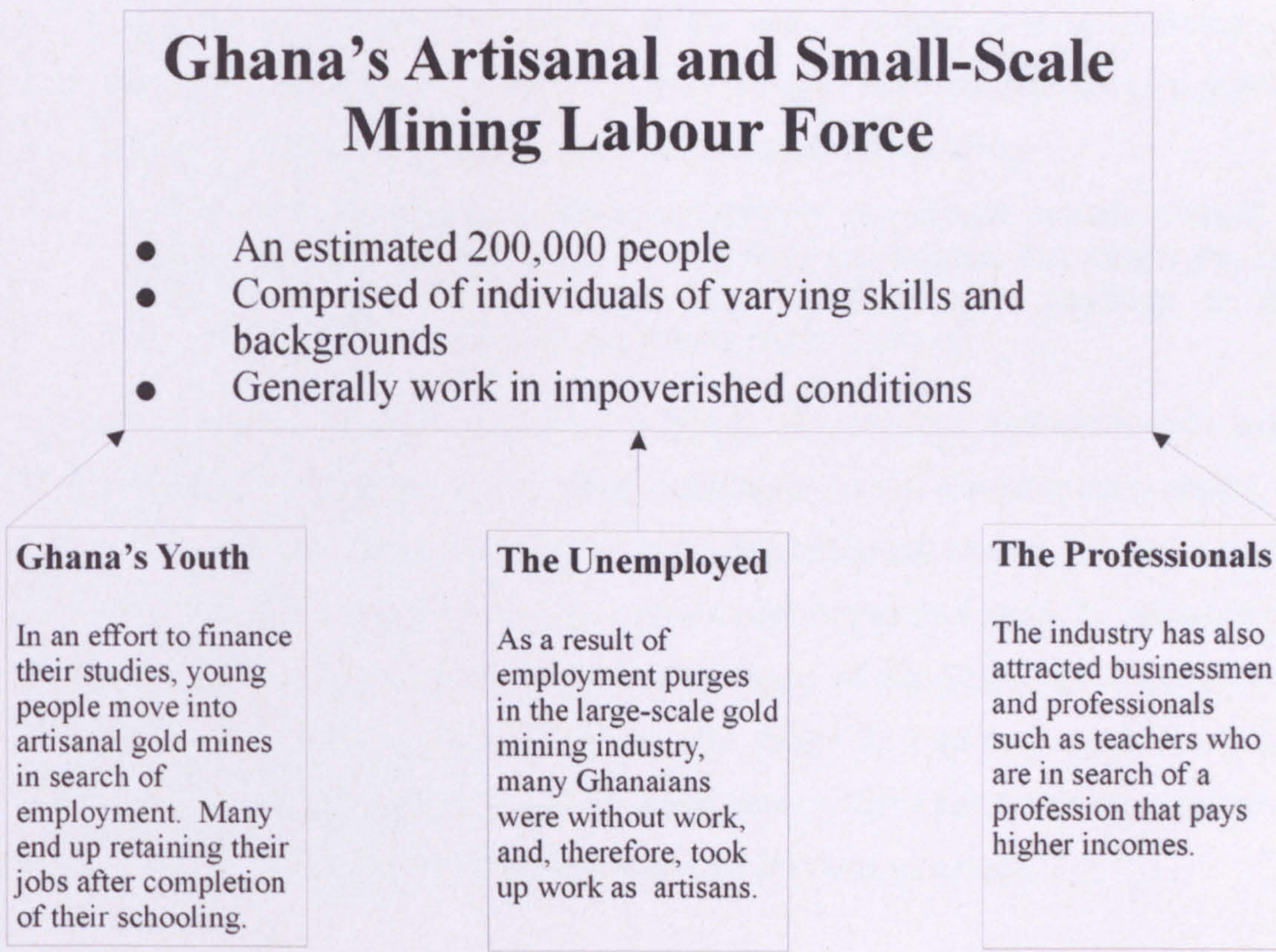
> "As far as the gold is concerned, we don't waste our time for anything else because we know the returns here will give us money, though small. But it is not money alone…I was attending Greek School and working but was given about five acres of farm trees, at the same time, cassava, which has also enabled me to get a lot of money. This is why I am here both mining and farming". [Kosi Asante, *galamsey*, Tarkwa]

Based upon surveyed opinion, Ghana's artisanal and small-scale gold mining sector is poverty-driven, populated by a large contingent of the unemployed, numerous youths and retrenched professionals (Figure 6.5).

**Plate 6.7:** Boy employed as an ore washer at a registered site in Tarkwa

**Plate 6.8:** A teenage boy rests in an illegal pit in Tarkwa

**Figure 6.5:** Major groups comprising Ghana's artisanal and small-scale mining labour force, based on interview feedback



## 6.4 Attitudes of Ghana's artisanal and small-scale gold miners

### 6.4.1 Entrepreneurialism versus "work for bread"

As explained by Narayan and Petesch (2002, p. 1), poor peoples' stories reveal why they remain impoverished, and, more importantly, reveal their views on "encounters with state, market, and civic institutions that distort well-intended political, economic, and social policies". How do Ghanaian gold artisans view their situations? Three emerging themes can be articulated from the communications with miners on the ground.

First, and foremost, and as previously explained, artisans appeared very keen on abiding by legislation, fearful of the very idea of being jailed by the authorities. Although land use competition between large- and small-scale miners is noticeably intense in Ghana, incidents of precipitous violence (e.g. ILO 1999; Hilson 2002a) are few and far between, likely attributable to artisans' desires to avoid confrontation altogether. As Joseph Mensah, now a registered operator in Bibiani, put it, "I got a license in 1990. I registered for a license because I wanted protection because the police kept bothering me". Mieza Kyi, now an unregistered operator, reflected on why he was keen on securing a small-scale mining license in the mid-1990s. "Yes, I was registered. I did not want to violate the law...I wished to avoid troubles...it prevents you from getting arrested." Divine Mogey, now working on a registered concession in Tarkwa, also underscored the importance of licensing:

> "Yes, it (a mine license) is effective because you cannot operate without it (legally, that is). Moreover, if you don't have any license, that means you are cheating the Government, because you won't be give anything to the Government". [Divine Mogey, registered miner, Tarkwa]

Secondly, in spite of their fear of the officials, the artisanal and small-scale gold mining population appears to be losing confidence in the Government's ability to provide support. A number of artisans expressed bitterness toward the Government because of its alleged lack of support. As Francis Aryee explained, "I would never consider approaching the Government because some of my friends have approached the Government have not got any help, so why should I? I do not see why I should, too". Bibiani-based *galamsey* Jon Cowbinh appears to have lost complete confidence in the Government's ability to award suitable concessions to artisans:

> "No, I am not registered. I choose not to because I wish to avoid the government at all cost. They have destroyed the farming in this country and I am told by friends that they are doing the same with mining. I have been in this area for five years now". [Jon Cowbinh, *galamsey*, Bibiani]

Peter Kofur, also of Bibiani, began losing confidence in the Government after a number of unsuccessful attempts at securing a concession through legal channels:

> "I have liaised with both the officers in Dunkwa and Bibiani on numerous occasions, especially during times when we are trying to secure a concession. The men in Dunkwa were not too helpful but were just following orders. These guys in Bibiani have been so helpful, though. They know we are operating illegally but are trying to negotiate a concession for us through legal channels". [Peter Kofur, *galamsey*, Bibiani]

As further explained by Edward Joseph Mensah, "where is the Government providing us with equipment? Where is it providing us with finances, where is it giving us the know-how? None of its officers help us really with our efforts".

A third and final emerging theme is a polarisation in views concerning the nature of the work undertaken. Registered operators appeared highly patient, and claimed to view the work as entrepreneurial. For example, as Peter Jubea of Assin Fosu explained, "I registered because I *like* the work. I do not like doing things illegal because if you are caught, you end up in the precinct. I was working illegally before and I knew the consequences. Then, it was regularised, and I realised it was time to get a license". Kofi Michael Sackey, who is now registered in Tarkwa, spoke of expanding his operations:

> "One years' time, I see myself expanding the land in Tarkwa because we have a very good concession and we want to drill more. Haven't finished processing the documents at the Minerals Commission, so in a few months we'll get this done, and we'll start investing in Tarkwa. Two years want to come out as an established medium scale miner". [Kofi Michael Sackey, registered miner, Tarkwa]

However, the more transient *galamsey*, who are subjected to more impoverished conditions, are less settled in their work, and many sounded defeatist when probed about the possibility of pursuing *other* employment. Tarwaian *galamsey* Francis Banoh, for example, maintained he would be a miner "until I am 45 years old, at least [as] it's the best living right now, so until things improve, it's the only option I have". Similarly, Francis Ayree, insisted he would continue mining "until I am able to find

stable work...at the moment, this is what I have been reduced to". Mieza Kyi, now 65, claimed he would be a miner "until I die".

As John Cowbinh further explained, "this work is difficult, so I hope that more jobs become available. I even travelled to the city to find something but Accra is filled with unemployed and beggars, so I came here. I will probably be here...time flies, and every day is the same work for bread". Certain miners, such as Francis Asante, have no plans after minerals are exhausted. "Hopefully, these reserves will not run out anytime soon (but) I don't see myself changing work occupations in the next five years".

Other *galamsey*, such as Rolland Kyei, expressed frustration towards the laborious nature of the mining work. "Everything depends on day-to-day...unless we get something better, if we get any work now, we will move because this work is difficult...any better opportunity we welcome." Simeon Koju of Assin Fosu also implied that the work is taxing:

> "I want to eventually go back and studying at Cape Coast University...The mining life is miserable, dirty and hard but I haven't the choice at the moment...If you know anything about farming, our government does not do anything good for the small farmer, so this makes farming a difficult profession to make money...So mining is one of the only alternatives...But at this point, I cannot do this because I must feed the family and until I get enough money I won't be able to go back to university of technical college". [Simeon Koju, *galamsey*, Assin Fosu]

*Galamsey* such as Jon Yaw also discussed the importance of alternative employment. "We need a job to do. The Government needs to help us but they are not, then we can leave this bad way of life. They have to organise things for us. Look at my age...because there are no jobs, this is why I do this horrible work. When Government comes, and if they give us a loan, I can give it to my wife and kids. I could even invest and get interest...Government can help give us equipment for these sites."

Gold artisans are not necessarily *deliberately* evading laws but are rather behaving in a fashion largely dictated by the minimal resources provided to them by the Government. According to surveyed opinion, whilst certain operators have

entrepreneurial motives for their involvement in ASM, others are mining to secure a daily wage to purchase essentials.

### 6.4.2 Licensed versus unlicensed gold miners: security of tenure?

> "Right now, we are licensed or unlicensed but are still being pushed away by large miners". [Rolland Kyei, *galamsey*, Tarkwa]

To recapitulate, one of the key conclusions reached at the *International Roundtable on Artisanal Mining* in Washington was that "no real solutions are possible unless artisanal miners are given full legal and transferable mining titles to their claims" (after Barry, 1996). In Chapter 4, a number of indigenous experts and government officials echoed this view in terms of the Ghanaian case. Among the problems reported with licensing schemes included costs, lengthy application procedures, exceedingly short durations, and limited legal flexibility *vis-à-vis* large-scale operators.

Of the miners interviewed, nine were licensed, two were employed on licensed concessions, and the remaining, *galamsey*. Although there has been discussion in the thesis thus far on how obtaining a license to mine on a small scale can be a challenging task in Ghana, there was a visible difference in opinion between the registered and *galamsey* on the subject of licensing. Whilst *galamsey* appeared noticeably discontent with the existing scheme, those interviewed who *have* managed to secure a license appeared content with the system. As Francis Banoh, a registered miner currently based in Bibiani put it, "the licensing is good. It is a good process because if someplace if you go to some of these places around Bibiani, some of them doesn't have enough planning, so, if you get a license you are free and legal". Incidents have been reported whereby the prospective licensee has waited months for his license but opinions clearly change once the application process has been successful. Continued Banoh, "it is good to go through the steps – you just follow the procedures but it takes time...we have to wait. I do not know how the process works but I know it goes to Accra for evaluation". The registered operators interviewed indicated having a contentedness with the licensing procedure. "It is good," explained Peter Jubea, a licensed operator also based in Bibiani, "because it involves a huge amount. Sometimes, it takes a month, it takes long, now, though...it is lengthy...as of now, that is why people do not register...sometimes it takes a year...it is going to take

some time, as after sampling, it goes to Accra and EPA." Francis Banoh described more explicitly what he was required to do to secure his license:

> "We have to come and give them the map, and we make the research here, and then it goes to Accra...and then we find out if the place is free (available). And next, I must go and survey the land...it is a good thing, though. Next, they send it to this District Assembly...then we go to the Minerals Commission for the approval". [Francis Banoh, registered miner, Bibiani]

The message generally conveyed by registered miners was that licenses keeps police at bay. As Haruna Addison, who mans a licensed dual gold-diamond concession in Assin Fosu put it, "it is good because of the licensing process. The reason why I say it is good because it is helps prevent me from getting arrested. It is lengthy but when you have it, you have that security". Francis Banoh was more explicit in his commentary, noting, "all I see it is as a good thing, so I do not get arrested". Michael Owusu, who claimed to be employed by a licensed operator in Tarkwa, also indicated the scheme was a means of improving personal security:

> "The licensing system is ok. I know it takes long but once you get that license, you are a winner...no one can stand in your way. You no longer have to be fearful of someone kicking you off your land for that three-to-five years and if you have the right contacts, you can renew it easily with some bribe to the district council, I am sure". [Michael Owusu, Tarkwa]

Many registered operators, however, expressed discomfort with the short duration of the license. "We normally have to renew the license every five years," explained Divine Mogey, a foreman at a Tarkwa concession owned by the DAKEDE Company, "so they should lengthen the license, which will encourage us to work more." Neighbouring concession owner Michael Johnson also commented on the shortness of the licensing system. "The five year duration of the license should be extended. It is way too short, and the process we go through to get the license is too long. You go here, we have to go to EPA, to Mineral Commission, after getting the license, we have to go to Accra to get the permit every year...then its Mines Department...the assembly...the list goes on."

The *galamsey*, who are operating outside the law, do not have the luxury of security enjoyed by the licensed operator, and many interviewees were frustrated over not being able to secure a license. Certain operators, such as Raphael Kudzo, blamed the Government for siding with the foreigner over his "own people":

> "I, as a resident of Ghana cannot even get legal permission to mine my own land but the white man can mine it over me...the white man that does not even live here. I get no advice and the banks shut us out. The other day I was informed by the bank to deposit money or be forced to have my account closed". [Raphael Kudzo, *galamsey*, Tarkwa]

Others explained that they were unable to meet the financial demands imposed. "I do not have money to process the documents, which is why it is delaying," explained Douglas Abekah of Bibiani. "So, if you have money, it is processed quicker...everyone needs a bribe here but I do not have the money to make sure it goes through quickly." Kwame Oppona of Assin Fosu also complained about the issue of cost, indicating it was too demanding because there was no guarantee of obtaining gold:

> "We don't think the license is helpful because sometime you do not have money for the license and the other things. And plus we don't have the machines to dictate whether there is a diamond here or not. So sometimes, you go and take the license, and you find no gold at the end of the day". [Kwame Oppona, *galamsey*, Assin Fosu]

The length of the licensing procedure also proved to be another major deterrent to registering. As 65-year old Mieza Kyi explained, "it can be good but it is too long. Plus, as in my case, it does not guarantee tenure. I am not licensed at the moment but I was and I was kicked off my concession. Now, I am mining 30 km in the forest...out of reach". Francis Asante and Edward Joseph Mensah, both of Bibiani, voiced similar complaints about the licensing procedure:

> "This is something I wished to raise: the licensing system. What is the point of having a system in place for miners that makes operating more difficult? It takes them months to get the papers approved for Accra, and then the EPA and Minerals Commission...By the time they are finished, it is months. And the licensing only lasts for a short period of three years". [Francis Asante, *galamsey*, Bibiani]

> "Well, what do you think?...I am waiting for so long for my license to mine. There are so many problems with the system as you can see. Too much paperwork, and too lengthy a process. It is persuading miners not to register but rather to flee to places like where I am to operate illegally". [Edward Joseph Mensah, *galamsey*, Bibiani]

Other miners, such as Peter Kofur, complained about the complexity of the licensing system:

> "Absolutely complicated...I mean, on the one hand, it is good for those who have secured the license because they do not have to fear being kicked off the

> land by government but so few are successful because there is so little land that has been demarcated. Why is that? What I do not understand is that my gold is bought by the agents regardless of my status as an illegal miner. So get us better organised, government, and don't make it impossible for us with all this paperwork and costs to get a license. I mean, I am one of few miners that can read and can actually do this process with ease. Start thinking in terms of the miner, and not yourself, Government". [Peter Kofur, *galamsey*, Bibiani]

Jon Combinh of Bibiani related the complications of the system to the number of steps involved. "The scheme is complicated. We must go to Accra, which costs us money. Then we have to submit so many copies of our plans to these district officers. It is an expensive process overall, though and we miners cannot wait for approval. It is too long.. Box 6.2 provides more intimate accounts of miners' experiences with licensing in Tarkwa, an area which, as previously explained, is mostly under concession to large-scale operators.

To summarise, according to miners, a procedurally complex, costly and lengthy small-scale mining licensing procedure has been implemented in Ghana. Not only has licensing failed to provide the miner with security of tenure but it also appears to be propelling the anarchic expansion of environmentally-damaging "illegal" artisans. There is evidence that the complex licensing procedure in place for small-scale gold miners in Ghana provides minimal incentive to register with the Government. This is particularly problematic given the record levels of production experienced in the sector in recent years, which suggest that the number of operations is increasing at an unprecedented rate, and confirms that the Government likely possesses minimal knowledge of the whereabouts of major clusters of artisanal gold miners.

### 6.4.3 Availability of extension services

Poor road development, infrastructure and health services continue to constrain rural Ghanaian society. As Tarkwaian *galamsey* Jon Yaw put it, "improve the community infrastructure! This goes beyond mining, and will require the Government to build these terrible roads, improve its hospitals and get this piped water in place." Another explained: "improve our communities...we need the roads fixed, the piped water put in, and the food provided".

On the issue of extension support, there was a dichotomy of opinion. Whereas *galamsey* miners claimed that the Government provides few extension services and

minimal hands-on assistance, registered miners appeared more relaxed during interviews, for the most part, content with the level of Government assistance. Tarkwa-based *galamsey* Michael Owusu described the difference in the level of support administered to registered small-scale miners and *galamsey*:

> "Registered miners would agree, yes, but *galamsey*, no. Because the *galamsey* are the black sheep of the mining world and the Government does not want to help them...they make it difficult for them to get their land, and will not help them unless they commit to the registration". [Michael Owusu, Tarkwa]

The excerpts presented in the discussion that follows further illustrate this difference in opinion.

The registered have had the opportunity to liaise with Government officials on a number of occasions, particularly when they submitted the requisite paperwork for registration. Francis Banoh, now a registered small-scale gold miner based in Bibiani, praised the work of the local Government officers. "Yes, they (the district officers) have helped us a lot. They have helped us organise things here with respect to business dealings. This is the legal channel through their office, so we abide by the law." Michael Johnson and Kumega Anbion (of the DAKEDE Company), both of Tarkwa, also reflected upon governmental assistance in a positive manner:

> "They come here, brought us this machine, which should have gone to another place. Although we haven't been shown how to use it, we are lucky to have this grinder. The (district centre) staff has also helped us solve problems for us. There were some quarrels here, the police station and so on, and they accompanied us to the police station and explained everything to the police. There were illegal miners when they acquired the concession...and the police needed to know whether they were legalised". [Michael Johnson, Tarkwa]

> "Only the district officers have helped us. They have told us that we should not pollute the water and that the pits should be filled. The officers have introduced them to the machines. Originally, we were using manpower by pounding it in a metal mortar but later, they introduced machines". [Kumega Anbion, Tarkwa]

Moreover, *galamsey* working to register their operations, such as Douglas Abeke of Bibiani, appear to have softened their stance toward the Government. "They have helped us, yes. They help me to get the papers...ok, they help me to get more equipment, and to organise my site...they are helping me plan things."

