

**SITUATION ANALYSIS OF THE
SMALL-SCALE GOLD MINING IN SURINAME**

**Reforming the sub-sector to promote sound
management**

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CONTENTS

PREFACE	vii
EXECUTIVE SUMMARY	ix
ACKNOWLEDGEMENTS	xv
 I. INTRODUCTION	
1.1 Objectives, purpose and strategy	1
1.2 Proposed interventions	3
1.3 Background of the approach	5
1.4 The stakeholders and the stakes	6
1.5 Root causes	9
1.6 Format of the report	10
 II. LESSONS OF SURINAME GOLD MINING HISTORY	
2.1 Geology and gold mining	12
2.2 The early years (1875-1970)	14
2.3 The modern era (1971-2005)	16
2.4 Efforts to bring the sub-sector under control	20
2.5 Analysis of the gold mining history	21
2.6 Lessons learned	23
 III. THE SOCIAL DIMENSION	
3.1 The traditional inhabitants of the interior	25
3.2 The second gold rush	27
3.3 Life in the mines	29
3.4 Life away from the mines	30
3.5 Miner's organizations	30
3.6 Benefits to individuals, families and communities	31
3.7 Negative impacts on individuals, families and communities	32
3.8 Lessons learned	33
 IV. MINING ENTERPRISE DEVELOPMENT	
4.1 The challenge of defining the sub-sectors	35
4.2 The technical outfitting of enterprises	38
4.3 The classification scheme of Noetstaller	43
4.4 The organization of enterprises	44
4.5 Foreign investment miners	45

4.6	Concession holders and miners	46
4.7	Brazilian migrant miners	49
4.8	Customary mining zones	51
4.9	Occupied zones	53
4.10	Lessons learned	54
V.	SMALL-SCALE MINING AND THE STATE	
5.1	The current gold mining policy	56
5.2	The purpose of an integrated gold mining policy	58
5.3	Unresolved basic policy issues	59
5.4	The framework for gold mining policy development	60
5.5	The new draft law	63
5.6	Government institutions	76
5.7	Lessons learned	84
VI.	THE GOLD TRADE	
6.1	The CBvS	88
6.2	Licensed gold buyers	90
6.3	Jewelers	90
6.4	Gold exporters	91
6.5	Illicit trade	91
6.6	Lessons learned	91
VII.	DISCUSSION AND RECOMMENDATIONS	
7.1	Summary of the findings	93
7.2	The World Bank model	93
7.3	Expanding the World Bank model	95
7.4	The purpose and challenges of zoning	98
7.5	A provisional model for zoning	100
7.6	Outline of an Action Plan for the WWF	105
	BIBLIOGRAPHY	108

TABLES, BOXES, ILLUSTRATION, FIGURES AND MAPS

TABLES

1. Difference between large and small scale gold mining	17
2. Socio-cultural characterization of the mining economy	27
3. SSGM impacts	32
4. Mine outputs for underground and surface mining	41
5. Production allotment key	47
6. Monthly income statement	48
7. Differences in organizational structures in the various zones	53
8. Mine output for surface mining	64
9. Modified conditions of the draft law	66
10. Zones exempted from concessions allegations	71
11. Economic importance of placer gold mining for the Republic of Suriname	86

BOXES

1. The administrative presence in the interior	11
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ILLUSTRATIONS

1. Typical mineralization profile	38
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FIGURES

1. Estimated historical gold production in Suriname (1875-1985)	14
2. Gold purchases (kg) and royalties (in US\$* 100) received by the Central Bank of Suriname	79
3. Gold marketing chain	89

MAPS

1. Living areas of the Indigenous and Maroon groups	26
2. Gold mining zones by region	112

LIST OF ABBREVIATIONS

ACT	Amazone Conservation Team
ADEKUS	Anton de Kom Univesiteit van Suriname (Anton de Kom University of Suriname)
ATM	Ministerie van Arbeid, Technologie en Milieu (Ministry of Labor, Technology and Environment)
ATV	All-Terrain Vehicle
BGS	British Geological Survey
BOG	Bureau Openbare Gezondheid (Bureau for Public Health)
CBvS	Centrale Bank van Suriname (Central Bank of Suriname)
CI	Conservation International
COGASUR	Coöperatie van Garimpeiros in Suriname (Cooperative of Garimpeiros in Suriname)
CSNR	Centraal Suriname Natuur Reservaat (Central Suriname Nature Reserve)
E-SSM	Electronic small-scale mining
ETO	Eenvoudig Technisch Onderwijs (Elementary Technical Training)
FEM	Foundation for Experimental Mining (Stichting Expertimentele Mijnbouw)
FM-SSM	Fully mechanized small-scale mining
FOB	Fonds Ontwikkeling Binnenland (Fund for Development of the Interior)
GMD	Geologische Mijnbouwkundige Dienst (Geological Mining Service)
HM-SSM	Highly mechanized small-scale mining
IBER	Institute for Biology and Environmental Research
IDU's	Interdepartementale Units (Interdepartmental Units)
LBGO	Lager Beroepsgericht Onderwijs (Lower Professionally Oriented Education)
LSM	Large-scale Mining
MINOV	Ministerie van Onderwijs en Volksontwikkeling (Ministry of Education and Community Development)
MIU	Mine inspection unit
MSM	Medium-scale mining
M-SSM	Mechanized small-scale mining
NARENA	Natural Resources and Environmental Assessment
NATIN	Natuur Technisch Instituut (Nature Technical Institute)
NB	Natuur Beheer (NB)

NH	Ministerie van Natuurlijke Hulpbronnen (NHs)
NIMOS	Nationaal Instituut voor Milieu en Ontwikkeling van Suriname (National Institute for Environment and Development of Suriname)
OAS	Organisatie van Amerikaanse Staten (Organisation of American States)
PA's	Protected Areas
PAHO	Pan American Health Organization
PLOS	Ministerie van Planning en Ontwikkelingssamenwerking (Ministry of Planning and Development Coöporation)
PM-SSM	Partially mechanized small-scale mining
ROB	Raad Ontwikkeling Binnenland (Council for Development of the Interior)
SCF	Suriname Conservation Fund
SIDU	Stichting Interdepartementale Units (Foundation of Interdepartmental Units)
SPS	Stichting Planbureau Suriname (Suriname Planning Foundation)
SSGM	Small-scale gold mining
SSM	Small-scale mining
STD's	Sexually Transmitted Diseases
STINASU	Stichting Natuurbehoud Suriname (Suriname Nature Conservation Foundation)
tpy	tons per year
VIDS	Vereniging van Inheemse Dorpshoofden in Suriname (Association of Village Chiefs in Suriname)
V-SSM	Very small-scale mining
WHO	World Health Organization
WWF	World Wildlife Fund , World Wide Fund for Nature

PREFACE

The Suriname gold sector has been characterized by the usual boom and bust cycles. Inspired by gold discoveries across the border in the France department of La Guyane (French Guiana), the sector took off during the last quarter of the 19th century. Most of the commercial reserves were discovered in the so-called greenstone belt, extending from north-central to south-east Suriname.

By 1908, production peaked at 1209 kilograms per year and then began to decline. The construction of a 180 kilometer railroad, linking the capital city of Paramaribo to the gold fields, did not stem the decline in production. Investments and steam shovels and dredging equipment did not produce the desired results, and many concessions were sub-let to small-scale miners from the Caribbean, using less sophisticated methods. The Maroons (descendants of escaped slaves) transported miners and their equipment over the treacherous rapids of the interior rivers. On the eve of independence in 1975 gold production was reduced to a trickle. Poor organization and management, insufficient prospecting, improper technology and uncontrolled mining, but also the high cost of labor and mining in very remote locations contributed to the decline of the sector.

After 1975 gold production techniques in Guyana inspired Suriname miners to invest in river dredging and a large contingent of Guyanese miners came to work in the gold fields, alongside Maroon miners. The second gold boom got underway in the 1980s and 1990s. In the 1980s land dredging replaced river dredging as the most commonly used method, and as the years wore on more and more heavy equipment was introduced into the production cycle. Brazilian gold miners soon outnumbered Guyanese miners, and it is estimated that over 10.000 Brazilian miners are now active in the sector alongside Maroon miners. Many of the operations in the interior are not legal.

Uncontrolled small- to medium-scale gold mining has a negative impact on the environment and poses severe health risks for the miners and communities in the interior. The greatest environmental risks are posed by the use of mercury in the ore extraction process and the tailings and siltation caused by hydraulic mining. The Geological and Mining Department (GMD) of the Ministry of Natural Resources is aware of these problems and has developed several projects in order to mitigate the negative impact of small-scale mining.

The World Wildlife Fund is currently funding “The Guianas Sustainable Forest Resources Management Project,” and in this context a sub-project is being executed by the GMD. The purpose of this sub-project is to internally strengthen the GMD, particularly the Mines Inspection Department, so that it can better manage the small- to medium-scale gold mining sector and help preserve priority eco-systems.

This report has been prepared in this context of the “Goldmining Pollution Abatement Program,” and the purpose of this undertaking was to prepare a document that would provide a good overview of the current situation the small- and medium-scale gold mining sub-sectors in Suriname. This document will be published with similar documents prepared for Guyana and La Guyana de France, thus providing a comparative information base for the Guiana region. The report also contains a number of useful recommendations that could help regulate the small and medium-scale gold mining sectors in Suriname. We hope that these recommendations will be further developed and executed, leading to a better controlled industry and a significant reduction in negative environmental impacts caused by uncontrolled mining.

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EXECUTIVE SUMMARY

The World Wildlife Fund (through the WWF Guianas Regional Program Office (WWF-Guianas)) is providing financial and technical assistance for the abatement of the negative impacts of Small-Scale Gold Mining (SSGM) activities¹ in the Guianas and is promoting regional cooperation for harmonization of policy and guidelines in SSGM. The basic purpose of this program is to promote better mining methods and practices, and thus curb health threats and pollution caused by gold mining activities.

The objective of this report is to identify the causes and consequences of this absence, and to outline a strategy that can help Suriname develop a SSGM policy that in the long run will contribute to significantly improve gold mining practices regionally. The purpose of this policy development strategy is to achieve a win-win-win situation in Suriname for the environment, the small-scale gold miners, the interior community and the State.

The strategy calls for direct and indirect interventions involving key actors in the three main groups of stakeholders: the private sector, the State, and civil society. All key stakeholders have a role to play. The fundamental idea is to create enabling environments that empower miners to achieve higher productivity and better recovery rates, become more reliable tax payers and environmentally responsible gold producers, thereby assuring the government of a fair take produced with better technical mining methods. Up-to-date and practical mining laws and regulations are necessary conditions for achieving this objective. A strong and properly funded government mining agency is indispensable to the success of the proposed undertaking.

The first basic assumption entertained in this report is that pollution in SSM is a management problem, first and foremost. In this context it is argued that poor and poorly educated miners do not have the required management capacity to set up and run sustainable SSM enterprises, and are unable to develop low-impact SSM methods. Brazilian and Maroon² small-scale miners, who make up over 98% of the miner population in the interior of Suriname, face significant language and cultural barriers in the sub-sector, which prevent them from moving out of the informal gold mining sub-sector. Hence, assistance schemes are a *conditio sine qua non* for achieving lasting improvements in the sub-sector.

The second one is that it is not possible to develop effective legislation and regulations without 1) reliable information on the gold mines of the interior, and 2) a good understanding of the root causes of the many challenges faced by the stakeholders in the sub-sector. Laws and regulations drafted from behind a desk in Paramaribo will never be able to capture the variety and complexity of operations in the sub-sector, nor be able to recognize the many regulatory opportunities that have already been developed by miners themselves. Regulatory traditions and customs developed in the mines ('the miner's law'

¹ The abbreviation SSM is used for 'Small-Scale Mining.'

² Descendants of escaped slaves who settled in the remote rainforest interior of Suriname.

in the words of the Peruvian economist Hernando de Soto) already offer a solid basis for the development of effective laws and regulations.

The third one is that in the SSM sub-sector “remote control management” has never worked, and never will. The nature of the industry requires an on-site presence of senior management. Even excellent organizational set-ups in Paramaribo have proven to be a poor substitute for on-site senior management. The government also needs to zone the mining regions and establish a permanent presence in at least the 14 main mining regions that have been identified in this report, preferably along-side the private sector mining zone management systems that are already in place. Partnering between the government and the private sector can help strengthen the position of both stakeholders. Involvement of civil society organization is also essential.

Harmonization of mining policy in the three Guianas is critical to avoid regulatory opportunism, resulting in the crossing of national borders by miners to avoid more demanding environmental, reporting, royalty or tax regulations in one of the countries. Harmonization, however, requires that the SSGM regulations of Suriname, Guyana, and the French department of La Guyane are up to date and functional.

If this is not the case for one of the three countries, the respective government should at least have a clear indication of what direction it wants to go with the SSM sector. It must have an idea of how the sub-sector can contribute to the development of the country, and the environmental and health standards which apply. It should be a vision set out in a policy framework. In Suriname, mining laws and regulations do not yet reflect the current realities in the SSGM regions and zones; they are out of date. The government has not developed an integrated stand-alone policy for the gold mining sector with a special chapter devoted to the particular challenges posed by the SSM sector.

Other obstacles to proposed changes in the sector include; educational levels, literacy, cultural and language barriers are all significant issues to regulatory reform in the gold mining sector. Almost the entire greenstone belt has been given out to large-scale, medium-scale enterprises and speculators, thus the chances of finding a free mine site is very small. Under the current circumstances most gold mining will remain illegal.

In view of the complexity of the subject and the vast range of issues that have to be addressed and resolved, a specific policy is needed for the SSGM sector, which should dovetail satisfactorily with the government’s overall gold mining policy. Draft laws were formulated without a clear integrated stand-alone gold mining policy and a specific policy framework for SSM. Efforts should be made to involve the entire Suriname community in the policy making, and only when broad support is secured on a number of basic principles (for example, ‘the polluter pays”), should these principles be used to draft laws that will then be debated in Parliament. Saddling a Minister with this chore is to invite controversy. In order to survive politically, most Ministers would simply dodge the issues, and avoid making decisions

Furthermore, the proposed Inter Department Units' (IDU), which were to include representatives of the various ministries as well as police and military never materialized, and the responsibility for SSM issues - including regulation, control, health, and labor-lies with a variety of Ministries and Departments. A lack of communication and collaboration between these institutions is also hampering SSM regulation.

Of all stakeholders, the State is the greatest loser, but also invests the least into the sub-sector. According to the report of the National Planning Office between 1995 and 2001, the State collected less than one percent of the gross production value of gold in Suriname (SPS 2002:20), based on estimates of the Suriname Planning Foundation (Stichting Planbureau Suriname; SPS) while it should recuperate about 16% of the gross production in turn-over taxes, fees and royalties..³ If the SSGM sub-sector could be transformed from an informal to a formal sub-sector, the State would be the greatest beneficiary both in terms of revenue and improved management. Regrettably, the lack of confidence in the sub-sector has discouraged the administration from investing greater effort and resources into the sub-sector.

With regard to mining authorities, "lack of adequate operational resources prevents officials from enforcing existing regulations. The inability to enforce existing regulations results in illegal operations, poor environment, health, and safety standards and a loss of fiscal revenues from this activity. The lack of funds from fiscal revenues limits the ability of the government to perform its regulatory function and perpetuates uncontrolled artisanal mining."

Taxes from SSM can also contribute to further economic development of the country. Efforts to collect taxes directly from the small-scale gold miners in Suriname have not been successful in the past. The operation, named Goldfinger (1997-1999) came under heavy scrutiny from miners, the media, and the Suriname public, and did not bring the expected results.

Further, current national legislation with regard to SSGM is outdated. The draft Mining Act of 2002 provides for better protection of the environment and of workers in SSM than is the case in the Mining Decree of 1986. The proposed provisions regarding the rights of Indigenous peoples and Maroons, however continue to negate their rights as stipulated under international law. If accepted, this omission is likely to become a source of conflict between forest peoples –including local miners, who claim customary rights to the land, and the holders of formal mining rights.

On November 15, 2004, the Association of Village Chiefs in Suriname (*Vereniging van Inheemse Dorpshoofden in Suriname*; VIDS) submitted a petition to protest the draft Mining Law.. Calling the law discriminatory, the Indigenous representatives protest the

³ The estimate depends on whether one uses the conservative production estimate, sixtons per year (tpy), or the optimistic estimate, 12 tpy. Suriname exports 12 tons of gold per year, but information from gold buyers and recent arrests of gold smugglers suggest that a substantial share in smuggled in from Guyana and French Guyana.

absence of consultation requirements; the violation of their traditional rights to land and natural resources; the omission of legal protection for forest peoples; the lack of guarantees for equal benefits from mining profits; and the inadequate compensation provisions.

With regards to the purchasing of gold, an evaluation of changes in the policy shows that the Centrale Bank van Suriname (Central Bank of Suriname, CvBS) has been quite adaptive to customary practices in marketing. From being the sole purchaser, it has now opened up the buying market. Today the Bank itself merely serves as a regulatory body and collector of royalties. The role of licensed private sector involvement should be extended to the interior, so that better control can be exercised at the source of production. The role of mine inspectors in the process of gold buying in the interior is also critical, once again indicating the importance of a government presence in the remote mining areas.

The report recommends that the following sequence be observed in order to achieve successful interventions in the sub-sector:

- Zone the mining regions and further organize the SSM community;
- Provide management assistance training to SSM enterprises under the established organizational umbrella(s);
- Develop new legislation and regulations based on both an integrated stand-alone national policy for SSM, as well as useful customs and practices in the field, and taking into account the legal and institutional framework in the neighboring countries and;
- Institute monitoring and regulatory instruments based on a permanent government presence in the mining regions of the interior with private sector assistance

This approach does not simply recommend placing the “carrot before the stick.” On the contrary, already in the early stages of the reorganization of the SSM sub-sector, and better management non-active permits holders will have to relinquish their claims in order to make room for the titling of SSM enterprises still operating in the informal sector. It is argued that the main challenge is to develop a balanced menu of assistance and control interventions and to avoid the one-sided approaches of the past: Intervention and *control* is required in order to eliminate unacceptable work practices typical for informal SSM activities; while assistance is a prerequisite for the removal of operational constraints limiting productivity and competitiveness

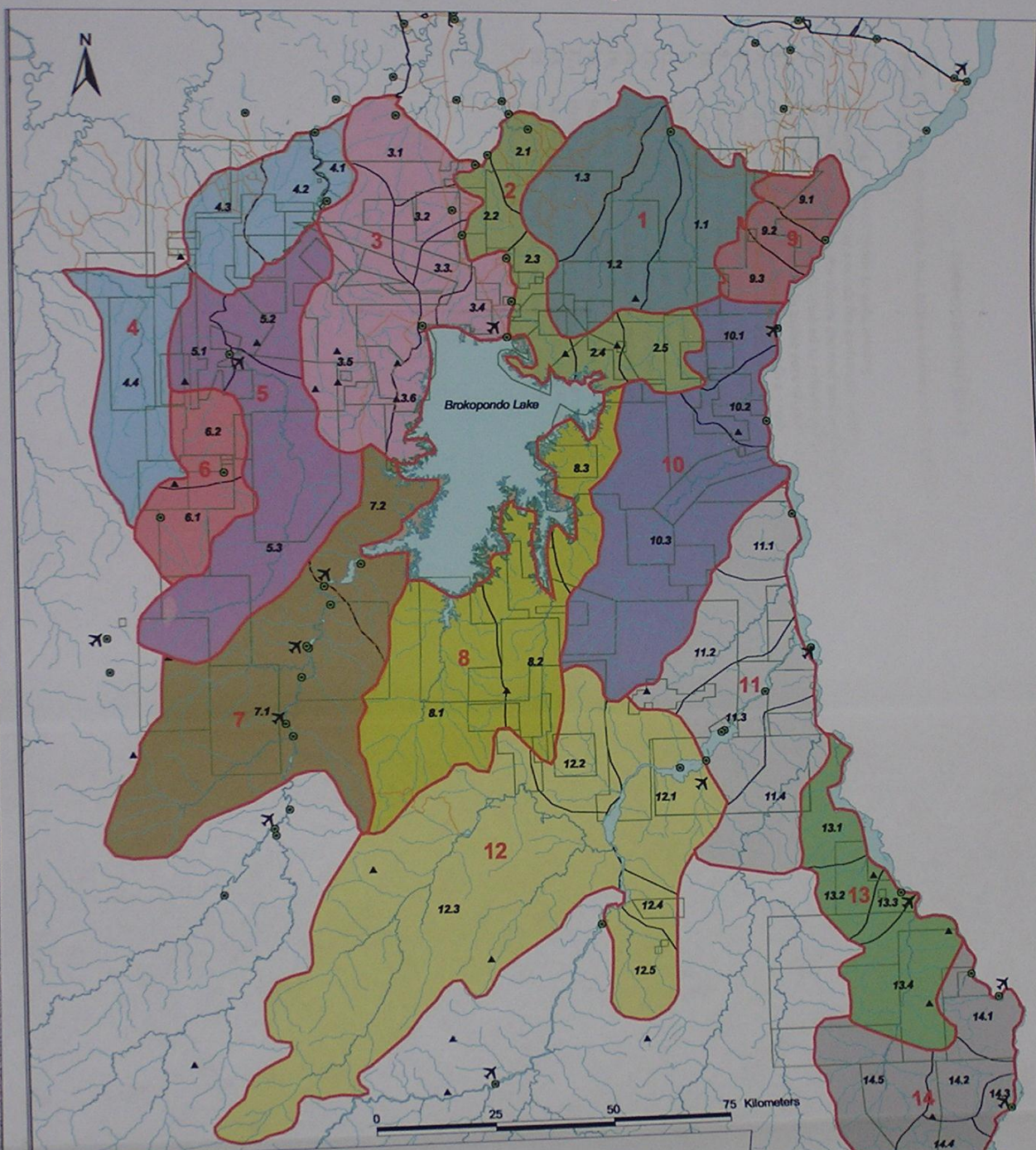
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The consultants appreciate the efforts of the WWF to contribute to the regulation of the SSGM sub-sector, and are grateful for the opportunity to participate in this worthwhile undertaking. Special thanks to Mr. Henk Naarendorp, manager of Naana Resources, who has facilitated field research in the Benzdorp Region. He has also been generous in sharing his vast expertise on the sub-sector. Gio Amania of Naana Resources was a generous host at Antino and provided the consultants with the much needed support and facilities in the field. A special thanks to the miners, especially Foreman Branqui, who have been very helpful in providing information on mining methods and the many challenges faced by miners in the field. Ronny Deel of Naana Resources was helpful in driving Mr. Healy around on an all terrain vehicle (ATV) in the Benzdorp Region, and in sharing his knowledge of the sub-sector. We are grateful to the Anton de Kom University of Suriname (Anton de Kom Universiteit van Suriname; ADEKUS) mapping department, Natural Resources and Environmental Assessment (NARENA), for invaluable assistance in demarcating mining zones. Many other people provided useful comments, insights, and editorial assistance. Thank you all!

Disclaimer: Opinions expressed in this report are those of the authors and do not necessarily reflect the views of WWF-Guianas or of other institutions the authors are affiliated with. The authors are responsible for all errors in translation and interpretation.

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Goldmining Zones by Region



Mining zone by Region

1 Commewijne River Region

- 1.1 Lower-Tempatie basin
- 1.2 Upper-Commewijne river basin
- 1.3 Mapane Zone

2 North-East Lake Region

- 2.1 Casipora
- 2.2 Njun Lombes
- 2.3 Bosant Zone
- 2.4 Wink Wai
- 2.5 Bovin Tempatie

3 North-West Lake Region

- 3.1 Upper Para Zone
- 3.2 Marschall Creek
- 3.3 Klaascreek Zone
- 3.4 Compagnie Creek Zone
- 3.5 Mindrinette Zone
- 3.6 Brownsberg Zone

4 West Suriname Road Region

- 4.1 Kwakugron
- 4.2 Lokai Aki
- 4.3 Gollath Zone
- 4.4 Bovin Tibli

5 Lower Saramacca River Region

- 5.1 Njun Jacobkondre
- 5.2 Murumuru Creek
- 5.3 Klein Saramacca River

6 Middle & Upper Saramacca River Region

- 6.1 Jan Basil Gado Zone
- 6.2 Upper Saramacca River Zone

7 Upper Suriname River Region

- 7.1 Laduari Zone
- 7.2 Dwestra Zone

8 South-East Lake Region

- 8.1 Marowijne Creek
- 8.2 Sana Creek Zone
- 8.3 East Lake Zone

9 Lower Marowijne Region

- 9.1 Pakira Creek
- 9.2 Jorka Creek
- 9.3 Arawa Creek

10 Middle Marowijne Region

- 10.1 Tamuku Creek
- 10.2 Nason Zone
- 10.3 Gran Creek

11 Stoomansland Region

- 11.1 Bergi Zone
- 11.2 Djuka Creek
- 11.3 Lower Tapanahoni
- 11.4 Gonini

12 Upper Tapanahoni River Region

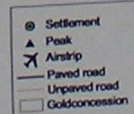
- 12.1 Upper Tapanahoni
- 12.2 Toso Creek
- 12.3 Jai Creek
- 12.4 Anamu Creek
- 12.5 Sela Creek

13 Lower Lawa Region

- 13.1 Abunusungu Zone
- 13.2 Langatole Zone
- 13.3 Collica Zone
- 13.4 Lower Asiti Zone

14 Benzodorp Region

- 14.1 Benzodorp Zone
- 14.2 Njam Creek Zone
- 14.3 Kawemhakan Zone
- 14.4 Mappa & Schreuder Creek Zone
- 14.5 Upper Asiti Creek



February, 2005

Chapter I

INTRODUCTION

Chapter 1 outlines the objectives, purpose and strategy in greater detail. Reliable information, a presence in the field and public-private partnerships is considered strategic preconditions for achieving the expected outcomes.

Simple interventions, such as the introduction of retorts can help set the stage for more complex activities such as the organization of miners. The zoning of the mining areas is also a necessary condition for bringing the sub-sector under control. With these instruments in place the process of policy formulation, legislative and institutional development can be greatly facilitated.

The chapter briefly discusses the ideas of the Peruvian economist Hernando de Soto, that have influenced this approach. Among these ideas, an important concept is to promote regulation of the sub-sector in such a manner that the interests of all stakeholders are served. This chapter explains how much they have to gain from the regulation of the sub-sector.

Remedial action can only be effective if the root-causes of the many challenges that face the sub-sector are thoroughly understood. In box 1 the historical causes of the absence of a strong administrative presence in the interior are outlined.