However, the majority of the *galamsey* consulted maintained a rigid stance toward the Government, expressing displeasure over the quality, quantity and availability of

extension services. As one operator put it, "although district staff do their best to help us, other than that, we are getting no assistance in the area of equipment provision, nor are we being guided in our work. It seems that small-scale miners only become the topic of conversation when the government feels they are doing something wrong". As explained in Chapter 4, the Government has attempted to decentralise support services by constructing seven ASM district support centres, although according to legislation, these centres, most of which are equipped with a district officer, mines warden and a driver, can provide little assistance to *galamsey* because of their unregistered – hence, illegal – status. "Yes, we know about the district centre here in Tarkwa," explained Fusekni Aruna, a *galamsey* based on the Teberebie site in Tarkwa, "we even sell our gold to an agent nearby. We have come by the centre in the past to ask for financial assistance but they had none." Mieza Kyi of Bibiani provided a more in-depth assessment of the problem:

> "I do not feel that I am getting enough support, no. When we were working, the technical advice, if we had it, we would have had better cooperation from the government but at the time AGC took over, we did not know much...we did not know about the environment, mercury pollution, a retort because of this work and production, and my attempt to get another organisation involved in my operation – an investor from abroad – I was supposed to get investment support from Wisinski Associates in the US, who confirmed with the Minerals Commission that I was a legitimate miner". [Mieza Kyi, *galamsey*, Bibiani]

A shortage of extension services appears to have left many *galamsey* confused. Out of sheer desperation, some operators, such as Francis Aryee of Assin Fosu, claimed to have contemplated writing letters to the authorities to request financial assistance:

> "First of all, I would write to some estate for some advise, especially for the small-scale industry I am in, because I do not want to mismanage the money...so first, when I get the money, by keeping it a safe hand, I know that it is going to be beneficial. But I have to invite the necessary people – those than can give me the necessary advice, so at the end of the day, the money is not lost". [Francis Aryee, Assin Fosu]

Kosi Asante of Tarkwa has claimed he has "written a letter to the Poverty Alleviation Office", although "the money has not come yet".

Other miners admitted having nowhere to turn for help. As Francis Aryee put it, "who on Earth helps us, besides God? I have never received help from government people. They say that the legalisation process in 1989 was going to bring about organisation. All it has brought is chaos to these parts...No geological information

either. We get it *all* ourselves. In fact, I would not be surprised if the government had no knowledge of the gold geology out here. You never *ever* see their workers prospecting the field". Referring to his inability to mobilise the funds to purchase a water pump, Kosi Asante explained: "All I am asking for is a pump that works, and I've gone to the district centre for help with this matter but have been told no...what else can I do to get this help? No one help us miners, including the government...*especially* the government". James Edward Mensah appeared equally confused when probed about the issue of extension services. "Who would *I* approach? If I had someone to approach, I would have done so by now".

The absence of what interviewed *galamsey* felt were necessary extension services appears to be contributing to a growing community distrust in the Government. As Jon Cowbinh of Tarkwa explained:

> "When they come, and we ask them questions and it is useful, then yes, it would be beneficial...like today you found out that we need the pump, so now if you told them this, it would help. They must agree that it is ok for us to operate, then I can see them really being able to help us...but the problem is, they do not recognise us or anybody. If they are satisfied, then yes, this will help". [Jon Cowbinh, *galamsey*, Tarkwa]

Benjamin Andoe, moreover, explained: "local people help here, no one else. "The Government *probably* knows the rocks and gold here but just chooses not to tell us." As another *galamsey*, referring to his exploration techniques, put it, "we only do trial and error. There is no designed format we follow, it's simply finding a deposit by luck...No one helps us. I'm sure the Government knows where these deposits are but they don't ever tell us".

The majority of the now-registered operators interviewed appeared content with the assistance they are receiving from the Government. However, as previously explained, illegal miners are receiving comparatively fewer extension services from local officers, who are bound by legal agreement not to provide the unregistered with assistance. This lack of support, combined with shortages in finances and technology, is likely brewing fuelling "hit and miss" activity in Ghanaian artisanal mining communities, where many inhabitants appear to have long lost what little confidence they had left in the authorities. "We would rather do it ourselves anyway," explained

Peter Kofur of Bibiani, "we fear that if the Government finds us some nice gold deposit, they will turn and give it to the large-scale operator anyway."

**Box 6.2:** Perspectives on licensing procedures for ASM

Worldwide, governments are being accused of implementing inappropriate legislation for ASM. Nowhere has this been more evident than with the procedures and policies now in place in most countries for securing small-scale mining license. Although such licensing can be positive if used as a policy tool for the sector, governments continue to view it as a form of revenue raising (Burke, 1997).

According to *galamsey* interviewed in Tarkwa in the Western Region, costs and associated time delays are dissuading many from engaging in the licensing process. As explained by Rolland Kyei, who is currently operating alongside a dirt road leading into a site managed by the large-scale miner Satellite Goldfields, "we know there is a licensing system, and the one area we had worked before was licensed but by our chief. So we know there is a license but we cannot do it ourselves but we don't involve ourselves in the procedure personally anyway as it must go through our chief. We don't know the procedures or have the money". In fact, miners like Kyei (as seen in Plate 6.9) appeared highly sceptical about potentially squandering funds on a license. "We know that there is a licensing system but unless we are sure there is something so that we don't waste money, then we won't do it. If there could be some prospecting to tell us that the place is good, then we do not worry about spending the money because it gives us security to the land."

Miners argued that unless costs and the bureaucratic time delays are reduced, illegal mining will likely continue to increase. "I cannot wait the time for a license nor do I have the money to pay," explained *galamsey* Benjamin Andoe. "But if I was given the land to mine *legally*, I would mine it and happily pay the fees but that will never happen. I would pay the fees because I would be safe and couldn't get arrested." In fact, the availability of land is perhaps an even more pressing problem. As previously explained, some 70% of Tarkwa is now under concession, which has made securing a productive land plot exceedingly challenging. As Michael Johnson, a former *galamsey* who is now registered in Tarkwa put it, "if they (the Government) see that those of them who have started, if they are workers, they need to assist in the demarcation of land plots. Why is the Government awarding these massive lands to GHG and other big companies? How can this illegal problem be corrected if the Government continues to award such massive land plots out when there is none left for the *galamsey*? They cannot be licensed because there is no land. Most have applied for licenses but have not received them because there is no land, so it is not that they are unwilling, it is just that they haven't been given any priority". James Edward Asante echoed Johnson's words. "The licence is ok if you get it but most people don't get it. The Government has made it difficult for the miner to secure land. We have to travel to Accra from way out here, which takes eight hours. We also have to provide so many plans but this is what takes so long. If this is not approved we have to start from the beginning".

As is the case in other artisanal gold mining regions, many Tarkwaian *galamsey* also view the licensing procedure as a security measure but at the same time, acknowledge its many problems. As explained by Raphael Kudzo, who has spent the past two years mining in a forest outside the main city centre: "it's good in that you do not get arrested and so you feel more safe but it takes long, and I hear that people get bad land in the end, and end up wasting time and money. I do not have a license because there is no land that I know of." Richard Awe also acknowledged the security provided by a license. "Yes, it's effective because if you don't get it, the Government arrests you. If you do not have a license, the Government can arrest you...when go to the place where the large-scale mining is, you get arrested. It depends upon how you can get help to get a good place where you can get a good deposit so you can get a license because the license costs...and then at times periodically, you have to produce gold at the office because you will be queried." According to Tarkwaian *galamsey*, the securing of a license to mine on a small scale has been exceedingly challenging. These difficulties have dissuaded many from registering altogether. What must be changed to facilitate increased registration? "Everything I've said," explained Fusekni Aruna, a *galamsey* of ten years, "because with a decentralised system comes improvements to licensing, for example, as these Government in the field will get more responsibility to do things. Right now they have none. That would make me register because I have the confidence in these men that they could find me a good land plot. Right now, though, they know where they are, they do not have the power to give me it."

**Plate 6.9:** Tarkwaian miners like Rolland Kyei (centre) indicated that costs and time Delays have deterred miners from obtaining a license

## 6.5 Environmental awareness of Ghana's artisanal gold miners

The MMSD publication, *Breaking New Ground* (MMSD, 2002) argues that "it is certainly true that small-scale miners tend to do more damage to the environment than those working in modern mining enterprises [because of] a lack of awareness – particularly of the less visible or long-term environmental impacts of activities" (MMSD, 2002, p. 320). Whilst this holds true of many artisanal mining communities worldwide, policymakers are often quick to conclude that artisans are completely unaware of the environmental implications of their activities. The present study revealed that paradoxically, many of Ghana's gold artisans are, in fact, armed with notable environmental knowledge. As the discussion that follows illustrates, even the most impoverished of miners interviewed exhibited some degree of environmental awareness.

### 6.5.1 General environmental awareness

The likelihood that "environmental costs of ASM are in general higher than those of other types of mines" (Hentschel *et al.*, 2001, p. 34) makes appropriate grassroots environmental planning crucial in this context. However, the issue of local environmental awareness in Ghana has been poorly explored. Dyasi (1985, p. 99)

examined traditional environmental awareness in Ghana in the context of water and land resources, arguing that among the Akan groups, "bodies of water are associated with gods or *abosom* and must be used in accordance with the wishes [and that] land utilisation according to custom should mesh with the needs of the environment". More recently, Porter and Young (1998, p. 521), based on research undertaken in selected villages in the Volta, Central and Greater Accra Region, reported that there was "substantial environmental knowledge among some sectors of the population [and] widespread tradition of resource management through the application of taboos and regulation of various kinds".

*Galamsey* also appeared well aware of the environmental implications of their activities. "We know but there is no choice," explained Tarkwaian *galamsey* Rolland Kyei. "We know we are spoiling the trees and so on, and, if we got enough money, we would replant vegetation...we are aware of this but the little we are getting we cannot afford to buy any seeds." Peter Kofur, a Bibiani operator, also acknowledged the damaging nature of his activities but was quick to identify the comparatively more severe impacts of large-scale activities. "Small-scale mining is damaging but look at the large miners. Their activities are far worse. They claim to do EIA and other things but how many cyanide spills have we heard of in Ghana at large properties? So many...*I* know the soil damages we cause and *I* try to keep them low. *I* don't deliberately destroy trees, either." The case of *galamsey* Michael Owuso is further testimony that the participants of the sector are environmentally aware:

> "I know that the landscapes here have been destroyed by miners moving quickly. These *galamsey*, sometimes they move so rapidly, they destroy everything in their paths, which gives us such a bad name these days. But we do not do that. We have been in this general area for going on three years, and we do our best to keep the nature clean". [Michael Owusu, Tarkwa]

To address these problems, many miners reported undertaking various environmental planning initiatives. "I know that the environment is being damaged by our activities," explained Simon Kojo, a Bibiani-based *galamsey*. "Look at this landscape...it does not look good. I know that we put sediment into the waters and cause the erosion." To prevent these problems, Kojo made mention of better organising their concession. "We place the tailings over there...far from the river. We later use these tailings for refilling. We also pan over there, far from the water, and downstream from our activities. We also burn the amalgam downwind."

Edward Joseph Mensah appeared equally concerned with managing his site, particularly, the placement of waste tailings:

> "We put the waste tailings over in that put, do not cut down trees we do not need, use the samplings from our very houses to replace the wood we chop for to build our bowls and shovel handles". [Edward Joseph Mensah, *galamsey*, Tarkwa]

Certain miners showed a concern for their fellow countrymen. For example, Francis Banoh, a registered operator in Bibiani, indicated, "we wash our tailings far away from the river, and we try to take our washings deep in the pits, so the polluted waters do not escape into the rivers from where we drink. We try to mine not to spoil the trees". *Galamsey* operator Francis Aryee of Assin Fosu described the purpose of deploying such an approach in greater detail:

> "In terms of environment, there is a river here, so we cannot inconvenience the other people who use it for drinking...because when you are mining here, it can go to other people over there. So we have to know how to mine it so it does not affect them. We have been going to this Environmental Protection Agency for some environmental advice about three times in the past year...the district centre offers, many times, because they are there for us". [Francis Aryee, *galamsey*, Assin Fosu]

Based upon surveyed opinion, there appears to be a notable degree of understanding among miners regarding the potentiality for environmental problems at sites. As a result, rudimentary (environmental) planning is being undertaken by many operators.

### 6.5.2 Land degradation

To briefly revisit the discussion put forward in Chapter 2, worldwide, large stretches of land are now filled with potholes abandoned by artisans in search of further depository sediment. The Ghana case appears no different, as visitations to many of the country's gold mining areas confirmed that miners have damaged substantial forested areas and landscape cover (Plates 6.10 and 6.11).

Certain miners were resistant to the idea of embracing land stewardship practices. "Yeah...we have spoiled the land," explained Tarkwaian *galamsey* Kosi Asante, "but it is not all that much simply because we use the river side. It is already a marshy area so it cannot be spoiled that much – the land cannot be used anyway." Francis Bonoh, who is registered with the Government, admitted to not having fully reclaimed the spent lands on site. "My pits? Yes, we cover it. We do not plant trees, though...and

no, no grass replanting either." Jon Combinh added: "we know we are spoiling the environment but what are we going to do? We just don't have the time to refill".

However, other respondents indicated that it was to their advantage to reclaim abandoned pits, as it prevents what one *galamsey* described as "unnecessary" injuries. "There are holes here, yes, and we try to fill them so people do not fall in them," explained Tarkwaian *galamsey* Jon Yaw. "They are dangerous. We have gotten hurt here before." Haruna Addison, a registered operator also in Bibiani, echoed Yaw's words. "I am aware because when we do not cover the holes, someone will fall inside or die. Where we go, we cover our things. We have everything in mind when we start. We have the gravel here, so we know that it is available for re-grading." Referring to the potential ruggedness of gold mining terrain, *galamsey* Edward Joseph Mensah noted, "we refill the pits, yes, because it is dangerous if we fall in them". Based on interview findings, three *additional* noteworthy initiatives are being undertaken at sites that suggest that gold artisans are exercising some degree of land stewardship.

First, there was indication that the refilling of pits is an ongoing activity. As explained throughout this thesis, a major challenge confronting governments working to regularise ASM is the minimisation of perpetual "hit and miss" activity. Certain miners implied that concurrent reclamation was an effective means of minimising injurious conditions:

> "We refill pits immediately when done with one. It ensures our safety and helps repair the damages caused by the mining itself. We refill using the shovels, using the waste tailings as fill. We then plant these grass seeds on top of refilled piles. You can get these seeds in town". [Michael Owusu, Tarkwa]
>
> "When we do this one here, we put this one on as a cover". [Haruna Addision, registered miner, Assin Fosu]
>
> "We level the soils sometime but that is it...what planning can we do? Look at the holes all over...we have to be as quick as possible". [Jon Combinh, *galamsey*, Tarkwa]

Secondly, miners claimed to be refilling their pits with waste tailings, which, in many cases, were observed to be strategically piled to the sides of excavated trenches. Many used the term "tailings" during interviews, and implied the need for their safe disposal. "Tailings, we put in a specially dug out hole," explained Michael Owuso,

"so it cannot contaminate our water sources." Similarly, Edward Joseph Mensah noted: "we refill the pits...we refill them with the old tailing that are stored here at the side". Francis Asante, who was perhaps the most impoverished of the miners interviewed, reportedly working for a wage of less than US$1 daily, also acknowledged the importance of tailings management:

> "If you must know, we put our tailings in a storage place out of the way. We know it is acidic when the water goes through it, and we know the mercury is in there in small bits but toxic quantities". [Francis Asante, *galamsey*, Tarkwa]

Finally, certain operators indicated having re-vegetated mined landscapes, although all sites visited exhibited major signs of land degradation. Referring to his *galamsey* gang, Francis Aryee noted:

> "We refill pits, yes. We make sure that when we move from one place to another place that it is fixed so that for years ahead, we can farm and do other things. Sometimes, we plant these psalm trees". [Francis Aryee, Assin Fosu]

Simeon Kojo also reported having re-vegetated the landscape surrounding his operations:

> "Refilling the holes is for our safety and that we damage the landscape, we should repair it. We have even begun replanting seedlings here to make the landscape look better and repaired. We have also levelled the ground in places with our shovels". [Simeon Kojo, *galamsey*, Assin Fosu]

Despite enduring numerous complications as a miner over the past 15 years, Mieza Kyi also claimed to be reclaiming the landscapes he damages. "We know that we damage the environment because ore is in the ground, and we must remove trees and grasses to get to it. Our miners are planting trees, we are making ponds to contain the tailings. We also put the topsoil on the tailings so it can be re-vegetated. The waste is refilled but that is only when we are sure that all of the gold is gone. We plant trees only where they are taken out."

**Plate 6.10:** Deforested landscape as a result of artisanal gold mining, Western Region, Ghana

**Plate 6.11:** Excavated pits at an abandoned artisanal gold mine site in Tarkwa

### 6.5.3 Mercury pollution

As was also indicated in Chapter 2, of the environmental problems resulting from intensive artisanal gold mining activity, mercury is by far the most pressing. Globally, official bans, trade restrictions and military intervention have proven

ineffective at deterring the artisan from using mercury carelessly and uncontrollably[21]. Notwithstanding its problematic regulation, how well rehearsed are Ghana's artisanal and small-scale gold miners in terms of mercury education? In the present case study, all but two of the miners interviewed provided some indication of knowledge of the toxicity of mercury in gold mining activities.

Whereas artisanal gold miners around the world have generally been resistant to adopting "best practices" when it comes to utilising mercury (Veiga and Hinton, 2002), the Ghanaian contingent interviewed exhibited a deep knowledge – albeit rudimentary, and likely obtained via local information channels or "word-of-mouth" – of the environmental implications of its careless usage. One miner, James Mensah, a Tarkwaian *galamsey* and former school teacher, provided a *scientific* explanation of the health effects of mercury:

> "Mercury...it can attack the amnion vessels and others and much more. Mercury as it is with the environment, I don't think we have it so much to the point where it can cause some harm. Only we use it to raise the gold. What I think, if it get into you too much, you may have a problem. You don't have to put it in you mouth...we wear something on our face... where it can harm you is when you get the gold. When you put it in the fire, it can cause harm, because of the smoke. We do not stand in its path and we cover our faces". [James Mensah, *galamsey*, Tarkwa]

The repeated reference made by interviewed miners to implementing environmental safeguards when utilising mercury conflicts with the many accounts from artisanal gold mining regions in different countries which suggest artisans have yet to realise that the health implications of mercury usage has become a priority environmental concern in the industry. A growing number of artisans worldwide are dismissing outright the scientific evidence justifying the toxicity of mercury. Veiga and Hinton (2002) highlight one famous example in Brazil, where, during a nationally televised program in 1987, Jose Altino Machado, the-then leader of the *garimpeiro*, swallowed a vial of "deadly" mercury to purport his belief of it being non-toxic. One *galamsey* interviewed in Assin Fosu clarified that "many *galamsey* that feel that because they have used mercury so long, they feel it cannot harm you". Neighbouring *galamsey* Joe Kojo, was also noticeably resistant when probed about the mercury issue,

[21] A case in point, Brazil, where, despite there being legislation prohibiting mercury sales to gold miners, officials have still been unable to control its ban. The Brazilian army has also been unable to stop anarchic gold mining activity, as the number of *garimpeiro* is double that of military personnel (Hylander, 2001).

indicating: "I know that it's poisonous, so I have heard but it has not harmed me, so I use no gloves, head wear or anything. The mercury that comes in the bag, I open with my mouth".

However, the remaining interviewees appeared to be well grounded on the health implications of amalgamation, and claimed to have taken several precautionary measures to ensure its safe use. Certain operators, for example, noted their deliberations to avoid amalgamating gold in close proximity to water bodies. "We have to be careful with the mercury," explained Peter Kofur, *a galamsey* based in Bibiani. "Sometimes, when we are crushing the gold from the ore, we have to be careful because it is poisonous, so we make sure we do not dump it in a stream so that other people drink it." Edward Joseph Mensah and James Edward Asante, two *galamsey* operating along Tarkwa's dirt roads, also stressed the importance of utilising mercury *away* from local sources of drinking water. Mensah explained: "with the mercury, we try and wash out our bowls but not in the water of the river because it flows downstream, and the people downstream can be affected. So, we try and rinse it in the bush". Asante added:

> "This mercury I hear escapes into the air and rivers. This is why we try not to inhale or eat it. I...keep the mercury away from the stream because people drink that water". [James Edward Asante, *galamsey*, Tarkwa]

In the 1970s, when the "dilute and disperse" philosophy of pollution control began to take centre stage in national environmental legislation, individuals began to show an understanding of the impacts of local environmental management – although, much to the detriment of surrounding environments. The main highlight of the "dilute and disperse" paradigm was the opening of the 380m tall "superstack" in the 1970s in the Sudbury nickel mining region of Canada (see Gunderman and Hutchinson, 1995). The logic behind the initiative was to disperse pollutants – dilute waste streams – over greater distances but in smaller and less toxic quantities. Many of the miners interviewed indicated having adopted a strategy similar to "dilute and disperse". For example, as Bibiani-based *galamsey* Mieza Kyi put it, "I burn it (the amalgam) down from the gold mining area, so that the mercury goes into the air". The typical practice is to burn the amalgam in a remote area downwind from the immediate operation. "We cannot breathe it in," indicated Jon Cowbinh of Tarkwa, "so we burn this amalgam away from the people and in the bush." Tarkwaian *galamsey* Rolland Kyei

added: "we know that if mercury is burned in the building, it is poisonous...that is why we go far away". Similarly, Fusekni Aruna noted: "we know that mercury is poisonous, so we protect ourselves...when we put the mercury into the box, we add water, so it lowers our costs...OK...the effects? We do it in an isolated place".

Many miners insisted they wash their hands after using mercury. Although such washing is ineffective, as it is often conducted without the use of soap or an adequate substitute, it does nevertheless indicate that miners *are* aware of the importance of detoxifying skin surfaces and utensils after amalgamation. "We know that mercury is poisonous," Kyei explained. "Some of us are putting the amalgam in the hand to squeeze the mercury out. We use our hands but we make sure we wash our hands afterward." Both Douglas Abekah and Mieza Kyi of Bibiani explained that they wash containers once finished with mercury:

> "Mercury is poisonous. We keep it in the small bottle, then we wash in the water". [Douglas Abekah, *galamsey*, Bibiani]:
>
> "With regard to the mercury stream pollution, we have these wooden bowls and we ensure that the mercury do not go into the stream. We make sure we scrape out as much mercury". [Mieza Kyi, *galamsey*, Bibiani]

As explained in Chapter 4, to reduce mercury emissions in the industry, the Government began introducing the TherMex glass retort to miners under the guidance of UNIDO experts. The UNIDO TherMex retort, which, again, is transparent and subsidised, was deemed the appropriate retorting solution, and was introduced in Ghana in late-2000. Thus far, mainly registered operators have been exposed to the technology, which has had mixed results among users. Divine Mogey, who works as a foreman at a registered site in Tarkwa, praised the efficacy of the retort:

> "We used to treat the gold here after in the open air but now we use the retort. When you put the gold and amalgam into the water, it pollutes it, so we use retorts and we put them into the fire and reuse the mercury. We do not use gloves. We use retorts because we can collect the mercury back – the mercury we have used already...and the recycled mercury is effective". [Divine Mogey, Tarkwa]

Similarly, Richard Awe, a *galamsey* operator in Tarkwa, had few complaints about the TherMex retort he claimed to regularly borrow from a neighbouring licensed miner.

> "Yes...the mercury...when you put your hand on the mercury or it drops on your hand, the mercury can make you sick...I am using the stone and I am using

> the retort. I am working at my own company – this is why I am using the retort. I don't use my hands, I use stones. We use it because mercury is poisonous...just for health. It's a good system. The retort people told me that mercury is poisonous so I am using it for my own future...originally, we did not know it was a poison". [Richard Awe, *galamsey*, Tarkwa]

However, a number of interviewed operators voiced complaints about the TherMex apparatus. For example, Francis Aryee, a former *galamsey* now employed by Haruna Addison in Bibiani, acknowledged the need for effective retorting and complained about the time it takes to purify gold in the TherMex model:

> "Ok, what I know about mercury is that it is harmful to human health. Sometimes, after processing the gold or in the distiller or when burning the gold, the smoke that you inhale affects you, do the Japanese government and China government have provided a certain bottle to use for distilling to help reduce mercury emissions here and for that process here. Yes, the one (the TherMex model) that we use has not helped us, because when burning one gold, it takes about thirty minutes to one hour, and we need a lot gold to process...We need something to burn something in a very fast way. (Also), if you have plenty of individual miners or a "gang" working, you cannot just have one retort for all because it takes too much time". [Francis Aryee, Bibiani]

Jon Yaw, a *galamsey* based in Tarkwa broached both the issue of fragility and cost in his assessment of the TherMex retort. "I saw one in Dunkwa before. It was all burnt out. A friend told me that as part of the licensing, the offices sell them to miners at what they say is discounted but 500,000 *cedis* is two days earnings for me...too much to pay." Francis Asante, another *galamsey* based in Bibiani, echoed Yaw's words:

> "Yes, I have seen this glass retort...I have also seen it break in the field. They claim it only cost US$80 dollars now. That is too much because even the most careful of people have had them burn out on them...for these reasons, I would never ever adopt them". [Francis Asante, *galamsey*, Bibiani]

Comparatively few *galamsey* indicated having seen the UNIDO TherMex retorting technology. When ignorant *galamsey* were briefed on retorting technology, and then probed on the possibility of acquiring retorting devices, most appeared sceptical, again, because of cost. One such case was Jon Cowbinh. "No, I do not. I would not either because it sounds expensive. I cannot see the Government subsidising something like this. They have not done anything like that before, why now?" Similarly, Richard Awe implied that the retort was beyond his budgetary means. "At 80,000 cedis, it is too much I am afraid. You say that it is a special price for us from 500,000 cedis? It is still too much."

Notwithstanding the marginal success of the retort, many of Ghana's artisanal miners have pursued alternative techniques to minimise inhalation of noxious mercury vapours. Michael Owusu, for example, claimed to have constructed a device from discarded plumbing pipes:

> "There was a seminar held for all small-scale miners some time back, and I attended. It was held here in Tarkwa by the district office, who informed us about the health impacts of mercury. We therefore use a retort, burn the amalgam away from streams even though it is enclosed in the retort, and use these masks we have made. I know of this transparent retort but I do not use it. It is too expensive and my friends have had it burn out and break on them. So I built one myself out of pipes. It is enclosed and I know that the gold is not lost even though I cannot see it. I am not stupid. It is recovered in the end along with my mercury. I adopted it because I was concerned for my health...Mercury gets in your blood stream...it makes you dizzy and sick. And the land gets damaged too. I know we do this...Immediately after the seminar, I didn't practice safe mercury techniques immediately; I only did so when I became slightly ill and did not eat properly for three days. Only then did I build this hand made retort". [Michael Owusu, Tarkwa]

However, the majority of miners reported covering their mouths and noses with assorted rags, and avoid inhaling emissions. "We knew someone in Dunkwa that used the mercury with his bare hands and breathed it in and got sick after a time, and had to go to the local hospital," explained Assin Fosu-based operator Simon Kojo. "We see it as an invisible long time poison. We do not use gloves but we make sure we don't touch it, and then we wash our hands thoroughly...then we do not inhale it, too." Kosi Asante, who, at the time of this research, was operating illegally on the former GHG concession in Tarkwa, also noted that "when (they) burn it, we cover our nose so we do not inhale it". Raphael Kudzo, another *galamsey* working in Tarkwa, provided a more detailed synopsis of how gold artisans avoid contamination from mercury fumes:

> "Mercury is bad for you but I have never gotten sick. Still, I put a wet clothes over my face and make sure I do not breathe it. Plus, I wash my hands downstream so it does not stay on my body and make me sick...Just the rag...and we do not burn the amalgam indoors because the fumes can make you sick. It happened to my friend and he was bringing up his food. I just make sure I wash my wands with this soap bar here in a pail and don't inhale it". [Raphael Kudzo, *galamsey*, Tarkwa]

To summarise, environmental awareness has clearly percolated to Ghana's grassroots[22] gold mining communities. Table 6.1 summarises selected environmental management practices reportedly adopted by gold artisans in Ghana. It is against the background of these observations that operators were asked if they should be held accountable for these environmental problems.

**Table 6.1:** Environmental management measures adopted by Ghanaian artisanal and small-scale gold miners, based on interview feedback

| Area | Measure | Comment(s) |
|---|---|---|
| General | Awareness of environmental impacts | Both registered and unregistered miners admitted that they destroy landscapes in the process of mining. |
| | Tailings management | Certain miners demonstrated an awareness of the need to safely dispose of contaminated waste tailings. |
| Land Stewardship | Refilling of pits | The main reason certain miners gave for refilling their pits was to prevent injury. |
| | Re-vegetating of landscapes | There was a polarisation of views of re-vegetative initiatives. Whilst some miners claimed it was not their responsibility, others admitted to replanting trees and seeds within mined regions. |
| Mercury Management | Washing | Many miners reported washing their hands, utensils and bowls after using mercury. |
| | Rudimentary air and water pollution control | Repeated indication was made on how lengths had been taken to both use mercury away from streams and burn amalgam in remote areas in order to minimise contamination. |
| | Retorts | Retorts have been implemented with limited success. Miners report problems with costs and fragility with the latest TherMex models. |

### 6.5.4 Should Ghana's artisanal gold miners be held accountable for environmental problems? – A view from the ground

There was a similar polarisation in responses over the issue of *who* should be held responsible for remedying the environmental problems emanating from artisanal and small-scale gold mining activity. Of those who suggested that miners should *not* be

[22] Similarly, Crispin (2003a) reports how in PNG, such percolation or filtering is responsible for the abundance of knowledge of mercury at the community level.

held accountable for their environmental problems, most had reportedly conflicted with large-scale miners over land resources, and were therefore agitated at the prospect of having to reclaim and responsibly manage a parcel of land they had secured without the aid of the Government. Certain (interviewed) licensed operators, who were, themselves, at some stage *galamsey*, appeared sympathetic towards the illegal artisan. "I know *galamsey*," explained Francis Banoah, a registered small-scale gold miner based in Bibiani. "They destroy everything but you cannot blame them due to the difficulty in obtaining a concession. These large-scale peoples have swallowed up all of the land, so where can they go?" Francis Aryee, who is now employed at a registered site, was equally firm about the very idea of not holding artisanal gold miners responsible for the environment because the Government is neglecting to provide support services:

> "No because maybe a miner, like if I am a miner, the environment agency should come to me and give me the necessary advice so that when there is a lot going on, they can force me to do the right things...not only advice but also technologies too...Until they get the miners this advice and technologies, they should not be held responsible". [Francis Aryee, Assin Fosu]

Many of the *galamsey* interviewed refused to be held accountable for environmental problems for different reasons. Kosi Asante, for example, indicated that because the Government benefits economically from artisanal gold mine output, the industry's operators should not feel pressured to engage in any environmental management *per se*. "No, because we are just using the land. The reason why is we need to carry the production to the Government and the Government also benefits from it...so in the case of the small miner...the Government should help us." *Galamsey* such as Rolland Kyei and Edward Joseph Mensah, on the other hand, broached the issue of job shortages in their explanations. "There is no work, which is forcing us to do this," explained Kyei. "We do not think there is any right for anyone to come and punish us for trying to survive. If the Government came around and tried to create more jobs, then that would be different." Mensah was equally thorough when probed about environmental accountability, implying that miners should be aware of the environmental implications of their activities but at the same time, should not be punished for not meeting national demands. "Absolutely not – for miners like me, especially. The Government has driven me to this forest. I have been forced to mine here, when I didn't want to. The miners who have been given a concession should,

though, because they have qualified and therefore should be doing their most to improve what they damage. Miners like *galamsey* should do their best to avoid impacts simply because it is right to protect nature. That is why I do it. But I shouldn't be punished for what damage I did do. That is wrong because it is the Government's fault I am here to begin with". In both Kyei's and Mensah's cases, the Government allied with large-scale miners and drove them from their lands.

Although the majority of mine sites visited were noticeably degraded environmentally, certain miners claimed that they, themselves, *should* be held accountable for the industry's environmental problems. This group's view is largely based on preservationist beliefs. "I think that all miners should be ethical to nature," explained *galamsey* miner Francis Asante. "What I mean is that even though in the Government's eyes, we are illegal and we feel this to be unjust, it still does not give us the right to destroy landscapes. Plus, it is to our benefit as *galamsey* not to destroy the land so that we do not leave a trail from which officers and security can detect us and detain us." Bibiani-based operator Peter Kofur, who, according to his stories, has had several negative experiences with large-scale operators and the Government, echoed Asante's views:

> "I was caught in Obuasi twice for encroaching on the AGC concession and detained at a police station for questioning. They arrested me for mining gold illegally. I was desperate, as I did not have any money at the time, and needed to provide for the family on those two days...they released me two days later.
>
> "If the miner is just being careless, he should be punished. We are one community out here, and must depend on each other for survival. Look at the roads, the water supply and the conditions of the crops. The Government clearly does not come out and help us in any way apart from punishing us. So, we must preserve the land as best we can, and then go from there. If every miner does this – illegal or not illegal – then, our health will be maintained". [Peter Kofur, *galamsey*, Bibiani]

As Tarkwaian artisan Michael Owusu furthermore put it, "I think that miners should not go about damaging land freely. I mean, this is Ghana and, as Ghanaians, they should respect their homeland. That means not destroying trees if you can and repairing what damages you as a miner have caused".

Interviewees debated the issue of responsibility, particularly those who had been subjected to harsh treatment in the past. For example, Bibiani-based Joseph Mensah was imprisoned despite securing a license to mine on a small scale:

> "I have been in jail...I was having our concession...a licensed concession...a big large-scale company AGB. They started prospecting our concession because they had a bigger area. They wanted to include ours in their concession, so they came to our sites to prospect, and we would not allow them, and this resulted in a brawl, and we were thrown in jail for refusing to allow them to come on the land. They had a prospecting license, but we were registered to be there but we were the ones thrown in jail". [Joseph Mensah, Bibiani]

Although there was clearly a polarisation in views among interviewees on the issue of environmental responsibility, judging by the sound knowledge exhibited by the majority of respondents in the areas of mercury management and land stewardship, it is likely that Ghana's artisanal miners are not deliberately defiant when it comes to environmental management. Rather, armed with their limited environmental expertise, most miners appeared content with, as *galamsey* Simon Kojo put it, simply being "entitled to work...as long as (we) maintain (our) activities".

## 6.6 Identifying additional forces of resistance

Not only do Ghana's artisanal and small-scale gold miners appear to be subjected to a highly bureaucratic licensing procedure, but most also claim to be armed with few resources. At the UN *International Seminar on Guidelines for Development of Small- and Medium-Scale Mining* in Harare, 1993, delegates agreed that "governments and their agencies should endeavour to provide an adequate institutional framework and stable business environment by mobilising and extending social, technical and economic support to small- and medium-scale mining" (Labonne, 1994, p. 15). Based on surveyed opinion, the two most significant impediments faced by Ghanaian artisanal and small-scale gold miners are insufficient financial support and an inadequate supply of technology:

> "Just moneys and equipment, that's all. Once we have this, as small-scale miners, we can increase our productivity, and help provide more for our families and communities". [Francis Banoh, *galamsey*]

This section of the Chapter reports on these problems, using feedback from both registered and illegal miners.

### 6.6.1 Technology

> "In the area of equipment, a lot of the equipment being used is very poor at the moment. Miners can be idle for a week just because a water pump does not work; when you have the equipment, you can fund a small-scale miner". [Kofi Michael Sackey, *galamsey*, Tarkwa]

Asamoa (2001, p. 58) recently argued that in Ghana, "the pre-colonial technological framework of subsistence economic activity has remained in tact", with "the hoe, the cutlass and axe...still the major...implements used". As explained earlier in this chapter, equipment at the most advanced of mines visited rarely extended beyond basic stone and metal implements; the most fortunate of operators have simple milling machines and diesel water pumps at their disposal. However, has the reliance on such basic technology affected levels of gold production?

The inability to secure finances appears to be preventing miners – both the licensed and *galamsey* – from obtaining equipment. Those interviewed specifically stressed the need for (water) pumps and ore crushers. As licensed operator Peter Kofur of Bibiani put it, "we need machines, especially the crushers because using manpower is hard. And also, the pumping machines – we need a practical system because right now, we have to lay the pipes to drain water, and sometimes the site is far from the road". Pumps are needed to counter the mass influxes of water that occur during the rainy season and during the change of seasons. "We encounter plenty of problems in the rainy season especially," indicated Tarkwaian *galamsey* operator Jon Combinh. "During these times, we cannot pump the waters out and this causes us delays. These delays prevent us from improving our yields." Combinh, who conceded to having few savings at the time of interviewing, claimed he was forced to cut back on his operations in 2001 because of out-of-season thunderstorms. Another Tarkwaian *galamsey*, James Edward Asante, indicated that incoming water has interfered with work being conducted within the shallow pits carved to extract placer gold grains:

> "I need a pump because with this alluvial deposits, it starts flooding very quickly and when we can't get the water out it prevents us from working". [James Edward Asante, *galamsey*, Tarkwa]

A shortage of operational pumps has also compromised the functionality of the operations of registered miners such as Michael Johnson and Divine Mogey of Tarkwa:

> "The main problem with us is getting the necessary amount of money to buy pumps, to pump water from underground; if we had more pumps, we could pump out the water, and hire more miners. Most of them have abandoned their sites because the water is seeping everywhere...all of these small-scale sites adjacent to us are linked...so if you pump here, the water goes down in surrounding areas as well...we just need a suitable pump". [Michael Johnson, registered miner, Tarkwa]

> "If you are not having money, you cannot be doing any improvement. As for here, we have been getting something small, so we have only been able to gradually improve. We had only one machine when we started...but now we have about four machines but only over time. So, there have been improvements but they have been slow because we have had limited moneys. We have had to go to our buyers to borrow money to hire to pay for labour. Moreover, we are small-scale miners so we cannot mobilise moneys to go hire somebody like geologists to come and do the work for us...we cannot pay the person". [Divine Mogey, Tarkwa]

In fact, water has reportedly affected many Ghanaian miners' work, particularly, the *galamsey*, who depend on a daily wage more so than the registered operator. Tarkwa-based operator Rolland Kyei, for example, described how the absence of pumping technology prevents the collection of economic gold fragments:

> "If you reach a point, even though we still have the ore, we can't cope so we have to leave. So, if we have the money, we will just a pumping machine because when we leave we know we leave behind ore. So if we got money, we would buy at least one pump...Some of the ore is down but when we reach a point, we cannot get it. We only need a pump to tackle it...it has prevented us from collecting much ore because there is more uncollected down there than we have collected". [Rolland Kyei, *galamsey*, Tarkwa]

Moreover, at the time of interviewing, two registered miners in Tarwka reported having to cease operations because there were no functional pumps to remove water from recently excavated trenches (Plate 6.12). "As of now," explained Kumega Anbion, a foreman at one of the sites, "there are pits filled with water. We need help to get this water pumped out. We need the Government to supply pumps. We also need help with our machinery...we need more advanced machinery." A similar situation was occurring on Haruna Addison's concession in Assin Fosu: "I need a pump but there is not many...I do not have equipment...I need a pump...I have used pumps before on my other concession but it is spoiled".

Miners such as Haruna Addison also indicated that an absence of sophisticated crushing machines has further impeded their production. "I use all manual mining

tools like shovels and bowls and manual labour. Look around – there is nothing mechanic here." Joanas Barboo, who was arguably the most advanced of small-scale gold miners operating in Ghana, with three concessions, a license to export gold, and numerous bulldozing machines, also identified the need for more sophisticated machinery like crushers. "They (the Government) need to improve and give us the facilities like the crushers. The Government should be able to prospect the area to give us an idea of what were are mining and the equipment that we need…It is difficult sometimes to get the equipment we need. In these cases, we contact the district centres for help but they have bosses too. They must get the permission from the head office to provide us with the equipment. This takes a long time and we sometimes have to lay off people or sack them until the equipment becomes available."

**Plate 6.12**: A defective water pump at a concession in Western Tarkwa

Mieza Kyi of Bibiani, who, as explained earlier, was removed from his concession, despite acquiring it through legal channels, provided a more personal account:

> "Because it (the work) was manual, and difficult to take the hard rock from the ground and feed into the mortar, and the manual thing, and in the long run, the production was not so encouraging…We had a lot of people doing this, so at the end we had to share out the earnings, and it was just peanuts that everybody got. And just at the time the gold price was going up, at a time for us to make it big, the Ashanti Goldfields took over the concession, and therefore, we could not go further, and that resulted in where I am now…and the little we have left has been what we have been feeding on…I need a crusher and a grinder and a washing plant…I need the improvements and the support we need is money

> first, and crusher and grinding mill, and washing plant, and the pump for the washing plant". [Mieza Kyi, *galamsey*, Bibiani]

As indicated in Chapter 4, according to the surveyed opinion of indigenous experts and government officials, many of the efforts taken to disseminate equipment to miners have been ineffective. The most recent undertaking, coordinated by GTZ using World Bank funding, resulted in the purchasing and implementation of mechanical equipment more suitable for medium- and large-scale mining. A similar perspective was provided in the field. For example, referring to the hammer mill displayed in Plate 6.13, Michael Johnson explained:

> "We have received a hammer mill but haven't arranged or organised who can use it…the World Bank put this mill in place but did not show us how to use it…I guess we are lucky to have it…but what I do not understand is that it is here but we are unable to produce gold in mass quantities because everything is flooded". [Michael Johnson, registered miner, Tarkwa]

The general message conveyed by miners is that on the rare occasions the Government has attempted to disseminate equipment, inappropriate apparatuses have been introduced.

**Plate 6.13:** Hammer mill constructed in 2001 using World Bank money on a Tarkwa registered plot. According to local miners, the Government has failed to equip operators with the technical "know-how" to operate the machine. As can be seen in the photo, it has gone unused, and is used to hang Laundry.

### 6.6.2 Insufficient financial support

There is a burgeoning literature that describes the importance of providing financial support to rural, subsistence communities. As Moller and Woodworth (2001, p. 267) explain, "the failure of macroeconomic policy to create a stable and reasonably fair basis for development in the Third World has given both greater impetus and acceptance to the grass-roots approach to development..." As a result, "the last decade has seen the evolution of microfinance institutions that have created significant income and employment opportunities for the poor in developing countries" (Bhatt and Tang, 2001, p. 319). Given the high costs of administering large numbers of small loans, the central banks in developing countries have tended to provide more substantive loans to the less impoverished (Quinones and Seibel, 2000), despite perceiving the risk and transaction costs involved in dealing with smaller parties as greater (Eyiah, 2001).