1.1 Objectives, purpose and strategy

The objective of this report is to analyze the key issues in the SSGM sector and use the lessons learned to formulate a number of feasible proposals that can be implemented to better manage the sector for the significant reduction of negative health, social and environmental impacts. The ultimate purpose is to suggest ways in which all relevant stakeholder groups can help the government, private sector, the miners, the communities of the interior and others can work together to bring the sub-sector under control and ensure the use of less destructive and polluting mining methods. The report sets out to answer the following three key questions:

1. How can the SSGM sector be regulated and incorporated into the formal economy of Suriname, and become a more sustainable means of earning a livelihood?
2. What roles and responsibilities should be assigned to the government, private sector and civil society?
3. How can these roles and responsibilities be translated effectively into operational rules, assistance schemes and mechanisms of control?

The key challenge is to bring the sub-sector under control by creating a win-win-win situation. Government, private sector and civil stakeholders should benefit from the reforms. Reform is to be achieved under severe geographic constraints: isolation,

dispersal and the remote location of mine sites in a rugged rainforest terrain. Three basic parameters define the task ahead:

- the development of practical regulations that are broadly supported
- the development of assistance schemes in Paramaribo and in the field and
- the development of mechanisms of control.

One way to make these regimes, schemes and mechanisms work is to partition the vast mining area of the interior of Suriname into clearly identifiable mining regions and manageable zones in which gold mining units and dredges operate and to establish support and monitoring bases at strategic locations. A model zoning strategy is present in the concluding Chapter VII.

Regulatory, assistance and control systems have to be developed for each region based on common policy principles for the sub-sector. At the same time, regional variation between mining zones must also be accommodated. For example, it may be necessary to develop separate administrative regimes for zones operated by investors from Paramaribo and for zone mined by Maroons. A multiplicity of regulatory systems is unavoidable, but certain basic principles should apply to regions and zones.

The following strategic considerations have significantly influenced the process of formulating recommendations:

- ***Reliable information:*** In the process of developing functional regulatory and assistance regimes, a rational allocation and distribution of resources can only be achieved if reliable information is available on the sub-sector. This information is needed to assess the feasibility and appropriateness of the administrative and management options for the different mining regions and zones.
- ***A presence in the field.*** The regulatory, assistance and control regimes have to be based on a permanent presence in the field. Long lead times are needed to develop and implement a reform program. It will be very difficult to develop and sustain the required organizational environment without on-site administration and management.
- ***Public-private partnerships.*** It will be challenging for the State to secure sufficient resources in the short-term to finance operations in remote locations of the interior. Therefore, private sector and civil society participation can help cut cost and promote stakeholder involvement. Moreover, the government has much to learn from a number of private sector zone management initiatives. By involving these stakeholders the government will tap into a storehouse of field knowledge and experience.

As noted above, several mid-size enterprises operating in the interior have already developed extensive zone management systems.. These enterprises could assist the

government with their experience in setting up a sustainable administrative infrastructure in the mining regions.

1.2 Proposed interventions

Promoting the use of retorts. During a brief fieldwork stint in December of 2004 the consultant had the opportunity to photograph a foreman of a hydraulic mining unit using a retort to recover mercury from the amalgam (FRAME 1).



FRAME 1: MINER USING RETORT
Chris Healy

The use of a retort in itself is not spectacular; other units also use retorts. There is one gold mining enterprise that prides itself in using no mercury at all. But these are exceptions. Most mining units in the interior do use mercury and they don't use retorts. In the instance noted above, out of 40 or more units in the mining region that was visited, the foreman was managing the only gold mining enterprise that was using a retort, and he was doing so voluntarily. He reported that he always uses one because it is in his interest, the retort protects his health. He said that he acquired the habit in Brazil where the use of a retort is prescribed by law.

These remarks are very instructive. The knowledge, beliefs and attitude of a miner will determine whether he uses a retort. The challenge of reform is the challenge of getting into the head of miners and policy makers. That is where they harbor their values regarding safety, well-being and the environment, but also ideas regarding good

enterprise management, efficient production and technical excellence, as well as effective policy making and execution.

Forcing miners to use a retort will not change their minds and their values. The first challenge to be addressed is a mental one, the attitudes, beliefs, knowledge levels and practices of miners and mining officials have to be changed. *Knowledge levels* are relatively easy to influence, if culturally appropriate material is used that is attuned to the educational level of miners. *Beliefs* are much harder to change, but they too can be changed. *Attitudes* are the hardest to change, and if no results are achieved the rule of law is often the only way out. But the carrot should come first, and only then the stick.

The WWF is not in a position to draft or approve mining laws or regulations. That is the role of the National Assembly and the Ministry of Natural Resources (NH). The organization can, however, immediately help develop and implement an awareness campaign that will drive the point home that retort use is cheap, technically feasible and urgently needed. Such a campaign will not only influence miners but also members of the National Assembly and the administration. The campaign could motivate administrators and law makers to draft, and approve a concise law mandating the use of retorts.

Organizing miners. The second proposed intervention is intended to help the miners establish a national miner's organization consisting of concession holders, equipment owners and individual miners. Regional differences in mining zones will be accommodated by launching chapters which together will make up the national miner's association.

The basic idea is to empower miners to have a voice as a major stakeholder, to promote and protect the rights, interests and welfare of miners, facilitate the exchange of experience and the promotion of better practice, and to foster the development and enforcement of Codes of Practice. A strong organization will not only protect the interests of miners, it will also provide the government with an active and responsible counterpart to share the burden of reforming the sub-sector. The organization can help create *enabling conditions* for the miners, starting with effective and realistic laws and regulations and an efficient and equitable mining institution that serves the interests of both the State and the small-scale miner.

The organization can also help create many *supportive conditions*. In the initial phase of sectoral reform it can also play a critical role in monitoring, supervising and enhancing gold mining methods, techniques, and processes, the elimination of undesirable practices and the promotion of sustainable mining. Small-scale enterprises should be able to secure expertise in mining technology and management through the national miner's association. The purpose of the exercise is to help miners "think outside of the box." The organization should develop the capacity to provide ongoing technical and management assistance in the field, thereby increasing recovery, productivity and the earnings of the miners.

Zoning of mining areas. The third intervention involves assisting the government in creating a more enabling environment in the sub-sector. It is suggested that the principle reason for zoning is to provide an organizational basis for regulating the mining regions. Better regulated regions are safer and create an enabling environment in which miners and interior communities can collaborate. Zones under effective government management will provide a context in which the miner's association can set up assistance schemes to promote technically, economically and environmentally sounder mineral extraction techniques. Higher recovery and productivity will result in higher incomes, allowing miners to invest in better mining equipment and develop superior mining methods, feeding an upward spiral of recovery, profits and reduced pollution.

A miner who has a good year and expects to do even better the next year is a better taxpayer and more effective manager. A miner who has barely managed to get by and is uncertain about the next year will not be able to pay taxes, and is not in a position to worry about the environment and the social costs of his operation. The basic idea is to encourage and support the government in creating a viable tax base in the SSGM sector.

Policy, legislative and institutional development. With a national organization of miners and the zoning of mining regions in place, the government will be in a much better position to develop a new mining policy. In fact, the work done under the first three interventions will have produced significant input from the key stakeholders that can be used to formulate a policy framework and improve the new draft mining law. The process of interactive policy making, however, should be institutionalized, as rapid changes will most certainly continue to occur in the sub-sector.

With a solid policy basis, the new laws that are being drafted will be more practical and will enjoy greater support among the miners. The likelihood of compliance with the regulations will have been significantly increased. Under these circumstances it will also be easier to design and develop efficient and effective mining institution. The British Geological Survey (BGS) has already developed a full proposal for the development of a Minerals Institute and this work could be used as a point of departure in the preparation of a revised proposal.

1.3 Background of the approach

The approach recommended here has been inspired by the writings of the Peruvian economist Hernanado de Soto, who has formulated innovative strategies to redress the shortcomings of the “underground” or informal economies in developing countries. De Soto's basic thesis is that the poor in developing countries have not accumulated all the assets needed for successful capitalism. Because they are legally disenfranchised, they do not have title to the land and other assets they exploit, the poor are unable to turn these assets into liquid capital – the kind of capital that generates new wealth.

De Soto argues that during the industrial revolution, the advanced nations faced the same kind of development problems that low-income countries face today. In those days the developed nations “were themselves Third World countries teeming with black markets, pervasive mafias, widespread poverty and flagrant disregard for the law.” About 150

years ago these countries initiated a conversion process that included the development of uniform and transparent property laws accessible to entrepreneurs who were living “outside the law.” The efficient property systems and improved tenure security provided a basis for capital creation that financed the economic development of the industrialized nations, “their economies began to soar into wealth without their even realizing what they had done.”

This interpretation of the economic history of the developed countries contains insights and ground rules that can be extremely useful for the formulation of an innovative approach that will actually help resolve the chaos in the placer gold mining sector of Suriname, but also help fill the legal vacuum in which this sector operates. In fact, de Soto devotes an entire section of “The Mystery of Capital” to the transitional process that brought about the regulation of the chaotic United States (U.S.) gold mining sector during the 19th century. Key elements that made this transition successful included the realization that respect for the accumulated wisdom and customs of miners was essential. Moreover, thousands of mining laws had to be consolidated into an integrated system that guaranteed administrative efficiency and tenure security. The transition from SSM to medium- and large-scale mining (LSM) requiring greater investment would have never succeeded without mining codes that clearly define ownership and provide adequate tenure security.

These “missing lessons of U.S. history” described by de Soto inspire a new way of looking at the problems associated with the unregulated placer gold mining sector in Suriname. An effort to legalize all placer mining operations and provide tenure security to miners throughout the country is a key ingredient of the proposed transitional process. This report recommends that the organizational patterns and the “miners’ laws” that have evolved in the gold fields of Suriname should be recorded and carefully studied. This expertise could be used to add innovative elements to the draft legislation and regulations that will actually succeed in introducing order into the sub-sector. The chance of acceptance and compliance will be greatly increased, if the new regulations incorporate rules that the miners themselves have developed.

1.4 The stakeholders and the stakes

The SSM methods now in use cause substantial damage to the natural environmental and public health. Occupational risks to miners include health complaints associated with inappropriate mercury handling; the release of mercury into the environment during mining and during the burning of the gold-mercury amalgam in open air. Miners also risk injuries and mortality from accidents, which occur regularly in the absence of adequate safety regulations and gear. Mining-induced environmental degradation includes deforestation, erosion, siltation of rivers and creeks, and alteration of the rainforest micro-climate, all resulting in a significant loss of biodiversity. As mining tailings are causing creeks and rivers to become increasingly turbid, forest communities are experiencing a shortage of clean drinking water and a subsequent increase in water pollution related illnesses, including diarrhea. The threat of bioaccumulation of mercury in fish, caimans and other animals consumed by communities in the mining areas is well

known. The risk of water- and air-borne movement of mercury to locations far beyond mining areas is now also becoming a cause of concern.

Problems in the alluvial gold mining sector have been extensively documented: scholars and students, international organizations and government agencies, consultants and commissions have produced an extensive list of dissertations, reports, papers and project plans. To date, however, efforts to regulate the alluvial mining sector and introduce environmentally sounder mining techniques have not had a measurable impact on gold mining pollution abatement. It is essential, therefore, that the government's policy, regulatory and institutional framework is reviewed, as well as the private sector and civil society aspects of the overall problem, in order to find out why it is so difficult to make progress. Understanding the problem is half of the solution.

Of all stakeholders, the State is the greatest loser. The state also invests the least into the sub-sector. According to the report of the National Planning Office between 1995 and 2001 the State collected less than one percent of the gross production value of gold in Suriname (SPS 2002:20). According to the estimates of the Suriname Planning Foundation (Stichting Planbureau Suriname; SPS), the State should recuperate about 16% of the gross production in turn-over taxes, fees and royalties, an amount between one and two million US Dollars per month.⁴ If the SSGM sub-sector could be transformed from an informal to a formal sub-sector, the State would be the greatest beneficiary. Regrettably, the lack of confidence in the sub-sector has discouraged the administration from investing greater effort and resources into the sub-sector.

A second loser is Suriname society. The people of Suriname are witnessing massive environmental destruction in the interior as, large rainforest and drainage basins tracts are destroyed by SSGM. The service providers to the sub-sector profit from gold mining, but the community as a whole sees very few benefits from the extraction of this non-renewable resource. Moreover, a very high environmental price is paid for the extraction of gold. There are almost no dynamic spread effects or other pro-development effects beyond the sub-sector. On the contrary, the negative impacts of SSGM may threaten other economic activities such as fish farming. Exports may be held back if mercury levels in water near farming areas exceed internationally, accepted limits. The sub-sector has been left to fend for itself; the administration is tolerating this situation, while the Suriname community passively observes without demanding change.

The miners themselves also lose. Several thousand Indigenous and Maroon individuals are employed in the sub-sector, but very few have gold exploitation concessions. When registered enterprises show up with an official reconnaissance or exploration permit native miners have to withdraw from the concession and seek employment elsewhere. There are up to 10.000 foreign miners and service providers working in the gold fields of the interior, and most of them do not have valid residence or work permits. There is no

⁴ The estimate depends on whether one uses the conservative production estimate, six tons per year (tpy), or the optimistic estimate, 12 tpy. Suriname exports 12 tons of gold per year, but information from gold buyers and recent arrests of gold smugglers suggest that a substantial share in smuggled in from Guyana and French Guyana.

law and order in most mining areas and along the access roads. When miners working illegally in the country get robbed or injured, they do not dare to turn to the police out of fear for deportation. The gangs stalking the mining areas know this and take advantage of the situation. Illegal foreign miners face humiliating circumstances, and they are eager to attain legal status in the country. Opportunities to do so for non-Dutch speakers are administratively demanding. Moreover, administrative capacity to process the number of potential applicants is not sufficient. If tomorrow ten thousand illegal miners would descend upon the immigration office, it would be impossible to process their applications in an efficient and timely manner.

The fourth loser is the private sector, both national and foreign. Mining enterprises invest between twenty and two hundred thousand dollars into operations without having the benefits of secure title. They rarely know what to expect before they start. The State may show up and levy unrealistic taxes, confiscate equipment and gold. Strong men in the unorganized mining areas may push out the smaller operators. Maroons may show up and claim a mining area on the basis of the unsettled land rights issue. Even when miners have concession rights, their assets are not protected and unimpeded operation is not guaranteed. With a few exceptions, almost all of the LSM titles that have been issued are exploration and not exploitation permits. As a result, many so-called ‘legal’ miners working in the interior are in fact operating extra-legally, under a so-called ‘policy of tolerance’ (‘gedoog beleid’).

Foreign investors also face challenges associated with an unregulated SSM sector. Article 36.3 of the 1986 mining decree, which stipulates that SSM can only be carried out in zones set aside for this purpose by Ministerial decree, to be published in the State Gazette, was never carried out. During the development of the Rosebel Gold Mine, a large number of small-scale miners invaded the property, and it took years to bring the situation under control. Many small-scale miners, on the other hand, complain that they are unable to secure concessions in which to work. The situation is further complicated by the unsettled land rights claims of the Indigenous and Maroon communities, many of which are located in or near LSM concessions. The regulatory gaps resulting from an out of date mining code were filled with a mineral agreement, but foreign mining officials have often suggested that an up-to-date mining code would be a more effective instrument for promoting investment. Investors want to know what they are up against when they evaluate investment options in a country, and the mining code is a key elements in the decision making process.

The fifth losers are the communities of the interior. Their customary settlement areas are being invaded by miners with and without permits. Because these territories have no legal status, they cannot seek eviction or third party compensation claims. The Indigenous communities with a predominant fish diet face the greatest risk of bioaccumulation of mercury in the food chain. Many fish species are unable to survive in silted river and creek water near mining areas and important sources of protein are lost. Diseases such as malaria are widespread in and around mining zones and the threat of STDs including HIV/AIDS are becoming a significant concern in communities that are in contact with mining areas.

1.5 Root causes

Why is it so difficult to regulate and structure the SSM sector? A thorough analysis involving all key stakeholders would be needed to acquire an in-depth understanding of the root causes of the problems. At this point, it would be useful, however, to make a number of general observations regarding causes of the problems in the sub-sector.

The government was overwhelmed by the second gold rush at a time when the nation was facing serious political and economic problems. The new developments were difficult to comprehend and the responsible government agencies were not equipped to deal with this massive mobilization of manpower and equipment, far beyond the effective administrative range of the government. The lack of response is often interpreted as an intentional *laissez-faire* policy on the part of the government, but it is probably more appropriate to acknowledge the absence of well-developed policy options to deal with this ‘new’⁵ phenomenon.

Between 1996 and 2000 an attempt was made to get a grip on the SSGM sub-sector and to secure a reasonable government take from the sub-sector. The method that was developed had a strong regulatory bias and a weakly developed support component (see Chapters II and V). The enabling conditions for regulating the sub-sector, such as a well-designed zoning instrument and a partnering miner’s organization, were absent. The outcome of this effort further discouraged rather than encouraged administrators and this may in part explain the lack of confidence of the administration in the sub-sector. Minimal government returns from the sub-sector have left the administration without the necessary resources and opportunities to reform and regulate the sub-sector.

We will argue in this report that this pessimism is unjustified. How could government officials expect to control a highly dispersed sub-sector operating in remote locations when the State never had an administrative and physical presence in the interior of the country to begin with? The difficulties in controlling the sub-sector have arisen by default, and not by design. Until the 1960s the State administration of Suriname was limited to the coastal area, and to this day 75% of the national territory is beyond the day-to-day administrative control of the State. The vast interior district of Sipaliwini, however, does not have a capital city. The office of the District Commissioners of Sipaliwini, the interior district where most of the gold mining takes place, is located in Paramaribo on the Zwartenhovenbrug street.

How can the State control the sub-sector without a permanent presence in the interior where most of the gold mining takes place? As long as the State remains absent from the gold mining zones it will be very difficult to regulate and control the sub-sector. Even

⁵ To be sure, careful study of the administrative responses to the first gold rush at the end of the 19th century would reveal much valuable information. By the 1980s, however, these lessons of history had faded into the background of the government’s administrative memory.

when administrators do travel to mining areas in the interior, they usually limit their visit to river-side settlements, kilometers away from the mining areas. They also tend to stay only one or a few days, which is much too short to exert considerable influence on the sub-sector.

Throughout the report, many more problems and issues will be raised and analyzed, topic by topic. There is, however, a reason for singling out the problem of an interior presence of the administration at the outset of this analysis and discussion. All other problems are secondary to the challenge of on-site management. There is no way to remote-control gold mining areas, not by the administration, the private sector or the environmental agency or organizations. The only way to make progress, first and foremost, is to move out into the field alongside the miners, and empower them to improve their own situation. Because they already have an infrastructure and zone management expertise, concession management enterprises and legitimate gold mining enterprises can play a critical role in helping the government institute a viable presence in the interior.

1.6 Format of the report

The format of the report is designed to present the basic information in such a way that patterns can be discerned in the complex make-up of the sub-sector. The basic information is presented in a logical progression, moving from a review and analysis of the gold mining history in Suriname, and then on to a discussion and analysis of the role of the three main groups of stakeholders: government, private sector and civil society.

Chapter II on the history of gold mining in Suriname starts out with a brief overview of the natural setting in which alluvial mining takes place: the drainage basins in the interior of Suriname which host stream deposits. This natural context can help clarify the complex interaction of environmental impacts that occur as a result of alluvial gold mining. The early years (1875-1970) are briefly reviewed. The recent history (1971-2005) is discussed next. An analysis of the recent events follows, and the lesson learned are used to formulate recommendations.

The report then presents information on the social dimension of SSM in Suriname (Chapter III), information on the private sector (Chapter IV), and finally of overview of the public sector institutions responsible for gold mining (Chapter V). Chapter V also reviews the current draft legislation for SSM and makes recommendations for improvement. The gold trade is then briefly reviewed (Chapter VI).

In the last chapter (VII), a number of recommendations are made. The World Bank model for analyzing SSM is reviewed and adapted to the situation in Suriname. Next, the subject of zoning is broached, and a provisional model for zoning is presented. The chapter ends with a proposed outline of an action plan for the WWF.

Box 1: The administrative presence in the interior

The economy of Suriname was based on plantation agriculture between the 17th and 19th centuries. The plantations were confined to the coastal area, as well as the administration of the colony. The colonial history of the interior is primarily the history of the Indigenous and Maroon (escaped slave communities) peoples. They were the only peoples who had established permanent settlements in the interior. During the 18th and 19th century, missionaries ventured into the Indigenous and Maroon communities of the interior, and after the peace treaties of 1760, 1762 and 1767 the administration stationed a handful of colonial emissaries ("*posthouders*") in Maroon settlement areas. After the 1920s this presence was discontinued.

During the first gold boom (1875-1908), a 180 kilometer railroad was built to link the gold mining areas in the watersheds of the Saramacca and Suriname rivers to Paramaribo. This logistic incursion, however, was not accompanied by a permanent extension of the coastal administration into the interior of the country in the form of civil registration offices, schools, public health centers, and so forth. Control posts for the gold mining sector were established at strategic locations, but these faded out of existence after gold production had declined to insignificant quantities in the 1960s and 1970s.

In the 20th century the bauxite industry became the mainstay of the country's economy. The Suriname Bauxite Company, a subsidiary of Alcoa, did venture into more remote coastal locations, such as the Cottica River region. The company town Moengo was built, with modern infrastructure and services. The government administration followed suit, and after the East-West highway was built in the early 1960s the government presence increased steadily. The government has now taken over almost all the infrastructure.

When the hydro-electric dam was built in the early 1960s the road network was extended to the dam site at Afobakka, about 100 kilometers from Paramaribo. Up until then the road net extended only 47 kilometers south, to the international airport at Zanderij. At that time the district of Brokopondo was created, and a districts commissioner's office was established at the town of Brokopondo along the Suriname river. This is the most southern district commissioner's office in Suriname, but it is no more than 100 kilometers from Paramaribo and still 300 kilometers from the southern border of the country.

In 1985 a new division of districts was introduced. The new Sipaliwini district covered most of the area of the interior and 80% of the land mass of the country. The districts of Brokopondo and parts of Para and Marowijne are also considered 'interior' districts. In the early 1980s the main road artery was extended to Pokigron, 180 kilometers from Paramaribo. This distance, however, is less than half-way to the southern border of Suriname.

Efforts by the government to move the administration further southwards into the interior received a major set-back during the interior war (1986-1992). During the conflict most of the interior was isolated from Paramaribo. Almost all the government infrastructure in the interior was destroyed or looted. After the Accord for National Reconciliation and Development in August of 1992, it took a tremendous effort to repair the existing infrastructure and re-establish a government presence in the interior. The interior is still recovering from the destruction brought on by the war

Chapter II

THE LESSONS OF SURINAME GOLD MINING HISTORY

In this first data chapter we extract lessons from Suriname gold mining history. We start with a brief review of the geology of gold deposits in Suriname and the mining systems associated with these deposits. This information provides the context in which the gold mining history of Suriname is interpreted. The early years of Suriname gold mining history (1875-1970) are reviewed next, followed by a discussion of the modern era (1971-2005).

The Suriname gold mining history is then analyzed in order to identify trends and patterns. Efforts by the Wijdenbosch government (1996-2000) to bring the SSM sector under control are also evaluated. The resulting insights are used to formulate a number of lessons learned from the experiences in the SSGM sector.

2.1 Geology and gold mining

Geologically Suriname can be divided into a crystalline basement, or shield area, and the coastal plain. The coastal plain is divided into three zones. The young coastal plain consists mainly of clay interspersed with sand and shell ridges. The old coastal plain resembles the young coastal plain in structure but with slightly higher elevations and relief. The third zone, the savanna belts, consists of bleached quartz sand. The shield area covers more than 80% of the area of the country – this hilly landscape is covered with dense tropical rainforest.

The metamorphic⁶ rocks of the Marowijne Group were formed during the transamazonian orogeny⁷ over 2000 million year ago. These are islands of twisted, ancient rock metamorphosed from basaltic lava and topped by sediments. The Rosebel Formation, the Paramaka Formation and the Armina Formation are part of this complex, which in its totality forms the so-called transamazonian greenstone belt.

The Marowijne Group greenstone belt surfaces at the Goliath Mountain at the headwaters of the Coesewijne River, just south of the savanna belt in Central-Suriname. The greenstone belt transects the shield area in a south-easterly direction, ending in the south-east corner of the country along the Lawa River. The Lawa area is interspersed with gabbros. Meta-Gabbros (De Goeje Gabbros) are part of the Granotoid-Volcanic complex. Gabbros, the coarse grained equivalent of basalt, are the second most common group of plutonic rocks. There is also an east-west trend that extends from the Gros Rosebel Savanna in the direction of Langatabiki. The major gold deposits in Suriname are associated with these formations. Most of the older gold mining zones are located in the

⁶ Rocks drastically altered by the heat of molten magma or squeezed by the movement of vast tectonic plates. From *metamorphosis*, which means transformation in Greek.

⁷ The era of mountain formation.

NW-SE greenstone belt between the Goliath Hills and the Lawa River, but the E-W extension is also becoming increasingly important.

Apparently there is a small greenstone formation in West Suriname along the Matapi Creek and possibly a larger greenstone belt that has a north-south orientation extending from the Wilhelmina Mountain Range along the Eilerts de Haan and Kayser Mountains towards the Sipaliwini savanna. An attempt was made by Brazilian miners to mining gold in the Kutari River west of the Sipaliwini savanna, but the authorities intervened and the miners left the area.

At the outset, it is useful to recognize the distinction between two basic types of gold deposits and the kind of mining associated with these deposits.

- Primary or lode (vein⁸) deposits that are primarily exploited by medium- and large-scale hard rock mining enterprises
- Secondary or alluvial (placer⁹) deposits mostly mined by SSM enterprises or individuals.

Most of the operations in the Suriname gold mining history worked alluvial deposits, though gold bearing quartz veins were mined at several locations along the railroad between kilometers 93 and 133, including the Headley-Reef deposit at km 124.3 (now beneath the hydro-lake), De Jong Noord, Gros Placer and Mayo Placer (now all part of the Rosebel Mine). Crushers and ball-mills were used to process the ore.

In the interior of Suriname today, the patterns of placer mining are related to the stream order in drainage basins. Hydraulic units usually work their way “upstream” in a drainage basin towards the watershed until they cannot go any further due to the size of rocks and other barriers in the terrain. Because a significant share of the gold particles is lost in the tailings, a second and third go-around is often feasible. The drainage basins form natural demarcations of the zones within which the alluvial mining takes place with hydraulic units on land and with dredges in the river. In the Chapter VII we will suggest to use drainage basins as a starting point for zoning of mining areas.

⁸ Most gold hard rock deposits are formed by a variation of the hydrothermal process, a process that concentrates metals. It can only be mined profitably where circulating hot acidic fluids have dissolved it from its source rocks and precipitated it elsewhere in highly concentrated form. If boiling occurs when the fluids approach the surface, or if there is a reduction in temperature and acidity, the gold is dropped from solution, often enveloped by masses of white silicon dioxide, known as quartz.

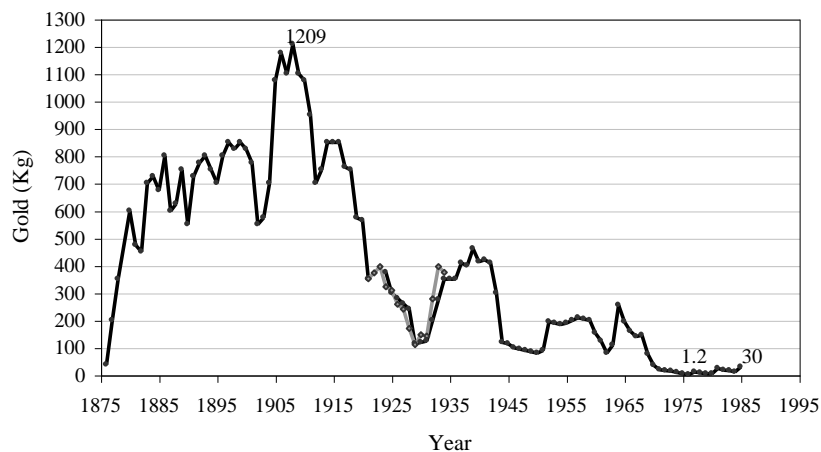
⁹ Minerals transported downhill from weathered outcrops of primary mineralization zones into stream beds, river valleys or alluvial plains. Water-borne heavy materials such as gold, platinum, and tin are sorted out during transport by their density and durability, becoming concentrated as placer deposits wherever flowing water slows down, for example, in potholes in the stream bed, inside meander bends, downstream from constrictions in the channel or at the confluence of two or more streams.

2.2 The early years (1875-1970)

The first recorded official exploration for gold in Suriname occurred in 1718. It was followed by various private and State initiatives to explore and exploit Suriname's gold deposits. Efforts during the 18th century to find gold in the former Dutch colony were not successful. Between 1742 and 1745, the Patented Suriname Mineral Company mined gold in the area around Berg en Dal and the first export of 5 ounces was reported in the trade annals. The company failed. Historical sources give two explanations: the collapse of a mine shaft, and disease, probably malaria.

When Mr. C.A. van Sypensteijn became governor in 1873, he corresponded with the Governor of French Guiana where commercially viable deposits were being mined. He outfitted an expedition to the Marowijne River in 1874 and the results were positive. The geologists reported that the formations were the same as those in French Guiana, and the first 14 concessions were granted. Between 1876 and 1879, some 187 new placers were discovered in Suriname and production rose from 38 kilos to 475 kilos in this period. Suriname was in the ban of gold fever, the first gold rush was on. The dramatic increase in gold production between 1875 and 1908, as well as the subsequent decline, is in figure 1 below.

Figure 1. Estimated historical gold production in Suriname (1875-1985)



Sources:

1875-1974: *Mededelingen Geologische Mijnbouwkundige Dienst* 22

1921-1934: *Heilbron and Willemsen* 1980

1960-1985: *Gemerts* 1986: 21-22

In 1896, mechanized mining was introduced. The company 'Goldfield of Suriname' started to use steam powered hydraulic mining equipment at the Brownsberg Mountain. A wide variety of machinery, including steam pumps, bucket-line dredges and ore crushers were introduced near the end of the 19th century. A railroad was built along the Pakira Creek to transport ore from the mine to the washing plant along the river. Remnants of heavy equipment can be found in most of the old gold mining regions. Production surged to 1208 kg in 1908. Orders for new steam powered equipment were placed only after a few weeks of prospecting. Insufficient prospecting and the acquisition

of inappropriate equipment soon translated into losses for the mechanized operations. Deep overburdens and the presence of large boulders also made highly mechanized mining difficult, as did the presence of tough clays that trapped gold. At that time over 5,000 workers were registered in the gold fields, many of them from the Caribbean region.

In his 1954 report on gold mining in Suriname, James Lawton¹⁰ noted that “as rich placers of the Colony became exhausted and it became unprofitable to hire miners at days wages, a system of leasing was introduced from British Guiana. It was known as porkknocking, and is still in use today.” Between 10 and 15% of the porkknocker take was paid to the concession holder who usually set up a company store on the concession. All gold produced was to be sold to the concession owner at a rate slightly lower than the bank rate in Paramaribo. The difference was supposed to cover the concession taxes and royalties. This historic leasing system is a precursor of the concession leasing systems that are still in place today.

Also in those days the government preferred to deal with a hand-full of LSM companies rather than with thousands of porkknockers. It was much easier to collect royalties and taxes from a few LSM companies than from 5,000 individual miners. It was also difficult to obtain accurate production figures from concession owners who were leasing to porkknockers. But when the large operators went out of business, the government had no choice but to deal with the small-scale miners.

In order to monitor the mines and collect royalties as SSM expanded at the end of the 19th century, the government had to establish more control posts. Control infrastructure in the remote and densely forested interior was very expensive and difficult to manage from Paramaribo. Around 1900 a trip to the Lawa gold field started with a boat trip over sea from Paramaribo to Albina, followed by a canoe trip over dangerous rapids lasting 12 to 15 days. The construction of a narrow gauge railroad to the gold fields between 1903 and 1912 improved access to the interior considerably. Eventually 173 kilometers of track were laid. The original idea was to reach the Lawa, but the tracks never extended beyond the Sara Creek. The railroad was to provide a boost to the sector, but when it was completed in 1912, gold production had already started to decline.

When gold production reached an all time low in the 1950s and 1960s, experts began to doubt the viability of the sector. The myth of the disappearing pork-knockers emerged. It was assumed that as in Australia and the U.S., SSM would disappear as alluvial deposits were exhausted. Lawton considered the possibility of a second gold rush unlikely. In fact, he anticipated disappearance of small scale gold mining:

As for the known gold bearing districts, the fact that 41,431 Kg. have been removed from the ground without discovery of new gold bearing creeks would appear to indicate that the days of placer mining were numbered. It is becoming more and more difficult to induce pork-knockers to leave the town to engage in mining as more money can be made

¹⁰ An American, with experience in gold mining, who came to Suriname around 1900 and lived over 50 years in the country. He passed away in the mid-1950s.

working for day's wages at the bauxite mines or elsewhere. When these pork-knockers will no longer go to the goldfields, there will be no further production of gold.

Lawton also suggested that the government should subsidize the gold mining sector, because the cost of wages and provisions were too high. Lawton was right, up to a point. By the mid-1970s gold mining had all but fizzled out.

However, what Lawton could not foresee was the rise in the gold price after 1971 when the U.S. let go of the gold standard, and the introduction of new low cost and mobile technology that was used to produce powerful dredging and hydraulic mining outfits. He could not imagine that after 1971, over ten thousand small-scale miners would head into the interior to dredge the rivers and re-work the same placer deposits that had been mined during the first half of the 19th century. He was right, however, in the sense that LSM in Suriname would eventually be developed with foreign capital and expertise.

Lawton was also pessimistic about the possibility of upgrading the skills of small-scale miners:

The average gold miner in Suriname has little interest in reef¹¹ mining. By training and experience he is a placer miner who must see results within a comparatively short time. The development of a lode and the installation of a mill would have to be done with capital from outside the Territory, but it would seem as if reef mining was the one hope of bringing the Territory back into the ranks of profitable gold producers.

Lawton also supported the need for a systematic geological survey of the interior to assist in the discovery of new sources of gold. The need for a systematic geological survey of the interior was indeed recognized and between 1943 and 1947 the Mining Section of the Department of Social Affairs was established. In 1949 the section became the Geological and Mining Service (Geologische Mijnbouwkundige Dienst; GMD) under the Department of Economic Affairs. Its main tasks were to prepare geological maps of Suriname and an inventory of the natural resources. This service grew steadily and by 1965 the GMD had 21 academics on its staff. In 1977 the geological map of Suriname was published; it was the result of 35 years of geological mapping in very inhospitable terrain.

2.3 The modern era (1971-2005)

In 1971 the U.S. abandoned the gold standard and the price of gold began to increase, exceeding US \$ 700 for a troy ounce by 1980, and then settling between US \$ 300 and US \$ 400. These favorable prices lasted until the end of the 1990s. The devaluation of the Suriname guilder between 1985 and 2000 made gold mining all the more attractive during this period. For the interior residents, who pay much higher prices for fuel and

¹¹ This is an old term for 'hard rock' mining, the extraction of primary deposits not too far below the surface, and refers usually to quartz reefs that miners could exploit with simple to moderately complex rock crushing equipment.

other goods imported from Paramaribo, gold mining was the only way to sustain a minimal standard of living in their customary settlement areas.

After 1975 gold dredging technology was introduced in the Marowijne river from Guyana, and the interest in gold production began to revive. During the 1980s gold production with dredges on the Marowijne and Lawa rivers increased further. The higher gold prices had made the sub-sector interesting again.

In 1986 a new mining code was approved, which makes a distinction between ‘large-scale’ or ‘investment mining’ – referred to as “mijnbouw”- and SSM (‘klein mijnbouw’).¹² Table 1 lists the main differences between the two systems.

Table 1 Differences between large and small scale gold mining

Parameter	Mining	SSM
Sequence of mine development	Phased, moving from reconnaissance to exploration to exploitation	Reconnaissance, exploration and exploitation rights granted at the same time
Size of claim during phases	A reduction scheme: 200,000 to 40,000 to 10,000 hectares	200 hectares for all phases
Term	2, 7 and 25 years	2 years (with option for extension)
Right of disposal	Exploration and exploitation permits may be transferred	None
Plans or feasibility study including work schedule	Required for all phases, including investment budget and work schedule	Not required
Reporting	Required for all phases	Required

During most of the interior war (1986-1992), the communities in South-Eastern Suriname were isolated from the rest of the country, and gold was the only tender with which supplies and equipment, but also arms, could be purchased in the French Department of La Guyane. During the difficult years in the 1980s the GMD suffered significant setbacks. Most of the interior of the country was off limits during the interior war. The Accord for National Reconciliation and Development signed in 1992 brought an end to the interior war. The gold fields became reasonably safe again for investors and the second gold boom got underway. At that time, the operational resources of the GMD were not increased sufficiently to deal with the new gold boom, involving at least 10.000 miners, if not more.

During the years that followed; devaluation of the Suriname currency and budget cuts reduced the operating capacity of the GMD, and by 1997 the service had only two geologists on the payroll (including the director!). The limited human resources and high

¹² The code makes a distinction between ‘mining’ and ‘SSM.’ The conditions for conducting ‘mining’ makes it more appropriate to refer to this activity as ‘large-scale’ mining or ‘investment mining.’

costs of operating in the interior reduced the field operational capacity of the service to occasional trips funded by companies or foreign agencies.

Maroons who acquired some gold mining expertise during the interior conflict mortgaged houses in town to buy gold mining equipment. Persons living in the coastal area were also eager to profit from the new gold mining opportunities and invested in the sub-sector. After the interior war, the pace of miners from Brazil moving into the interior of Suriname picked up considerably. Maroons were eager to sub-contract to Brazilian who worked long hours, were often experienced and skilled in mining, and were willing to take on risky jobs such as diving. As river deposits became exhausted during and after the interior war, gold production moved on land using the hydraulic mining techniques of the Brazilians. This approach became the most common ore extraction method. Miners also started transporting excavators to the interior on two canoes, tied to each other with poles, a technique developed during the interior war. ATV's were introduced which greatly expanded the operational range of miners.

The 1986 code did not anticipate the introduction of large missile river dredges and 6 inch hydraulic systems with heavy equipment now in use on land that could process over 10.000 tons of ore per year. These techniques are no longer simple. As the high alluvial grades are mined out and operations begin to rely on second- and third reworking of mine sites, volumes of ore processed must be increased to break-even or turn a profit. The volumes of waste produced by hydraulic mining is considerably larger than the volume of tailings produced by partially mechanized SSM using 2 inch or 3 inch pumps and the small sluice boxes that were common up to 1986. When placer deposits in creeks and valleys are mined out, moreover, the powerful hydraulic units can be used to mine weathered and soft rock profiles (laterite and saprolite). In Guyana and French Guyana hydraulic miners have worked down to depths up to 50 meters or more. During the past decade this has become an increasing trend.

In the meantime the government saw little benefit from the SSM sector and was eager to attract foreign investors to develop LSM enterprises. The LSM sector would be much easier to oversee, and the government was convinced that large-scale projects were the only way to secure direct benefits for the State. In 1994 the exploration firm Golden Star concluded a mineral agreement with the government. Parliament approved an enabling act authorizing the Minister of Natural Resources to sign the agreement. Under the agreement Golden Star acquired the exploration rights to the 17,000 hectare Gros Rosebel concession in the Brokopondo District from the State owned mining company Grassalco. Golden Star also began to lease concessions in other parts of the country. Canadian exploration companies Canarc and Blue Ribbon were also active in Suriname during the mid-1990s.

These exploration companies also leased properties from Suriname owners; speculation and "concession grabbing" became widespread. Persons with no experience or expertise in gold mining managed to acquire prospective lands and tried to lease these properties to foreign exploration companies. A holder of an exploration right who succeeded in leasing

their property to a foreign exploration company could earn a significant sum of money on a yearly basis.

When gold dipped below US \$ 300 per ounce between 1997 and 1998, the exploration rush by foreign investors was over. Companies reduced their presence to a skeleton crew, put their projects into ‘care and maintenance,’ or pulled out altogether. The lucrative leases were cancelled and once again, the mining industry turned to the ‘small-scale miner’ with hydraulic mining equipment. Many owners of concessions started to allow Surinamese or Brazilian miners to work on their property for a 10% fee. The sub-sector continued to grow and today SSM directly employs to about 10,000 persons or more and provides mining-related jobs to a similar number. Most of the miners are illegal immigrants working without exploitation concessions.

Between 2000 and 2004, the gold price recovered from a low of US \$ 260 to over \$ 400 per ounce and the gold mining sector was reinvigorated. The Gross Rosebel project was activated again; the mineral agreement was revised and ratified. An investment of US \$ 100 million was made by Cambior in a cyanide based ore processing plant and heavy duty mining equipment. The development period has lasted almost ten years and at least US \$ 30 million was invested in the development of the resources. The mill was designed to produce 8 tons per year (tpy), but production may exceed 10 tons in 2005. The government is already reaping benefit from the project in wage taxes and royalties. Mine construction also has had positive pin-off effects to the local economy. On the down side, local people complain that they have not obtained the jobs they were promised as they were no longer able to make a living as small-scale miners in the concession area. Those who do find formal employment at the mine work for contractors, a status that does not provide job security, pensions, or adequate social security benefit.

Suralco renovated the road to the Maroon village of Lange Tabbetje and built a road that linked this road to the plateau of the Nassua Mountains. The company initiated gold exploration activities in the Nassau Mountains area. Soon hundreds of small-scale miners began to mine alluvial deposits in the creeks along the road, and eventually they moved into the highly weathered profile (laterite¹³) with mineral accumulation and partially weathered parent rock (saprolite¹⁴) with mineralization zones. Suralco has a difficult time getting the situation under control, and would very much like to see miners stay out of the saprolite deposits, which are likely to make-up a substantial part of the mine-able reserves. This issue in section 4.1 will be discussed along with the challenge of defining the various gold mining sub-sectors.

¹³ The term laterite is derived from the Latin word *later*, meaning brick or tile. In laterite the upper soil horizon has undergone extreme chemical weathering (leaching) above a lower oxidized horizon, where accumulation of existing minerals such as iron and aluminum may occur. Both layers are rich in iron oxides, hence the dark red color.

¹⁴ Saprolite has the consistency of tough clay and often consists of various earth-colored bands. It is usually found below the laterite profile, and this is partially weathered parent rock that has remained in its original place and has retained much of its original structure. The structural features of saprolite can provide geologists with critical information about the geological context of mineralization zones, hence the concern about the unsystematic mining of this profile (see section 4.1 for an illustration of a typical mineralization profile).

Recently Suralco concluded a joint exploration agreement with Newmont Mining of Denver Colorado, one of the largest gold mining companies in the world. Prospecting is now underway and the first indications are positive.

2.4 Efforts to bring the sub-sector under control

Between 1997 and 1999, the tax office initiated Operation Goldfinger. The secret service and armed forces were recruited to execute the program. The first task was to register the number of gold enterprises and gold miners working in the interior of Suriname. During the registration exercise, miners were informed about the purpose and procedures of tax collection in Suriname. The gold mining area was divided into 5 zones. It was reported that 15,000 miners were registered after payment of an annual fee of US \$ 200. Based on these alleged registration figures it has been estimated that this operation resulted in a government take of about 3 million US Dollars.

The second phase of the intervention was referred to as “Evergold.” The Government of Suriname intended to create a sustainable infrastructure in the interior of Suriname to undertake regulatory and revenue collecting activities. The Commission for the Regulation of the Gold Sector was installed, and a plan was prepared to establish the Foundation of Inter-Departemantal Units (Stichting Inter-Departementale Units; SIDU) that would field Inter-Departmental Units (Inter-Departementale Units; IDU’s) in five strategic alluvial mining zones. Each field unit would consist of representatives of six ministries, the CBvS and the National Institute for Environment and Development (Natuur Instituut voor Milieu en Ontwikkeling van Suriname; NIMOS), the then newly created environmental agency.

The statutes of SIDU called for the creation of a fund, replenished annually by a percentage of the collected revenues. The fund would provide operational resources to maintain the SIDU foundation and the IDUs in the field. The fund also was to provide financial support to Indigenous and Maroon communities for their socio-economic development. These provisions were progressive. The statutes did not specify, however, what percentage of the collected revenues would be channeled back into the sub-sector. Also it was not clear to what extent this effort was given a permanent institutional base and infrastructure. Moreover, the plan greatly outpaced the provisions of the 1986 mining code, raising questions down the line.

The activities of this SIDU foundation proved controversial. The media began to publish critical reports on the procedures that were used to register miners and collect revenues, putting pressure on the government. Opposition members posed questions in parliament about the legality of the registration exercise vis-à-vis national labor laws. Miners were efficiently registered but the procedure did not comply with the regulations for obtaining a work permit in Suriname. The legality of the revenue collecting procedures and of the administration of the fund was a subject of heated debate in parliament. The system was set up parallel to the current mining code, and some argued that the government added a

second informal system to the existing one. When the government changed in 2000, this effort to bring the sub-sector under control was put on hold.

Operation Goldfinger did have some positive impacts. It inspired several mining companies to develop their own systems of control in mining regions and zones. These companies pay taxes to the government on the 10% concession fee that they collect from small-scale miners operating on their concessions. These initiatives open the door for the government to involve the private sector in the development and maintenance of instruments of control in the vast and numerous mining zones of the interior. This subject is discussed in greater detail in chapters IV and V.

2.5 Analysis of the gold mining history

The short overview of the history of gold mining in Suriname reveals patterns that have repeated themselves, and are likely to be repeated in the future. As has often been the case in other parts of the world, the first gold rush in Suriname involved thousands of individuals not organized into companies or cooperatives, often with little or no knowledge and experience in any kind of mining. A typical “storming” cycle got underway, but before the masses of miners could proceed to the “forming” phase large-scale operators moved into the gold fields, backed by foreign capital.

Once investors in collaboration with larger gold mining enterprises had the time to review the situation, plan and fund operations, the second phase of mechanized mining began. But also here lack of knowledge and understanding of the gold geology and mining conditions in Suriname, as well as lack of adequate prospecting and financial planning, caused most of the large operations to fail. After the 1980s investments in small-scale outfits mining increased considerably, as did the operational costs. Units today use heavy equipment and consume considerable amounts of diesel. Since no systematic prospecting is carried out, the risk of failure is high.

History demonstrates that, predicting the demise of SSM is a tricky affair. It is very difficult to anticipate the developments of the world market price for gold. It may be even more difficult to predict new technological innovations that would make it possible to mine much lower-grade deposits. The possibility of the development of new geological knowledge or discoveries is also difficult to anticipate, particularly since the interior of Suriname has only been superficially surveyed.

In the 1970s and 1980s the second gold rush was initiated by small-scale miners. The higher gold price was an incentive for the rush, but also factors such as landlessness and poverty in northern Brazil, and a decline in the standard of living in Suriname. Moreover, new and more efficient gold mining technology became available. The new six and eight inch dredge and hydraulic operations could process volumes of ore comparable to the LSM operations around the turn of the 18th and 19th century. The interior war (1986-1992) intensified the dependence of many interior communities on gold mining. After the peace treaty was signed in August of 1992, that brought an end to the interior war, the

sub-sector sector expanded very rapidly. Investors in SSM began to exploit gold deposits in even more remote locations, aided by ATV's and excavators.

With some semblance of law and order restored in the interior, Suriname was once again attractive to foreign investors. Golden Star was the first to set up office in Suriname and soon other junior companies followed suit. Many local holders of concessions profited from sub-letting their properties to foreign gold exploration firms. When the gold price tumbled below US \$ 300 per troy ounce in 1997-1998, Golden Star put the Gross Rosebel project in 'care and maintenance.' About 30 million US Dollars had already been invested in reconnaissance and exploration on the property and elsewhere in the country. Other juniors did the same with their prospects or pulled out altogether. Holders of properties once again began looking at small-scale miners to save the day.

The initiatives under the Wijdenbosch government to bring the sub-sector under control indicate that substantial resources can be collected by establishing a presence in the field. It has been estimated that during the SIDU effort some 3 million US Dollars were collected. Sufficient operational resources were available to fund the undertaking, but the resources by themselves were not enough to guarantee success. Reinvesting a legally specified percentage of sub-sector revenues would have provided a more predictable basis from which to plan, organize and execute control type interventions.

The SIDU effort did not include a fully developed support program for miners to reduce operational constraints and improve security. This is a critical condition for securing miner's support as well as fending off criticism in the media that puts the government under pressure to retract its policies and strategies. The number of posts envisioned was also not enough to adequately monitor the gold mining in the interior.

There is a lack of an up-to-date and functional mining legislation that reflects the realities of the sub-sector. The mining code of 1986 does not sufficiently acknowledge the limitations faced by the government and the miners in the field, and underestimates the institutional framework that must be in place before the sub-sector can be brought under control. Today there are over 10,000 miners working in the interior, and it will be very expensive to establish and maintain control posts in the main mining regions, which may consist of 50 mining zones or more. The introduction of air travel and ATV's has greatly expanded the operational range of small-scale miners. It will be very challenging to carry out the government's regulatory tasks over such a vast area consisting of rugged rainforest terrain.

The absence of specific environmental regulations is alarming and needs to be rectified as soon as possible. How much environmental damage is Suriname community willing to accept in lieu of the development benefits linked to the gold mining sector? In 1896 hydraulic mining was introduced in the interior of Suriname. Today almost every small-scale miner uses the hydraulic method. Mercury is used at considerable health risks to the miner, and the method has a devastating environmental impact.

Hydraulic mining was outlawed in California in the 1880s, and today in the Yukon no mercury is used but there also is hardly any SSM. In Brazil, strict regulations were introduced to control mercury use, but when smuggling got out of hand, the emphasis shifted towards the mandatory use of retorts. The technology is available today to conduct dry and mercury-free mining with excellent results, and these environmentally sounder extraction and processing methods can be introduced in Suriname.

2.6 Lessons learned

The review and analysis of the Suriname gold mining history produced a number of insights from which the following lessons were learned:

- There are many similarities in the developments during the first gold boom period (1875-1925) and the second (1971-2005). First there is considerable enthusiasm by investors, but as the expected returns do not materialize, investment funds dry up. The small-scale miners are then called on to take all the risks. The subsequent emergence of concession leasing enterprises is a common thread that runs through the gold mining history of Suriname. This is a reality that should be acknowledged and incorporated into new mining legislation.
- Prospecting is critical to all types of mining, perhaps with the exception of panning and other low-cost manual methods. As soon as a significant investment is involved, and substantial operational costs occur, prospecting is the only way to reduce the risk of failure.
- Historical developments suggest that small – scale miners will not disappear. Depletion of river deposits saw miners move on land, and with the depletion of alluvial creek and valley deposits, miners moved to laterite and saprolite profiles. There is still a long way to go before all the deposits that can be accessed by small-scale miners are depleted. Moreover, the emergence of large-scale operations does not mean that small-scale miners will cease operations. On the contrary, these very different systems seem to go hand-in-hand. Small-scale gold miners are good at discovering deposits that may be exploited later by larger operations. And when the gold price drops, when large-scale operations fail, or in difficult economic times, the small-scale sub-sector provides employment to thousands of workers. A government policy considers that assistance, regulatory and co-existence will be more realist than one that tries to legislate SSM out of existence.
- The role of the private sector in bringing SSM under control is indispensable, for concession owners have already established infrastructure in many remote locations of the interior. Where such a presence is lacking, there is a role to be played by the government or customary authorities.
- Future legislative efforts to bring the sub-sector under control should include provisions specifying the percentage of revenues to be channeled back into the

sub-sector. This is the only way to ensure that sufficient resources are available to finance a permanent administrative presence in the remote mining regions and zones of the interior.

- Government efforts should not focus only on securing fiscal revenues. Assistance schemes and other enabling conditions such as technical assistance for improved practices and security are also indispensable in bringing the sub-sector under control , and reducing the negative impacts.
- Without a good zoning and administration of the mining areas, it will not be possible to provide assistance and monitor compliance with existing regulations.
- Without an up-to-date mining code and regulations designed on the basis of the prevailing realities in the gold fields, and without “miner-friendly” government institutions, any new monitoring and control system that is introduced will not be effective.

Chapter III

SOCIAL DIMENSIONS

In this chapter we identify the main stakeholder groups in the interior, where SSM takes place. We begin with a description of the traditional inhabitants of the forest: Indigenous peoples and Maroons. These forest peoples lived for several centuries in relative isolation from outsiders and the Suriname nation state. This changed in the late 1870's, when thousands of miners came to work local gold deposits. A century later a massive influx of Brazilian miners took place, often returning to the areas that were mined at the onset of the first gold rush. We characterize these foreign and local miners, as well as their living conditions in and outside the mines, in sections 3.2 through 3.4.

Small-scale miners throughout the world are organized in cooperatives and associations that provide financial, technical, administrative, and other support. As we describe self-organization among miners in Suriname, we will seek to explain the relative lack of self-organization among Suriname miners. The chapter concludes with a brief evaluation of the positive and negative impacts of SSGM on individuals, families and communities. These impacts have been described in detail in numerous other studies, and instead of repeating what has been said before, the reader is referred to complementary books, reports, and papers.