In Ghana, however, few financial outlays have been provided to small-scale gold miners, although there are a number of rural banks in operation throughout. As Addeah (1989, p. 15) explains, a rural bank in Ghana "is simply an independent company (or legal entity) whose registered office located in the rural area is the same as its headquarters...A rural bank is not the branch of any other bank nor is it the same as its headquarters".

An absence of financial support appears to be limiting miners' day-to-day operations, hindering production and desired expansion; those interviewed blamed both the government and rural banks. "No one out here is willing to provide financial support," explained Haruna Addison, a registered gold miner based in Assin Fosu. "There are no loans, no Government people providing funding." Michael Owusu of Tarkwa blamed the Minerals Commission for not providing assistance in the area of ore exploration. "Even though I am experienced and good at finding the gold, I am no trained geologist. I am sure that the Minerals Commission has some kind of qualified technician who could aid in this area." On the issue of the rural banks, Kofi Michael Sackey of Tarkwa noted:

> "Securing loans for small-scale mining is difficult. Ghana does not have any loan system in place for miners...have loans at minimum level for agriculture. Agriculture has 15% interest rate but there is nothing for mining". [Kofi Michael Sackey, *galamsey*, Tarkwa]

Out of desperation, certain miners, such as Simeon Kojo of Assin Fosu, have put in applications for funding at the rural banks, despite knowing their applications will be declined:

> "We have not qualified for funding as I have said but the money we have received we have used to buy the equipment as I have said or to buy food. One time, I had to borrow money from a neighbour to fix part of my house, as some wood panels fell from the roof...so the monies we have got has been used for personal reasons". [Simeon Kojo, *galamsey*]

Other individuals, such as Francis Asante, have resorted to thievery. "We do have a pump but it is defective. I stole it when we left AGC but the motor blew out on us."

According to interviewed miners, the lack of financial support has had two adverse effects. First, and foremost, it appears to have prevented operators from adopting more sophisticated machinery to increase production. For example, when probed with the question of whether of not a shortage of finances had prevented improved operational efficiency, Tarkwaian *galamsey* miner Jon Cobinh explained:

> "It (money) has only prevented us from buying shovels and pumps...we need more capital...how can we improve efficiency without better equipment? I know there is still gold in those dumps over there but it is too low quality and we don't have the time to go through them...we have not received money from anyone...no chiefs, no banks, no government...One time, we had to wait days before we were able to pump out the water from some pits. And while we waited, some security chased us off the land. Had we had a pump we could have done it quickly before being chased...Another time, we could not wait to prospect the land fully, because we hadn't the experienced hands. So we just went ahead and mined to save us time but it hurt us in the end. We ended up recovering so little gold". [Jon Cobinh, *galamsey*, Tarkwa]

Mieza Kyi, who, at 65, should be retired, described a number of incidents where financial shortages have prevented mechanical advancement:

> It prevents us from mechanising, or getting more people involved. I remember a case in Dunkwa where we could not pump the water out for days and we went without money and on the last day, food. We simply had to bucket the water out by hand which took days...We were trying to get into other things. Previously, all of the things we working were manual, so we couldn't generate enough funds to be able to be able to open up the work. But if there is money to come, then we could become semi-mechanic, so we get these equipment...pumps, a washing plant, so that production could increase... In Dunkwa as well, the crushers we made were very slow and we could have used a crusher and miller that were petrol but we did not have it". [Mieza Kyi, *galamsey*, Tarkwa]

Registered operators such as Bibiani-based Peter Jubea appear to have fared no different. "If you get gold there, sometimes you need some money to help you through because when it is hard rock it can take a month to extract. You need money in the interim to function."

A number of miners revealed what they would do had they had access to increased funds. For example, Michael Owusu of Tarkwa explained, "I would improve the conditions at this concession. I would replace this jute sack and purchase some high quality sluicing machines. I would also pay workers to do more specialised tasks here so we are better organised". James Mensah, also from Tarkwa, commented on how increased finances would facilitate the purchasing of new equipment. "It can be able to buy the pumping machine. I would buy one and some of these shovels, like that...prospecting...if I get the money."

*Galamsey* Jon Yaw of Tarkwa, and Edward Joseph Mensah and Jon Combinh of Bibiani also spoke of improving their machinery in the event that they were awarded funding:

> "If I was given money, and that is a big if, I would improve my equipment. And then I would improve the prospecting means – the way we do it. And I would get rid of these jute bags and buy better sluice boxes from a supplier". [Jon Combinh, *galamsey*, Bibiani]
>
> "If I got some funding support, I would first buy a pump. Next, I would put my children in better schools. Then, I would hire two more hands to help us improve our output. I would then also look into relocating to another concession through legal means". [Edward Joseph Mensah, *galamsey*, Bibiani]
>
> "If we were given more money, we would buy food, more shovels...If we get enough money, we would buy our own pump, instead of hiring one...It has only prevented us from buying shovels and pumps...we need more capital". [Jon Yaw, *galamsey*, Tarkwa]

Miners furthermore commented on how a shortage of finances has prevented them from hiring additional staff in an industry that appears to rely almost exclusively on manpower. "One time, I did not have the money to pay a man to work," *galamsey* James Edward Asante explained, "so the gold did not get dug. And, another time, I needed a pump and the man who owns the concession down the road would not lend it to me and there was none to lease so the area was not worked for four days. This meant that none of us got payment for four days." Jon Combinh of Tarkwa described

a similar situation. "We were without some hired hands, as we could not keep on two workers. The buyers did not agree to lend up the money because we had defaulted on a repayment and had to wait to provide more money."

The pressure to find gold to pay workers' salaries has, on occasion, resulted in the dismissal of employees. "Sometimes, when we are unable to extract gold, we must lay people off but we need them to find more gold," explained Tarkwaian *galamsey* Raphael Kudzu. "What do we do? We just have to rely on ourselves to find the deposits, then, and rehire when we can pay...this has happened plenty of times." Francis Banoh, a registered miner based in Bibiani, explained the issue in greater detail:

> "If I got more money...I would...hire more people. At the moment limited moneys restrict me from doing so. At first, we were working, we did not have money. At the moment, our manual labour is limited as well, as sometimes we can only let people come temporarily as there is no returns to justify their work. So if we had more moneys injected in this business, it would be more efficient in the end". [Francis Banoh, registered miner, Bibiani]

The inability of the Government to make funds available to artisans appears to be perpetuating the cycle of poverty in the industry described initially in Chapter 2. "(A money shortage) prevents me every day from improving," explained Edward Joseph Mensah of Bibiani. "Look at the state of my hands and my work. I constantly have to keep an ear open for the police and other securities. How can you function effectively under such stress? The only thing keeping me going is the very need for the payment for food and luxuries."

## 6.7 Adaptation strategies

Notwithstanding the foregoing problems, operators appeared to have adapted to their circumstances by resorting to a number of coping strategies. Despite leading poverty-stricken lifestyles, and receiving minimal support from both the Government and financial institutions, Ghana's gold artisans have forged community-based partnerships in an effort to secure badly-needed assistance. Specifically, as registration has failed to facilitate increased access to both technological and financial resources, both licensed and unlicensed operators have turned to the community for assistance, and have organised themselves into "gangs". The stories of both selected

*galamsey* and licensed operators are used to describe these adaptation strategies more accurately.

### 6.7.1 Importance of cooperative "gangs"

> "*Galamsey* – the groups are brought together, simply because it is impossible to license everybody. But if they come together as groups, and the government acquires land for them to operate within, then it will be fine. But you cannot have a license without land. So, you must have land on which to operate that does not belong to anybody or does not belong to large scale. Then you can have a license. The Government must work to make land available. Sometimes, the large-scale miners have some areas which they cannot work anymore. This should be freed up". [Divine Mogey, small-scale gold miner based on a registered site in Tarkwa and former *galamsey*]

Jennings (1994, p. 13) argues that "in order for small-scale mining to be prosperous and safe, it needs to be raised from being an unorganised, unsupervised industry to one that is modernised, monitored, organised, and supported so that specific goals can be set and met". As explained in Chapters 4 and 5, a number of expert researchers and Government officials maintain that the organisation of cooperatives constitutes a vital first step toward improving organisation in the industry. There is evidence in the field that both legal and illegal miners have already begun to organise themselves into groups; this organisation – albeit rudimentary – could have important implications for financing and environmental manageability.[22]

The licensed operators interviewed, who, again, have been granted a full 25 ha of working space, not only employ a number of people but also appeared to have separate work areas for different mining "tasks" (Plates 6.14 and 6.15). Michael Johnson, who secured a license to mine gold in 2001 under the name 'The New Target Mining Services' explained how he now employs numerous people performing a wide range of tasks. "Here, we use an electric pump...and then we have the mills – the modified corn mills. We have seven mills, the mills we use to mill corn, which we use to grind to a powder before sluicing. These job are done by different people. We are plenty but now, there are a hundred and something workers." Bibiani-based operator Peter Jubea also manages a highly-organised concession. He claims to have

[22] As indicated in Chapters 4 and 5, the more organised artisanal mining parties are, the more credible they become in the eyes of potential financiers – namely, the rural banks. Moreover, the existence of organised groups facilitates more effective environmental monitoring and regulation because of their more quantifiable, less elusive, nature.

both successfully recruited numerous *galamsey* to work at his registered site and launched an investment campaign to secure funding to expand his operations:

> "I had my own concession in the Ashanti region, which had 300 workers but in 1996, a large-scale company from Canada bought it up. But now I have a new concession, which has about 65 people. Before this, I was mining in the Ashanti Region. I am not rich because I am now beginning and these are what we project production to be in the future". [Peter Jubea, registered miner, Bibiani]

Despite not having any machinery on site, Jubea's employees appeared to be highly organised, performing individual tasks within, what he referred to as, "fixed places on this concession given to us by God".

Notwithstanding the superior level of organisation of registered operations, many *galamsey* also appeared cognizant of the need for organisation and cooperation. All *galamsey* interviewed claimed to be members of "gangs", a local term given to small groups of artisanal gold miners (Plate 6.16). Typically, at the end of the working day, gold is pooled (after Appiah 1998; Iddirisu and Tsikata 1998), sold, and, depending upon the working arrangement, proceeds are divided accordingly among participants. Clearly, gangs – which are essentially informal cooperatives – have been formed in response to the difficulties *galamsey* have had securing financial and technological resources for their operations; each appears to have entrusted one another with their equipment and excavated gold, the obvious logic behind the move being that a larger workforce improves efficiency and production. Tarkwaian *galamsey* John Yaw, for example, commented on how he and his fellow gang members share all of the equipment on site. "We share this petrol pump. Yes we (also) have sluices most of us made ourselves...we share this...and basic shovels." Similarly, Benjamin Andoe, also based in Tarkwa, reflected upon how his seven-man *galamsey* team shares all of its equipment:

> "At this site, we have shovels, a petrol pump and sluicing equipment, which we all share. I only have a shovel and a sluicing board but it is broken, so I am borrowing my friend Kwami's board". [Benjamin Andoe, *galamsey*, Tarkwa]

In summary, and possibly to the Government's advantage, there is evidence of both registered small-scale gold miners and illegal *galamsey* organising themselves into crude cooperative groups.

**Plate 6.14:** The separating of sediments is commonly performed using jute sacks and almost exclusively within excavated pits, similar to this *galamsey* site in Western Tarkwa

**Plate 6.15:** At the more advanced sites, such as this registered concession, also in Tarkwa, an area is designated for all milling and grinding activities

**Plate 6.16:** A *galamsey* gang in Tarkwa, Western Region

### 6.7.2 Chiefs, gold buyers and neighbours

According to Hentschel *et al.* (2001), Jennings (1999) and others, the management of most small mines is usually keen on mechanising operations, upgrading production, and developing new reserves – tasks which require notable influxes of investment capital. In Ghana, an absence of finances, technologies and associated extension services appears to be to preventing resilient miners from pursuing alternative sources of support. In cases where land has not been freed up via legal means, artisans have reported to chiefs for further "permission" to mine; gold buyers and fellow community inhabitants are also commonly approached for financial assistance. The role of each of these parties is examined successively.

***Chiefs***

Although there is now a rich literature that examines the role of chieftaincies in rural sub-Saharan Africa (Miles 1993; Sanders 1998; Coplan and Quinlan 1997), few of the miners interviewed made reference to chiefs in the context of support. In the more rural, uninhabited reaches of the country, chiefs are frequently called upon for their approval of utilising land for a specific purpose. More specifically, "the land tenure systems in Ghana are traditionally embedded in the politico-cultural fabric of the

country's ethnic groups, which themselves correspond to two broad descent groups – the matrilineal Akan and the non-Akan groups" (Fred-Mensah, 1999, p. 953). However, recent legislative amendments have rendered the cultural ties of Ghana's indigenous communities to land secondary to the interests of the State. One particularly sweeping provision was made to Section 10 of the *Administration of Lands Act* in 1962, which, as explained in Chapter 2, empowers the president to grant stool land without necessarily being held responsible for associated repercussions (Botchway, 1998, p. 527). PNDCL 153, Parliamentary Article 156 of the 1992 Constitution vests all minerals in the country in the state, regardless of geographical location; the Act simply grants the State the right of compulsory acquisition of land for the purpose of mining. In principle, therefore, land is accessible to the State for the promotion of State agricultural enterprises such as block farming or plantations. In practice, however, the vast majority of land is vested in traditional landowning groups – essentially, lineages. Reiterating discussions made in Chapter 2, the land is referred to as 'stool land', and the heads of lineages are customarily regarded as the custodians of group lands and traditionally prohibited from alienating any of it without group consent (Sarris and Shams, 1991, p. 71).

Many *galamsey* reported having gained the permission of chiefs once it was discovered that they were unable to secure land concessions through legal channels; because of their non-presence in day-to-day operations, it is likely that the issue of chieftaincy is now an issue of the past among the interviewed. Certain miners, however, admitted to soliciting the expertise of chiefs when land use disputes arise. "Sometimes, we approach the chiefs because we do not want any land issues," explained Francis Aryee, "and, because we do not want any land disputes so before we start the job, we approach them for advice." Simeon Koju of Assin Fosu also conceded to relying on chiefs during periods of land use crises: "Sometimes, the chiefs were kind in Dunkwa, arguing with the District Assembly for our welfare...in exchange, we paid him a little something."

### *Neighbours*

The decision of the Ghanaian Government not to provide its miners with finances, technology and extension services appears to have triggered an increasing dependence

on various community "sources" – namely, friends and family.[23] The situation reported appears no different for the registered and unregistered, as representatives from both parties indicated that finance shortages and inefficient technologies are hindering potential increases in gold production. Francis Banoh of Bibiani, and Michael Johnson and James Edward Asante of Tarkwa described how, despite being registered, a shortage of finances and technology has reduced them to depending on family for income supplements:

> "It's a job in our community – a job that we learned from our brothers. Those that are involved in the small-scale mining...these places, there have been few jobs for the last 15 years, so small-scale mining promises some *chop*. I have never received a government grant, no I have never leased equipment or rented...simply because they would not give me the money. We would approach our friends, brothers, whomever in the community...no bank or investor would ever lend us money because they do not trust us. They see us as the low caste of society...this is why, in times of need, we look to our closest friends". [Francis Banoh, registered miner, Bibiani]

> "We have been operating at this site for more than three years...actually, since 1991 but we only got a license last year. The Association (for Small-Scale Mining) fought and then they released the land. It was only in the past two years that AGA freed up some land...after the local branch of the Association fought for this. One of our friends tried to give us finance...all of the money was given to us up front". [Michael Johnson, registered miner, Tarkwa]

> "The Government does not provide support to miners that are not with a license so they will not give us money. The banks also do not give money to miners. They only give money to farmers. If I had to get money I would approach in the community". [James Edward Asante, registered miner, Tarkwa]

The *galamsey* operators interviewed exhibited a greater dependence on themselves, their families and the community for financial backing and support. "We don't get any money," explained Rolland Kyei. "It is what we have saved...no grants, no funding, nothing...just my own pocket money...just us...maybe family or what my wife has got from the market...Our work is *galamsey*."

Hentschel *et al.* (2001) call for strategies to increase credit availability to artisanal and small-scale miners, which would inevitably require the rural banks to assume an expanded role; rural banks specialise in providing credit to farmers and small-scale

[23] Reinforces arguments put forward by Singh (2000) and Roberts (1994). Singh (2000, p. 601), argues, "in contrast to the modern sector where state and industry subsidise massively those preparing for employment, in the informal economy it is the family or household and the community, which are of central importance for securing basic survival needs. Roberts (1994) article, *Informal Economy and Family Strategies*, describes the general importance of family ties as a means of coping with the poverty that generally comes with working in the informal sector.

investors, particularly, the poor (Bamfo, 2001). As previously explained, Ghana's rural banks have schemes in place for the artisanal farmer but not the miner. A recent World Bank report argues that rural financial institutions in several nations have operated at a loss because they have been burdened with low collection rates, are heavily dependent on subsidies, and lack innovative management (Yaron, 1994). The case in Ghana appears no different, as rural bank managers view the disorganised, transient nature of artisanal and small-scale miners as a major complication to providing small loans. As one bank manager (Ghana Agricultural Bank, 2002) in Tarkwa put it, "these peoples are always on the move, and never here but there and there and there...how can the banks give loans when they don't know where miners will be tomorrow, the next day, and the day after?"

Many of the interviewed artisans admitted to having turned to local markets for mining equipment in response to the Government's apparent lack of concern over the industry's technological needs. Some have turned to Indian and Chinese merchants but have often obtained poorly designed equipment. "We purchased the equipment in Tarkwa from the Chinese people," explained *galamsey* Raphael Kudzo. "I hear from other people that their equipment has broke but only our pump has appeared to burn out." Neighbouring operator Richard Awe also admitted to purchasing pumps from visiting Chinese merchants. "We got the equipment from the Chinese people in Tarkwa, because I wanted to buy the machines from the Indian peoples but did not have the money, so I had to buy cheaper machines from the China people. But the machines that the China people brought to Ghana were no good. There are no guarantee on the equipment from the China people. If you buy today and its spoils, tomorrow you do not get your money back." *Galamsey* Joe Kojo also indicating having purchased a "small petrol pump from a distributor in Tarwka sometime back from the China man" that has since "spoiled".

Several miners – particularly, the *galamsey* – appeared to recognise the futility in approaching the rural banks for assistance. "Either I can try to go to bank or my friends," explained Douglas Abekah of Bibiani, the location of at least three rural banks. "We contribute ourselves, though, (and) we are trying to sharehold at the moment because the banks provide little support." What the absence of a banking service *has* done is further unite the rural communities where miners reside.

The majority preferred not to be addressed as "*galamsey*" because of the negative association it carries throughout the country. "Many are ashamed to admit that they get involved with small-scale mining," explained Tarkwa-based registered operator Njetah Mensah, "because it has a bad name. Many still feel pressed to go 'underground.'". It appears that much of the derogatory commentary in the local newspapers has reached the miners. "No one recognises us," explained Tarkwa-based *galamsey* Benjamin Andoe. "I can read the newspapers and what they say about us? How can they do that? We are trying to make a living. We have no help, and interacting with them (government people), like you said, would make things worse because they would kick us off." Joe Kojo, also of Tarkwa, was equally concerned with his personal treatment as a *galamsey*. "I think treating *galamsey* like people is a start. We must find a way to make things easier for them (*galamsey*), such as providing them with equipment and treating them as citizens. All Government does is arrest them for no reason. They are mining to feed themselves and get *chop*."

As a result of this perception, many indicated that they preferred to remain secluded and unnoticed, rather than run the risk of making financial inquiries at local banks and Government offices, which they feared could result in them being pressured to vacate their land. As Francis Asante put it, "(we rely upon) no one but ourselves...maybe the chiefs, if necessary...we don't want to be caught here, so we just go about it as quiet as possible".

Again, what appears to be deliberate societal isolationism of the artisanal gold mining community has led subsistence (gold) operators to entrust their colleagues perhaps more than they would normally:

> "Who am I to approach for money? At least we Ghanaians have a sense of community, and are able to provide assistance in the form of money and *chop* to our neighbours. If I ever needed some support, I would approach my family first, and then my friends...It is little money we need, so it is easy to get". [Peter Kofur, *galamsey*, Bibiani]

The stories told by Peter Mensah, a *galamsey* based in Tarkwa, and Douglas Abekah of Bibiani, captures the essence of the dependency of the typical gold artisan on the community for financing:

> ***Prompt: Has a shortage of finances prevented you from improving the efficiency of your operations? Explain.***

> "Yes, it has affected me. We started from, years back, maybe 2 to 3 years back, but there was no money, so we just started doing it on the individual front just because there was no money...but now we are coming together like a cooperative system, where everyone is putting there money in so we can achieve something greater in the long run". [Douglas Abekah, *galamsey*, Bibiani]

> "Money and equipment...we need them both for effective start up. We cannot afford equipment – that is the only problem. The only people who would consider giving us money is the community. So, if I was that needy, I would approach some fellow citizens with this. I rarely hear of people receiving advice...and I receive none myself". [Peter Mensah, *galamsey*, Bibiani]

For these reasons, PMMC's gold buyers have played an important role in providing financial assistance.