3.1 Traditional inhabitants of the interior

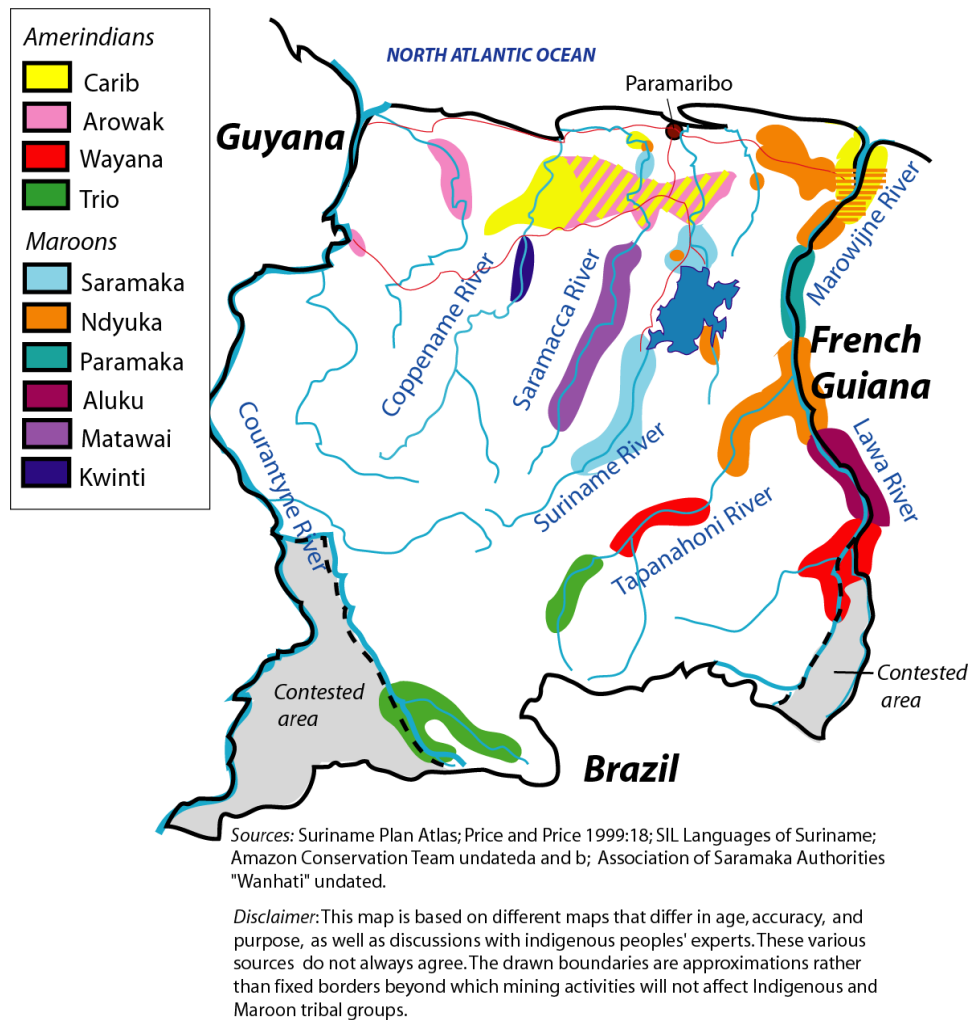
The Suriname interior, where all gold mining takes place, is inhabited by forest peoples; Indigenous peoples (or Amerindians) and Maroons (Figure 3.1). Each of these groups is made up of several culturally distinct societies. Among the Indigenous peoples one can distinguish coastal and inland societies. Coastal Amerindians consists of Caribs and Arawaks. Trios, Wayanas and several smaller Indigenous communities live further inland. The Trio and Wayana are linguistically related to the Caribs, even though they live in the southern part of Suriname.

Among the Suriname Maroons, two language families can be identified: the Afro-Portuguese and Afro-English. The Saramaka and Matawai speak an Afro-Portuguese language dating back to the 17th century that was developed in Central-Suriname on the Portuguese-Jewish plantations. The languages spoken by the other four groups – Ndjuka (or Aukaners), Paramaka Kwinti, and Boni (or Aluku)- are related to Sranantongo, the coastal creole language that was developed on the English plantations around the same time.

Nowadays most interior groups, particularly Maroons, rely to a greater or lesser extent on goods and services from the coast. Where possible Indigenous and Maroon children attend public schools; the ill tend to visit Western clinics; families may eat canned fish,

sugar, salt, and other processed foods; and people rely on shotguns, tools, and plasticware, and many other manufactured assets. On the other hand, the kin-ordered societies in the interior have maintained a large degree of cultural, socio-economic, and political autonomy from the coast. Children take part in traditional livelihood activities from a young age; forest medicine plays an important role in curing natural and spiritual diseases; families continue to produce, hunt, and fish a large share of their food; and many products continue to be fabricated from materials found in nature. Moreover, traditional political leaders and decision-making structures remain central to regulating society.

Map 1. Living areas of the Indigenous and Maroon groups



SSGM is not new to these interior populations. Especially Maroons have a long tradition of artisanal gold extraction. In the early days, however, gold mining was an emergency or opportunity strategy; to solve an immediate need or desire that required cash money. Today, as we will discuss later on in this chapter, SSGM drives the economy of Maroon forest villages in East Suriname.

3.2 The second gold rush

Until the 1980s, few people other than the above mentioned forest peoples lived and worked in the interior. In Chapter 1 we also noted the absence of the government from this area. This pattern started to change with the onset of the 20th century gold rush, in the late 1980s (see Chapter II). While the government remained physically and politically removed from the forest, foreign and a lesser extend- coastal small-scale gold miners and service providers began to flock to the mining zones of the interior.

Most of these gold miners are Brazilian *garimpeiros*, who make up more than three quarters of the Suriname mining population (Table 3.1). They usually originate from Brazil's poor North-East and Amazonian states; enter Suriname without the required visa; and work clandestinely. The largest share consists of professional *garimpeiros* who have been mining for years and even decades. Starting their mining careers in Brazilian *garimpos*, they have worked in a variety of countries including Guyana, French Guiana, and Venezuela. In addition, a smaller number of Brazilian small-farmers work temporarily in the mines. Mining allows them to save money for a larger investment and pay outstanding debts. Migrant miners from Guyana, other Latin American countries, and Europe probably represent no more than 1% of the mining population.

Table 2. Socio-cultural characterization of the mining economy

Main group	Sub group	Main functions (in order of frequency)	Est. % ¹
Surinamers	Interior Maroons	Pit work Service provider Unit owner Concession holder	17
	Coastal Maroons	Pit work Service provider Unit owner Concession holder	5
	Urban residents from other ethnic groups	Service provider Concession holder	2
Brazilians	Professional <i>garimpeiros</i>	Pit work Service provider Unit owner	65
	Small farmers	Pit work Service provider Unit owner	10
Other foreigners	Guyanese, Columbian, peruvian	Pit work Service provider	1
Total			100

¹ The listed percentages are rough approximations. In-depth survey work is needed to find out how realistic these figures are.

Local Suriname miners are for 90-95% of Maroon ethnic origin. A significant share of them originates from the city. Few of these urban Maroons ever worked or lived in the

forest prior to their arrival in the mines. Their roots and kin relations, however, makes it relatively easy for them to find a job and a subsistence living. Coastal Surinamese from other ethnic groups who work in the mining area tend to work outside the pit as mechanics, backhoe excavator operators, and merchants.

Most concession holders are Surinamese citizens from the coastal area. During the past decade, the GMD has tried to increase the number of Maroon concession holders. Most of these permits are SSM concessions, though some large-scale exploration permits have been granted. This effort is laudable, but it has also created friction in customary settlement areas. These have been cases reported of Maroon miners showing up with a permit at the mines. They would inform the village authorities that their activities were sanctioned by the government; hence there was no need to pay a form of royalty or fee to the village.

Women constitute 5-10 % of the population in most mining areas. A selected few women have managed to become mine operators. In Benzdorp there is at least one Brazilian woman who owns a mining outfit and supervises the miners. When she is away another woman takes her place as fore (wo)man. At least three female mine operators are active in Sela Creek, all of them Maroons who grew up and were educated in the city. Most women though work in the mining service economy as transient vendors, cooks, sex workers, store owners, or a combination of the above. Women miners and service providers are mostly Brazilians and Maroons, but also other Surinamers and female migrants from Guyana, the Dominican Republic, and other countries work here.

The relative proportions of Brazilians and Maroons, men and women, vary per zone. Brazilian miners tend to make up the majority population in most mining zones, but not everywhere. The mining population in the Anamu Creek and Sela Creek zones (Upper Tapanahoni River Region), for example, consists primarily of Ndjuka miners from “opo” Ndjuka villages.¹⁵ In 1999, after a Brazilian had killed a Ndjuka miner, the Ndjuka Granman, Matodya Gazon, banned the presence of Brazilians in these zones. Today Brazilians are slowly re-entering but they continue to represent a minority group.

Similarly, the share of women varies between sites. Relatively few women work in Sela Creek after Granman Gazon spoke out against their presence in an effort to control local prostitution. One of the larger concession holders in the Sara Creek zone has limited the presence of women to those in a stable (marital) relationship with someone on-site in order to reduce the chances of conflict. He is able to enforce this rule thanks to the relative isolation of his site and his large degree of control.

¹⁵ The political, economic and social organization of Ndjuka society is ‘kin-based,’ it consists of 12 clans. Six clans live ‘above the falls’ at Puketi, and are referred to as the ‘Opo’ (up-river) clans.

3.3. Life in the mines

Life in the mining area is emotionally and physically demanding. Miners live for months in a row in mining camps that are based a long way from their homes. These camps vary in luxury and complexity, ranging from a set of simple shelters where miners hang their hammocks, to more established base camps with sleeping quarters, a restaurant, a store, an entertainment area with TV, and accommodation for sex workers.

A typical day in a mining camp starts before dawn, when the cook rises to make coffee. The miners leave their hammocks at about six and, after a quick sip of coffee, leave immediately for the work site. Meanwhile the cook may bake bread, wash the dishes, and fetch water - if these tasks have not been completed the previous evening. Following the Brazilian system, the *merinda* (bread with coffee) is served around 9 am either at the camp or at the pit. After this brief break, the miners work steadily until lunch time or the *almoço* (noon-1 pm).

Usually there is another *merinda* at about 4 pm, and dinner follows at about 7 pm. The quality of the main meals varies with the affluence and ethnicity of the mine operator. Maroon mining teams with a Maroon cook are likely to eat ethnic Maroon foods, such as rice or kwakka (dried cassava product) with some salted meat or fish, fresh fish, or bush meat, and a small portion of vegetables. Brazilian miners tend to find these meals too meager, and partly for this reason refuse to work with the Maroon system. Brazilian operators tend to provide more fresh vegetables -some of which they grow around the kitchen area-, meat, chicken, and a selection of condiments.

After or before dinner the miners will wash up in a nearby stream or with water from a hand-dug well. In the evening hours they may play chess, gather around the TV, or else visit nearby bars, video entertainment, and women. Bars may have pool tables, table football, and *cabaret*, a dance show with skimpily-dressed women. Miners follow this pattern six days a week. The rest day usually is Sunday, but in some areas Maroons have determined another *kina* (taboo) day on which it is forbidden to work. Work schedules tend to be more flexible in all-Maroon teams.

Because most mining areas are far removed from the capital city and forest villages, miners must rely on traveling merchants and mine shops for all extra purchases. As a result a significant chunk of miners' earnings is absorbed by heavily priced snacks, meals, (alcoholic) drinks, medicines, and services. This is especially true for single Brazilians who do not have nearby families. Local miners are more likely to spend their earnings on their families.

As the years go, more and more Brazilians are settling in Suriname. Some have established a more permanent residence in some mining zones. In the Benzdorp region, there are families that have been around for ten years or more. They have built small but comfortable homes surrounded by bougainville and other flowery plants, a garage for the ATVs, a workshop and other infrastructure typically associated with a permanent residence. Also a number of more recent arrivals live as mining families at the mine sites.

During fieldwork at Benzdorp the consultant visited the mine camp of a mining husband, wife and son. They were setting up a new mine in a rugged and hilly but pristine forested area miles away from the developed sections of the mining region. Their mining equipment consisted of a four inch set-up with two small diesel engines. They had an ATV used to ferry fuel and supplies to the camp. The husband had built a simple but cozy kitchen for his wife with a clay oven to bake bread. The couple was assisted by a young Indigenous couple from Kwamalasamutu. It is a mistake to think that all miners are roughnecks who are in the business just to make a buck. Most miners are driven by poverty and try hard to earn a decent living.

3.4. Life away from the mines

Upon leaving the mining area, local miners typically return to their families in a forest village or the capital city. Even though Maroon men may spend part of their income on fancy clothing and flashy golden jewelry, most dedicate a significant share of their incomes to support their wife and children.

Brazilian miners who take a break from work typically go to Paramaribo, where they cluster in the Tourtonne IV through VI neighborhoods. The majority who do not have family in Suriname spend their time in Brazilian-owned bars and hotels. Here they meet fellow Brazilians, exchange news about promising and risky mining sites, listen to Brazilian (life) music, and drink and eat everything that has been denied to them for the months in the forest. After two decades of Brazilian migration, a significant number of Brazilians have settled in Suriname, learned Sranantongo, and sent for their families or begun relationships with Suriname women. The more acculturated Brazilians usually rent houses in the Tourtonne neighborhood with a spouse or colleagues. Some send money to family at home but it is unclear how much of *garimpeiros*' earnings flow back as remittances to Brazil.

3.5 Miner's organizations

In Chapter II we noted that there is no historical record of miners attempting to organize themselves into an association or cooperative prior to 1975. Best organized today are migrant miners from Brazil. With 12,000 members, the *Cooperative of Garimpeiros in Suriname* (Coöperatie van Garimpeiros in Suriname; COGASUR) is the largest mining organization in Suriname. COGASUR was created in 1999, in response to the many problems *garimpeiros* encountered both in the mining areas and in dealing with representatives of the Suriname government, including the GMD, the Ministry of Labor, the tax office, police, and military. Today the Cooperative helps *garimpeiros* apply for a work permit, call to and from Brazil, make radio contact between the city and mining camps in the interior, sale of gold, health insurance, and legal assistance (e.g. a lawyer when arrested), among other services. In addition, the Cooperative organizes emergency aid, for example by holding a money collection to finance the funeral of a deceased *garimpeiro*. Gold miners willing to pay the monthly fee of US\$ 5 can become a member regardless of nationality.

In contrast to the Brazilian migrant miners, local Suriname miners are poorly organized. Despite expressed interest in membership of a miners' organization, each individual is waiting for someone else to take the first step. This passive attitude is partly caused by a lack of understanding of what a miners' organization might do for its members. In addition, several other conditions hinder the creation of functional and lasting organizations among Maroon gold miners:

- Lack of skills in organizational management
- Absence of trust among miners
- Dispersion and mobility
- Fear that increased visibility as members of an organization will increase the chances of expulsion from profitable mining areas by the government.

This is not to say that local Maroon miners are not at all organized. Smaller, local gold miners' groups do exist. In addition, Maroon miners tend to rely on kin-based support networks to solve small problems such as a lack of labor, money, or supplies. In the case of more severe problems or threats, spontaneous miners' organizations have arisen. In the early and mid 1990s, for example, gold diggers from the village of Nieuw Koffiekamp organized in response to the arrival of Golden Star Resources, a large-scale exploration company. Fearing income loss and forced relocation, the Nieuw Koffiekamp Collective negotiated with the government about the conditions under which large-scale industrial activities were to take place. The group leaders also organized protest actions such as road blocks. This and similar groups, however, usually dismantled after (or even before) the problem is solved and do not have a fixed membership and administration.

3.6 Benefits to individuals, families, and communities

SSGM has various positive and negative impacts on individuals, families, and communities (Table 3.2). Individuals enter the placer mining industry to earn money. Their typical earnings are intermittent, variable, and uncertain but, on average, relatively high. In 2002, the *COGASUR* in Suriname estimated that the average Brazilian miner or *garimpeiro* earned between US\$ 500 and US\$ 1500 a month. By comparison, a professional nurse or teacher in Paramaribo earns approximately US\$ 250 a month. An additional benefit of working in the mining area is that the mine operator will provide for food and housing.

At the family level, mining is a significant or the main source of family income in many Maroon villages near mining areas. Even though women produce a large share of their family food stuffs, cash money is essential. It provides access to non-agricultural foods (e.g. sugar, salt, oil), additional sources of protein (e.g. salted fish and meat), household supplies (e.g. pots and pans, furniture), clothing, and construction materials (e.g. zink for the roof). Cash money also allows families to pay for school fees and travel to the city, among other services.

At the community level, SSGM helps rural villages keep their heads above water. The money from mining allows for the existence of stores, which provide access to daily life

necessities without having to travel far. Other local businesses, such as carpenter shops and restaurants also flourish by the virtue of mining activity. In addition, miners may reach a helping hand to community members in times of need. For example, a gold miner may pay for an aunt's land to be cleared so that she can produce food for her family.

Table 3. SSGM impacts

Scale	Positive	Negative
<i>Individual</i>	Employment	Illness (e.g. malaria)
	Personal income	Occupational accidents
	Free lodging and food	Risk of becoming a crime victim
		Risk of mercury pollution from skin contact and inhalation
<i>Families</i>	Household income	Absence of men from the home
		Fatherless children
		Spread of HIV/AIDS
<i>Communities</i>	Economic motor behind shops, bars, and other local business	Polluted drinking water
	Individual miners help less affluent villagers with money and services	Public health threats (e.g. malaria, water-born diseases)
	Community development, e.g. donations for school or clinic	Risk of mercury intoxication from consumption of polluted fish

In other occasions miners contribute collectively. Villagers from Nieuw Jabobkondre, for example, have held collections among miners to pay for the construction of a new school. Brazilian and local mine bosses in the area have been helping out with cash donations and materials such as nails and timber. Sponsorship also is indispensable during funerals and other ceremonial events. Pro-active collaboration among miners is less common but does occur sporadically. In the village of Balengsula, for example, a mining cooperative used concession fees obtained from Brazilian miners to finance the building of a village clinic. In the village of Manlobi, miners regularly pull resources to pay for fuel for the village generator when government provided fuel gives out.

3.7 Negative impacts on individuals, families, and communities

Among the greatest risks of working in placer mining in the eyes of miners are occupational accidents, malaria, and becoming a victim of violent crime¹⁶. Skin contact with mercury and the inhalation of mercury vapor constitute additional risks to miner's health. Other illnesses that are either induced or aggravated by mining include skin irritations and rashes, head aches, muscle strains, and heat stress. In some areas, alcoholisms and drug abuse threaten miners' health.

At the family level, mining has led to the absence of young, healthy men. In some villages, the departure of unmarried men makes it difficult for women to find a suitable

¹⁶ See WFF reports Heemskerk and Oliveira 2003 and 2004

spouse, and jeopardizes their access to land, materials resources, and money. On the other hand, mining-related migration has led to an increasing number of children fathered by migrant miners. Most fathers have now left the area, and those who are around rarely fulfill their parental responsibilities. We cannot foresee whether children of mixed Maroon descent will experience negative consequences from growing up without a father. Women with a male partner are only slightly better off. As their spouse is absent for months in a row, they now perform tasks that men traditionally did, such as clearing agricultural fields. Moreover, uncertainty about the husband's return makes it hard for women to plan economically. Separation from the family is less a problem for miners working near their home villages that can spend their weekly day off at home.

Communities pay for the economic benefits of gold mining with the damage to the natural environment and health. Among the worst environmental impacts of mining for forest communities is water pollution. Rivers and creeks provide drinking water as well as water to cook, bathe, and wash clothes and dishes. In many villages, traditional sources of drinking water are no longer suitable for human consumption. This condition forces women to paddle or walk long distances, rely on tap water, or even buy water in the city. After fetching water, people let the dirt settle for a while before using it for drinking. This is not an adequate solution though, and diarrhea and other water pollution-related diseases are common, including dysentery, leishmaniasis, and jaundice. Other serious threats to public health are the uncontrolled spread of malaria and mercury intoxication from the consumption of contaminated fish.

Last, the conglomeration of men away from their families has sparked the development of a thriving sex industry in and around SSM camps. Multiple partnership and unsafe sexual practices promote the spread of sexually transmitted diseases, including HIV/AIDS. Men take these diseases to their homes, with mortal consequences.

The negative health and environmental impacts of SSGM have been described in detail for Suriname and many other countries. Instead of repeating what has been said, the reader is referred to the bibliography, which lists numerous reports, books, and papers on the issue.

3.8 Lessons learned

We have presented an overview of the main groups living and working in the interior, their way of organization, and the implications of their work for individuals, families, and communities in the interior. These socio-economic data expose three themes that will influence the success or failure of policy interventions among small-scale miners:

- First, there is an alarming lack of detailed demographic information for the SSM sector. Figures on the numbers of miners and sub-groups of local and foreign miners, men and women, and organized and non-organized miners are rough estimations. Quoted percentages are copied from one study to the next without verification. A census-style field survey of all mining areas is needed to provide

essential baseline data for regulatory efforts. Regulation remains impossible as long as we do not know who we are dealing with.

- Secondly, the mining population is heterogeneous in terms of ethnic origin, family background, living conditions, and many other socio-cultural aspects. Some garimpeiros are transitory visitors to Suriname, with little vested interest in the country other than its gold. Others have established families, sent their children to Suriname schools, learned the local language, and are integrated in Suriname society. There are Maroon men from forest villages who work for nine months in a row in the mines, away from their wife and children, who suffer from a lack of clean water and malaria at home. Yet the Maroon mining population also includes women who come to trade for a couple of weeks out of the year. They may be sharing their meals with a Hindustani excavator operator, who has come to earn investment money for a business in town. Prior to developing interventions, policy makers should identify a target group and consult with members of this group to assess program relevance and efficiency.
- Last, Suriname miners are not systematically organized, for reasons discussed in an earlier WWF report². It is impossible to approach miners as individuals. Miners' participation in workshops and other elements of participatory policy reform requires that miners form cooperatives or associations. We are not the first to observe this. To date, however, no governmental department or non-governmental organization has made a serious effort to organize local small-scale miners.

Chapter IV

MINING CLASSIFICATION AND ENTERPRISE DEVELOPMENT

We begin the chapter by discussing the challenge of defining the gold mining sub-sectors. It is argued that the simple dual classification scheme in the mining code of 1986 needs to be refined. The technical outfitting of enterprises is reviewed next, and options for improved mining technology are identified. Against this background, the classification scheme of Noetstaller is used and slightly modified to suggest an appropriate three or four-level classification of gold mining activities in Suriname.

The organization of the various gold mining organizations is reviewed next. Five categories of mining zone organization are analyzed, ranging from large-scale foreign investment companies to occupied mining zones. The purpose of this analysis is to first, reveal the different organizational structures and how they function in the field. Understanding the various organizational schemes in the private sector is a necessary condition for the reform of the sub-sector. The table at the end of the chapter summarizes the defining features of the various organizational systems.

The findings also suggest that small scale miners' income is not enough to finance the technical innovations that are needed to increase income and reduce pollution. Ongoing technical assistance in the field is needed to improve prospecting, mining, ore processing and enterprise administration in order to upgrade SSM enterprises and make them sustainable income earners. However, a well organized SSM sub-sector is needed to provide a context within which assistance and control schemes can be successfully executed.

4.1 The challenge of defining the sub-sectors

Before discussing the objectives and organization of gold mining enterprises in Suriname, it is useful to review the existing definitions that are used in the mining code and other international instruments that could be applied and adapted to the situation in Suriname. The Suriname mining code makes a distinction between mining ('mijnbouw') and SSM ('klein mijnbouw'). The difference between the two systems has been described in more detail in Chapter II (Table 1).

The Ministry of Natural Resources (NH) requires that persons or enterprises seeking mining rights have sufficient capital at their disposal, possess the technical expertise, organizational infrastructure and experience to develop the mine. Small-scale miners, on the other hand, are not required to possess substantial capital, technical and human resources. Moreover, the NH commits itself to free technical and administrative assistance if and when it is available (article 39-1-e).

This distinction was useful at the time that the law was promulgated. It characterized the two main categories of mining. The technology available to the small-scale in those days was limited to a shovel and pick-axe, and later a small water pump that could process 5 to 10 m³ of ore per day. This limited miners to alluvial deposits or hand processing of quartz veins. Large-scale enterprises, on the other hand, could explore for large scale deposits, which could be hard rock but also alluvial or soft rock. If the grades were attractive and the ore bodies large enough to capture the interest of investors, a mill could be built that would process millions of tons of ore per year. Advances in geological expertise and mine engineering during the past thirty to forty years, have changed the characteristics of the gold mining sector. The classical distinction between primary deposits and secondary deposits, though useful, no longer reflects new developments in the gold mining sector.

The ***lode or vein deposits*** are also referred to as primary deposits, and are formed by hydrothermal processes, where gold precipitates during chemical reactions between hot fluids, metal bearing solutions and rocks in the earth's crust. Volcanic activity or intrusive rocks such as granite are a source of heat, and if there is a well developed ground water table, hot fluids and gases are produced. As the hot, corrosive mineral laden water moves up through crack and crevices in the rock it cools, and solidifying gold and other minerals are deposited in fractures and pore spaces. Almost all gold deposits are probably originally hydrothermal with the exception of placer deposits.

Alluvial or placer deposits are also referred to as secondary deposits. Gold bearing veins located in moist climates with heavy rainfall such as in Suriname will erode away very quickly once being exposed to the action of surface elements. Weathering and disintegration of the rock matrix releases the gold particles. The place where the vein or lode reaches the surface will also break down and decay, and as the softer and more soluble parts of the rock are carried away by erosion, the native gold will become more concentrated. As the gold gravitates down hill eluvial (hillside) places are created. As the gold is transported greater distances from its original source alluvial placers are formed. The gold will usually settle in the gravel layers of creeks or rivers above the dense tough clays, or get trapped in cracks and crevices or behind rocks in the bedrock. If the land in a given area is uplifted, the original creek will cut its way down to a new "base level," leaving bench or terrace placers "high and dry" from the original stream that created it.

There are, however, also large quartz-pebble conglomerate deposits that are at times difficult to distinguish from bench placer deposits. These conglomerate deposits supply 50% of the world's annual gold production, and have been classified by some geologists as modified paleo-placers, while others consider these deposits to be of hydrothermal origin. This is a subject of considerable controversy, which has been debated extensively at mining conferences and in mining literature.