***PMMC Gold Buyers***

By providing marginal support to its miners and having centralised purchasing and assistance services, the Ghanaian Government has indirectly placed a significant degree of responsibility in the hands of its gold buying agents. This has often resulted in corruption, as gold buyers are regularly approached by miners in desperate need of financing, and, therefore, regularly take advantage of their ignorance of the gold market price by quoting them a "bush price" (Hilson, 2003). To further put into perspective the image of mistrust carried by the Ghanaian gold buyers, when it was discovered that the author had purchased gold from a buying agent in Tarkwa, the director of PMMC (Boachie, 2002) inquired, "are you sure that that is *real* gold?".

Both registered and illegal operators frequently find themselves leaning toward the gold buyers for financing. Certain miners, such as Fosekni Aruna of Tarkwa, appeared unaware of, or, indifferent to, the corrupt behaviour of the country's gold buyers. "I just approach the buyers. No banks, no government, nothing. We have used the money from the buyers to buy a pump sometime ago but it broke. What we do is what we get an advancement from the buyer. Sometimes, we buy our daily items, sometimes equipment like shovels, because they know we will pay it back." Other ignorant miners, clearly unaware of the buyers' documented behaviour, view the lending arrangement positively. "I have a friend, Trinity, in Tarkwa who lends me money," explained *galamsey* Richard Awe. "He is a gold buyer."

Many more of the experienced miners interviewed, however, acknowledged that they understood that buyers were corrupt, and advised that they should only be consulted for a loan in cases where there are no alternatives. "If I was desperate and really needed some sort of financial assistance, I would approach one of two gold buyers," explained 41-year old Michael Owusu, who has worked as a gold miner for ten years. "But only if I was desperate because these guys sometimes charge some ridiculous interest. Up to 40% at times, which is a lot of gold to recover in order to make a repayment like that." Rapael Kudzo and Kosi Asante, two Tarkwa-based operators with a combined 24 years' experience in mining, echoed Owusu's views:

> ***Prompt: Who provides you with finances?***
> "Nobody but the buyers but they are corrupt. They give us a loan at high interest, and demand our gold as payment. I have also written a letter to my buyer (my boss) in Accra but I have not heard word". [Kosi Asante, *galamsey*, Tarkwa]
>
> "If I had to, I would approach the buyers but do not want to. It is just that they are the only ones that probably would lend money and it is easy because we repay in gold on agreement of speech". [Raphael Kudzo, *galamsey*, Tarkwa]

On the issue of gold buyers, *galamsey* Jon Combinh indicated: "I would *never* consider borrowing from the gold buyers because they are thieves". Neighbouring operator Benjamin Andoe furthermore explained, "the buyers...are corrupt...they give us a loan at high interest, and demand our gold as payment".

According to surveyed opinion, irrespective of minimal prospects for financial and technical assistance, Ghana's artisanal gold miners, fraught with economic difficulties, have managed to tap into local sources for relief. Apart from seeking advice from chiefs, artisans consult their fellow community members for financial support, and, when desperate, request loans from PMMC gold buyers.

## 6.8 Discussion: what does the future hold for Ghana's gold artisans?

Government officials conceded that indigenous mining agencies provide very little support to the *galamsey* miner. As one district officer put it (Government of Ghana, 2002a):

> "We have an idea of where the *galamsey* are but rarely go there because they are not registered. If they've no land, and, legally, are not supposed to be there, I am technically incriminating myself by helping him".

Laws furthermore stipulate that miners must first secure a license in order to be recognised, and thus treated, as participants of the legalised and formalised sector of the economy. With few exceptions, the full effect of limited Government support has been felt by *galamsey* throughout the country; the majority interviewed appeared well aware of the reluctance of country policymakers to provide them with access to extension services.

However, whereas Government officials and laws hold a dichotomised view of miners, making a clear distinction between registered and *galamsey* operators, the latter often portrayed as illegal and law-evading citizens, empirical evidence suggests that the industry is monolithic in terms of its occupants, government assistance, extension, support, and environmental management. First, and foremost, Ghana's ASM sector as a whole has attracted a wide-range of individuals from different backgrounds – including students, retrenched labourers and professionals – with both its legalised and *galamsey* segments appear to have absorbed an equally diverse group of people. For example, in the case of the registered contingent interviewed, Divine Mogey manages a concession in Tarkwa owned by a university professor, and Joanas Barboo, who also owns concessions in Tarkwa, has two years' university training at the Tarkwa School of Mines. However, the *galamsey* group interviewed also has its share of educated and semi-skilled people. Most notably, James Mensah, who is currently working illegally in Tarkwa, has collegiate training and has taught physics in Liberia. Other *galamsey*, such as Francis Aryee of Bibiani and Jon Cowbinh of Tarkwa, worked as labourers and foremen at large-scale mines before being laid-off. Clearly, both segments of the industry exhibit similarities in terms of the training and educational background of their participants, the only difference being that the legalised segment is comprised of individuals who have successfully secured a license.

Secondly, and, in accordance with the opinion of certain Government officials, both registered and illegal miners voiced complaints about the licensing system in place for ASM. Although the findings reported in this chapter suggest that there is noticeable difference in opinion between the registered and the unregistered on the issue of licensing, it is likely that when the former voiced their opinions about the registration procedure, they were relishing in their temporary security of tenure provided by

license; most sympathised with their unregistered, and inevitably, illegal, colleagues. "When I go and see these *galamsey* working," explained Peter Jubea, a registered Bibiani-based operator, "sometimes I talk to them, and they say it is a risky job, so I ask them instead of doing it illegally, why not do legally? But most of them are not interested. The problem is, before, you need money to get a license. If you don't have money, how can you get it? It's all about money. If we simplify the system, more operators will register." Edward Joseph Mensah also lobbied to "make the licensing more friendly...they need miners to take the initiative. For this, they must be convinced of a functional system". As reported earlier, much of the problem relates to the inability of the Government to provide high quality concessions:

> "(The system) should be liberalised somehow. Somehow, decrease the amount of harassment. That is all I want right now. You can have the chance of getting to some good place – that is the key. We need to be assured that plots are viable. If not, there will not be any incentive to mine because the government is not trustworthy with their allocation...anything that can enhance us". [James Mensah, Tarkwa]

> "If we prospect the place, and we know it ok, then we will be willing to get a license, because we know that the money spent is not wasted. We need to know the extent of the ore. The license costs money, which we do not have much of at the moment". [Rolland Kyei, Tarkwa]

With few available land plots it should come as no surprise to the Government as to why thousands of *galamsey* elect to operate with minimal regard for the environment. As registered operator Njateh Mensah, in recapping the pressing problem of land allocation facing the industry, put it:

> "The concessions: about 90% of the miners do not have the licenses because they have given their land to Dunkwa Continental but are still working on the land. This also leads to degradation. The Minister should use his power to take the land out of the hands of large-scale miners that do not need it and re-demarcate it and then if licensed, they will be responsible". [Njateh Mensah]

The *galamsey*, who, as explained earlier, receive minimal assistance from Government, expressed discontent with officials not coming to their aid in their efforts to secure a concession. However, contrary to Government opinion, few of the *galamsey* interviewed expressed an unwillingness to become legal miners. Rather, a combination of finance shortages, an unavailability of land, and perceived bureaucratic registration procedures appears to be working against the Government's goal of regularising informal artisanal gold mining. More specifically, miners appear

to be growing increasingly frustrated and losing confidence in the Government largely because the lengthy application process has yielded unfavourable results. Francis Aryee put this increased discouragement into perspective.

> "I have been declined a concession twice, have been made redundant from a large-scaler once. I simply do not trust the Government anymore". [Francis Aryee, Assin Fosu]

As Michael Owusu furthermore put it, "simple licensing schemes, etc. would all make individuals look at the Government differently as an aid agency rather than a blockade. Yes, we are illegal here, this is why we try to go undetected but we tried to register in Dunkwa some time back. After waiting for two months, they told us that all of the area's land had been awarded to large-scale miners like AGC. How can a miner register when there is no land available? I know there is a problem with laws because according to laws, the land is the right of the people".

Communications with certain operators, such Joe Kojo of Tarkwa, revealed that many *galamsey* operators, having grown frustrated with the system, no longer wish to contact the Government for assistance, and prefer to continue operating undisturbed:

> "I just mine in peace. I do not want the help of the government because I know their stance. They have not freed up land for us in other areas, so I choose to mine here, where they know less of us. We are able to mine here, though illegally, because officials and companies do not much of our operating here. I really do not have an opinion on the support because I want to work independently. I was mining in Dunkwa before but issues became intense with AGC so I relocated my family here. As few companies are around as yet, it has been easier for us to operate. In fact, the whole gang came here from Dunkwa." [Joe Kojo, *galamsey*, Tarkwa]

Others, however, have not been as fortunate as Kojo in their attempts to remain in isolation, claiming that portions of the lands which they once worked have long been absorbed by large-scale mining companies. "Before we are working at our site, the mining people, the engineer came from the AGC," explained Francis Banoh, "because we were working parts of their land that they were not using. We were working their pits and their wastes just so we could take food. So then, they called the officers and they arrested us. All we were doing was reprocessing their tailings – their waste – and they kicked us off and tried to arrest us." Francis Aryee, who, again, has managed to obtain employment at a registered site, also reflected upon his past experiences with large-scale miners. "The large-scale miners sometimes tell us not to mine. They tell

us not even to mine the old areas of their concessions. They do not employ us. I do not have any place to mine as well. So, it's like when these big companies get a place, the small-scale miners suffer."

Although a number of Government officials and the press may indicate otherwise, empirical evidence suggests that *galamsey* are not necessarily law-evading citizens. The *galamsey* operators interviewed indicated they were declined for a concession because of a host of situational, technological and financial factors. Moreover, most indicated that they were content with assuming a life of clandestine and transient activity because of repeated unsuccessful license applications. One such operator, Tarkwa-based Jon Cowbinh, was asked what it would now take to convince him to operate within the legal bracket, given this assortment of problems. "I think by recognising us. If we see the Government making an effort, so will we. They think we are dirty people and make us ashamed of what we do. All the newspapers talk badly about is." Benjamin Andoe, also of Tarkwa, echoed Cowbinh's words. "Simply like I said – if you give us the title, we will listen but right now, we get no help. We are lowest caste in Ghanaian society." As a result, the Government provides little, if any, technical, financial and training-related assistance to *galamsey*; according to selected miners' stories, collectively, these factors have prevented environmental and associated socioeconomic improvements in the industry, in turn, perpetuating a vicious cycle of poverty.

Thirdly, although environmental problems in the industry are intensifying, both registered and unregistered operators exhibited a notable degree of environmental awareness. A likely reason why mercury pollution and land degradation continue to be pressing environmental problems in the industry is because transient *galamsey* activities are on the rise. Despite a polarisation in opinion concerning the current state of affairs in the industry and the markedly different accusations put forward by both miners and government officials, the highly bureaucratic nature of the policies and procedures in place for registering small-scale mining operations cannot be denied. When asked what it would take to become a licensed small-scale mine operator, Tarkwaian *galamsey* Raphael Kudzo indicated: "if you *guarantee* me the land to register, and the assistance, I will go to the office". However, whereas at least 3048 $km^2$ is currently under concession to large-scale mining companies, only 30 $km^2$ of

land is controlled by small-scale miners (Government of Ghana 2002d; Yakubu, 2003), testimony to the challenges associated with securing a parcel of land through legal channels. "The biggest priority is land," explained Bibiani-based Simon Kojo. "With no land, we cannot mine, and the Government is making it difficult to get land. Either there is none or it is being used by a large miner, or it is a forest that cannot be mined. I think miners have become frustrated with the system and are now not listening to the Government. This is why I, myself, am operating like this and so many others."

The very notion that Ghana's artisanal and small-scale miners *lack* environmental awareness appears to be exaggerated. Certain Government officials interviewed implied that the industry's environmental problems are largely attributable to miners' lack of environmental awareness, an argument commonly made in environmental management studies conducted in other ASM communities around the world (e.g. Crispin 2003a; Maponga and Ngorima 2003). However, based upon communications with miners – both registered and unregistered – there is a recognisable level of, albeit, rudimentary, environmental awareness among industry participants. Not only did a number of miners report having refilled pits and disposed of tailings, but many also exhibited a sound knowledge of the environmental and associated health-related impacts of mercury. The majority, moreover, claimed to wash their hands and utensils after amalgamating gold, and reportedly burn amalgam in remote areas and away from water bodies. Although the source of this knowledge has yet to be determined, it appears the Government is confronted with a more workable and correctable situation than its officials have implied.

Fourthly, both registered and unregistered operators have limited access to finances and technology, giving rise to an unprecedented increased dependence upon the community for support. Whereas many experts and Government officials recommended as an initial undertaking improving the organisation of miners through cooperative formation and empowering the Association of Small-Scale Mining, the majority of miners consulted called for increased access to finances and technology, indicating that it was the Government's *duty* to provide them with the necessary resources to improve operating conditions. "I think that giving the proper assistance in terms of grants and equipment, and the confidence the miner needs are the keys,"

explained *galamsey* Francis Asante. "Like everything in Ghana now is about money, so a layman like me that wants to mine an area, for which I do not have license, and I do not have the money for the license, so I have to mine the area illegally. The Government officials should come to their aid...through financial support... everything is about financial support. The Government needs to come down here and plan the whole thing." Similarly, Peter Jubea, despite his security of registration, claimed that equipment and money were the solutions to his problems. "Just money and equipment, that's all. Once we have this, as small-scale miners, we can increase our productivity, and help provide more for our families and communities." A number of other miners called for the dissemination of appropriate technology and improved equipment, and finances:

> "All we can say is more financing and more machines...Training, no problem because we know what we are working, we are still not getting all of the gold. This is where we could use the help. What is what we really, really need is financing and a pumping machine. I can't speak for others but this is what we feel are the big changes needed at this site". [Rolland Kyei, *galamsey*, Tarkwa]
>
> Equipment is it. I can do the rest on my own but I would like to be able to license myself here, so I don't have to worry about my safety every day. If we were given more money, we would buy food, more shovels. If we get enough money, we would buy our own pump, instead of hiring one, we look at it on a daily basis... we haven't the money to invest". [Jon Cowbinh, *galamsey*, Tarkwa]
>
> "Small money coming in to help the project, to increase production, and with improved equipment, the gold loss will be minimised and the technical advice so we would know about these environmental damages and to control this mercury pollution and to support our work". [Joseph Mensah, *galamsey,* Tarkwa]
>
> "Capital...and we need a concentrator, equipment and pumps...the Government must address these areas. Whenever they support us, we can hire more people. Right now, there is no jobs. We would also be able to improve our working conditions and the efficiency of operations". [Divine Mogey, Tarkwa]

Miners such as Peter Kofur drew a link between increased funding and improved efficiency. "The obvious thing, if we got money, would be improved efficiency. We rely on the jute sack for sieving, which yields about 25% efficiency. This is not good. We must then waste time re-processing our tailings."

Miners such as *galamsey* Michael Owusu offered more constructive recommendations in this context. "Where are the incentives like tax breaks, free equipment, etc. to

convince these miners to operate legally or environmentally good? They do not exist. These are necessary to persuade these simple minded miners to begin listening to the government because most miners do not have education like me and cannot analyze things right." As registered operator Michael Johnson furthermore put it, "the biggest change is the elimination of the bureaucracy. If they open more offices and the land is not there to give them *legally*, it would be useless to provide technical assistance, unless there is enough land. The miners are waiting to be licensed but when they are not given the land, they have no choice but to mine illegally, so what's the point in opening additional centres? On the mining side, we do not have much problem. The problem is the processing. Improvements should be made on the processing, which is pretty efficient at the moment". Miners claimed a shortage of finances, technology and hands-on assistance has hindered possible improvements; the coping strategies identified by interviewees have therefore become survival strategies.

Other *galamsey* miners insisted that increased hands-on assistance from Government – a reversal of existing policy – was a key to improving the efficiency of operations. "If the Government assures the miner that all is well, then more will agree to be regularised," explained Francis Asante. "I think it would help us improve our efficiency. I know our systems in place are inefficient. And if this expertise is around us regularly, it would eventually be corrected, putting us on a pathway of improvement." Francis Aryee of Assin Fosu, and Edward Joseph Mensah also called for increased hands-on assistance in the field:

> "Like if I am a miner, the environment agency should come to me and give me the necessary advice so that when there is a lot going on, they can force me to do the right thing. Not only advice but also technologies too. Until they get the miners this advice and technologies, they should not be held responsible". [Francis Aryee, Bibiani]
>
> "They need more staff on the ground, as it is just the two men at the (district) centre here and their driver. They need to keep us up-to-date on the know-how of operating effectively as a miner. This is their duty. Interaction would be helpful provided they gave the correct assistance and training. But if they came out in force to hurt us and take away everything, then there is no need for this help". [Edward Joseph Mensah, Bibiani]

In light of current levels of technical and economic assistance, and many of the additional industry constraints identified by interviewed operators, what does the future hold for Ghana's artisanal gold miners? As explained earlier, because of the

bleak employment prospects nationwide, the majority of operators indicated that they would likely remain in the industry for many years. When probed about how long he expected to continue mining in Tarkwa, *galamsey* Michael Owusu replied "probably for at least three more years", and when asked how long he expected to be involved in the artisanal gold mining profession altogether, he replied "at least 15 more years". When asked about how long he expected to continue mining, *galamsey* Edward Joseph Mensah provided an equally vague response:

> "As long as I can operate without being caught. (I'll) Find another concession around here, because there are many more here and to the west. This activity provides me with more money than anything else. Vendors make nothing, but gold is gold...so, I think it will be some time because it ables me to put my little kids in school". [Edward Joseph Mensah, *galamsey*, Bibiani]

"I will probably be involved for more than 10 more years," noted Joe Kojo. "This area is rich in deposits, so I will continue to work in Assin Fosu. I have minimal training, and do not know anything else. There is no employment in the cities so I am here now. I will continue for as long as I can."

Miners facing the possibility of depleted gold reserves at existing sites conceded that they would simply obtain another concession once mineral reserves are depleted, rather than pursue employment in another industry sector. "I will simply move to another site," explained Fusekni Aruna. "As long as I don't have work, I will be a miner." Certain employees at registered sites, such as Divine Mogey, sounded equally discouraged when probed about the possibility of pursuing alternative employment. "When deposits are exhausted, we will move on (to another site). What else will we do? There are no jobs in Ghana and the Government is not helping us in the least." In fact, the majority of interviewed miners indicated they would remain in the artisanal gold mining profession in the event of local resource depletion:

> "If gold ran out, we would get another place. If it feels it is not that much more productive, we can switch to another business". [James Mensah, *galamsey*, Tarkwa]
>
> "If I had no more gold, I would prospect another area to get gold. Many more years because there is nothing else for me and my fellow brothers to do job-wise". [Kosi Asante, *galamsey*, Tarkwa]
>
> "I'll probably find somewhere else to mine...there is gold all over these parts. All I need is a shovel and my brothers (referring to his colleagues). This activity provides me with more money than anything else. Vendors make nothing, but

> gold is gold. So, I think it will be some time because it ables me to put my little kids in school". [Jon Cowbinh, *galamsey*, Tarkwa]

To summarise, according to the stories of the industry's operators, the inefficient nature of Ghana's artisanal gold mines is a main reason why industry environmental problems remain pressing. Using accounts from interviews with artisanal and small-scale gold miners on the ground, this chapter has surveyed opinion to identify many of the additional factors inhibiting improvements in the industry. Despite enacting legislation and a system of registration for small-scale gold miners, licensed and unlicensed operators face similar barriers. The apparent reluctance of the Government to provide increased assistance to what clearly continues to be viewed, and treated, as an informal sector of industry, combined with a growing antagonist attitude among operators toward the authorities, makes the effective management of this highly inefficient, environmentally degrading and rapidly expanding economic activity exceedingly challenging.

It is against the background of the experiences and struggles reported by artisanal and small-scale gold miners, as well as the feedback provided by institutional actors and industry experts that the next chapter provides as assessment of the industry's current state of affairs, and makes recommendations for improvement.

# Chapter 7 – Discussion, Conclusions and Recommendations

"The task for the new millennium is to bring small-scale mining into the mainstream...Small-scale mining can and should be encouraged by creating the operating environment that encourages the use of best practices for mining and for occupational health and safety and environmental protection. Together with institutional arrangements that provide for the effective implementation of regulation by strong, informed government institutions, this will enable small-scale mining to thrive."

– *Norman Jennings, in "Small-scale gold mining: Examples from Bolivia, Philippines & Zimbabwe", International Labour Office, 1999*

## 7.1 Introduction

This thesis has presented a range of perspectives on the current policy stance toward artisanal and small-scale gold mining in Ghana, as well as possible ways forward. Initially, the opinion of experienced individuals based both outside of and within government was surveyed concerning key issues related to ASM. The final stage of the research surveyed the opinion of miners on similar issues for the very reason that "traditionally, scientists and development experts have simply not wanted to see local forms of knowledge as having anything important to say" (Nygren, 1999, p. 271).

As argued by Woller and Woodworth (2001, p. 270), "any development policy that fails to improve the lives of the poor cannot be considered successful...Thus, there exists an immediate need for alternative approaches to develop outside of the macro-policy arena that directly attack poverty at the grassroots level, where its ravages are felt so keenly". A number of researchers (e.g. Bulmer 1983; Bhatt and Tang 2001; Saiz 2001) advocate the use of bottom-up research techniques in developing world settings. Whereas top-down, macro-political approaches typically emphasise the application of bureaucratically-driven policies in remote, grassroots environments (after Woller and Woodworth, 2001), micro-political approaches target the solicitation of inputs from a range of actors. Specifically, and, as demonstrated in this thesis, there are two – often contrasting – views that must be taken into account when implementing policies and extension for economic activities at the grassroots. The first is that of the regulators, which, in the present investigation, comprises government officials as well as the experts (e.g. consultants and academics) who provide research inputs. The second view is provided by those being regulated – the miners themselves.

The analysis that follows analyses, in the context of the Ghanaian artisanal and small-scale gold mining industry, the worlds of both the regulator and the regulated more concisely. Analysis of findings presented in earlier chapters is used to illustrate the markedly different views these groups have on key industry issues.

## 7.2 The view of the regulator: justification for formalising informal ASM operations

It is generally argued that participation in informal industries such as ASM provides immediate poverty relief in both rural and urban areas (after Singh, 2000). Ease of entry, small-scale activity, self-employment, minimal capital requirements, low levels of organisation, and the inexpensive provision of goods are among the main factors luring poverty-stricken people to various channels of the informal sector in the developing world economy (Charmes, 1996). As shown in Chapter 6, artisanal and small-scale gold mining provides employment to a wide range of individuals of varying skill. Charmes (1996) generalises that because of financial crises, SA programmes, and the inability of the public sector to create the requisite number of jobs to absorb rising labour forces, the informal economy has become a mainstay for an increasing number of inhabitants of the developing world. The foregoing assessment aptly describes the situation in Ghana, where, as a result of its prolonged ERP and massive layoffs in the public sector, a large contingent of the population has been drawn to the western portion of the country, where they have taken up employment as artisanal and small-scale gold miners.

Sanyal (1996, p. 163) argues that in the context of the informal sector, "the crux of the conventional argument for formalisation is that the (informal) status of the poor has made them vulnerable to the whims of politicians, police, and city officials, which has increased the level of uncertainty in their lives, thereby discouraging them from investing further in housing and business". As is the case throughout most of the developing world, the Ghanaian Government legalised artisanal and small-scale gold mining because of its potential economic contribution, amid additional claims that such a move would provide its participants with tenure of security and improved access to resources. In accordance with Sayal (1996), the Ghanaian Government maintains that formalisation and regularisation strengthens impoverished communities: apart from providing the poor with a representative "voice", it is

frequently argued that formalisation of the informal economy reduces the dependence of its participants upon local "strongmen" and political bosses, and, therefore, improves their access to state amenities and ultimately, their quality-of-life. For governments, on the other hand, it is argued that regularisation of informal industries such as ASM facilitates the expansion of non-agricultural occupations in countries dependent upon a rural-agricultural economy; minimises the cost of urbanisation; stimulates the growth of a market economy; provides inexpensive labour; supplies basic goods at affordable prices; provides a conducive environment for the expansion of dynamic local entrepreneurs; and stimulates innovation and technological adaptation. Moreover, formalisation can lead to increased revenues for authorities in the forms of property taxes, permits, sales taxes and trading permits (Maldonado 1995; Sanyal 1996); in the Ghanaian case, the Government – more specifically, PMMC – has clearly benefited from the legalisation of ASM, as evidenced from the increased collection of gold and diamonds in recent years.

A recently added dimension of the informal-regularisation debate is environmental management. Revisiting Blackman's (2000) views, the informal sector contains among the most pollution-intensive activities. This is a direct result of the "squatting" nature of the industry's participants, along with a general disregard for environmental issues because of a preoccupancy with achieving economic subsistence (Briassoulis, 1999). Omuta (1986) furthermore attributes environmental conflicts in the informal sector to localised congestion, imbalances in population distribution, and poor quality resources. Sethuraman (1981) argues that the absolute lack of access to land and supporting infrastructure perpetuates environmental problems within the sector (in Perera and Amin, 1996). In the context of the present case study, the link between improved organisation of ASM and improved environmental management is demonstrated by Jennings (1999, 2000), Hentschel et al. (2001) and others. Specifically, if operations are localised, and the efficiency of activities are improved, the widespread land degradation and mercury pollution that currently characterises the sector will likely be markedly reduced.

The initial aim of this thesis was to advance understanding of the institutional context of ASM and the different policy strategies that have been adopted to date to bring the sector into the legal domain for organisational and environmental purposes. As

documented in Chapter 4, the traditional approach to ASM regularisation has emphasised the implementation of regulations and codes of practice, provision of financial and technological support, and the enactment of licensing procedures and accompanying demarcation of land plots. To facilitate regularisation, systems of rural support have been established, including banks, governance, and technology and training, although each has generally been unique, tailored specifically to the country in which it has been implemented.

As further explained in Chapter 4, in an attempt to bring ASM into the legal domain, the Ghanaian Government passed *The Small-Scale Gold Mining Law* in 1989, which mandated that prospective miners undergo a systematic process of assessment involving stages of paperwork and government evaluation for the sole purpose of obtaining a license to mine. As a means of concurrently improving technology and providing support, equipment was disseminated to miners, mainly under the auspices of GTZ and the World Bank, and district support centres were erected within the areas containing the highest concentrations of artisanal and small-scale gold miners. In response to the industry's pressing environmental problems, retorts have been disseminated to miners at the *locale*; a reclamation bond was launched to finance land remediation activities; and an EIA procedure was inserted into the licensing procedure. To carry out the foregoing, and related, tasks, the Government established the SSMP to provide institutional support; the Minerals Commission, the Mines Department, Geological Survey Department, and PMMC comprise the SSMP.

It appears that the interventions taken by the Government to both regularise and improve environmental management in the artisanal and small-scale gold mining industry have managed to only facilitate minimal improvements; problems with the current policy stance have been well-conceptualised indigenously. Initially, interviewed experts indicated the low salaries of Government personnel and the shortage of support staff overall were preventing effective enforcement of ASM legislation. There was further explanation that the laws themselves are poorly defined, failing to distinguish between legal operators and "illegal" *galamsey*. A case was also made for how the EIA was simply a money making scheme for the EPA, which, itself, has no defined role regarding ASM altogether.

Insufficient institutional support was identified as a second major problem. Findings suggest that the Geological Survey Department and the Mines Department have abandoned their responsibilities assigned to them *as per* the SSMP. Specifically, the Geological Survey Department has relinquished its geo-prospecting duties, whilst the Mines Department no longer provides input on key health and safety issues. Representatives claimed that these agencies abandoned their responsibilities because of alleged financial constraints. However, whilst the Geological Survey Department official called for his agency to commit to providing increased institutional support, Mines Department officials implied that (the Mines Department) does not necessarily have an integral role or a defined place in the SSMP. As a result of this abandonment of tasks, the Minerals Commission has been forced to assume additional responsibility but has been unsuccessful in bridging the gap because of its well-documented shortages of both finances and personnel. In addition to being forced into playing a dual role as policymaker and regulator, the Minerals Commission has been unable to mobilise the requisite funding to carry out priority prospecting duties, and has failed to effectively decentralise support for prospective artisans, the latter manifested as poorly-equipped district support centres. The EPA's imprecise role regarding ASM was also identified by certain officials as an additional problem. Whilst it administers the EIA procedure, officials – in particular, those consulted at the Minerals Commission – indicated that the agency prefers to leave important industry issues in the hands of the Minerals Commission. However, there was a consensus amongst individuals interviewed, with the exception of Mines Department officials, that insufficient institutional support was inhibiting the Ghanaian Government from both regularising and improving environmental management in the resident artisanal and small-scale gold mining circuit.

Impoverished policy design and delivery was identified as a third main problem with the current policy stance. Government officials and experts outside of government identified, *inter alia*, the following as areas of primary concern:

1) The continued use of inefficient, environmentally-degrading equipment and inability of the Government to disseminate appropriate technology.
2) Unsuccessful dissemination of the mercury retort.
3) Insufficient knowledge of miners (number operating, types of operations, locations, etc.) and their practices.

4) The existence of an inappropriate licensing system.

There was further consensus that inappropriate legislation and insufficient institutional support have been responsible for the foregoing problems.

Although the blueprints for a potentially effective SSMP are in place, a shortage of institutional commitment to the cause has clearly inhibited its success. Furthermore, limited funding, minimal expertise and poorly designed legislation has impeded the complete absorption of artisanal and small-scale gold mining into the legal domain, and has given rise to the well-publicised registered miner-*galamsey* dichotomy that exists today.

## 7.3 Perspectives on environmental problems and possible ways forward

A second aim of this thesis was to determine how the environmental and associated socioeconomic problems associated with artisanal gold mining have been conceived by expert and regulatory groups in Ghana. As previously explained, a link has been made between improved industry organisation and reduced environmental impacts. An initial hypothesis put forward in Chapter 2 was that the industry's environmental problems and possible solutions have been well conceptualised indigenously, and the findings presented in Chapter 4 suggest this to be the case.

Whilst Chapter 4 surveyed expert opinion on the current policy stance, Chapter 5 provided perspective on possible solutions to problems, as conceived by regulatory and expert groups. There was consensus, as previously explained, on the shortage of institutional support for artisanal and small-scale gold mining. Although representatives from certain institutions were uncommitted to the idea of possibly providing assistance for ASM, each nevertheless identified a shortage of support as a major impediment to improving industry conditions.

However, based upon surveyed opinion, there appears to be three schools of thought concerning possible ways forward. The first group, which comprised academics, consultants and industry people, articulated the most progressive agenda. This group called for environmental problems to be tackled step-by-step, and argued that each must be approached from several dimensions. Apart from indicating that initial emphasis be placed on the execution of short-term initiatives aimed at improving the organisation of operations – namely, cooperative formation and increased prospecting

– it was explained that more ambitious undertakings, such as re-skilling programmes, equipment provision and improved retort implementation, should be pursued over the long-term. The group, furthermore, called for increased inputs from academia and consultancy as a means for executing the foregoing.

The second group, within which Minerals Commission and Geological Survey Department officials were placed, was considered a proponent of "intermediate environmental management". Although comparatively progressive *vis-à-vis* individuals based within sister government agencies, representatives from this group were more reserved in relation to the "progressive" thinkers of academia and industry, likely because of their familiarity with governmental agendas and institutional commitment to ASM issues. Nevertheless, representatives from the group also called for the Government to address problems incrementally, and to place initial emphasis on strengthening the Association for Small-Scale Mining (*i.e.* the representative "voice" of the artisan), facilitating cooperative formation, and intensifying geo-prospecting activities. The group likely provided more realistic recommendations overall. For example, many of the more ambitious undertakings proposed, including the provision of extended credit lines for miners, construction of centralised services and training, were described as only being feasible provided that the initial initiatives proposed were undertaken. Moreover, the group, unlike the "progressive" thinkers, indicated that the construction of additional district centres was not an option at this point because of cost and demand factors.

The last group was labelled the "prudent" environmental thinkers because they currently have no stake in ASM, nor are their institutions committed to providing institutional support to the industry: EPA, Mines Department and PMMC officials were placed in this category. Few provided recommendations for improvement and were resistant to the idea of their respective institutions assisting the Minerals Commission with ASM regulatory and policymaking duties. Although EPA officials called for studies to be undertaken to improve understanding of conditions on the ground, there was no instruction given on how this could be done. Mines Department officials, moreover, were resistant to many of the ideas put forward for improving environmental management in the industry. The group also appears to be

perpetuating a negative image of the industry, fuelled largely by their ignorance of the needs and mindsets of operators (as reported in Chapter 5).

To summarise, the environmental impacts associated with artisanal and small-scale gold mining have been well conceptualised indigenously in Ghana, although there was varied feedback provided on possible ways forward in the industry, a likely reflection of the different stakes held by the interviewed actors. Whilst the initial group of "progressive" thinkers provided comprehensive recommendations, many reflecting upon past experiences, at the same time, they are unfamiliar with the mindsets of government officials, institutional commitment, and resources at their disposal. The most "prudent" environmental thinkers constituted a group uncommitted to the ASM regularisation and environmental challenges; EPA, Mines Department and PMMC officials were placed in this category. Minerals Commission and Geological Survey Department officials, however, considered here to be "intermediate" environmental thinkers, provided a series of descriptive and perhaps more feasible recommendations, as well as a scheme and timetable for implementation. It is concluded that because of their current commitment to ASM, industry stake and expertise, Minerals Commission and Geological Survey Department officials are in the best position to recommend possible ways forward; of the actors interviewed for this research, only this group was able to effectively articulate potential barriers to improvement.

## 7.4 The view of the regulated: the marginalised artisanal gold miner

The officials initially consulted were critiquing the participants of an industry whose voices are rarely heard; their needs are rarely accounted for in policymaking activities. The final aim of the thesis, therefore, was to compare the views of experts and government officials with those of the resident artisanal and small-scale gold mining community. Through a collection of stories, Chapter 6 highlighted, *inter alia*, the structural and situational problems (e.g. organisational, financial, cultural, etc.) faced by miners; their pressing needs; how they perceive the industry's problems; their levels of environmental awareness; and their opinions of support and barriers to improvement. A second hypothesis put forward was that the Ghanaian Government has not effectively addressed the problems of the artisanal gold mining population accordingly, and has furthermore failed to raise livings standards among industry

participants because it is not in tune with their needs. Although certain government officials identified problems with the current policy stance, interviews with miners confirmed that governmental intervention has done little to improve conditions in the industry.

Whereas a number of Government officials criticised ASM – particularly, *galamsey* activities – mine operators provided an entirely different perspective on the industry's current state of affairs. There is empirical evidence in this thesis indicating that miners are not deliberately evading laws, as officials and the press regularly indicate but are rather struggling to comply with the regulations of a costly and bureaucratic process. Given the well-documented difficulty associated with securing a viable land plot, there is little justification for the miner to adhere to regulations governing where he should mine.

The empirical research presented in Chapter 6 reinforced the final hypothesis put forward in Chapter 2: that the Government has failed to meet the needs of the industry's participants accordingly. It was predetermined that the disproportionate illegal segment of Ghana's artisanal and small-scale gold mining sector was likely an indication of an unsatisfactory policy environment in place for operators. However, whilst the media and certain Government agencies have effectively established a division between registered miners and *galamsey*, the latter often portrayed as clandestine and law-evading individuals, paradoxically, prospective operators claimed to be working to acquire legal status but cited costs, bureaucratic delays with paperwork, and poor resource definition as reasons for their prolonged and inevitable illegality.

Although the literature generally states that ASM is practiced by impoverished and uneducated people, the miners consulted for this study included semi-skilled and/or retrenched labourers, youths, and unemployed professionals, reaffirming the World Bank's claim of it being a "poverty-driven" activity. However, both the licensed contingent and *galamsey* exhibited a notable degree of knowledge of environmental management, and mentioned having made several attempts to adhere to what they described as a rigid regulatory framework. In many cases, prospective small-scale gold miners have reportedly followed legislation step-by-step but have been unsuccessful in securing a concession, or have been awarded a poorly-mineralised

plot. In areas such as Bibiani, all of the land has been allocated as large-scale mining concessions, giving the artisan limited opportunity to work. There have been instances where legal small-scale miners have been uprooted outright from their land plot for the purposes of its inclusion as part of a large-scale mineral exploration concession.

Of the government officials consulted, only those at the Minerals Commission appeared aware of the challenges faced by artisanal and small-scale gold miners. Generally, operators are without appropriate technology and lack the financial backing needed to hire additional employees. Many also reportedly engage in perpetual "hit-and-miss" activity in response to the Government's inability to provide detailed geological maps that identify areas suitable for ASM. Moreover, and, as previously explained, the miners consulted exhibited a notable degree of environmental awareness, stressing, *inter alia*, the importance of reclaiming pits and the integrality of taking the appropriate precautions when handling mercury; the Government, however, has failed to capitalise on this knowledge to further improve conditions in the industry.

The findings from this study suggest, in accordance with the conclusions reached by a number of authors (e.g. Jennings 1999; UN 1996b; Hentschel *et al.* 2002), that the policies and regulations put in place for artisanal and small-scale gold mining in Ghana have further marginalised the impoverished miner. There is evidence presented in this thesis suggesting that many segments of the Ghanaian Government are aware of the difficulties faced by miners, as well as the bureaucratic nature of industry policies. However, it is maintained here that if environmental conditions are to improve in the artisanal and small-scale gold mining industry, the Minerals Commission must continue to play a central role in the rebuilding process although thus far, it has been unsuccessful in soliciting the requisite institutional support from other government institutions.

The next section of the chapter reports some additional conclusions drawn from the present investigation.

## 7.5 Identification of priority concerns

### 7.5.1 Top-down regulation and control

As explained at the outset of this chapter, there is a burgeoning literature describing how macro-regulation and associated support has compounded problems in the grassroots communities of the developing world (Batterbury *et al.* 1997; Bovens *et al.* 2002). Although decentralised governance is a stated goal of many African governments, including the past and present Ghanaian administrations, as Olowu (2003, p. 41) reports, "there are considerable institutional and political challenges involved in making it a reality". In the context of artisanal and small-scale gold mining in Ghana, in addressing its environmental impacts, the Government has overlooked the importance of undertaking preliminary studies in communities for the purpose of improving understanding of miners' needs and capabilities.

Appiah-Opoku (1999) advocates that indigenous ecological knowledge plays a pivotal role in environmental management at the grassroots, and argues that in Ghana, the following two factors influence environmental management: 1) appropriate local environmental knowledge, and suitable methods or technology to exploit resources; and 2) a philosophy and environmental ethic to keep exploitive abilities in check, and to provide ground rules by which the relation among humans and the environment are regulated. This "folk ecology", "ethno-ecology", "indigenous knowledge", or "rural people's knowledge", has been compiled by a group of people through generations of living in close contact with nature. It features, *inter alia*, a system of classifications, a set of empirical observations about the local environment, and a system of self-management that governs resource use. In short, "indigenous knowledge includes the complex of practices and decisions made by local people" (Oudwater and Martin, 2003, p. 389).

Since the United Nations Conference on Environment and Development, 1992, there has been consensus that the implementation of what is recognised as "sustainable development" should be based largely upon bottom-up strategy – *i.e.* low level solutions derived from community incentives (Leach *et al.*, 1999). This is in response to growing realisation that, "it is at the local/community level that the connections among ecosystem health, the health of human communities, and individual livelihoods are most apparent and critical" (King and Hood, 1999, p. 49). This "need

to deal effectively with such (social and cultural) issues, both domestically and internationally, represents a clear and new reality for the mining industry" (Clark and Clark, 1999, p. 190). Tapping into such information enables governments to draft policies that better reflect the needs of grassroots industries (after Nygren 1999; WinklerPrins and Sandor 2003), in this case, artisanal and small-scale gold mining.

The approach taken by the Ghanaian Government to improve conditions in ASM clearly mirrors the approaches generally deployed by the West to provide aid to developing countries, which Parsons puts into perspective in the following passage (Parsons, 1996, p. 170):

> "Traditionally, foreign 'experts' would play a role of 'all-knowing' authority. Expatriate engineers would sweep onto the scene, designing bridges and other large structures, having very little contact with local communities. Many of the engineer's projects would directly benefit the local elites or foreign companies, often intensifying disparities between the upper and low social and economic status...Such conditions still exist in the Third World, but it has become clear that this type of technical assistance does not raise development standards".

In terms of the present case study, such "little contact" is exemplary in the efforts taken to introduce equipment to artisanal and small-scale gold miners. As explained in Chapter 4, initially, under the auspices of GTZ and the World Bank, technologies were introduced to improve the efficiency of ASM operations. However, the apparatuses purchased proved more suitable for large-scale miners and consequently had to be sold at discounted prices after extended periods of non-use. An agreement was subsequently forged with CEDECOM, which, at the time, mainly had experiences with artisanal fishermen; the cycle of inappropriate equipment purchase, therefore, continued. More recently, the mercury retorts purchased and made available to miners at subsidised prices have also proven unsuitable. Certain miners have expressed a reluctance to adopt the newly-introduced UNIDO model – something the Ghanaian Government failed to ascertain beforehand – because of concerns with fragility and cost, which continues to be beyond their budgetary means.

Appiah-Opoku and Malamoottil (1997, p. 161) identify the following as primary reasons why developing world governments repeatedly fail in their attempts to decentralise support to grassroots industries:

- Inability to effectively harness available resources within communities;
- Dependence upon outside ideas, goals, technology, and supervision;

- Fundamental differences in the physical, socioeconomic, cultural and political environment between the West and recipient developing countries; and
- Expense, in terms of imported goods, technology, and the galaxy of outside experts in the field needed to implement the approaches, and their lack of commitment to the goals and aspirations of the host nations.