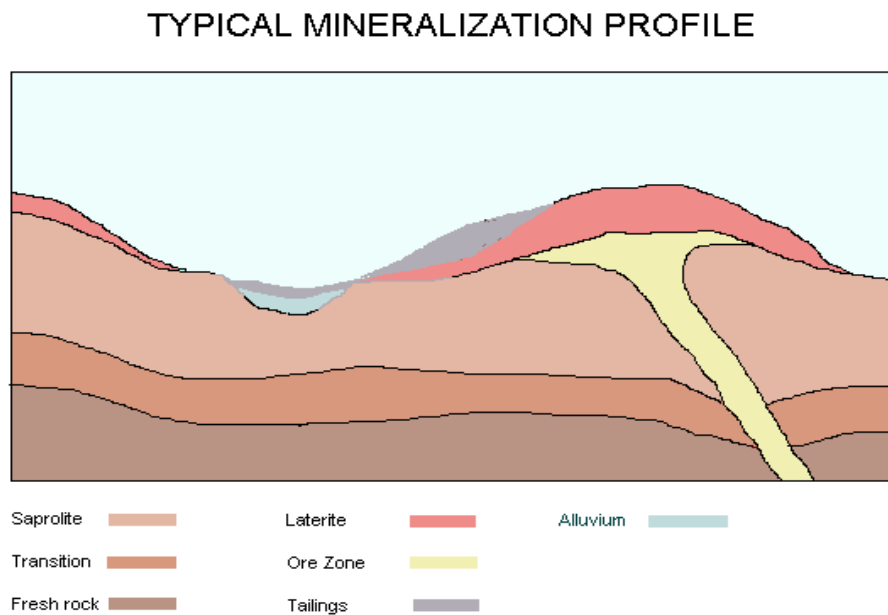
It is important to point out that there is no scientific consensus on where to draw the line between lode or primary and placer or secondary deposits. It is particularly tricky to classify saprolite. These soft-rock deposits consist of the top 50 to 100 meters of rock that is altered by rainwater and chemical weathering. The weathered rock has retained much

of its original rock structure and is rusty tough clay that may contain extensive low-grade mineralized zones and some pockets of higher grades. This saprolite layer is often overlain by a laterite blanket which also may contain gold mineralization. The laterite does not retain much of its original rock structure, save for a few quartz stringers. One could argue that saprolite is ‘weathered primary deposit,’ but what about laterite?

Both the laterite and saprolite layers can be mined without drilling, blasting or crushing and are of interest to both large-scale and SSM operations if the grades and volumes are commercially attractive. More than half of the reserves in the Rosebel mine consist of laterite and saprolite. When the alluvial deposits become exhausted, the more capital intensive SSM operations may shift to laterite and saprolite layers. Through this transition they become the competitors of LSM companies. In locations where gold mineralization zones in saprolite and laterite blankets are targeted by both large and small-scale miners, conflicts are most likely to arise. It would be helpful if the new mining code recognized this new challenge in regulating the sector.

The terms and concepts used in the Suriname mining code of 1986 are now out of date and need to be refined. The range between LSM and SSM is continually shifting: new technological developments have added operations that hardly qualify as ‘SSM.’ It makes little sense to equate a six-inch hydraulic operation or an 8-inch river dredge with panning, manual rock crushing and small-scale sluicing, the original referents for the term “SSM.” The “middle range” has expanded, but also the “upper end.” With the opening of the Gross Rosebel mine in 2003, Suriname now has a mining operation that truly qualifies as ‘LSM’. The mill processes about 20.000 tons of ore per day. It is clear that new terms are needed to define the range of gold mining systems and processes that are operating in the field today.

Figure 4.1



4.2 The technical outfitting of enterprises

Descriptions referring to the level of mechanization are useful ways to classify mining operations. Artisanal mining (A-SSM) refers to panning and hand crushing of rock using a iron mortal and pestle. Partially mechanized SSM (PM-SSM) refers to manual ore extraction with a pick-axe and shovel while a 2” or 3” water-pump is used to concentrate the ore in a small sluice box. This method is rarely used today in the interior of Suriname, but two decades ago it was the most common method of SSM. A new term “electronic mining” (EM) may be useful to describe the two or three men teams that use a metal detector to locate gold deposits.

Mechanized small-scale (M-SSM) covers hydraulic mining without an excavator while highly mechanized SSM (HM-SSM) describes land dredging with an excavator. Further elaboration may be possible when not only ore extraction but also ore processing is considered in a classificatory scheme. Terms such as fully mechanized SSM (FM-SSM) might be used to describe a hydraulic unit with an excavator that uses a shaking table or centrifuge or chemical processes for final ore concentration. Clearly, there will always be some manual activity involved. The basic idea is to classify SSGM on the basis of the levels of mechanization in all the phases of the ore extraction and ore processing. These categories may prove particularly useful in structuring assistance programs and when trying to design regulations that mandate less dangerous or polluting mining methods.

The WWF-Guianas program has recently prepared a review of the gold mining technology that is being used in the Guianas, as well as information on alternative mercury free mineral processing technologies. This Technical Paper report is available on the website of the WWF Guianas Regional Program Office. What follows is a summary of the main mining technologies that are being used in Suriname with some slight modifications:

1. Artisanal mining (A-SSM). Miners use a pick axe to dislodge ore in quartz veins and pulverize it with an iron pestle and mortar. A gold pan with mercury is used to recover the fine gold. This technique, as well as simple panning in creeks, is becoming rare as most shallow and easy to mine deposits have been depleted.
2. Partially mechanized SSM (PM-SSM). Ore extraction is done by hand. A miner works four to six days to extract about 8-10 cubic meters of ore from a pit not more than 3 meters deep. The stockpiled ore is then hand-fed into a small sluice box. A 2” or 3” pump is used to run water through the sluice box. Again, as shallow alluvial deposits are now harder to find, the use of this technique has declined considerably. This method is still used to re-process tailings from larger operations.
3. Electronic SSM (E-SSM). Metal detectors are now used by small teams of two or three men to locate gold. The ore is extracted manually and panned with mercury. A sluice box is used if the volume of ore to be processed is larger, after which the

concentrate is panned with mercury. This technique has become popular recently, but many concession owners object to EM. Because of their remote and vast operating area it is impossible to collect a fixed percentage or fee from electronic miners.



FRAME 2: LAND DREDGING IN BENZDORP

4. Mechanized SSM (M-SSM) or “land dredging.” (FRAME 2) Two diesel engines are used, one with a water pump and one with a gravel pump. Trees are felled with chain-saws, the forest is cleared by hand and then burned. The water pump supplies water to one or two high pressure jets that are used to remove the topsoil and strip the overburden. The pit is then mined. The high pressure jets are used again, this time to dislodge, break up and liquefy the ore in the pit. The ore slurry flows into the pit channel usually dug through the middle of the pit. The gravel pump draws out the gold bearing slurry from a basin in the pit channel and pumps it to the sluice box. The concentrates are manually removed from the sluice box for upgrading and amalgamation.



FRAME 3: STRIPPING OF TOPSOIL IN NIEUW KOFFIE KAMP

4. Highly mechanized SSM (HM-SSM) has a similar set-up to M-SSM. However, instead of water jets, an excavator is used to clear the land, remove the topsoil FIGURE 3, strip overburden, and stockpile ore for processing. In some instances, the excavator is used only to prepare for mining, in other instances the excavator is used more extensively throughout the ore extraction process in the pit. The excavator digs out the ore layer and deposits it on a pile that is hosed down by water jets. The slurry then makes its way to the pit channel.
5. Dry SSM (D-SSM) or ‘dry mining.’ FIGURE 4 an excavator is used in



FIGURE 4: DRY MINING IN AQUA AZUL, SARAMACCA

6. conjunction with another excavator, or a conveyor belt, to feed ore into a grizzly (parallel bar screens) and then into a sluice. Water is only used in the ore processing phase, not during ore extraction. The water system is 'closed,' that is, the effluent is channeled into settling ponds and then re-used. The system produces considerably less effluent than the hydraulic ore extraction methods. This system has been tried at the Goliath Berg areas in West-Suriname.
7. Missile river dredging (MRD). River based operations that rely on suction pumps to vacuum alluvial sediments from the beds of larger rivers. The slurry is then channeled into a large sluice box on a dredge for primary concentration.
8. Cutter head dredging (CHD). River based operation using a rotating saw-tooth conical device that penetrates the hard crust in the river bed to retrieve consolidated material. The suction intake system is basically similar to the missile dredge.

In the section on amalgamation methods of the referred WWF-Guianas Technical Paper, Vieira notes that mercury is the preferred chemical in the recovery of gold. It is used in the mining pit, in the sluice box and during the final clear up process. At Benzdorp the miners report that only small amounts of mercury are poured into the channel of the mining pit, through which the slurry is directed to the intake hose of the gravel pump feeding the sluice box. Mercury is placed behind the riffles if the sluice box has them. The sluice boxes observed in Benzdorp did not have Hungarian (referred to dredge or angle iron) riffles. The nomad matting was covered only with expanded metal. During clean-up of the sluice box small quantities of mercury were used to amalgamate the ore.

Vieira reports that "most miners only amalgamate gravity concentrates. This practice utilizes less mercury than those mentioned earlier and hence losses to the environment are significantly reduced. Approximately eight grams of mercury is used to recover one kilogram of gold, since most of the coarse gold particles are hand sorted." Once the ore in the sluice box has been amalgamated, miners take to a creek or pond or use a barrel or pail to pan the gangue. The miner is left with a ball of mercury and gold, that is squeezed through a piece of fine cloth. Next, chemicals (bleach, soap powder and vinegar) are used to further clean the amalgam.

In Benzdorp, it was observed that during the final wash-phase of the channel in the mining pit, the miners were very meticulous about recovering every last gram of gold from the basin in the mine pit channel. Very little mercury was used during final clean-up of the sluice box. If a retort is used still more mercury is recovered. The amalgam squeezed through the cloth recovered considerable amounts of mercury. It seems that most of the mercury used, during final clean-up of the sluice box is recovered. This information contrasts sharply with reports which suggest that for every kilogram of gold three to five kilograms of mercury is used. The information from the field and from Vieira suggests that more thorough field investigations are needed to more precisely assess mercury use during mining and amalgamation.



FRAME 5: BURNING AMALGAM IN OPEN AIR

The last phase of mercury removal in the field is, however, a cause for major concern. Only one of the 40 units that were in operation in Benzdorp used a retort to recover mercury during the final heating of the amalgam in the field. The retort recovered 100 ml or more of mercury from a yield of 544 grams of gold. All the other units burn the gold-mercury amalgam in open air FRAME 5 at considerable risk to the person who performs this chore. It has been suggested that the burning of the mercury-gold amalgam in open air may very well be the principal source of mercury emissions into the environment. If mercury is conservatively used during mining and clean-up and a retort is used for the final burning, most of the mercury will be recovered. However, field testing is urgently needed to assess the potential for achieving zero or low mercury emission.

In the Technical Paper, Vieira mentions alternatives for mercury free mineral processing. Improved sluice boxes, the Cleangold Sluice, Gemini 'shaking' Table, centrifuges and chlorine processing are all methods that can be used to recover gold without mercury. The ideal situation would be an appropriate combination of a selection of these technologies. For example an improved sluice box would increase the gold yield, making available the extra resources to purchase a shaking table or centrifuge. The initial cost might seem prohibitive, but once miners notice increased financial benefits from the use of sounder technology they will not hesitate to exploit the available options. A long-term field project with on-going technical assistance is required to first convince miners that better options are available, and to help them to secure the technology. The private sector has to play a critical role in promoting awareness and making available the technology. A one or two-day demonstration in the field will not do the trick.

4.3 The classification scheme of Noetstaller

In his effort to define SSM, Noetstaller (1987; 2.08) noted that “if one of the principal motives for selecting quantitative classification limits is to establish criteria for eligibility, evaluation for assistance programs, demarcation lines have to be set sufficiently narrow to permit efficient treatment of individual segments in accordance with the respective needs.” He developed a useful scheme that distinguishes between surface and underground mining and four categories of mining:

- 1) Very small scale mining (V-SSM)
- 2) Small-scale mining (SSM)
- 3) Medium-scale mining (MSM)
- 4) Large-scale mining (LSM)

The following table ranks operations according to output in tpy run-of-mill ore:

Table 4. Mine outputs for underground & surface mining

Size Segment	Mine output in tpy run-of-mill ore	
	Underground Mining	Surface Mining
VSSM	Below 5,000	Below 10,000
SSM	5,000-50,000	10,000-100,000
MSM	50,000-500,000	100,000-1,000,000
LSM	Above 500,000	Above 1,000,000

This is a considerable improvement over the dual classification in the Suriname mining code. This scheme, however, has to be adjusted somewhat to reflect production rankings in the SSGM sector. Moreover, almost all of the mining is surface mining. There is some tunneling here and there, but as alluvial deposits become exhausted small-scale miners may very well begin to turn to deeper deposits. As far as we know, the level of medium-scale surface mining (MSM) is probably not attained in Suriname. With a planned annual production of over 7,000,000 tons, the Gross Rosebel mine clearly fits the classification of LSM.

As for the two lower-end categories, a downward adjustment of very SSM might be useful. The limit of 10,000 tpy in the Noetstaller table would lump all SSM systems in one category, and would not distinguish between artisanal mining and a highly mechanized 6” hydraulic operation with an excavator. There is a substantial difference in the environmental impact that these two types of operations may have. An upper limit of 2,000 or 2,500 tpy would better cap off manual- or partially mechanized SSM with small sluice boxes, and clearly set this group apart from the highly mechanized operations. It would then be more appropriate to refer to the first three items on the list of Vieira as

very SSM (V-SSM). Another option is to use the three-tiered classification system of Guyana: small-scale- medium-scale and large-scale gold mining. The advantage of this system is a reduction in the sets of regulations that would be required to for the various sub-sectors. In view of the corresponding environmental impacts, however, in this scheme SSM (SSM) should refer only to artisanal, manual or partially mechanized gold mining, and not include hydraulic mining. Hydraulic mining operations should be classified with the medium-scale enterprises.

4.4 The organization of enterprises

Every gold miner or developer of a gold mining enterprise seeks to satisfy a need expressed in the demand for gold. The gold may be used for jewelry, but also for industrial or investment purposes. But here is where the similarities end. At the one extreme, gold is one of those minerals that can be produced by a highly organized and technologically sophisticated enterprise under an investment scheme of several hundred million dollars. At the other extreme, gold can be produced by a very poor person with a pick-axe, shovel, a small sluice box and a gold pan, an investment worth less than 100 US Dollars. Gold mining is a very challenging frontier where the investment community of western world meets head on with the often very poor artisanal miner.

In the case of Suriname, the big players in terms of capital and numbers are both ‘migrant miners’: the foreign investment miner moves liquid capital, physical assets and know-how from the wealthy or industrialized nations to Suriname, the subsistence miner relocates his physical strength and mining experience from Brazil to Suriname. Both are likely to run into the Maroon miners who have for over a century supplemented their subsistence income with money income from gold mining or as service providers in the sector. And both will turn to the custodians of the mining areas, entrepreneurs from Paramaribo who through their mining expertise and experience or through political capital control access to most of the greenstone belt in Suriname. So if we are to consider the purpose and organization of mining enterprises, it would be helpful to explore at least the five categories of stakeholders listed below and the variety of organizations they represent or mining capital and technology they mobilize.

- 1) Foreign investment mining companies
- 2) Concession holders and mining enterprises
- 3) Operations by Brazilian migrant miners
- 4) Customary mining zones controlled by local Maroon miners
- 5) Occupied mining zones

4.5 Foreign investment mining companies

Since the focus of the report is on SSM it suffices to point out that foreign investment mining enterprises such as Cambior observe the principle of economic efficiency in mining. The enterprise strives to achieve the highest possible recovery at lowest cost per gram, and it has the capital, expertise and experience to do so. The purpose of this type of enterprise is to turn a profit that will be paid out to shareholders. Basically, owners of

capital invest in such an enterprise to increase their wealth. In this respect, the large operator does not differ from medium- or small-scale investment miner.



FRAME 6: GROSS ROSEBEL MINING OPERATIONS

The mining strategy of a LSM company differs from that of a small-scale operation in one important aspect. In large-scale operations as much as 30 to 40% of a hundred million dollar project will be invested up-front in reconnaissance and exploration. In theory LSM should be a predictable and routine operation. When it starts to mine the company should know where the gold is, how it can be extracted most efficiently, and how much it will cost. The main unknown variable and the world market price of gold, and other cost factors such as energy which could also fluctuate and influence the cost of production. Political risk is an additional factor particularly in developing countries.

In sum, there is a systematic progression from reconnaissance to exploration and then on to the feasibility study, mine plan, external audit of the proven reserves, mill construction and exploitation of the reserves. In order to protect their investment, large-scale operations ensure that the best possible legal arrangements are concluded with the government. In the case of Suriname, Cambior concluded a mineral agreement with the State, as many of the provisions of the mining code, particularly the investment and environmental provisions, are not up to date. Large-scale operators are also required to conduct an environmental impact study and a social impact study. In the mineral

agreement the company has also committed itself to observe stringent environmental regulations, and it employs skilled and experienced staff to achieve this objective.

The main problem is that monitoring the agreed upon economics, mining efficiency and environmental standards should not lie with the enterprise but with the government agencies responsible for these tasks. Suriname does not possess the large-scale gold mining expertise to monitor the results of the enterprise, nor does it have the resources and tools to monitor compliance with environmental regulations. Efforts are now underway to improve this situation and to install a lab at the GMD for the purpose of environmental monitoring.

4.6 Concession holders and miners

In this category we made a distinction between three categories of permit holders:

- A. Permit holders as miners
 - 1. holders of exploitation permits who mine their prospect
 - 2. holders of exploration permits who mine their prospect
 - 3. holders of SSM permits who mine their prospect
- B. Concession Leasing Enterprises
 - 1. holders of exploitation permits who lease to sub-contractors
 - 2. holders of exploration permits who lease to sub-contractors
 - 3. holders of SSM permits who sublet the prospect
- C. Non Active permit holders
 - Holders of permits who have no presence in the field and exercise no control over the prospect

In Chapter V the legal aspects of these three categories will be reviewed in greater detail. In this section on economic and technological organization, the three categories are important because there are considerable differences in the structure, function and impact of the enterprises..

Permit holders as miners. Under this type of entrepreneurship, capital is mobilized by the permit holder to set up and sustain one or more gold mining units on the concession. The concession holder is usually the equipment owner or shareholder in the enterprise. The owner of the mining enterprise will invest between US \$ 10,000 to US \$ 20,000 in equipment for each mining unit, and the cost of transporting the equipment to the mine. Inclusion of second-hand heavy equipment would add another US \$ 40,000 to US \$ 60,000, depending on the location of the mining site. The total investment could be in the range of several hundred thousand dollars. The better organized mining enterprise will maintain an administration and put together a balance and profit and loss statement at the end of the year.

Most workers are paid a percentage of the gold that is recovered during a regular mining cycle. Some title holders bring their workers in, take care of lodging and meal arrangements, provide health care, and oblige miners to buy at the company store. Environmental management can be improved with this system. For example, central processing of concentrate without mercury has been put into effect in the Sara Creek mine of Wylab.

The level of control and security in an owner-operated zone must be high. Valuable capital assets in situ that are financed by the owner must be guarded with great scrutiny to avoid theft of expensive parts, fuel and other mining supplies. Reliable foremen are needed to manage and operate mining units and to ensure that equipment specifications are not exceeded and proper maintenance is observed. The owner must have a good control system in place to ensure that recovered gold is accurately declared and an appropriate percentage of the production is paid to the miners. The risks are high, and as a result this type of operation is difficult to sustain in remote mining zones where the owner cannot be present or have reliable representation on a continuous basis.

The concession leasing enterprise. Under this type of entrepreneurship the concession holder leases part of the concession to sub-contractors or independent unit owners. The unit owners usually pay a 10% fee to the concession holder. The concession holder may also collect fees from store owners, fuel transport enterprises, restaurant and brothel owners. Security guards of the concession management enterprise will collect the gold from miners when the sluice box is opened, pay them their share, and maintain statistics of production by the various units on the property. The enterprise will principally invest in zone infrastructure, facilities and systems to monitor and control the sub-letters or sub-contractors and offer security and other facilities to unit owners and miners.

These zones are characterized by a high to medium level of organization. The concession region of Naana Resources on the Lawa River is an example of a well organized sub-letting scheme where the concession holder not only provides general security, but also maintains an elaborate miners' registration system and production statistics. The company pays taxes to the government and provides a quarterly production royalty to the local indigenous community. Security is much better than at the uncontrolled zones and persons who do not abide by the elaborate system of rules are evicted. In other cases, mining teams working under a sub-letting scheme have few obligations to the concession holder other than paying their concession fees and staying away from criminal activities.

It is easy to confuse the owner operated and the concession sub-letting systems, because in both cases miners are paid a percentage of the recovered gold. It should also be pointed out, moreover, that combinations of both systems are possible in a single mining concession. It is also important to realize that many sub-letting schemes arose out of necessity rather than choice. As the demographic data indicates, three quarters of the miners are migrants with gold mining experience who do not have concessions. In the remote locations of the interior it is very difficult and costly to keep migrant miners out of a concession.

The absence of a government presence in the mining zones further complicates the situation. In many cases a sub-letting scheme is the only way to control the zone and at least collect some income from mining activities on one's concession. Some concession leasing systems are a provisional strategy for dealing with squatters on the concession and represent a way to bring the situation on the property under control until a LSM enterprise can be interested in developing the prospect. Some concession holders are not eager to invest in mining enterprises without an elaborate reconnaissance and investment scheme at a capitalization level that only experienced foreign mining enterprises can pull together.

It is not clear at this time how the investment benefits from both systems compare. Both systems have advantages and disadvantages. Most certainly the risks faced by a permit holder who mines are very high, because sufficient capital is rarely available to conduct extensive up-front exploration and ore estimation. The amount of capital that the active miner of a permit must raise is also considerable. The zone management enterprise does not take the investment risk associated with the purchase of mining equipment and operational expenses, but this type of enterprise cannot directly influence mine production. The commercial risks are by the unit owners that work on the property borne. Thus, while the mining enterprise has a direct influence on the mining activities, the concession management enterprise does not.

Non-active permit holders. A leading figure in the Suriname mining sector noted that he did not now what was worse, a non-active permit holder or an illegal occupant. He said "I cannot find words to describe the situation. A person receives a mining permit and does nothing with it. He or she does not even try to make contact with illegal miners on the property that the State has legally placed under his or her control. At least the illegal occupant is mining. These permits should be withdrawn immediately."

Speculation was the main reason for obtaining these permits. When foreign gold mining investors turned their attention to Suriname in the 1990s, many influential persons in Paramaribo, most with no mining experience at all, quickly obtained permits in all the unallocated portions of the greenstone belt. Having locked in the potential gold mineralization zones, foreign investors were forced to turn to these gatekeepers of the greenstone belt to secure exploration prospects. Hefty fees were paid on an annual basis to lease these exploration permits. One foreign investor complained that this situation further increased the cost of the already very expensive, risky and difficult to finance exploration programs. This form of absenteeism is detrimental to the sector. The holder of the permit discourages others from exploration for viable deposits, and takes no responsibility for the management of the area, thus providing a breeding ground for crime, pollution and other undesirable social developments.

Summary. A SSM enterprise offers the owners the opportunity to invest directly in small gold mining and earn a profit. Though this approach is risky, good management and mining expertise have produced positive results in some instances. The purpose of establishing concession management, on the other hand, is usually motivated by the desire to first bring the property under control of the legal title holder. The owner will at

least earn some income from mining on the property until it can be transformed into a LSM enterprise with foreign capital, expertise and experience. Absenteeism in the gold mining sector creates the worst of all possible worlds. The mine site becomes a free-for-all, and crime rules. Miners face uncertainties and are continually at risk of injury and even death. The government should seriously consider revoking the permits of the non-active concession holders.

4.7 Brazilian migrant miners.

Among Brazilian miners, the range of investment capital and mining expertise that has been mobilized varies considerably from unit owner to unit owner. At Benzdorp, there are owners who operate one or more 6 inch units with heavy equipment, maintain elaborate camps with a maintenance shop, short-wave communication equipment, a satellite TV dish and other amenities. The owner usually has one or two foremen who manage the day-to-day gold mining activities. The results for the month of November 2004 Table 5 are presented for a Brazilian owner who operates two mining units with one backhoe excavator. Some equipment owners also operate a store, a restaurant or a camp for sex-workers, as well as ATV's to transport fuel and supplies. Not all unit owners have large en well equipped outfits. There are also poor unit owners who struggle to get by with small 4 inch outfits. The owner usually works in the pit alongside the other miners and maintains a very basic camp.

Investment cost of a hydraulic mining for land mining may vary between US \$ 10,000 and US \$ 20,000, including the cost of delivery to mine site. Inclusion of heavy equipment would add another US \$ 40,000 to US \$ 60,000, depending on the location of the mine site. The cost of a river dredge may vary from US \$ 50,000 to US \$ 200,000 depending on the sophistication of the technology used.

Payment to crew members varies with the level of investment and technology. A unit that works with the help of an excavator will dig, prepare, and mine a pit about twice as fast as a unit without an excavator. The cost of the mine operation, however, will be substantially higher. As a result, the crew of a 4" or 6" unit without an excavator will receive twice as much, 30% instead of 15%, of the gold production, because they will work longer to produce the same amount of gold as a unit with an excavator. The crew of a unit with excavator will produce more gold faster, but at a higher cost, and thus earn a smaller percentage of the overall gold production. The table below outlines the payment rates.

The table on the next page lists the monthly results of a SSGM enterprise employing two hydraulic units at adjoining locations and one excavator in the Benzdorp area. The cost of fuel is a key factor in the cost of production. During mid-2004 the cost of fuel was 24 grams of gold per barrel of 200 liters, but at the end of the year a very severe dry season resulted in an all-time low water level, making river transport impossible. Fuel had to be flown in and the price in December per barrel of diesel increased to 40 grams. The results below are for the month of November. At that time, fuel had already increased to 30 grams per barrel, but the units were using fuel bought at the old price. In December,

however, insufficient water in the creeks and high fuel prices translated into significant losses for all units operating in the Benzdorp area. As the price of oil continues to increase, the profitability of the enterprises will further decline.

Table 5. Production allotment key

PRODUCTION ALLOTMENT KEY Gold Mining Units			
Type of Operation	Owner	Crew	Concession Holder
Type 1 : 4" Unit, hydraulic operation only	60%	30%	10%
Type 2 : 4" Unit, hydraulic operation & preparation by poclain	75%	15%	10%
Type 3 : 6" Unit, hydraulic operation only	60%	30%	10%
Type 4 : 6" Unit, hydraulic operation & preparation by poclain	75%	15%	10%

The two units of this enterprise opened their sluice boxes three times during the month, which is below standard. Hence the results are about break-even. If the two units had each opened their sluice boxes four times during the month, the enterprise would have earned a profit. Based on these costs, it is fair to say that the break-even is about one kilogram of gold per month for a 6" unit with an excavator. Most other units in the area only opened their sluice boxes once or twice during the month and suffered considerable losses.

Table 6. Monthly income statement

MONTHLY INCOME STATEMENT (At US \$ 12 per gram of gold) 6" GOLD PRODUCTION UNIT WITH POCLAIN		
Production Revenues		US\$
Revenues (in gr. of gold - 268+244+431+315+386+541)		2,185
Variable costs		
Concession fee (10%)	218.50	
Wages prod. Crew (15%)	327.75	
Diesel poclain (26days X 100 l. @ 12 gr.) X 1	312.00	
Diesel gravel pump (26days X 50 l. @ 6gr.) X 2	312.00	
Diesel water pump (26days X 40 l. 4.8gr.) X 2	249.60	
ATV Gasoline (200l. @ 30 gr.) X 1	30.00	
Food and drinks (boat of 300 gr. for six months)	50.00	
Grease (1 pail, 19l @ 5 gr.)	5.00	
Hydraulic oil (3 pails @ 7 gr.)	21.00	
Spare parts	25.00	
Total variable costs		1,550.85
Revenues – variable costs		634.15

Fixed costs		
Operator (150 gr. p. m.)	150.00	
Cook (60 gr. p. m.) X 2	120.00	
Oil boy	30.00	
Fuel transporter	50.00	
	350.00	
Depreciation		
Poclain (50,000/3/12/12)	116.00	
Gravel pump (4,500/3/12/12) X 2	20.00	
Water pump (4,000/3/12/12) X 2	18.00	
Hoses/small equipment X 2	10.00	
ATV (9,000/5/12/12)	12.50	
Workshop/tools (10,000/5/12/12)	14.00	
Camp and furnishings (3,000//5/12/12)	4.00	
	194.5	
Total fixed costs		544.50
Total costs (variable + fixed)		2,095.35
Revenues – (variable + fixed costs)		89.65

It is important to note that most miners operate at break even or make only a small profit. In SSM almost all the capital resources go into the purchase of mining equipment, logistics and start-up. Though some reconnaissance is done, funds for extensive systematic exploration are rarely available. The erratic distribution of gold deposits and the lack of information on the quality, quantity and mineralization patterns make this a very risky undertaking. Basically, this manner of mining is a gamble. One can never predict or anticipate what the outcome of a mining cycle will be. Nevertheless, operators are eager to comply with the regulations in zones controlled by concession leasing enterprises. The enterprises invest in the infrastructure and provide security as well as other visible benefits to miners. The security arrangements at least provide some security in a very risky enterprise environment.

4.8 Customary Mining Zones

Sela Creek is the most telling example of a customary mining zone. It is situated in the Opo (up-river) Region of the Ndjuka settlement area along the Tapanahoni River. The zone encompasses at least two creek basins, the Sela Creek and the Anamu Creek, located about 10 kilometers upstream from the village cluster of Godo-olo. The mine was discovered in the 1930s by Ma Sela, a Maroon woman who crossed the watershed between the Gonini River and the Tapanahoni in order to reach her village. The existence of this mine was kept secret until the second gold rush got underway. The mining areas are quite a distance inland. Miners working further inland must walk a whole day to get to their mine camps. Five years ago there were about 70 mining units with 700 persons active in the region, including miners, service providers and transitory merchants. This is probably the largest customary mining area in the interior.

Mining rights are allocated through Indigenous or tribal laws - regardless of formal claims to the area. In the Upper Tapanahoni Region, for example, mining rights are administered under customary law by two Ndjuka Maroon clans in respectively the Sela

and the Anamu zones. In principle, these clans are to receive a percentage-of-production from each mine unit on their concessions, usually 5%. Tribal authorities continue to be respected and play an important role in the assignment of mining rights and conflict resolution. For example, when a Maroon miner was robbed and killed a few years back by Brazilians, the Paramount Chief closed the mine for several months, and expelled all Brazilian miners.

Though high grade deposits are located from time to time, the overall economic performance of the Sela Creek mining zone is marginal. When the gold recovery of a mining cycle is below cost, unit holders run into trouble and are unable to meet their obligations. Workers often complain that they do not get paid when the unit owner produces below cost. Because he has no access to commercial credit, the unit holder is forced to shut down his camp and go to work in the mining pits alongside the workers of another enterprise. When he has saved enough to service his debts the unit owner takes the risk again, pre-finances another round of mining and prays for better results.

About ten years ago it was common for Maroon families to mortgage their real estate to obtain loans to finance mining operations. The newspapers were full of advertisements announcing the auction of these properties. Almost none of the units maintain a proper financial administration, and most certainly do not depreciate their equipment on schedule. The fluctuating gold production, unpredictable weather such as floods or droughts, coupled with the risk of a major equipment breakdown in the remote rainforest, are all conditions that warrant a significant reserve. Under these circumstances, and without proper exploration of the erratic gold mineralization zones, this type of operation is indeed a gamble. The monthly results of the enterprise presented in the previous section indicate how challenging it is to break even, and how difficult it is to make a profit.

According to reports from the field, the results of Sela Creek are probably not much better than Benzdorp. Most units seem to produce around break-even point, but further field research is needed to collect reliable statistics from the various mining zones in the interior of Suriname. The handful of better organized units will get by and turn a profit from time to time, but most unit holders struggle to survive. When calamity strikes, such as a severe drought, leading to an increase in fuel prices, or a machine has a major breakdown, the unit owner will have a difficult time surviving.

The requirement to pay the concession fee is not always scrupulously observed, as clan elders have little power to enforce payment. Three key problems have been identified. First of all, since most unit owners are probably operating at break even or even lose money, making the payment is not always possible. In the second place, miners seem to resist payment because there is no transparency regarding the use of these public resources. The belief is widespread that the respective clan heads simply pocket the money and do little for their respective communities. Since the elders or chiefs do not have the power to enforce payment, the issue of fee collection is often the subject of strife and conflict.

Finally, the concession holder who manages a zone under customary law does not invest in security of the mining areas, nor do they provide other services to miners. They do nothing to improve the infrastructure of the mining zones. So miners are not motivated to pay the prescribed fee because they see no benefits from the resources they hand over to the tribal authorities.

4.9 Occupied Zones

The fifth situation is that of *occupied zones*; concession areas or State land that has been squatted by smaller mine operators in the physical absence of a concession holder or mine inspectors. This is a common scenario, as many concession holders do not have the will or resources to control these vast tracts of land in the rugged and remote interior. Most concession holders are in fact absentee holders and make no effort to establish a permanent presence in their concession. The problem of maintaining a government presence in the vast, remote and rugged interior has already been alluded to in Chapter I and will be further analyzed in Chapter V. Miners in occupied zones usually obey customary rules about stakes and rights, but conflicts do occur, and easily lead to violence. It also happens that a powerful miner takes (temporary) control over an area, and demands a payment from the other occupants in exchange for ‘protection’.

4.10 Lessons Learned

The results of the analysis suggest that the simple dual classification scheme in the mining code of 1986 needs to be refined. The LSM operations are under international pressure to be good corporate citizens, and are more likely to try to keep pollution under control. Pollution caused by the manual small-scale miner is negligible, but in large numbers partially mechanized operations can seriously pollute creeks. Hydraulic operations are very large silt producers and need to be classified in a category that sets this activity apart from the smaller operations. It has been suggested that artisanal mining be defined as a gold mining activity that processes less than 2,500 tpy run of mill ore. In a four-tier system, artisanal mining would be classified as V-SSM, and hydraulic mining as SSM. In a three tiered system artisanal mining would be anything below 2,500 tons- per year run of mill ore and operations above that limit would be classified as medium-scale mining, which includes hydraulic mining.

Earnings of SSM operations are unpredictable and subject to fluctuations in cost price associated with factors under control and beyond the control of miners. For example, at the end of last year a severe drought brought river transportation at the Lawa River to a halt and prices of fuel almost doubled. Miners began to operate at a loss and the owners either shut down altogether or reduced production by 50 to 75%. Breakdowns of second-hand machinery are endemic. Miners do not conduct extensive prospecting and have no way to estimate and anticipate future production. After each mining cycle, cash or gold reserves must be kept, if possible, in anticipation of sub-standard results during the next cycle. But miners rarely have the opportunity to do so.

Under these circumstances, miners are not inclined to experiment with unfamiliar technology, no matter how promising it might be. The only way to encourage experimentation is to have a long-term presence in the field under which credit and continuous technical assistance is provided to miners. However, the assistance schemes will not have the desired impact unless a much better organization of the mining regions and zones in the interior is achieved and an organization of miners is established that has the infrastructure to provide technical assistance.

Five levels of enterprise organization are reviewed, and some economic indicators are used to give an impression of the financial potential of small-scale miners to improve their mining technology. The strength and the weaknesses of the various systems are indicated. Examples of excellent organizational efforts have been noted, while in other locations almost no organization is in place. Without authoritative and functional organization of mining regions and zones, it will not be possible to introduce and adequately manage assistance schemes, and to monitor and control compliance with new regulations that will be drafted and voted into law. It is suggested that existing organizational schemes set up by private sector enterprises should be studied thoroughly.

The concession management enterprises have found many useful and practical solutions to the many problems encountered in the sub-sector. The government may consider incorporating these tools in new laws and regulations promulgated for the purpose of reforming and structuring the sub-sector. The involvement of the private sector in the regulation of mining regions and zones is also an option that warrants careful considerations. Several concession management enterprises have a proven track record in this area.

The organization of miners is another key element in the reform and regulation of the sub-sector. The Brazilian miners have organized themselves into COGASUR, and this organization has contributed significantly to the well-being of its members. What is missing is an organization of the Suriname concession holders and equipment owners, including Maroon miners. Without such an organization, it will be difficult to reform the sub-sector and regulate the mining regions and zones. It will also be difficult to provide effective assistance on a regular and structured basis to foster better and/or improved techniques and practices, and to reduce the negative impacts. It is suggested that a project be developed to survey the mining regions and zones and to consult concession and equipment owners as well as miners about setting up such an organization. It is critical that this effort not be seen as a trick by the government to register miners and to collect taxes. The primary focus should be on assistance, to improve practices and serve the well-being and the interest of the members, but not the State. Of course, efforts to reform the sub-sector and introduce controls will be much easier and effective with such an organization in place. Basically this should be a private sector initiative supported by the Chamber of Commerce and by other business and industry organizations.

Table 7. Differences in organizational structures in the various zones

	Owner operated zones	Concession sub-letting	Customary zone	Occupied zone
<i>Level of control</i>	High; concession owner regulates concession area and mine units based on national and customary mining laws, and personal preferences	From high to low; some concession owner have a presence in the mine and exercise control. Others are absentee permit holders, and exercise little or no control.	Medium; mixture of tribal and customary mining laws	Low; self organized, following customary mining laws. Compliance with the customary 'miner's law' is haphazard and theft of gold and violence is common.
<i>Management style</i>	Pro-active with a presence of a mine manager. Infrastructure is developed and maintained.	Functions as a "landlord," collects statistics and fees. In low control mines no permanent management presence and fee collection is intermittent.	Chiefs and clan elders manage the area on the basis of customary tribal laws.	Unit management is good, but the overall management of the mining zone is not regulated or structured, creating an unpredictable working environment.
<i>Mine unit ownership</i>	Most equipment owned by concession holder, some leasing of equipment	Unit owners with agreement of permit holder to work on the concession	Unit owners, for the most part Maroon	Unit owners without concession or access to a concession
<i>Registration of mine units</i>	Inventory of all mining equipment, registration of laborers, and service providers.	Range between high degree of administration to a low degree or absence	Informal, oral consent	No administration of the mining zone
<i>Concession fees</i>	Not applicable, permit holder works on his own concession	10% to legal concession holder	5-10% to tribal land rights holder	Nothing or fee extracted by powerful individual
<i>Taxes and royalties to government</i>	Equipment owner/permit holder pays corporate tax, and royalty; Individual miners pay royalty if gold is sold to legal dealer	Concession holder pays tax and royalty; Individual miners pay royalty if gold is sold to legal dealers	Individual miners pay royalty at sales point if gold is sold to legal dealers.	Individual miners pay royalty at sales point if gold is sold to legal dealers.
<i>Safety</i>	Relatively high; authoritarian control. Manager hires heavily armed guards	Ranging from high to low, depending on the level control exercised by the concession holder	Medium, safe-guarded through clan relations. Individual operators may carry weapons, usually hunting rifles, or hire armed guards.	Low; no regulatory authority. Individual mine operators either carry weapons or hire armed guards.
<i>Authority and sanctions</i>	Concession holder and overseers mediate and enforce regulations. Authorities are involved in serious offenses.	Concession holder and overseers mediate and enforce regulations. Authorities are involved in serious offenses.	By chiefs and/or clan elders. Authorities are involved in serious offenses.	Self-organized; right of the strongest. An individual with social standing or power of arms may interfere

Chapter V

SMALL SCALE MINING AND THE STATE

This chapter reviews three key issues that need to be addressed in order to create an enabling environment for SSM: policy, legislation and institutional development. The first section of this chapter reviews the national SSGM policy of Suriname. The absence of an integrated gold mining policy has been noted, and the causes for this absence are reviewed. Suggestions are made on how to initiate an interactive SSM policy development cycle that will create enabling conditions for legal and administrative reform that are required to create a viable sub-sector.

The absence of a SSGM policy has stymied the legislative drafting initiatives. Three attempts have been made to create draft laws, but none of these three attempts have rallied a broad support base. Moreover, recent developments such as the “concession leasing enterprises” and “larger SSM operations” have been noted in the explanatory memorandum of the latest draft law, but the draft law contains no provisions to define and regulate these developments in the field. So it is critical that these areas be developed further before the new draft law is debated and approved. It is suggested that functional legislation be developed on the basis of the results of an interactive policy development effort and reliable information from the field.

It is argued that if the new laws and regulations do not reflect realities in the field, the new regulatory efforts will fail. It is critical, therefore, that any new legislation will reflect the dynamic nature of the sub-sector and which anticipates the required institutional framework needed to bring the sub-sector under control. Practical and feasible regulations are not enough, a strong institution is needed to monitor and control the sub-sector. Sustainability of the institutional effort can only be guaranteed if revenues are channeled back on a regular basis from the sub-sector into the administrative infrastructure. This is also the only way to ensure that the State receives a fair take from the sub-sector.

5.1 The current gold mining policy

In the Policy Note of 2001-2005 the government has produced a number of statements regarding the gold mining sector.¹⁷ This note indicates that in the year preceding 2001 US\$ 150 million was invested in the gold mining sector and that this is a significant indication of the export potential of the sector, especially in the context of favorable world market prices. The policy note stipulates that “one of the priorities of the government is to create a favorable investment climate for both large- and small scale mining project funded by international and national investors. “ Moreover, it is the

¹⁷ Summarized from the report of the SPS (SPS; National Planning Foundation) entitled “Developments in the gold sector from the 1990s onwards” (2002).

government's policy to phase out small-scale illegal and polluting gold extraction and stimulate mid-size and large-scale gold mining, on the basis of a so-called contingency policy. A ban on the import of mercury was also considered. Industries which use mercury in their production process would be exempted. What follows is a list of statements of intent by the government outlined in the policy note:

- Evaluation of gold purchasing by the CBvS
- Facilitating gold miners to invest income from the sector into communities of the interior
- Improved controls in purchase of gold through official channels
- Improved awareness building, assistance and regulations in order to protect people and the environment
- Introduction of sounder production techniques and equipment
- Introduction of measures to finance and combat environmental degradation
- Ban on the import of mercury
- Setting aside or zoning area for medium-scale mining

The report of the SPS notes that with regard to the first point, the evaluation of gold purchases takes place on a regular basis and the results are forwarded to the President of the CBvS and the Minister of Finance. The second issue raises more questions than it answers. Are the costs of company support to a community tax deductible? Is the company taking over the role of the various ministries responsible for community development in the interior? This approach is very risky for in the past community projects have stranded in mid-stream when companies pulled out because natural resource extraction in the area proved uneconomical. It is interesting to note that reference is made to zoning, a critical condition for reforming the sub-sector. The introduction of sounder production techniques and equipment would increase miner's income and reduce pollution. Insufficient emphasis is placed, however, on increasing the government's take.

With regard to issues 2-8 the report notes that no systematic efforts have been undertaken to realize the stated objectives. These objectives do give a general idea of the direction the government wants to move with regard to gold mining, but these statements are not sufficiently developed to constitute a policy framework that can form the basis for a reform strategy. How then should the process be initiated that will result in a more elaborate and comprehensive policy document?

Further to gold mining policy, article 2 of the latest draft mining code states that

“General mining policy is vested in the President, who can give general guidelines with regard to this matter. The Minister is responsible for the execution of this policy.”

The explanatory note of the latest draft code notes that “mining is of great importance to the economy of the country. ***A general mining policy by the president is therefore desirable.*** The implementation of this policy is assigned to the Minister in charge of

mining affairs” (emphasis added). Article 90 of the Constitution of the Republic of Suriname places the responsibility for policy making in the mining sector with the President, and this is mentioned not only in the latest draft mining law prepared by the Partnership Geologists and Miners (PGM), but also in the earlier version of the BGS . However, nowhere in the explanatory note of the latest draft law it is explained how policy guidance would be dispensed by the President. Since the Policy Note 2001-2005 contains only a very rough outline of a few policy issues, should the Minister of Natural Resources call the President every time a decision has to be taken that has some policy implications?

5.2 The purpose of an integrated gold mining policy

The current approach to gold mining policy development leaves the stakeholders in the dark; they are forced to speculate what the President will decide when key policy questions arise. This is a weak basis for developing an enabling environment in the gold mining sector.

It can be argued that every nation has a national mineral policy. In some instances this can take the form of a stand-alone document but more often such a policy must be interpreted from the legal framework, government administrative practices and announces by key government officials (e.g., such as speeches by the Minister for Mines) Where the policy does not exist as a stand-alone document, determining what the policy is for any particular issue can be a challenging and in many cases, highly speculative process (Otto 1997, p.2 in Otto and Cordes 2002, 2-1).

Simply referring back to the President for policy guidance in the draft mining code provides insufficient transparency to the investor and miner, but also to government officials and civil society. It is important for everybody in the sector to have a clear understanding of the government’s position on the gold mining sector. A fully developed, integrated stand-alone policy document is the only way to achieve this objective. Such a document would serve the following purposes:

- **Consensus building:** The process by which the policy document is prepared can be used as a consensus building tool, allowing important issues to be identified, discussed and agreed on before legislative drafting and administrative revisions commence. It is important that consensus is reached on the basic policy principles before regulatory reform gets underway.
- **Policy:** It provides guidance to the mineral industry on the government’s position regarding key issues.
- **Planning:** It can serve to provide realism and perspectives for understanding the role of minerals in national development, as well as the role to be played by the various key stakeholders in the mining regions and zones.
- **Legislative drafting:** It provides guidance to those drafting the law and those who will debate and approve the law on the direction and expectation of the nation with regard to regulating the sector.

- ***Institutional:*** It provides guidance to government departments, administrators, decision groups, monitoring and regulatory agencies for the application and interpretation of laws and regulations affecting both national and international investors in the sector.

An integrated stand-alone gold mining policy document can play a critical role in the process of regulatory reform. The following question can now be posed: How should the policy-making process take place?

Article 90 makes it clear that the President is responsible for initiating and managing this process. This does not imply that the President must be involved on a day-to-day basis in order to dispense mining policy. The President could appoint a mining policy development commission that reports to him and develops an integrated national mining policy under his guidance and supervision. It is not clear why this was not done before the legislative drafting process got underway. The overall regulatory process vacillates between policy development and legislative amendment. At the commencement of a reform process, however, policy development is logically prior to legislation drafting. It is difficult to understand how the many complex and politically loaded issues were translated into provisions of the draft mining code. Without the guidance of an approved policy directive, or a more comprehensive and integrated policy document, it would be difficult to choose the best alternatives in a wide range of legislative options.

As the previous chapters indicate, there is a huge gap between the current mining code and the realities in the gold fields. And there still is a large gap between the provisions of the draft mining code and the realities in the field. These gaps have to be closed. The most effective and efficient way to close this gap is to develop a mining policy that enjoys broad support from all key players in the mining community. This policy directive can then be used to develop the provisions of the new mining code.

5.3 Unresolved basic policy issues

There are a number of basic issues that have to be resolved before the process of legislative drafting and institutional development can get underway. The most basic of the issues is the position of the government on the place and role of SSM in the economic development of Suriname.

- Does it want to discourage the activities in this sub-sector, as indicated in the explanatory memorandum of the current mining code? Does the government believe that the days of SSM are numbered and that the challenges associated with the sub-sector will phase out automatically as small-scale deposits are exhausted? Does the NH believe that the regulatory, economic, social and environmental problems associated with SSGM will disappear as alluvial resources become exhausted?
- Or does the NH want to recognize the SSGM sector as an important source of employment and economic activity, and will it invest in programs and activities

that will help regulate the sub-sector and alleviate or mitigate the negative political, economic, social and environmental impacts this sub-sector creates?

- How is consensus to be achieved among key stakeholders on the basic principles that will be the foundation of the new gold mining policy, and the backbone of new SSM legislation and institutional development?
- If the NH chooses to regulate and develop the sub-sector, how does it intend to achieve efficient, equitable and environmentally sound codes and regulations? Efficient here means administrative procedures free of unnecessary bureaucratic delays, equitable refers to equal access to all miners to concessions and the benefits of the sub-sector. Environmentally sound refers to ore extraction and processing methods that employ the best available and affordable practices that avoid excessive environmental degradation and health risks for miners and communities in or near mining areas.
- Since much of the SSM in Suriname is poverty driven, how does the NH intend to make the system more accessible to the poorest members of society (including Indigenous and Maroon miners) and migrant miners so that they can become legal entrepreneurs? Educational, cultural and linguistic barriers play an important role in marginalizing miners. How are they to be brought from the informal sector into the economic mainstream?
- How does the NH intend to reconcile conflicting needs between the sub-sector and the all other inhabitants of the Republic of Suriname? How does it intend to promote sustainable development in the sub-sector without undermining economic activities of other sectors or sub-sectors?
- What type of legislative and institutional reform is needed to achieve these objectives?

5.4 The framework for gold mining policy development

The policy, legal and administrative topics that have been identified can be categorized into the nine major headings listed below:

- Gold mining policy development
- Sectoral planning and zoning in the gold mining regions
- Concession regimes in the new mining law, including leasing or sub-contracting
- The allocation of concessions
- Institutional development and fiscal policies
- Strengthening of the sub-sector (training, organization, mining equipment and procedures, administration and finance, safety, health and environment)
- Environmental regulations, monitoring and enforcement

- The rights of Indigenous, Maroon and migrant communities
- Illegal mining and security issues

The list of issues is quite long and complex. Many of these questions cannot be answered without having good information from the field or without consulting the key stakeholders. This process should be more than a mere consultation. Developing a broadly supported policy framework will require an interactive policy development process that includes frank discussion with concession holders, equipment owners and miners in the field in order to find out what they think would be needed to reform the sub-sector.

Development of gold mining policy. How does the NH intend to develop SSM policy? Is the policy going to be command type, expert designed, or interactively formulated, or a combination of these? What policy sources will be tapped to facilitate practical, feasible and efficient rule making? Will the rule making traditions and practices of the SSM sub-sector be considered? Does the NH want to involve not only miners, but also Indigenous and Maroon miners in the policy development process? What about the migrant miners? Are they to have a voice in policy development? How will the policy making process take place at intervals (how long), or will it be adaptive? Will it be ongoing and designed to incorporate new developments as they occur? The ideas developed by the Peruvian economist Hernando de Soto are particularly relevant to these questions.

Sectoral, planning and zoning of gold mining regions. How does the NH intend to execute the planning and zoning provisions of the mining code with regard to SSM? Is the NH interested in using zoning instruments to help structure and regulate the SSGM sub-sector? Can natural features such as river basins be used to help define the SSM zones in order to facilitate management, assistance, monitoring and regulation? How much importance does the NH attach to participatory and consultative processes in establishing mining zones? Is the NH interested in considering existing organizational practices (“the miner’s law,” concession management enterprises) as a basis for input in the reform effort? How does the NH intend to coordinate the policies and activities of the various ministries with responsibility in the sub-sector? Will regional, social and cultural differences be considered in the development of mining zones and concession regimes? How are the ecological issues and concerns going to be addressed and coordinated in the planning regime?

Concession regimes and leasing in the new mining law. How are the sub-sectors to be defined and what types of concession regimes are envisioned with regard to the various categories of mining that are to be established? Is it feasible to develop a concession regime for SSM that will serve the economic, social and sustainable development of the country? How large will a SSM concession be? Why? What are the terms and conditions attached to these concessions? Is it feasible to register mining equipment and to pay a fee for the equipment? Will sub-leasing of concessions be permitted and on the basis of what kind of zoning and/or organization regime? On what basis will concession fees be established? Is the government interested in incorporating new developments such as the ‘concession management enterprise’ into the new law?

Allocation of concessions. How does the NH intend to develop a concession allocation regime that is efficient, equitable, transparent and uniformly applied, one that results in a sustainable flow of revenues from deposits worked by small-scale gold miners? What type of arbitration or legal procedures will be instituted to ensure an equitable allocation and management of concessions? Since SSM is practiced by persons with limited capital resources, how is access to concessions going to be regulated? What kind of support regimen is envisioned to facilitate the poorer miners in obtaining concession and meeting the legal requirements? Is the government interested in de-centralizing the concession allocation regime, so that miners can register their equipment and obtain concessions in the interior? How will the concession regime be elaborated at the different levels: local, sub-regional and regional?

Institutional development. What type of institutional structure does the NH foresee: a relatively independent mineral institute or a department within the NH to administer and manage the SSM sector? How does the NH intend to achieve an equitable and transparent concession allocation regime based on a modern and efficient infrastructure with motivated staff earning salaries corresponding to their qualifications? How does the NH intend to develop an efficient SSM administration, free of bureaucratic delays and unethical practices that hamper the development of the sub-sector? How will the NH foster a commitment to high ethical standards among mining institutional staff, in town and in the field? How will the government establish a presence in the remote and difficult to access mining regions and zones? How will the management of SSM regions and zones be established and maintained? How will acceptance and respect for mining authorities in town and in the field be fostered? How will compliance be monitored? What type of sanction mechanisms are to be considered? Is there a role for the private sector and civil society groups in the management of mining zones? How will the long-term financial sustainability of the institutional base be assured? How will the mining institutions foster compliance with existing regulations?

Capacity building and training. What kind of efforts will be undertaken to strengthen the sub-sector (training, organization, mining equipment and procedures, administration and finance, safety, health and environment)? What will be the role of government, private sector and civil society in this process? What type of training instruments and institutions will be developed to ensure the viability of organizations and operators working in the sub-sector? What kind of training will be developed to foster a commitment to safe and environmentally sound mineral extraction, to make available more sustainable technology and to ensure sound mining practices?

Environmental regulations, monitoring and enforcement. What type of monitoring systems will be developed - in town and in the field? What type of information and communication systems will be set up to channel relevant information to the respective institutions responsible for environmental monitoring? What type of control environment will be created, and what will the role be of the private sector and civil society in this environment? What type of control activities will be undertaken and how? Who will perform risk assessment and interpret the results? Which regulatory agencies or

institutions will be involved, both in town and in the field? How will compliance be fostered? How will confidence in these institutions and their authority be fostered, and how will measurable outcomes be ensured? How will their independence and integrity be assured?