This characterises the Ghanaian effort taken to regularise and decentralise support for ASM. Although certain experts as well as government officials, particularly those based at the EPA and Minerals Commission, called for improved bottom-up intervention, the district support centres constructed for the purpose of facilitating improved interaction at the community level remain poorly equipped and are restricted by an acute shortage of finances. Moreover, they have not been empowered to make any decisions regarding licensing, permitting and land concession allocation, furthermore suggesting that a centralised model of regulation continues to be in place for ASM. As the situation stands, the Government possesses insufficient geological information but more importantly, lacks knowledge of who is engaged in ASM activity and where they are operating. Once the Government acquires data regarding, *inter alia*, the education levels of miners and industry needs, it will put itself in an improved position to address environmental management and interrelated socioeconomic concerns.

To summarise, it is evident from feedback from both experts and miners that the Ghanaian Government has failed to decentralise support for ASM; it, moreover, has failed to improve its understanding of miners' needs and activities, in turn, leading to the design of impoverished policy.

### 7.5.2 The licensing system: a perverse logic?

As Roberts (1994, p. 8) explains, in the informal sector, "the issue is not one of regulation *per se* but of the form of regulation". Specifically, despite their intentions to improve the organisation and efficiency of activities through regulation, there is growing consensus that governments are increasingly adopting procedurally complex policies and laws in their efforts to formalise informal sectors of their economies. As explained by Lagos (1994, p. 112):

> "Supporters of the illegality-approach argue that the institutional and legal framework constitutes an obstacle to the formalisation of the informal sector. They maintain that the formalisation or legalisation of micro-enterprises is virtually impossible because of government interventions through disproportionate regulation and bureaucracy which are not only excessively time- consuming, but also impose high financial costs".

Lagos (1994) furthermore identifies a series of barriers to regulating the informal sector, most of which apply to the case study of Ghanaian artisanal and small-scale gold mining examined in this thesis. The first barrier is the *initial registration process*, which, according to Lagos (1994), Mead and Morrison (1996) and others, normally requires the physical presence of the applicant in a number of institutions. Lagos (1994, p. 114) argues that "the initial registration process has the sole objective of obtaining legal recognition as an economic unit". In the current case, many of the experts and officials consulted conceded that the licensing procedure in place for small-scale gold miners is complex and bureaucratic, requiring the prospective operator to travel, often needlessly, to various locations to complete the required paperwork. Communications with selected artisans confirmed that the licensing system *is* inappropriate, involving the completion of what they perceived as several time-consuming procedures which potentially inhibit operation. Specifically, objections were voiced by miners over travelling and the time delays associated with evaluating licensing applications. The current arrangement provides miners little incentive to register with the Government.

The second barrier is the *location of the enterprise*, which, as Lagos (1994) explains, relates to both where the operation is situated and the quality of the unit itself. Despite claims made by certain officials that support services have been implemented for artisanal and small-scale gold miners, communications with miners and visitations to sites revealed that Government intervention has done little to raise living standards in ASM communities. Certain miners also confirmed that the locations where they have been awarded concessions often lack sufficient mineralised gold, or have been eventually included as part of a large-scale concession, as indicated earlier. The result, according to the surveyed opinion of the mining community, has been a depressed confidence in the authorities, and reliance upon continual, environmentally-degrading "hit and miss" activities.

The third, and final, barrier, *tax registrations*, also relates to the initial registration procedure – specifically, the costs associated with registering an operation (Lagos, 1994). Speaking abstractly, Bugnosen (1990, p. 2) claimed that "many small mining operations remain unregistered because of the bureaucracy and, in some cases, the expense involved". Such appears to be the case in the Ghana, where the Government has imposed a series of costs upon the subsistence mine operator, which, according to many interviewed miners, are beyond their budgetary means. This appears to be further dissuading prospective registered operators from securing a license. "Time costs", which are simply bureaucratic delays, were described by Minerals Commission officials as well as miners as major barriers to remaining unregistered. "Financial costs", identified by Lagos (1994) as expenses related to labour and technology, also proved to be pressing problems for Ghana's gold artisans, many of whom reported that shortages of funds have prevented the hiring of additional workers and investment in appropriate technology.

As a result of being unable to transcend these barriers, *galamsey* continue to be perceived as proponents of illegal, clandestine mining activity. In the past, governments have often been quick to label those unwilling or unable to register as constituents of an "irregular sector [involving] some illegality such as tax evasion, the avoidance of regulations (for example, minimum wage and factory safety legislation) and social security fraud" (Thomas, 1992, p. 4). In accordance with claims put forward by Hentschel *et al.* (2002), who generalise that small-scale mine licensing is typically bureaucratic, Ghanaian policymakers have implemented a procedurally complex scheme for artisanal and small-scale gold miners, which, in its present form, provides little incentive to registering, and has evidently perpetuated illegal mining.

### 7.5.3 Security of tenure?

When small-scale industrialists are granted security of tenure, they are generally more accepting of government polices, and committed to investment and improving operating conditions (Brasselle *et al.*, 2002, p. 374). When individuals feel more secure in their right or ability to maintain long-term use of their land, the return on long-term improvements and conservation strategies is higher, and they therefore have greater incentive to undertake the appropriate investments. Moreover, when land is more readily convertible into liquid assets through sale, the improvements achieved

through investment are realised. The resulting increased value of land, in turn, facilitates improved access to credit and markets. However, as explained by Niazi (2003, p. 275), "[an] uneven access to land resources constitutes an economic and environmental threat that necessitates equitable land distribution by reforming the institution of land tenure".

The issue of security of tenure in ASM was brought to the forefront in the recently-published UN document *The Compendium on Best Practices in Small-Scale Mining in Africa* (UN, 2002). The document specifically indicates that, "the duration of tenure for most small-scale mineral rights is usually very short with no guarantee for renewal [which] is unattractive to prospective investors, financiers and developers" (UN, 2002, p. 25). Such appears to be the case in Ghana, where licenses only grant the small-scale gold miner entitlement to mine for a period ranging from three to five years. Communications with miners on the ground revealed that the duration of the license is short and fails to guarantee sufficient security of tenure. Miners implied that the bureaucratic procedures and the costs associated with securing a license warrants longer entitlements to land; this is a likely another factor behind the widespread illegality in the artisanal and small-scale gold mining circuit. As Maldonado (1995, p. 706) put it, "whether they realise it or not, small-scale entrepreneurs make an economic calculation along the lines of cost-benefit analysis, in that the extent to which they comply with legislation is based on considerations linked to opportunity cost".

Furthermore, despite legalising small-scale gold mining as an industry, it appears that the Ghanaian Government gives priority treatment to large-scale mining, as evidenced by the record levels of investment that has occurred in the sector (documented in Chapter 2) *vis-à-vis* ASM. As generalised by Thomas (2002, p. 339), "constrained by an urgent desire to see rapid economic progress, many developing countries, particularly some in post-independence Africa, resorted to the execution of large-scale development projects in the decades following the 1960s...[many] poor rural peasants have been the unintended victims of large-scale development projects". Speaking more specifically about mining, Morgan (2002, p. 165) argues that "the increased competition for the available mineral investment funds has led to a degree of relaxation of many policy and legal frameworks to attract the required foreign

investment". Thus, in cases where large-scale miners have expressed an interest in expanding their operations, licensed small-scale miners have often been pressured by authorities to vacate their lands; in the present case study, formerly licensed miners now operating illegally in Bibiani were forced from their lands by the expanding AGC, and denied in their applications for license renewals.

Without security of tenure – more specifically, a contract which *guarantees* entitlement to a parcel of land for an extended period – prospective licensees will have even less incentive to register their operations.

### 7.5.4 Disparity of assistance

Bugnosen (1990) was among the first to identify how the majority of small-scale mining conferences conducted to date, despite effectively addressing issues pertaining to the semi-formal, semi-mechanised small-scale mining segment, have paid comparatively little attention to the plight of the more widespread and less-privileged subsistence artisanal miners. This problem is often replicated in the field, where seminars, training modules and technological dissemination activities organised for small-scale mining are typically based in and around *established* ASM communities, at the same time, failing to reach the more populated rudimentary groups. Despite possessing little knowledge of the whereabouts and practices of the more itinerate mining groups, and doing little to acquire such knowledge, governments are quick to blame operators when support-related initiatives prove ineffectual. The fact remains that because of their isolation, a greater percentage of artisanal mining groups are without access to many of the government-coordinated education, training, and technological services aimed at improving the organisation of the industry, and, ultimately, facilitating positive environmental and associated socioeconomic change.

Although Ghanaian artisanal and small-scale gold miners receive secondary treatment to their large-scale counterparts, there appears to be further disparity between the registered and the more transient *galamsey*. Apart from securing a concession, registered miners are legally entitled to solicit inputs from local district officers, and generally, have more organised operations. The *galamsey*, on the other hand, are without any entitlement to land *per se*, and are rarely in contact with support staff. As the law prohibits district officers from interacting with illegal miners, few provide assistance to the *galamsey*, unless under their own volition; this was confirmed during

interviews with both government officials and miners. This disparity in treatment, in turn, is particularly problematic, given that it is the *galamsey* who are in the greatest need of support.

In summary, the following additional conclusions were drawn from the study undertaken in this thesis. First, the industry's problems continue to be addressed from the top-down, and there is evidence that the Government is not in tune with the needs of miners. Secondly, the licensing in place for small-scale gold mining is bureaucratic, featuring, in the eyes of miners, experts and certain government officials, many unnecessary stages and costs. Miners, moreover, indicated that the license fails to provide adequate security of tenure, and is a likely reason why a disproportionate number of operators continue to be unregistered. Finally, as reported briefly in this section of the chapter, the *galamsey* mining contingent receives the least assistance from Government, despite being in the greatest need of support. It is against the background of these conclusions that the following section prescribes recommendations for improving the policy environment for artisanal and small-scale gold mining (in Ghana), and facilitating improved environmental management at sites.

## 7.6 Recommendations for improvement

In accordance with arguments put forward in general ASM texts (e.g. Jennings 1999; Hentschel *et al.* 2002), many of which were first introduced in Chapters 1 and 2, the evidence supplied in this thesis suggests that Ghana's impoverished artisanal and small-scale gold mining community has been further marginalised by government policies and extension. According to the stories of experts, certain government officials and miners, there has been little progress made toward raising living standards in the industry; moreover, there has been complacency on the part of authorities with fully incorporating the industry within the legal domain. The SSMP, overall, is suffering from a shortage of finances, institutional support, and, based upon views from the field, miner confidence.

Notwithstanding these shortcomings, the Ghanaian Government appears to be the beneficiary of a relatively learned, keen, semi-skilled and ambitious ASM population. Whereas artisanal mining populations in a number of other countries, including

Brazil, Nigeria and China, have openly opposed regulations and government assistance, the Ghanaian artisanal and small-scale gold mining population appears to feature operators willing to comply with Government instruction, provided that the return on such a commitment is adequate. Although clearly not fully realised in Government circles, this cooperation and awareness could go a long way toward successfully executing future undertakings aimed at improving environmental management in the industry. However, the current arrangement of frameworks and policies in place for ASM provides prospective operators little incentive to participate as legal miners, let alone undertake environmental management practices.

It is therefore recommended against the background of the barriers to improvement identified in this thesis that the Government focuses exclusively upon pursing the short-term interventions capable of improving the organisation of operations; the underlying logic of such a move is that improved organisation facilitates more effective environmental management. In the context of the present case study, such a move is particularly important, given that the UNDP, UNIDO and EU are proposing to play an expanded role in the areas of mercury management and miner training in the country in upcoming years. The efficacy of the planned work of these organisations, however, is contingent upon the existence of organised and quantifiable groups of miners, as well as the availability of baseline industry data, which the government currently lacks. In this, the final section of the thesis, recommendations for improvement are put forward.

### 7.6.1 Improved resource definition

According to reports and reconfirmed by interviewed government officials, unexplored land plots continue to be awarded to small-scale gold miners; generally, both the mineralised content and anthropogenic character of these plots is unknown. The problem has arisen as a result of the Geological Survey Department abandoning its geo-prospecting tasks (stipulated within the blueprints of the SSMP). The inability of the Minerals Commission to finance geo-prospecting for ASM has forced staff to entrust the prospective artisan with providing details on a designated concession, or bypass the entire prospecting task entirely. Without pre-determining resource definition, miners have been awarded unproductive plots or concessions within which, *inter alia*, portions of towns, schools and villages exist. Inadequate resource

definition provides the artisanal gold miner with little incentive to initiate what is now widely recognised in many circles to be a lengthy registration procedure.

Policymakers must find ways to undertake prospecting activities before awarding concessions because poor resource definition leads to additional, often-unmanageable problems such as land use conflict, unnecessary land degradation, and encroachment. Given the financially impoverished nature of indigenous government agencies, in particular, the Minerals Commission and Geological Survey Department, it is recommended policymakers consult geologists and graduate students at the Tarkwa School of Mines – which is already based in the heart of the gold mining region – to undertake prospecting tasks. Such an approach is comparatively inexpensive, and could be designed in a fashion whereby in exchange for work, students are credited with coursework.

Another – albeit, more ambitious – approach would be to liaise with foreign mining institutions, such as the Colorado School of Mines, Camborne School of Mines, and the Western Australia School of Mines, to undertake these tasks as part of research projects or graduate student field research. Alternatively, partnerships could be forged with many of the European or North American Geological Survey Departments to help devise detailed geo-chemical maps. Many such agencies already have proven track-records in Africa, as notable portions of their budgets are devoted to undertaking work in developing countries. Groups such as the US Geological Survey, Swedish Geological Survey Department, the Danish Geological Survey, and the British Geological Survey have, in the past, aided a number of African governments with various geological tasks, many of which were policy-related.

Regardless of *where* the assistance comes from, as an initial task, the Ghanaian Government must focus upon improving its geological knowledge for the purpose of putting itself in a better position to allocate concessions to prospective miners accordingly.

### 7.6.2 Increased security of tenure

In accordance with a series of publications (e.g. Hollaway 1997; UN 2002), and, as already explained in this Chapter, the licensing system enacted by the Ghanaian Government for small-scale gold miners fails to provide sufficient security of tenure.

With prospective operators forced to endure what they perceive as a bureaucratic, costly and lengthy registration process, three years' entitlement to a parcel of land is insufficient. Moreover, as explained in Chapter 6, in places such as Bibiani, miners have reported being uprooted outright from their concessions, which have subsequently been awarded as part of large-scale mining and/or mineral exploration concessions.

Extending small-scale miners' entitlement to land plots could go a long way towards restoring confidence in the regulatory and licensing system. With the initial registration period for large-scale mining and mineral exploration lasting upward of 30 years, it is recommended that the Government extend the small-scale mining license to a minimum of 10 years. This is currently the case in both Ethiopia and Zambia, where a small-scale mining license *guarantees* an operator entitlement to mine for as much as 10 years, regardless of deposit type (UN, 2002). An additional means of providing miners with increased security of tenure is by providing entitlement to transfer and mortgage rights, an option pursued in Tanzania. According to the "Transfer of Minerals Rights" under the *Tanzanian Mining Act*, small-scale miners are entitled to sell their properties through outright sale or development agreements. This, in turn, facilitates partnerships between small- and large-scale miners; the latter is, moreover, forced to pay prices dictated by the small or artisanal mining party if it is interested in acquiring their land. Presently, the legislation in place in not only Ghana, but also Namibia, Cote d'Ivoire and Senegal prohibits small-scale miners from transferring and mortgaging their mineral rights.

Increased geo-prospecting and improved security of tenure go hand-in-hand; once the geological characteristics of landscapes are determined and geochemical maps are developed, the Government can readily relocate operators to areas both appropriate for ASM activity and not under immediate threat from expanding large-scale operations. However, without *guarantee* of security of tenure, operators will unlikely undertake the investments in terms of time and finances needed to obtain a license.

### 7.6.3 ASM censuses

Through surveying a mere 51 miners in the field, this study illustrated that Ghana's artisanal and small-scale gold mining populous is comprised of individuals from markedly different backgrounds, of varying skills, and of different ages. Minimal

knowledge of such details is a likely factor behind many of the failed efforts of the past aimed at raising living conditions in the industry – most notably, technological enhancement initiatives.

It has been recommended to Minerals Commission officials that a comprehensive ASM census should be carried out. According to certain Minerals Commission officials, such an undertaking could be completed in two weeks during the dry season, given the appropriate personnel and resources. It was explained that census people could be drawn from the pool of statisticians used by the Ministries of Communication, Roads and Transport, and paid a daily wage of between 100,000 and 150,000 *cedis* (or US$20); hired transport would also be required, as well as monies for lodging and supervision.

Preliminary estimates reveal that a comprehensive census of this scope, and similar to that which was conducted by AusAid in PNG (see Crispin, 2003b), would be in the range of US$150,000. It is recommended that the IDRC, CIDA and DfID be contacted for financial support, as each is currently promoting various Sustainable Livelihoods projects throughout sub-Saharan Africa. The AGC may also be approached to help finance the census, as it has experienced a share of problems in the past with *galamsey* that have resulted in precipitous damages.

Determining the details of miners is necessary before ambitious re-skilling, training and equipment provision projects can be pursued; the Government must acquire more precise information in order to know what it is dealing with.

### 7.6.4 Partnerships with large-scale miners?

Several publications (e.g. UN 1996a; UN 1996b; Hentschel *et al.* 2002) advocate the increased participation of large-scale mining parties in the context of ASM support and management. Although there is evidence of functional working partnerships between large- and small-scale mining parties in Ghana, in particular, at the properties of former-Teberebie and Bogosu Gold Fields, there continues to be greater incidences of conflicts between the groups, brought on by the poor land demarcation strategy used by the Government; conflicts at AGC's concessions have been particularly intense in recent years (see Hilson, 2002b, 2002c). As long as large-scale mining parties – who have the funds at their disposal to make positive contributions in this

context – are allowed to operate freely, and with minimal regard for their small-scale counterparts, there is little incentive for any to cooperate and provide assistance.

It is expected that securing the assistance of AGC will be particularly challenging, given its controlling share – more than 50% of production – in the domestic gold mining economy. In the past, large-scale mining companies such as AGC located both inside and outside of Ghana have been unpredictable in terms of their willingness to provide extended cooperation to governments on ASM issues. As explained the ILO (1999, p. 54) put it, "cooperation or confrontation?...Established mining companies are wary of the activities of small-scale miners for many reasons, often with some justification, particularly when they encroach on mine property". On the positive side, Davidson (1993) documents partnerships forged between artisanal gold miners and the gold mining international corporation Placer Dome in Venezuela, and the UN (1996b) documents additional agreements forged between these parties. The ILO (1999) documents cases in Ghana, particularly the actions taken by GHG in the early-1990s, when illegal miners were absorbed by the company, issued security cards, and relocated to designated portions of concessions

However, given the sheer unpredictability of mining companies, it is recommended that the Ghanaian Government approaches local large-scale operations with some degree of caution. The ILO (1999) reports incidents whereby large-scale mining companies have been equally impulsive about removing perceived "illegal" artisanal operators from their concessions.

### 7.6.5 Provision of support in accessible formats

Both registered operators and *galamsey* have been resilient, relying on sources of social capital – namely, families and colleagues – to provide financial and technological support. Currently, the Ghana's rural banks are uninterested in providing financial support for ASM, which they likely associate with transient activity and unreliable operators. However, the Bank and associated indigenous rural financial conglomerates do provide financial support to small-scale farmers, as explained in Chapter 4. Therefore, there is no plausible reason why these institutions could not provide funding to registered small-scale miners, who are confined to a parcel of land for a notable period (three-to-five years) and are unlikely to evade lenders. Investment through enhanced financial support is a key to improving

mechanisation in the industry, and allows miners to escape poverty-stricken conditions.

Mobilising the requisite financial support for ASM parties will require the Government to demonstrate to the rural banks that parties have been sufficiently organised and grouped in locations readily accessible to the authorities and investors. Unless the Minerals Commission and sister agencies organise ASM operators into working cooperatives that exhibit a notable degree of organisation, reliability and semi-permanence, it is unlikely that lending parties will be inclined to provide financial support.

In terms of technological support, the continued financial volatility of the *cedi* makes the solicitation of domestic equipment merchants an imperative. As explained by Minerals Commission officials (documented in Chapter 5), at various times, Chinese and Indian merchants, among others, have disseminated various items of machinery to ASM parties. However, the requirement for payment in US dollars makes the widespread adoption of equipment provided by foreign parties unlikely. Agencies such as DfID and GTZ have, in the past, partnered with local academic institutions in Zimbabwe (Institute of Mining Research) and Zambia (School of Mines) to design improved technologies for artisanal and small-scale miners, including sluices, crushers and treatment plants. It is crucial that the Government exploits the services and skill at the Tarkwa School of Mines for similar purposes; as was indicated earlier, it is presently sitting idle in one of the country's most important small-scale gold mining regions.