The rights of Indigenous, Maroon and migrant communities. How will the rights of Indigenous and Maroon communities be articulated in the SSM laws and regulations? How will independent and respected arbitration and appeal mechanisms be created to ensure protection of the rights and interests of these communities? What role will be allocated to the traditional authorities in the administration and management of SSM zones in customary settlement areas? How will compensation mechanisms be developed and how will the government assure independent and impartial application, control and monitoring of these instruments?

Illegal mining and security issues. How will the transition from illegal to legal mining be anticipated, structured and phased? How will this transition be implemented? How will security in the mining zones be organized, executed and monitored? How will the necessary resources, communication and controls be instituted and maintained over time?

5.5 The new draft law

A new mining law was drafted in 2002 by the Society of Geologists (*Maatschap der Geologen*) to address some of the problems currently experienced in the mining sector and paucities in the existing mining legislation. The processes of drafting and approval have been lengthy and contested. Now, three years after the first draft version appeared, the new Mining Decree is being evaluated in the State Council (*Staatsraad*). From here it will be sent to the National Assembly for approval.

The new draft mining law (Version of 16-10-2003) is an improvement over the old mining code in several areas. This proposed law provides regulations to curb environmental degradation (among others art. 13.5; art. 20; art 30.1; art 38.1j; art. 41; art. 45.1; and art. 64), taking the norms and standards of the World Bank Pollution Prevention and Abatement Handbook & Operational Policies as a guideline.

The draft new mining law also obliges the holders of an exploitation right to submit an Environmental Impacts Report (*Milieu Effecten Rapport*), which must include plans, analysis, and prognoses of possible environmental impacts. It also must include a so-called Environmental Management System (art. 64; *Milieu Beheer Systeem*), which presents strategies employed to mitigate or reduce adverse environmental effects as well as the selected measurement techniques.

The 2002 document also shows improvement in regulations concerning labor relations and the employment of foreign laborers (art 18). Furthermore, fees now are expressed in US Dollars. And SSM rights have been made transferable and can be leased to others (art. 12.2). Several other administrative changes have been made in an effort to regulate SSM in a way to also protect the interest of the miners.

Yet the new draft mining law has several weak points, most of which can be traced back to a lack of consultation with the three most important stakeholders: the GMD, Indigenous peoples and Maroons, and small-scale miners. First, GMD officials were asked to comment on the law. However, they had to share a limited number of copies, and consultation was not facilitated through a workshop or formal meetings. It is crucial that GMD employees do participate in the development of the new mining decree though, because they have first-hand experience with strengths and weaknesses in the previous law. Moreover, they will have to execute the new regulations.

What follows is a brief review of the key elements of the new mining code as they pertain to SSM. The various articles are discussed and recommendations are made on how they could be improved. The framework of the law is as follows:

Part I – General Provisions

Chapter I - General (articles 1-5)

Part II – Mining Rights

Chapter I - General (6-23)

Chapter II - Rights of reconnaissance (24-29)

Chapter III - Right of exploration (30-39)

Chapter IV - Right of exploitation (40-49)

Chapter V - Right of SSM (50-56)

Chapter VI - Right to quarry mineral masses (57-63)

Part III – Environment, Health and Safety

Chapter I - Preservation of the quality of the environment (64-65)

Chapter II - Health, hygiene and safety (66)

Part IV - Rights of Third Parties

Chapter I - Property rights (67-75)

Part V - Traditional Rights

Chapter I - Traditional rights (76-77)

Part VI - Supervision, Confidentiality and Settlement of Disputes

Chapter I - Supervision and confidentiality (78-79)

Chapter II - Settlement of disputes and arbitration (80-81)

Part VII - Levies and Incentives

Chapter I - Levies (82-83)

Chapter I - Incentives (84-89)

Part VIII - Penal, transitional and final provisions

Chapter I - Penal Provisions (90-92)

Chapter II - Transition- and final provisions (93-95)

The provisions of the draft law are reviewed below part by part.

Part I – General Provisions. Article 1 of Part I contains the definitions used in the draft law. The first thing that stands out is the fact that the old dual classification scheme that sets apart ‘mining’ from “SSM” has been retained. SSM is described as “the reconnaissance, exploration and exploitation of a mineral deposit that on account of its

nature, mode of occurrence and quantity, can be mined by simple means and techniques that are economically feasible.” This definition is problematic because nowhere is it explained what “simple” means in this context.

The retention of the dual classificatory scheme is contrary to the gist of the explanatory note, which observes that more advanced techniques and heavy equipment are being used increasingly in the SSM sub-sector. In section 4.3 we already pointed out that by using the dual classification system the term SSM would not distinguish the different ways of working and the environmental impact they have.

From an environmental and regulatory perspective we perhaps need to introduce at least three or perhaps four categories to classify operations in the field, or types of operations that may be introduced in the future. In section 4.3 we already discussed a scheme with four categories and suggested some modifications. In this section we will elaborate further on this scheme. Let us look at the classificatory issues that have to be dealt with in greater detail. The following categories are reviewed:

- V-SSM
- SSM
- MSM
- LSM

The smallest types of operations are gold panning, rock extraction and crushing by hand (with an iron mortar and pestle), electronic mining (with a metal detector). The environmental impact of a gold panner, manual miner or electronic miner is usually very limited. One warning is warranted. Thousands of manual miners could produce a significant environmental impact, such as at Serra Pelada in Brazil. From a regulatory perspective, this activity could be described as very SSM, and the amount of ore processed per year by one person would typically not exceed 250 tons. We could include partially mechanized SSM, manual ore extraction that uses a 2” or 3” pump to wash the ore in a sluice box, in this category. The amount of ore processed per person would be slightly higher, perhaps between 250 and 500 tpy. One partially mechanized operation has a limited environmental impact, but when a large number of miners are involved, this activity has the potential to be quite devastating from an environmental perspective. This has happened in the past and the cumulative environmental impact was extremely high. We can do two things, classify manual mining as V-SSM and partially mechanized mining as SSM, or consider both V-SSM. We would suggest that for reasons of regulatory efficiency these two categories be classified together as very small-scale or artisanal mining.

In Noetstaller’s scheme SSM mining was defined as operations processing between 10,000 and 100,000 tpy run-of-mill ore. The problem with this categorization is that we do not have an appropriate class to accommodate hydraulic mining. It makes no sense to equate these operations with gold panning. Because the volume of slurry that is processed is so high, hydraulic mining always has a significant environmental impact. The amount of slurry and tailings by far exceeds anything that could be produced by partially

mechanized SSM. These operations could process as much as 2,500 tpy run-of-mill ore, which is way above the limit of 500 tpy. But the volumes are considerably below the upper limit of 10,000 tpy run-of-mill ore which, in the Noetstaller classification, falls under V-SSM! It makes no sense to classify hydraulic mining as V-SSM! From a regulatory perspective it makes sense to establish parameters that reflect the environmental conditions that have to be monitored and controlled. In order to anticipate future developments this category could be capped at 5,000 tpy run-of-mill ore.

We might need to introduce a further distinction between medium-scale mining operations and large-scale operations, but it would be up to the environmental experts to indicate whether such a distinction is useful. Provisionally we suggest that a medium operation would fall into the category of 5,000-500,000 tpy run-of-mill ore and that LSM would encompass anything above that.

The table below ranks the operations according to output in ton-per-year run-of-mill ore:

Table 8. Mine output for surface mining

	Mine output tpy run-of-mill ore
Size segment	Surface mining
V-SSM	Below 500
SSM	500 – 5,000
MSM	5,000 – 500,000
LSM	Above 500,000

These figures above are only suggestions. The idea is to arrive at a table that reflects the realities in the gold mines of Suriname, one that makes sense from a regulatory perspective. The classificatory scheme is the backbone of the legislative instruments that are to be developed. Therefore, it has to be realistic and functional. It is advisable, however, to have a technical commission work out such details.

The explanatory memorandum also makes reference to ‘deposits suitable to SSM,’ and notes further than “many individuals doing SSM do not restrict themselves to deposits suitable thereto.” The list of definitions, however, contains no reference to types of deposits and in particular deposits “suited to SSM.” In section 4.1 we have already pointed out possible conflicts that could arise from competing interests for saprolite deposits and if the explanatory note suggests that such a thing as deposits suitable for SSM exist, they should be defined.

The explanatory note also makes reference to an intermediate category between SSM and LSM: “a category of holders of mining rights who often exercise their right in cooperation with smaller foreign mining companies (so-called junior mining companies or junior) or alone and in comparison with SSM typically has a larger and more complex organizational structure, invests larger amounts of money and has therefore to work more according to planning.” In section 4.6 we have further classified these types of operations

into several categories, basically distinguishing ‘permit holders as miners’ from ‘concession leasing enterprises,’ with further sub-divisions.

The law make no reference whatsoever to these different types of enterprises, that cannot be accurately described as either SSM or LSM. Again, the need for further classification is indicated. Moreover, the new draft law needs to formally acknowledge these different enterprise categories and include provision for the recognition, formalization and regulation of ‘concession leasing enterprises.’ By omitting this categorization and the subsequent legislation, new realities in the gold miner sector will be left out of the operational domain of the new draft code, and will remain beyond the regulatory grasp of the law.

Part II - Mining rights. In this discussion we must return again to our major concern about classification of the sub-sectors. Because the new draft retains the old dual classification scheme, the link between the mining rights to be granted and the method of mining is also retained. This is a problem, because no legal mechanisms will exist to prevent or curtail the massive pollution caused by hydraulic mining which is still classified as SSM. Let us review this issue, and see how the problem can be solved. An applicant for a (‘large-scale’¹⁸) mining permit must go through two phases: 1) reconnaissance, a general exploration phase and 2) exploration, a detailed exploration phase.

Reconnaissance is a general exploration phase, a preliminary target investigation that consists of a broad superficial survey. It is called the reconnaissance phase in the draft law, that can be granted for an area up to 200,000 hectares for a period of two years. The method involves a loose grid sampling and interpolation based on indirect methods of investigation such as the micro-panning of creeks and the analysis of surface rock samples in the permit area. The results must indicate whether further detailed exploration is warranted.

Exploration involves more detailed evaluation , or final target investigation. During this phase information recovered from ‘outcrops, trenches, boreholes, shafts, tunnels, bulk sampling and processing tests are used to construct a three dimensional models of he ore bodies and the sampling grid is spaced so closely that size, shape, grade and other relevant characteristics of the target are established with a high degree of accuracy and in sufficient detail for mine planning.’

The evaluation phase. In many other mining codes these two phases are followed by “an evaluation phase in which not only the technical and economic feasibility of a possible exploitation are determined but also the effect of a possible exploitation on man and the environment are investigated as well.” In the new draft law the requirements of this phase are incorporated into the provisions of the exploration phase and other parts of the code, including parts of the code that outline the requirements for an environmental impact assessment and a social impact assessment.

¹⁸ The law does not use the qualifier ‘large-scale,’ but only the term ‘mining,’ which technically includes everything but ‘SSM.’

Classification, legislation and regulation. For SSM, on the other hand, the rights of reconnaissance, exploration and exploitation are granted at the same time. This approach was practical twenty years ago when the current code was drafted, but, as noted above, the emergence of large dredges and hydraulic mining operations has rendered the dual classification scheme totally obsolete. Moreover, the emergence of *concession management enterprises* or *cultural management systems* in the field, involving between 500 and 1000 miners, calls for urgent regulatory interventions that cannot be achieved if the new mining code is not cognizant of these developments. The table below outlines the modified conditions of the draft law.

Table 9. Modified conditions of the draft law

Parameter	Mining	SSM
Sequence of mine development	Phased, moving from reconnaissance to exploration to exploitation	Reconnaissance, exploration and exploitation rights granted simultaneously
Size of claim during phases	A reduction scheme: 200,000 to 40,000 to 10,000 hectares	100 hectares for all phases (formerly 200ha)
Term(s)	2, 7 and 25 years	3 years (with option for extension; formerly 2 years)
Right of disposal	For exploration and exploitation	Yes (formerly no)
Exploration	Two phases, reconnaissance and exploration	Voluntary (the text reads “if contemplated”)
Plans or feasibility study including work schedule	Required for all phases	Report with work program, including mining method, level of production and number of workers
Reporting	Required by phases	Required

We noted the regulatory limitations of grouping artisanal or manual mining with hydraulic mining. In addition, the new code makes exploration in SSM optional (“if contemplated”), which results in a lost opportunity for hydraulic miners. In view of the investment costs associated with hydraulic mining and the associated risks, a less ambitious type of exploration could significantly reduce financial losses and unnecessary environmental destruction. If prospecting suggests that the grade at a specific site is uneconomical, miners will move on and not unnecessarily uproot the soil in search of gold that is not there in sufficient quantity.

To be sure, a hydraulic operation cannot afford the *pre-investment exploration* associated with LSM, but the law could require *pre-mining exploration* on a significantly smaller scale to protect the miner and to avoid unnecessary environmental destruction. The distinction being made here is between *pre-investment exploration* on the order of ten of millions of US Dollars and *pre-mining exploration* on the order of several thousand US Dollars. V-SSM could be exempted from this requirement. The approach to the

classification of sub-sectors in the draft code results in several lost opportunities that could protect the interests of the State, miners, third parties, and protect the environment.

Allocation of concessions. Educational levels, literacy, cultural and language barriers are all significant barriers to regulatory reform in the gold mining sector. Thousands of interior and migrant miners are not literate in Dutch, or do not speak the language, and are thus unable to apply for a concession. Moreover, almost the entire greenstone belt has been given out to large-scale, medium-scale enterprises and speculators, thus the chances of finding a free mine site is very small. Under the current circumstances most gold mining will remain illegal.

As suggested in the next chapter, zoning of the mining regions can contribute significantly to a much better regulation of the sector and sub-sectors. It is suggested, therefore, that the mining areas should be formally partitioned into mining regions and zones, much like the administrative zoning of Suriname into districts and resorts, or into electoral districts and resorts. Once mining regions and the constituent zones have been established by law, it will be much easier to develop an effective regulatory system. For example, if each mining region has a mine inspector, concession allocation and equipment registration could be issued in the mining regions by the responsible inspector. In a very short time almost the entire SSGM sector could be formalized in this manner. But in order to do so, an entirely new concession regime is needed, which at least distinguishes small-scale concessions from medium-scale and LSM, and which specifies which concession could be issued in the field and which must be secured in Paramaribo.

Part III – Environment, Health and Safety. The dual classification system retained in the draft law creates a situation whereby LSM must adhere to the very stringent norms and standards of the World Bank, as outlined in the “Pollution Prevention and Abatement Handbook,” while SSM must “strictly abide by the environmental rules given by the Minister.” Environmental regulation is a very sensitive and politically loaded subject. It is not appropriate to subject the Minister to the political risks associated with executive regulation of the many serious environmental problems in a sub-sector that is out of control.



FRAME 7: LANDSCAPE DESTRUCTION CAUSED BY
LAND DREDGING

The subject is so controversial that the reform initiative should start with the legislative branch. Efforts have to be made to involve the entire Suriname community in the process of environmental policy making, and only when broad support is secured on a number of basic principles (for example, ‘the polluter pays’), should these principles be used to draft laws that will be debated in parliament. Saddling the minister with this chore is to invite controversy. In order to survive politically most Ministers would simply dodge the issues and avoid making decisions.

The environmental impacts associated with the various mining methods are so different in kind, scale, and nature that specific regulations are needed for each sub-sector and type of mining practiced in the sub-sector. To be sure, international standards are useful, but it makes no sense to introduce them overnight. A phased introduction is needed over a period of several years, involving extensive assistance schemes in the field. The conditions in each mining region and zone are different, and unless consideration is given to the constraints of implementing new environmental regulations in the various regions, the desired outcomes will not be realized. Therefore, a systematic effort has to be undertaken, involving persons with extensive experience in the Suriname gold mining context, to develop feasible environmental regulations that be introduced step-by-step

over a period of five or more years. Of course, at the end of the phased process Suriname should be up to par with international standards for the sector.

To be sure, there are some general laws and regulations that can be introduced rather quickly for all regions. A law mandating the use of retorts should be drafted and presented to parliament as soon as possible. The cost of a retort is minimal, the technology is simple and the benefits are tremendous. The greatest beneficiary is the miner himself, he will not be subjected to the poisonous mercury fumes if he uses a retort. But this brings us back to the problem of zoning. Once new environmental laws and regulations are promulgated, there will be no way to enforce them unless a zoning system is in place with mining inspectors for each region. It makes no sense to create new laws and regulations unless there is some way of enforcing them.

Part IV - Rights of Third Parties. A recent IDB report¹⁹ criticizes the draft Mining Act's Chapter IV on the rights of third parties, which:

“...distinguishes between two categories: “title-holders” and “traditional rights-holders.” Title-holders are defined as persons possessing real title to land and registered “personal” use rights. Traditional rights-holders are Indigenous and tribal peoples. Both title-holders and traditional rights-holders must accept mining on their land, subject to prior notification and agreement concerning compensation for damages. If title-holders are unable to agree with the mining company, they have a statutory right to appeal to the courts. If traditional rights-holders are unable to reach agreement, however, the “Executive” is authorized to resolve the matter by issuing a binding decision; there is no right of appeal to the courts. According to the explanatory note, this discrimination against Indigenous and tribal peoples is warranted because “traditional rights are not suited to the normal [judicial] procedure, because these concern communal rights and not individual rights”²⁰ (IDB 2004: 42)

Clauses about relations with traditional title holders are limited to obligations to submit a social impacts assessment, produce a map of the possibly impacted villages, and develop undefined “community relations”.

On November 15, 2004, the Association of Village Chiefs in Suriname (*Vereniging van Inheemse Dorpshoofden in Suriname*; VIDS) submitted a petition to protest the draft Mining Law to the Chair of the National Assembly, with copies to the President, the Council of Ministers, the Council for Development of the Interior (*Raad Ontwikkeling Binnenland*; ROB), NIMOS, and the various LSM companies. In this petition, VIDS asks the National Assembly to withhold evaluation of the concept Mining Code as it violates the rights of Indigenous and Tribal peoples as well as the international treaty obligations of Suriname²¹. Calling the law discriminatory, the Indigenous representatives protest the

¹⁹ IDB. 2004. Suriname. An Overview of Indigenous and Tribal peoples. Paramaribo, Suriname

²⁰ *Explanatory Note to article 76 of the Draft Revised Mining Act*, pp. 28.

²¹ Suriname has been a member of the Organization of American States (Organisatie van Amerikaanse Staten; OAS) since 1977, ratified the American Convention on Human Rights in 1987, the International

absence of consultation requirements; the violation of their traditional rights to land and natural resources; the omission of legal protection for forest peoples; the lack of guarantees for equal benefits from mining profits; and the inadequate compensation provisions. It is important to note that at the root of this problem is the Suriname constitution, which lacks a legal framework necessary to recognize the rights of its Indigenous peoples and Maroons.

Despite the positive changes mentioned above, the draft new mining law continues to be a poor reflection of reality in the mining fields. For example, there is no provision to accommodate claims based on tribal customary rights, like those found in the Sela Creek mining zones. Neither does the law provide clear guidelines on health and safety regulations for laborers in the gold mines. Moreover, also this law does not provide adequate means to collect taxes from the more than one thousand machine owners.

Part V - Traditional Rights. With the signing of the Accord for National Reconciliation and Development in 1992, the government of Suriname formally acknowledged the rights of Indigenous and Maroon communities to customary settlement areas. The Accord was careful to specify that sub-soil resources remain the property of the State, in compliance with article 41 of the Constitution. The Accord did, however, recognize that in some tribal communities extraction of sub-soil resources such as gold is an integral part of their productive activities. Therefore, article 10-d states that tribal peoples could request and secure SSM rights in the economic zones of their customary settlement areas. The provision is zone-specific, which implies a priority right for customary settlement areas, similar to the timber concessions that have been granted to Indigenous and Maroon communities.

Though several attempts have been made to develop projects to resolve this politically loaded subject, very little progress has been made resolving the basic land rights issues. In 1993, the Redan Commission tried to convince several communities to accept suggested demarcation of their settlement areas, but because the claims were so far apart there was no basis for compromise. For example, in the Apura Region the Redan Commission was proposing timber concession on the order of 20,000 hectares, while the Indigenous communities were claiming several million hectares of land. Environmental organizations (including Amazon Cooperative Team and WWF-Guianas) and human rights groups have assisted Indigenous and Maroon communities in at least six regions in preparing land use maps of the customary settlement areas in order to promote sustainable land use, and/or provide evidence to support the land use claims of these communities.

Covenant on Civil and Political Rights in 1976 and became a party to the Convention on Biological Diversity in 1966. As such Suriname is obligated to recognize and respect the rights of Indigenous and tribal peoples as provided for in both customary international law as well as the international instruments to which they are bound (IDB 2004). See for more detail: Buursink Consultants. 2002. Diagnosis of Land Management Issues in Suriname; Kambel, Ellen-Rose and Fergus MacKay 1999 The Rights of Indigenous Peoples and Maroons in Suriname; IDB 2004. An Overview of Indigenous and Tribal peoples. Suriname. Paramaribo, Suriname.

To this day, however, little progress has been made in resolving the complex issue of developing legislation to provide these communities with secure title to the land they live on, farm, fish, hunt, collect, extract timber, gravel, sand and gold and use for cultural and religious purposes. The principal reason for lack of progress is again the failure to develop broadly supported basic policy principles on the basis of which demarcation of Indigenous and Maroon lands could take place. It will be very difficult to demarcate customary settlement areas until broad consensus has been reached on the policy principles on which to base land allocation. Of course, the mapping of customary land use patterns is useful to any future effort to resolve the crises, but the criteria for determining productive use should be agreed upon by the stakeholders and have a cultural and/or scientific basis.

There are a number of basic policy principles that have to be discussed and agreed upon by all parties: is permanent habitation a requirement for awarding title, or will areas, that are intermittently used to secure productive resources, also qualify? How much land is needed to secure productive resources? How is the government going to handle sub-soil resources? How much land should be set aside to guarantee the preservation of the environmental resources necessary for the well-being of the tribal communities? Which lands are necessary for the physical and cultural reproduction of the community? In other words, how many hectares does a person need to survive in a rainforest or savanna subsistence economy, and how many hectares should be set aside to assure sustainability of the forest resources? Which land should be set aside on the basis of cultural criteria: religion, historical occupation, identity and other factors to be identified during interactive policy making? It is essential that all key stakeholders are involved in the development of a land rights policy that will help resolve this issue.

This matter should not be treated lightly. Approximately 50 of the 140 Indigenous and Maroon villages are located in the greenstone belt and almost all the concessions in the interior overlap with the customary settlement area of one or more Indigenous or Maroon settlements. Until the land right issue is resolved, the development of the interior will be stymied.

It is of interest to note that most of the Sela Creek mining zone, which has been claimed by miners from the Ndjuka Maroon group, has remained *domeingrond* (State land). On the request of the Ndjuka granman, the GMD has not granted concessions to this zone to reduce the chance of conflict between Maroon miners and concession holder from the coastal area. There are various examples of such informal agreements between the GMD and Indigenous and Maroon authorities. On the positive side, these gentlemen's agreements show a realist position of the government vis-à-vis the SSM sector. In the absence of legal backing, however, oral contracts may be abandoned with changes in government and in the GMD-top. This situation leaves forest peoples, including tribal miners, in an unfavorable and uncertain position.

Table 10. Zones where the GMD has informally agreed to not grant mining concessions.

Areas	Reasons
Sela Creek mining zone, a tributary of the Tapanahony River	Request of the Ndjuka Maroon granman, in order to prevent conflicts with and among Ndjuka miners.
Along the Upper-Suriname River, south of the village of Pokigron	Some fourteen tourism enterprises are operational in this area; the Saramaka Granman introduced a ban on gold mining in this area and the government supports it
Along the Tapanahony River south of Sela Creek.	Wayana Amerindians living in this area have indicated that they would like to keep this area free of gold mining
Around the village of Kwamalasumutu, Sipaliwini savanna (southern Suriname).	The village council has advocated a no-mining policy

Migration. In 1986, it could not be foreseen that thousands of miners from Brazil would flock to the Suriname mining zones. According to oral records, Brazilians began working in the Suriname SSM industry around this time, but by 1986 they still presented a rather small minority. Hence the current mining code does not consider or deal with the presence of migrant miners, who now dominate the mining population.

Even in the absence of special provisions to deal with migrant miners in the mining law, the government should have a plan to manage migrant labor. No such plan seems to exist. Migrant laborers are not registered. The process to obtain a residency permit is lengthy and full of bureaucratic hurdles. During the earlier-mentioned Operation Goldfinger, there was an effort to register Brazilian miners. Apparently, some 15,000 miners were registered after payment of an annual fee of US \$ 200. Opposition members posed questions in parliament about the legality of the registration exercise vis-à-vis national labor laws. Miners were efficiently registered but the procedure did not comply with the regulations for obtaining a work permit in Suriname.

Assistance schemes. Article 39-e of the mining code of 1986 stipulated that the holder of a SSM rights is entitled to seek technical and administrative assistance from the Minister, and if feasible, this assistance will be provided free of charge.

Article 6 of the draft mining code prepared by the BGS expanded this provision considerably and stipulated that the proposed Minerals Institute should provide technical assistance to small-scale miners. It would do so by setting up training centers throughout the mining regions of the interior, prepare training material and issue free of charge a manual of procedures to small-scale miners. Article 15 of the draft law to establish the proposed Minerals Institute outlines the infrastructure that should be created in the field to:

- Provide technical assistance to small-scale miners (through experimental mining centers, amalgamation centers or demonstration pilot mines)
- To coordinate local activities of other organizations in the minerals sector
- To monitor mining activities, environment and health and safety measures
- To survey and verify boundaries of concessions

- To issue licenses to small-scale miners of indigenous origin

The professional staff of the regional units would report to a Regional Units Manager, who in turn would report to the Mining Department Director. The proposed Minerals Institute was never realized, thus the infrastructure and assistance program for SSM never came into existence.

In the latest draft mining code the matter of technical assistance disappeared altogether from the text. This could mean that members of the Society of Geologists (*Maatschap der Geologen*) who drafted the code ascribe to the view stated in the explanatory note of the 1986 code that SSM waste valuable resources since it is on the way out, and should not be encouraged. Alternatively the view could have prevailed that it is not the responsibility of the NH to train small-scale miners, but the tasks of the Ministry of Education and Community Development, or that it should be a private sector initiative or an activity undertaken by a miners association. This is a complex policy issue that should be discussed and debated among stakeholders in the sector. Clearly it will not be possible to incorporate the matter of certification and training at the legislative level in a sensible manner without at least an approved policy directive that also addresses the issue of technical assistance.