### 7.6.6 Decentralising support for ASM

The literature is replete with assessments of decentralised assistance, particularly financial support (e.g. McGuire 1999; Prud'Homme 2003). Ribot (2003, p. 54) documents a number of decentralisation efforts in Africa, arguing that in countries such as the Gambia, Cameroon, Malawi, Nigeria and Burkina Faso, governments "are devolving insufficient powers and benefits either to constitute a decentralisation or to motivate local actors to carry out environmental management responsibilities". Movement toward decentralised government began In Ghana in 1988, when a series of. District Assemblies (DAs), which encourage popular participation and promote development and are empowered with the responsibility for the "overall development

of their districts as well as a role in the formulation of the district composite budget" and "the mobilisation of the district's resources" (Ayee, 1996, p. 33), were established (Porter and Young, 1998).

However, as is the case with DAs, district support centres (for ASM) receive little autonomy in terms of decision-making. Most policy decisions must inevitably be approved in Accra, signifying that there continues to be a mainly-centralised model of support and governance in place. Although district centres are without personnel and abundant finances, such *additional* restrictiveness likely further inhibits progressive change on the ground. Given their daily interactions with operators in the field, district support staff is well aware of industry needs – more so than the bureaucrats in Accra. Thus, empowering officers to make key decisions regarding, *inter alia*, land demarcation and registration, could go a long way towards facilitating environmental and organisational improvements at sites, given that at the present time, miners have significantly greater trust in the staff on the ground *vis-à-vis* Government officials in Accra.

As explained in Chapter 4, at present, district officers are required to hear from Accra before undertaking administrative tasks, which is contributing to the exorbitant delays experienced in the system. It is therefore recommended the Government abandon its largely centralised model of governance for ASM, and begin soliciting increased inputs from district officers, who have an intimate knowledge of conditions on the ground.

### 7.6.7 Summary

In summary, it is recommended that the Ghanaian Government increases security of tenure for operators and simplifies the licensing system to make registration a more attractive option to the impoverished miner. It is then recommended the Government undertake a comprehensive census to determine the composition of the industry, which would put it in a better position to re-skill operators and upgrade conditions at sites over the long term. Finally, it is recommended that the Government decentralise power to its district officers, who are in better tune with the needs of subsistence artisanal and small-scale gold miners. By satisfying these recommendations, the Government would help to facilitate marked improvements in an industry in dire need of support.

Analysis of the material reported in this thesis would provide an essential starting point for improving conditions in the Ghanaian artisanal and small-scale gold mining sector. Through interviewing government officials, industry experts and miners themselves, the thesis has provided an overview of the viewpoints of different actors on both the current policy stance taken towards regularising the industry, as well as possible ways forward. Knowledge and synthesis of these perspectives is needed in order to implement improved industry policies, environmental management measures, technologies and support services for indigenous artisanal and small-scale gold miners.

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# Appendix I – Ghana's Small-Scale Mining Regulatory Framework

## Minerals Commission

Legislative Basis

- Minerals Commission Act, 1993 (Act 450)
- Minerals and Mining Law, 1986 (PNDCL 153)

Functions and Activities

- Technical assistance
- Application processing
- Preparing recommendations for granting of mineral rights
- Administering mineral titles
- Monitoring and compliance
- Procurement of special studies concerning mineral resources assessment
- Operating district support centres

## District Support Centres (Minerals Commission)

Legislative Basis

- Small-Scale Gold Mining Law, 1989 (PNDCL 218)

Functions

- Register small-scale gold miners
- Supervise day-to-day operations
- Advise miners

## Mines Department

Legislative Basis

- Minerals and mining Law, 1986 (PNDCL 153)
- Small-Scale Gold Mining Law, 1989 (PNDCL 218)
- Mining Regulations, 1970 (L.I. 665)
- Explosives Regulations, 1970 (L.I 666)
- Concessions Ordinance, 1900 (Laws of the Gold Coast, 1951 Revision, C. 136)

Functions

- Inspect miner operations to ascertain breach of law
- Compilation of mine accident statistics
- Control of mine mills and mineral treatment plants
- Inspection of license areas and enforcement of reclamation requirements
- Issue of license for storage
- Issue of permits for mining

## Geological Survey Department

Functions

- Provision of geological data for mining

## Environmental Protection Agency (EPA)

Legislative Basis

- Environmental Protection Agency Act, 1994 (Act 490)

Functions

- To reduce adverse environmental impact of mineral operations through monitoring, permitting and enforcement
- To secure prevention and control of emission
- To provide standard values regarding emissions and effluents
- Enacting environmental regulations

## Precious Minerals and Marketing Corporation (PMMC)

Legislative Basis

- Precious Minerals and Marketing Corporation Law, 1989 (PNDCL 219)
- Diamonds Decree, 1972 (NRCD 32)

Functions

- To purchase gold from small-scale miners
- Purchase diamonds
- License buying agents
- Export/license export of gold and diamonds

# Appendix II – "Experts" Interviewed in Ghana and Key Experience

| Interviewee | Organisation/Company | Key Experience |
|---|---|---|
| Senior mining engineer, Tarkwa | Ghana Goldfields | • 20 years' mining experience in Ghana<br>• former small-scale gold miner |
| Senior mining engineer/ director, Tarkwa | Ghana Goldfields | • 25 years' mining engineering experience in Ghana<br>• former small-scale gold miner |
| Senior academic | University of Ghana, Legon | • Extensive research expertise in Ghanaian mineral policy |
| Consultant/professor | A major mining consultancy in Accra | • 25 years' mining consultancy experience in Ghana and Burkina Faso<br>• Senior professor of geology at the University of Ghana at Legon |
| Former executive director | Environmental Protection Agency | • Former director of the Environmental Protection Agency<br>• Mining engineer |
| Consultant | A major mining consultancy in Accra | • Local consultant to Ghanaian universities and government agencies |
| Researcher/consultant | Based in the government offices of Accra | • Former government mining officer<br>• Now a mining consultant to the Ghanaian Government |
| Former Secretary of the Association of Small-Scale Mining | Based in Accra | • 10 years' experience in ASM<br>• Worked as secretary of the Association for three years |

# Appendix III – Questionnaire used during Interviews with "Experts"

## Background

1. What are the functions of your organisation with respect to small-scale mining?

2. Describe in detail the initiatives that have been undertaken by your organization to provide support to or formalise the Ghanaian artisanal and small-scale (gold) mining sector. e.g. extension, codes, literature, etc.

3. What is your view on the current (financial) support scheme in place for small-scale gold miners? Can it, in your opinion, be improved? Please explain.

4. List and describe both the positive and negative interactions that have occurred during the past 10 years between the *galamsey* and large-scale miners (state-owned, private foreign owned, or private domestic owned).

5. What, in your opinion, needs to change in the small-scale gold mining sector?

## Environmental Planning and Management

6. What activities (e.g. policy implementation activities, planning tasks, research activities, etc.), if any, has your organization undertaken with regards to environmental management in small-scale mining?

7. Environmentally, what, ideally, needs to be done in the small-scale gold mining sector, and in your opinion, why is it not?

8. What, in your opinion, are the priority environmental problems (e.g. mercury contamination, arsenic contamination, deforestation, etc.) in the small-scale gold mining industry, and what actions do you feel must be taken to address these problems?

9. a) Describe the efforts being undertaken by your organisation to improve environmental management at sites?

   b) Who carries out this work?

10. Has your organization been involved in any land reclamation or mercury management activities pertaining to small-scale gold mining, in Ghana or abroad? Explain.

11. a) Do you feel that there are barriers (e.g. bureaucracy, legislation, technological awareness, etc.) inhibiting environmental improvements in the

industry, and if so, what are they, and what do you feel must be done to address each?

b) What do you propose as next steps, and what additional steps does your agency want to take (with respect to improving the performance of the small-scale gold mining industry) in the future?

**Environmental Research and Education**

12. Please provide a listing and brief description of the small-scale gold mining projects your organization has been involve in to date.

13. a) Is your organisation involved in the training of small-scale gold miners? Detail the scope, nature, techniques used and topics covered (if applicable), and if there are any additional programs planned for the future?

    b) What would you envisage as the state-of-the-art environmental education program for the *galamsey*, and, in your opinion, what resources would be needed to implement such a program?

14. Are you familiar with the tasks being carried out by District Centres, and, if so, what services do they provide miners, and what information do they provide? Is there, in your opinion, opportunity for improvement and expansion?

15. To you knowledge, what strategies are used by Government to collect pertinent data for this sector?

16. a) To your knowledge, what efforts have been made to coordinate research with related research being undertaken by other important bodies?

    b) (If applicable) Describe the working partnership your organization has with other governmental bodies (e.g. Geological Survey, EPA, etc.) or international agencies (UNIDO, World Bank, etc.) in the area of small-scale gold mining research? Please provide details on major projects.

17. How does your organisation go about obtaining finances for small-scale mining research, and what fundraising strategies does it use?

# Appendix IV – Government Officers Interviewed in Ghana

| Position | Organization | Experience |
|---|---|---|
| Official (1) | Minerals Commission | • Over 15 years' experience in mining, and author of numerous technical publications on small-scale mining in Ghana<br>• Director of the most significant ASM policy-making body in the country |
| Official (2) | Minerals Commission | • Responsible for directing the day-to-day activities of the unit in charge of policymaking in ASM<br>• 20 years' experience in ASM |
| Official (3) | Minerals Commission | • Twenty years' experience in ASM |
| Official (1) | EPA | • Responsible for the day-to-day regulation of resident large-scale mining activities<br>• Oversees the EIA process in ASM |
| Official (2) | EPA | • Responsible for the day-to-day regulation of resident large-scale mining activities<br>• Oversees the EIA process in ASM |
| Official (3) | EPA | • involved in the monitoring and regulation of resident large-scale gold mines<br>• 15 years' experience in mining research |
| Official | Geological Survey Department | • Researcher and senior geologist<br>• Involved in the initial stages of the regularization of small-scale gold mining in Ghana |
| Official | PMMC | • Involved in the day-to-day purchasing of mineral product from artisans |
| Official | Forestry Commission | • Has dealt with the management of conflicts between miners and country preservationists |
| Official (1) | Mines Department | • Senior-most member of staff in the Mines Department<br>• 20 years' mining experience |
| Official (2) | Mines Department | • Played an integral role in the organization and execution of ASM support services during the early years of the SSMP |

# Appendix V – Questionnaire Used for Interviews with Government Officers

## Education

1) What is your view on campaigning to distribute literature to miners, informing them of the environmental and health implications of mercury usage and, generally, the environmental implications of their work?

2) What is your view on initiating simple extension programs, sending skilled representatives to regions to communicate info pertaining to environmental problems in the industry?

3) In your opinion, should PhD and graduate research be sponsored at the Tarwka School of Mines in the area of environmental management in small-scale mining? If so, in which areas (e.g. reclamation, geo-prospecting, etc.)? Explain.

4) Where do you see universities contributing to ASM environmental management? Probe: Retort design, Management programs, Gravity trap and sluice box design, etc.

5) What are your views on providing one-on-one training to miners, and hiring hands to train miners one-on-one in the areas of mercury management? What is needed to carry out such a task?

6) Should workshops be held for small-scale miners to educate about methods for mercury recycling? Do you see this as an effective approach? Explain.

7) Should miners be educated in the area of reforestation and re-vegetation?

8) Should site visitations by Minerals Commission engineers and consultants, involving one-to-one interaction with "groups" of miners and villages, and using a variety of media (VCRs, televisions, literature, etc.) to inform miners of environmental impacts of small-scale gold mining and available management practices, be increased?

## Management and Policy

9) Can pilot land rehabilitation projects (e.g. the Zimbabwean case with GTZ) be launched in Ghana, perhaps with participation from small-scale miners? If so, how, and if not, why?

10) Can the Government protect "ecologically sensitive regions" and commission a task force to protect these areas? What resources would be necessary to carry out such a task, and over what time frame? Similarly, should sensitive water catchments be protected, and, if so, how?

11) What is your view on the feasibility of providing low interest and interest-free loans to small-scale miners and grants to early adopters of mercury retorts?

12) Improved interaction between institutional bodies is regularly argued as a key to improving conditions in the industry. Should additional partnerships therefore be forged between the pillars of the SSMP – namely, the Minerals Commission, PMMC, Mines Department and the Geological Survey Department, as well as the EPA and

resident universities? What is your position on the idea of your agency providing increased institutional support to ASM? What is your position on other Government agencies providing increased institutional support?

13) What is your position on simplification of the licensing process for small-scale mining? Is it presently too complicated and burdensome (e.g. costs, delays, etc.) for miners? Explain.

14) Should the land reclamation fund be reinstated? If so, how, and if not, why?

15) Should the Government, as in other countries (e.g. Zimbabwe, Chile, etc.) sponsor a team of engineers and skilled workers to "clean up" conditions in the field, and then re-grade damaged areas? Which institutions are needed to coordinate such an undertaking?

16) What is your view on the use of performance bonds (i.e. rewards for miners that adopt environmentally friendly practices)?

17) Should additional hiring and designation of "managers" to small-scale mining regions (to oversee and manage small-scale mining regions) occur?

18) Should the use of worker "compounds", to which all mercury-related activity is transferred, be promoted in ASM regions?

19) What are your views on coordinating lending schemes for small-scale miners through the World Bank and UNDP, and then channel moneys through the Minerals Commission for distribution? Similarly, what is your position on the rural banks providing assistance in this area?

20) What is your position on the adoption of a tributor system on large-scale land concessions?

21) What is your view on developing an incentive-based program for land rehabilitation (i.e. provide incentives to miners who re-grade "damaged lands")?

**Technology**

22) Is there a need for Government to put in place small-scale miner technology "advisers" in district centres and prospective gold regions? Are current personnel levels at district centres sufficient? Explain.

23) What is your view on increased geo-prospecting ("Resource Identification") by the Geological Survey Department, and subsequent dissemination of info to small-scale gold miners? How important is this task in the context of improved organisation and environmental management in ASM?

24) What are your views on pilot demonstration projects of land re-grading techniques, mercury management practices, etc.? Is this an effective approach? Is the Government in a position to carry out such tasks, and if not, what does it need in order to do so?

25) Is the sharing of mineral processing services with large-scale counterparts a realistic option for artisanal miners? Explain.

26) How, in your opinion, and considering the current institutional arrangement, can the Government provide improved technologies (e.g. sluice boxes, traps, pumps) to miners?

27) Should "satellite" stations (i.e. smaller, simplified district support centres) be constructed, as in China, or perhaps, additional district centres? Explain.

28) What is your position on developing additional centralised mercury retorting centres, given the efficacy of the current setup in Bolgatanga?

29) Should alternative gold processing technologies (e.g. cyanide, thiourea, etc.) with highly effective environmental safeguards be promoted? What support and resources are needed for such an undertaking?

# Appendix VI – Artisanal and Small-Scale Miner Questionnaire

## Section 1: Background

### *Part A: Miner and Site Characteristics*

1) What is your age? ____ Sex?____

2) What is your level of education?
□ illiterate □ primary school □ secondary school □ post-secondary
□ technical training (please specify) _____ □ technical college/university

3) Are you a native of this area? ____
If no, where are you from? _____

4) Please specify the number of people in your family ____
How many of these individuals are involved in the industry? Explain.

5) a) For how long have you been operating as a small-scale miner?
b) What is your scale of operation in terms of manpower, production, and value?
c) Where were you mining before this site?
d) Are you presently, or have you been, involved any other industry activity, and if so, for how long?
□ general farming _____ □ logging _____
□ rubber cultivation _____ □ cocoa planting _____
□ other (specify) ____

6) Explain how you got involved in small-scale mining? (allow for elaboration)
a. Were your ancestors involved?
b. Are you a redundant large-scale mine worker?
c. Economically, is your mining employment more promising than your previous occupations? Explain.

7) How long have you been registered as a small-scale miner?
a. If applicable, why did you decide to register, and how long have you been operating at this site?
b. If inapplicable, how long have you been in operation at this site?

### *Part B: Basic Operational Practices*

1) How do you go about prospecting land?

Prompt:
When prospecting a location, do you rely on:
□ governmental guidance □ reliance on local knowledge □ no knowledge

2) Which pieces of equipment do you use for mining? Explain. _____
   Prompt: Do you use any of the following?

□ pans (*krowa*) □ sluicing equipment □ retort
□ James Table □ grinders □ manual rock crushers
□ gravity trap □ bulldozing □ mechanised crushers
□ milling machine □ matting material (specify) □ pumps

3) a) How long have you been using this equipment?
   b) Who is your supplier of equipment? Explain.
   □ The government □ handmade □ local supplier □ other (explain) ____

4) How did you acquire your equipment? Explain.
   Prompt:
   □ handmade □ direct purchase □ equipment sharing/borrowing
   □ other (specify) _____

***Part C: Financing and Credit***

1) How do you finance your equipment purchases?

Prompt #1: Have you received a government grant?

Prompt #2: Do any of the following apply? Explain.
□ subsidised equipment □ loan/leased/rent □ commission scheme [1]
□ other (specify) _____

2) Who have you approached for funding your operation, and if not, who would you consider approaching? Explain.

Prompt:
□ government in Accra □ local government offices/ district centres
□ rural banks □ local chiefs
□ other (please specify) _____

3) a) If you have qualified for funding, how has it benefited your operations? (refer to prompt list below) Explain.
   If you have not qualified for funding, where do you feel it could be most beneficial? (refer to prompt list below)
   □ sluicing □ mercury handling □ grinding □ training (specify)
   □ reclamation □ prospecting □ excavation □ resource identification

[1] A "pay as you go" or pay back system with monthly payments, for example.

4) Has a shortage of finances prevented you from improving the efficiency of your operations? Explain.
Prompt:
□ prevented upgrades in technology □ fewer hired hands
□ incomplete reclamation □ increased production

**Section 2: Environmental Awareness of Miners**

1) Are you aware of the environmental implications of your work? Explain.

2) Do you engage in any environmental planning before commencing mining?
Prompt: For example, do you strategically engage in/locate the following:

- panning activities
- waste tailings
- milling/grinding activities

3) Have you been in contact with any government officers in the past year, and if so, why, and please specify how many times?

Prompt: Have you been in contact with any of the following individuals, and if so, how many time in the past year:

□ district centre employees (specify who and when)
□ Geological Survey Department geologists
□ EPA officers
□ Mines wardens
□ Chiefs
□ other (specify) _____

If "yes", explain why or why not it has been beneficial? Has it influenced your practices in any way? Explain.

If "no", explain whether you do or do not believe that, interaction with these people would be beneficial?

Please explain your experience with these people

4) Have you ever been fined or punished by the Government for an environmental problem? If yes, please specify.

Do you think that miners should be held accountable for their environmental problems?

5) Are you aware of the services provided by district support centres? Do you know of their locations? Do you consult these centres?
If no, why (e.g. distance, knowledge of location, etc.)?
If yes, what for, and how many times in the past year?

6) How do you view the current licensing scheme in place for small-scale miners?
Prompt: Are you aware of it? If yes, explain whether or not you think it's effective and appropriate.

7) Are you aware that there are environmental/health implications with what you do?
   a. Mercury transforms into toxic methylmercury in the natural environment. These have deleterious effects on the natural ecosystem. Are you aware of the toxicity and harmful effects of mercury?
   If yes, explain what precautions do you have taken?

   b. As small-scale mining is a migratory industry, many pits are left unreclaimed. These erode and contaminate the landscape, and serve as breeding grounds for malaria-infected mosquitoes. Are you aware land degradation impacts of small-scale mining?

   If yes, are you refilling pits, and if so, by what means?

   If yes, what else have you done?

8) Have you used/are you using a mercury retort?

   If no, have you considered using one? Why or why not. Would a government grant change your mind?

   If yes, why did you adopt them in the first place?
   □ re-grading of land □ protective headwear, footwear and handwear
   □ environmental technology (specify)

9) Overall, do you feel that you are receiving enough support, extension services and advice on these issues? Explain. If not, why?

10) Are you receiving sufficient information about the geology of your concession

Prompt: are you receiving information about the locations of deposits, the abundance of mineral in your concession and how to most effectively extract it?

## Section 3: Future Outlook

1) a) How much longer do you think you will be mining in this location?
PROMPT: If less than six months, why are you considering moving?

b) what do you see yourself doing in one years' time? Two years' time?

2) What are you planning to do once local deposits are exhausted?

3) How much longer do you think you will continue to be a small-scale miner? Why?

4) Can you think of any improvements that could be made to the existing support scheme, licensing system, technological strategy that would benefit you?

5) What changes do you think must be prioritised?

6) What would persuade you to operate in the legal bracket?
Prompt:

- ☐ Simplification of the licensing scheme
- ☐ Provision of improved technology
- ☐ Increased number of support officers in the field
- ☐ Increased number of district centres
- ☐ Other (Specify) _____

7) Supposing more advice became available, how would this help you?
Prompt:

- ☐ Increase your production?
- ☐ Improve your technology
- ☐ Other (Specify) _____

BIBL. LONDIN. UNIV.