Again, we see how the failure to better classify and define the sub-sectors wrecks havoc with attempts to draft acceptable mining legislation. Clearly it is going to be difficult to demand certification of very small-scale miners, although most of the 600 or more hydraulic operations in the interior are powerful enough to do considerable damage to the environment. Some sort of regulation has to be phased into existence, better sooner than later. But how is the government to hold these mining units to standards if there is no institution that sets the standards, and if there is no way to train miners to meet the specified requirements?

It is difficult to predict what the outcome of the policy debates would be regarding the certification and training of miners. The point is that some form of control is needed for the larger “small-scale” mining operations, because technological advances have produced mining units that are powerful enough to process 50 to 150 cubic meters of ore weekly and even remove much larger quantities of top soil. When ten or twenty units are working in an area, the levels of deforestation, disturbed top soil and expelled effluent and tailings can be quite large. Thousands of square kilometers of rainforest have been turned into a devastated desert landscape with a disrupted hydrology and abandoned mining pits that form polluted ponds full of green algae, and yet provisions to regulate hydraulic mining are conspicuously lacking from the latest draft law. The most likely reason is the fact that hydraulic mining has been lumped together with the various forms of very SSM.

5.6 Government Institutions

The Ministry of Natural Recourses (*Ministerie van Natuurlijke Hulpbronnen*; NH) is the government entity responsible for everything related to mining, whether it occurs legally or illegally. The SSGM sector falls within this responsibility. The Geology and Mining Department is part of this ministry, and administers ore extraction activities (with the exception of oil and bauxite)..

The Geology and Mining Department (Geologische Mijnbouwkundige Dienst, GMD) is the working arm of the NH with regard to management and control of the mining sector. Its tasks include the preparation of concession applications and the inspection of mines and mining. Several dedicated individuals within GMD are working hard to improve administrative and technical facets in the SSM sector. but, the institution is unable to facilitate the sound management of the sector ..

Even though the GMD is responsible for mine inspection, in practice it is very difficult for its officers rarely visit the field, particularly the more isolated mines. Field inspections are primarily hindered by a lack of facilities. The GMD has only two field stations, at Loksi Hati and at Afobakka, for the entire interior. Neither one of these stations is permanently occupied by field officers or fully equipped. With one pick-up truck and a bus, travel facilities are inadequate, as is the money to charter transportation services (plane, boat) from third parties. A 2003 WWF grant (US\$300,000) to the GMD in support of SSM regulation should have resolved some of these hindrances. Orientation studies have been prepared and fact finding missions were undertaken. This grant, however, has not yet produced tangible results in the form of measurable technological, socio-economic, and behavioral changes in either the institution or the SSM sector.

A second obstacle to regular and systematic mine inspections is the lack of stamina among GMD personnel to be stationed in the field. There are exceptions of GMD officers who do take every opportunity to familiarize themselves with the field situation. The proto-typical urban GMD employee, however, is not willing to leave the comfort of the city behind to live in a place without electricity or clean drinking water and a high chance of contracting malaria. Employing and training local people, possibly ex-miners, as GMD field officers could help overcome this hurdle.

Sources within the GMD attest that efforts to sanction concession holders who do not comply with their mining or reporting obligations have been paralyzed by resistance from higher up. Yet it is clear that letting go of this type of preferential treatment is critical to the reform of the sub-sector and implementation of fair and equitable mining regulations.

The Ministry of Physical Planning, Land and Forestry management (Ministerie van Ruimtelijke Ordening, Grondbeleid en Bosbeheer)

The Nature Conservation Division (Natuur Beheer; NB) is responsible for the protected area system. NB employs game wardens that implement control in certain areas and on roads to and in the interior. Due to limited resources, remoteness and lack of easy access NB has not always been able to field sufficient wardens to monitor and control PA's.

NB is part of the Forestry Department of this ministry. The NB facilitated the creation of the Suriname Nature Conservation Foundation (Stichting Natuurbehoud Suriname; STINASU), in order to generate income through tourism to help sustain the PA's

STINASU was established to function as a working arm of NB, but also to earn some income from tourism to help fund nature conservation work in Suriname. STINASU also facilitates research in PA's. Because of their presence they implement some control in these areas. The most popular protected area is Brownsberg, which can accommodate over 20.000 visitors per year. Raleigh Vallen in the Central Suriname Nature Reserve (Centraal Suriname Natuur Reservaat; CSNR) is also becoming a very important destination.

PA's were/are established based on the following legislative products:²²

- Police Penal Code of 1915 (amended in 1942): Estuary of the Coppename River; became Coppename Monding Nature Reserve in 1961, based on the Nature Preservation Law of 1954.
- Nature Preservation Law (Government Bulletin 1954, no. 26), amended in 1992: All present Nature Reserve.
- "Agricultural Act" of 1936 and degree L-2 of 15 June 1982: Brownsberg Nature Park was given on long-term lease to the Suriname Nature Conservation Foundation (STINASU) based on this act.
- Planning ACT (Government Bulletin 1973, no. 89): Bigi Pan Multiple-Use Management Areas was created based on this act.
- Forest Management Act (Government Bulletin 1992, no. 80): Provides the possibility for maintaining forests that could have special scientific, educational, cultural, or recreational value.

With the establishment of the CSNR in 1998 (Government Gazette No. 65), merging three existing nature reserves into a single much larger protected area. About 12% of the surface area of the country has a protected status, and an additional 2% is proposed as new nature reserves or forest reserves.

The PA's that have been established to date are:

1. Hertenrits Nature Reserve (100 ha, 1972)
2. Coppename Monding Nature Reserve (12,000 ha, 1953/1961)
3. Wia Wia Nature Reserve (36,000 ha, 1961)
4. Galibi Nature Reserve (4,000 ha, establ. 1969)
5. Peruvia Nature Reserve (31,000 ha, establ. 1986)
6. Boven Coesewijne Nature Reserve (127,000 ha, establ. 1986)
7. Copi Nature Reserve (18,000 ha, establ. 1986)
8. Wane Kreek Nature Reserve (45,000 ha, establ. 1986)

²² This overview is based on the Directory of PA's prepared by Paul Ouboter of IBER for CI-Suriname in 2002.

9. Brinckheuvel Nature Reserve (6,000 ha, establ. 1961)
10. Brownsberg Nature Reserve (8,400 ha, establ. 1969)
11. CSNR (1,600,000 ha, establ. 1998)
12. Sipaliwini Nature Reserve (100,000 ha, establ. 1972)
13. Bigi Pan Multiple-Use Management Area (63,300 ha, establ. 1987)
14. Noord Coronie Managed resource Protected Area (15,000 ha, establ. 2001)
15. Noord Saramacca Managed resource Protected Area (83,000 ha, establ. 2001)
16. Noord Commewijne Managed resource Protected Area (65,000 ha, establ. 2002)

The system of Protected Areas (PAs) in Suriname does not guarantee exclusion from mineral exploitation in the respective areas. The 1954 law stipulates that PAs may be retracted if mineral exploitation is in the national interest. Much of the Sipaliwini Nature Reserve overlaps with a gold and diamond mining exploration concession granted to Nana Resources. An even greater threat comes from informal mining. The invasion of the Brownsberg Nature Park is a case in point.²³

The Brownsberg Nature Park is located some 115 kilometers from Paramaribo per road. It is a 500 meter high laterite plateau, nested on the north-west corner of the lake, covered with pristine tropical rainforest. There is a visitor center on the plateau, with bungalows and beautiful winding trails leading to several scenic waterfalls.

During the period 1997-1999, the Brownsberg Nature Park was invaded by gold miners using heavy equipment. Their activities have rendered a large tract of this protected area unsuitable for the promotion of eco-tourism and environmental education. Heavy equipment was used to remove the overburden, creeks were diverted and massive siltation and mine waste completely disfigured the landscape.

The incursion of gold miners is very unfortunate, because the Brownsberg Nature Park has played a leading role in the effort to demonstrate, that a nature protection system can help pay for itself through tourist activities (Mittermeier et al, 1990, 20). In terms of numbers, the Brownsberg Park has been the leading eco-tourism and nature study destination in Suriname. During the peak period in the late 1970s and the early 1980s, the park received between 7,000 and 9,000 visitors per year. There were days when between 200 and 300 visitors were registered.

The recent incursion of uncontrolled mining, moreover, may undermine the public's perception regarding the need for nature conservation. The impression might take hold that it is only interesting to protect an area until valuable resources are discovered²⁴.

²³ This section is based on an article by the consultant C. Healy in the Proceedings of the 3rd Annual Caribbean Tourism Organization of 1999 held in Paramaribo, Suriname.

²⁴ The Brownsberg Nature Park is not protected under the law of 1954 regulating the establishment of nature preserve. It has the status of "private park" and was leased to the Suriname Nature Conservation Foundation (STINASU) by the government for a period of 75 years, for the purpose of (promoting recreational and educational activities. "Both the law of 1954 and the deed granting STINASU the lease for the park can be overruled when overriding national interest are at stake." Reichart (1991: vi) correctly point out, however, that the park represents an important component in the total system of PA's in Suriname. He notes that due to his proximity to the populated areas (a two hour drive from Paramaribo).

This development was anticipated by one of the leading experts on nature conservation in Suriname, Henry A. Reichart, who, a decade ago, made the following remarks in the Management Plan for the Brownsberg Nature Park:²⁵

For to long now nature preservation and regional development have been seen as mutually exclusive activities. In almost all countries, PA's were established without taking into consideration the indigenous population. This was also the case with the Brownsberg Nature Park. The area was handed over to STINASU without paying much attention to the interest of the local population. As a result, the park remained a biologically rich enclave, surrounded by a denuded environment, in such a situation, when the aspirations of the indigenous population are ignored, it will not take long before the pressure on the park will be so great that it will no longer be able to perform its functions (1991, 36).

Though he clearly did not expect miners to enter the park with bulldozers and backhoes, Reichart has also anticipated the need for regulating and monitoring gold extraction activities in the park:

The lease of STINASU does not include the right to exploit minerals. Now and then a goldminer works in the park. It is important, therefore, that guidelines are established for gold miners. They should not be permitted to alter or divert creek beds, or arbitrarily cut down trees to build roads (1991, 28²⁶).

This particular incursion is only one of many negative manifestation of a largely uncontrolled gold mining sector in Suriname²⁷. Deforestation, river siltation and chemical pollution also threatened a wide range of tourist destinations in other parts of Suriname.

The situation is further complicated by the fact that the issue of indigenous land and economic rights looms in the background. Efforts to developed major projects in the interior have been stymied repeatedly by the challenge of dealing with indigenous Maroon communities, who one day hope to have some form of security with respect to the land and other resources they need for subsistence and survivals.

An intervention in 1999 and 2000 by park management and the authorities brought about the departure of the non-local miner and their heavy equipment. However, the local miners content that they need the income to survive and some therefore go on mining. Today gold mining is still going on in the Witi Creek area of the Park.

The park is accessible to 80% of the population, and that there is no other equivalent site in Suriname, which is as suitable as the park for conducting educational, research and nature tourism activities

²⁵ Reichart, H.A., 1991, Brownsberg Natuurpark Beheersplan 1991-1995. Paramaribo: STINASU.

²⁶ One mining expert noted that the mineral potential of an area should also be taken into consideration before a given territory is granted special protective status.

²⁷The Commission for the Structuring of the Gold Mining Sector in Suriname attempted to develop a program aimed at legalizing and structuring the informal gold mining sector.

Some experts fear that it might even be too difficult or too late to save the disfigured sections of the park. Millions of US Dollars will have to be spent on reclamation to reverse the damage²⁸. Reichart traced these problems back to the lack of consultations with the local community when the park was established, and this is an important “lesson learned.” Unless the local communities have a commitment to the park and nature conservation, efforts to protect and preserve will not work. The creation of the Suriname Conservation Fund (SCF) offers a glimmer of hope. Perhaps the resources generated by this endowment fund will facilitate the hiring of the expertise that is needed to develop a completely new nature conservation strategy. Such a new vision can help move the institutions currently involved in PA’s beyond the phase of creating paper parks.

The Ministry of Labor, Technological Development, and Environment (*Arbeid, Technologische Ontwikkeling, en Milieu*; ATM) has a central role to play in the SSM sector. Its Department of Labor carries the responsibility for labor licenses and labor conditions. The Environment Division of the ministry should safeguard environmental standards in collaboration with its working arm, the NIMOS. The Technological Division of this ministry should support the promotion of environmentally sounder mining techniques, including the use of retorts. None of these divisions, however, has formulated or implemented a policy strategy for the SSM sector. In February 2003, NIMOS and GMD signed a memorandum of understanding to collaboratively work on the environmental management of the gold mining sector. NIMOS, however, does not have an independent budget nor the necessary resources to plan and development projects in this area.

The Ministry of Planning and Development Cooperation (*Ministerie van Planning en Ontwikkelingssamenwerking*; PLOS). Besides the NH and the, several other ministries are responsible for different thematic areas related to SSGM. The Ministry of Planning and Development Cooperation (*Ministerie van Planning en Ontwikkelingssamenwerking*) and the Suriname Planning Foundation (*Planbureau*) should coordinate the work of the various Ministries in this area, particularly with regard to planning and zoning. However, in the absence of Ministerial initiatives, the involvement of these institutions is limited. As regulatory bodies for development of the interior, the **Ministry for Regional Development** (*Ministerie van Regionale Ontwikkeling*) and the Fund for the Development of the Interior (*Fonds Ontwikkeling Binnenland*; FOB) have the resources to help develop a strategic plan for SSM. Neither one of these institutions, however, is systematically dealing with this gold mining sub-sector.

The Ministry of Health (*Ministerie van Volksgezondheid*) and **Bureau of Public Health** (Bureau Openbare Gezondheidszorg; BOG) does not execute prevention program

²⁸As the park management recently discovered, it is not simply a matter of closing the large holes which were dug. The miners used the hydraulic system (high pressure hoses to spray loose the soil, and a suction pump carries the slurry to the sluice box. The soil was carried off in the effluent in the form of silt, while the tailings which remained behind consist primarily of gravel and rocks. Top soil and humus will have to be trucked into the area at high costs to fully restore the damaged areas.

in the interior on a regular basis. The BOG does service gold miners and others by providing malaria checks, but only once they have come to the city. Health care in the interior is the responsibility of Primary Health Care Suriname, better known under its local name Medical Mission (*Medische Zending*), a non-governmental organization. The Medical Mission receives 80% of its annual budget from the Ministry of Health and 20% from other donors such as the European Union (STD prevention program), PAHO (Roll Back Malaria), Rotary International (bed netting project), WHO, Dutch Treaty Funds, Stichting Lobi, and Family Health International (reproductive health) among others. The organization operates a network of more than 40 clinics throughout the interior, though none of these is located in the gold mines. Depending on where the mining takes place, the nearest clinic may be several hours or days travel away from the mining camps. Registered inhabitants of interior communities receive free health care at these clinics. Outsiders, including Brazilian and urban Suriname miners, are required to pay a small fee.

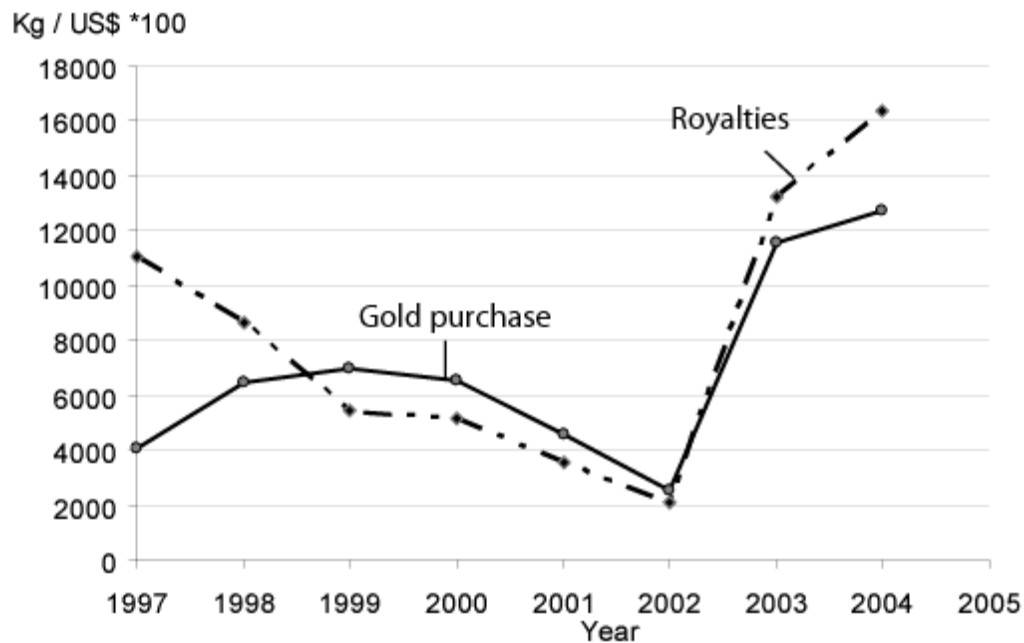
The Ministry of Finance (*Ministerie van Financiën*). Through its Department of Taxes, the Ministry receives tax payments from legal gold producers only. Taxes are to be paid by the concession holder over the concession area (per ha), and by the mine operator over laborers' wages and profits of the enterprise. In practice, the tax duties of a mine operator are difficult to assess by the tax service, which does not have the resources and man power to execute random field checks. If control does take place it is limited to visits to the administrative office in the city. SSGM contributes more to tax earnings indirectly, through the blooming service economy with mining equipment stores, calling centers, hotels, and restaurants. Mining-related commerce provides employment and income to a significant share of the Suriname rural and urban population, and tax incomes to the government – though it is difficult to estimate how much.

Other than taxes, royalties are paid by all miners and workers in the mining service economy who earn their wages in gold. Royalties represent 1% of the day value of the gold, and are collected when people sell their gold to the dealer. Dealers, in turn, will pay this 1% in their price to the exporter, who ultimately transfers it to the CBvS. The day value of gold is based on the world market price at the London Market Exchange. Because the LME price represents 24 carat gold, the value of lesser quality gold is multiplied by a factor 0.94 or 0.95.

Royalties averaged US\$ 821,500 per year between 1997 and 2004, representing 0.77% of the Gross Domestic Product. State royalties decreased in the late 1990s, but this trend was countered in 2002 (Figure 2). Over the past two years, the value of royalties the state has received from gold mining has increased considerably. This increase can be directly and indirectly attributed to the rise in gold prices since 2002. The Central Bank of Suriname (Centrale Bank van Suriname, CBvS) earns more money per gram of gold when the value of gold increases. The higher gold price also has spurred on renewed exploration activities by medium and large scale companies. When the price of gold dropped below 300 US\$ per troy ounce in 2001, it was simply no longer feasible for these companies to pursue exploration activities.

As noted earlier, efforts to collect taxes from small-scale gold miners have not been successful. The operation, named Goldfinger (1997-1999) came under heavy scrutiny from miners, the media, and the Suriname public. A first source of concern was the capricious nature of revenue collecting procedures. Tax collectors supported by military personnel entered the gold fields, and calculated tax payments on the basis of the number of mining units and other equipment used. Miners were forced to pay on the spot and in the case of inability to comply, machines and other possessions were confiscated. Illegal Brazilian miners usually just ran off into the forest upon arrival of the officials. Non-miners protested against the scheme because of the uncertain destination of the tax money. Rather than being used to strengthen government presence in the interior or to introduce assistance schemes, the funds were deposited in a presidential bank account.

Figure 2. Gold purchases (kg) and royalties (in US\$ * 100) received by the CBvS



Ministry of Justice and Police (*Ministerie van Justitie en Politie*) is responsible for preventing and fighting crime in the entire country, including the mining areas. In practice, this task is beyond the capacity of the Ministry and its working arm: the police force. There are police posts in some of the mining zones closer to the city, for example in the villages of Nieuw Koffiekamp and Brokopondo Centrum. A lack of man power, transportation facilities and other resources, however, makes it difficult for officers stationed at these places to service a larger area including the mining zones. In more isolated mining zones further into the interior, police and the national justice system are absent all-together. When they are called in, police agents tend to be poorly equipped and trained to deal with the SSM scene. And while most police officers try to serve the

community at the best of their abilities, there also are testimonies of overly aggressive police treatment of small-scale miners, particularly Brazilians.

Ministry of Defense (*Ministry of Defense*). The Ministry of Defense is responsible for national security. Its working arm, the national army, is represented in the interior by a military post on Stoelmanseiland. Yet without the physical and financial means of transportation, military officers are very limited in their patrolling and law enforcement activities. Consequently, the troops tend to remain in the immediate surroundings of Stoelmanseiland, unless an emergency situation arises.

SSM zones are plagued by security problems that have been exacerbated by Brazilian migration. Robberies and armed assaults along roads have become a real threat to miners. Even though Brazilians are not the only culprits, anecdotal evidence suggests that Brazilian criminal organizations have contributed to the professionalization and organization of crime in mining areas. In fact, the various mining mafias often are better organized and supplied than national security providers: police and military.

As the police and military take long to arrive at a crime scene, most miners do not even bother calling upon the national law enforcement agencies. Instead, miners have developed their own rules of conduct and security. These customary justice systems differ per mining zone.

The Ministry of Education and Community Development (*Ministerie van Onderwijs en Volksontwikkeling*; MINOV). The health care- and education system for the interior are two agencies that maintain a permanent presence in the interior of the country. For this reason, the Department of Education for the Interior of the Ministry of Education and Community Development offers a unique opportunity to assist in the reform of the SSGM sector in Suriname. Unfortunately this opportunity has not been capitalized on. Consideration was given to establishing a Foundation for Experimental Mining (Stichting Experimentele Mijnbouw; FEM), but involvement of the Ministry of Education was not an integral part of this proposal. Involvement of the Ministry would solve part of the infra-structure problem; existing school buildings and facilities could be used to train miners. Students at the tertiary level could also assist in developing training material and providing training. It is suggested that the FEM proposal be redrafted to rectify these omissions.

The education system in Suriname consists of five levels: kindergarten, elementary, junior-secondary, senior-secondary and tertiary. The Technological Faculty of the University of Suriname has a Geology Department. Important natural resources for Suriname are bauxite, gold, oil and other potential minerals such as copper, tin, platinum, kaolin, uranium, tantalite and other pegmatite hosted minerals. The Nature Technical Institute (Natuur Technisch Instituut; NATIN) is a senior-secondary educational institute that also provides training in geology and mining, but at a more applied level.

The training in geology and natural resources extraction gives students an understanding of the geological processes that form natural resources and the methods of mineral

detection and extraction. The information flyer of the University lists job opportunities after graduation including government jobs at the Geological and Mining Service or the Bauxite Institute, or jobs at private firms such as Billiton, Suralco or Rosebel Gold Mines. Opportunities in self employment and smaller scale mineral extraction are not mentioned. The University course is three years, with an option for continuation in a two-year masters program. The NATIN course is four years.

From the perspective of SSM, educational opportunities are very limited or non-existent. Beyond elementary school there is a wide a range of day and evening educational options, but not specific technical course is offered in mining. The courses focus on construction, automotive or general mechanics and electrical installation. It is recommended, therefore, that opportunities for small-scale miners are developed in the curriculum of the post-elementary education system. There is a Lower Professionally Oriented Education (Lager Beroepsgericht Onderwijs: LBGO) school in Klaaskreek in Brokopondo and one in Moengo in the District of Marowijne. A Simple Technical Training (Eenvoudig Technisch Onderwijs: ETO) course with low entry requirements could be offered in the evening for drop-outs. Students of the University and NATIN could assist in the development of training material and in assisting LBGO and ETO teachers to acquire the skills to offer courses in mining.

Setting up a private foundation that could engage in fundraising would make sense as government institutions are not allowed to fundraise. Such a private institute could partner with government educational agencies in order to provide scarce training resource and help to improve the quality of the programs being offered. Practical training could be given at actual mine sites in the interior.

Since many of the miners are Brazilian, consideration should also be given to the development of training materials in Portuguese. Attracting Brazilian miners to training programs could also facilitate better regulation and management of the sub-sector, as training materials could include information on the legal and administrative requirements and the environmental issues associated with gold mining.

5.7 Lessons learned

In this chapter we explored the government's role in the SSM sector. First the problem of policy development in the gold mining sector was discussed. In view of the complexity of the subject and the vast range of issues that have to be addressed and resolved, it is suggested that a specific policy is needed for the SSGM sector, which should dovetail satisfactorily with the government's overall gold mining policy. Draft laws were formulated without a clear integrated stand-alone gold mining policy and a specific policy framework for SSM. The advantages of having a stand-alone policy were explained. Such a document can

- Contribute to the consensus building process on this very sensitive subject
- Provide guidance on the government's position regarding key issues
- Strengthen the planning process

- Help guide law drafters and law makers in realizing realistic and effective laws
- Provide guidance for institutional development

In order to further clarify the need for a stand-alone policy document, a list of unresolved policy issues was reviewed in the context of a framework for SSGM policy development.

The new draft law was reviewed next, and the critical need for a more functional classification scheme was indicated. It was pointed out that the simple dual-classification scheme would lump together mining activities of a very different scale that also have significantly different environmental impacts. The problem of defining ore deposits vis-à-vis the various mining systems is also an issue that has to be addressed in the new law. A more elaborate three or four-tier system is needed that separates manual or partially mechanized SSM from highly mechanized gold mining methods that process much large volumes of ore and discharge much larger volumes of effluent.

In the new draft law no effort was made to define and introduce provisions for the regulation of ‘concession leasing enterprises.’ This relatively new phenomenon should be regulated, because these types of enterprises could play a critical role in helping organize and manage the mining regions and zones. There are several concession leasing enterprises that have developed elaborate control mechanisms in the field. These instruments should be carefully studied to see what useful elements they contain which can be incorporated into a regulatory system in the SSGM sector. The participation of the private sector in bringing the sub-sector under control is also critical and should be investigated and discussed.

A better developed classification scheme of the various mining systems could also have beneficial environmental impacts. It is not recommended that stringent prospecting requirements are attached to manual or artisanal SSM. However, in view of the amounts of top-soil and ore that are stripped or processed by hydraulic mining, it would make sense to require some sort of exploration. A distinction between *pre-investment exploration* and *pre-mining exploration* is suggested in order to distinguish million dollar ore assessment programs from much simpler but functional exploration that can be required for hydraulic mining. The miners themselves would be the greatest beneficiaries.

In view of the sensitivity of the subject matter, it was suggested that efforts to reform the sub-sector should begin at the level of the legislative branch. Once a broadly supportive mining policy is in place, and the laws and regulations have been promulgated, the executive should take the lead in implementing the new management and regulatory schemes. It will take years to make the new laws and regulations operational; hence a phased approach is suggested. It was pointed out, however, that there are some measures, such as a retort law, which could be introduced almost immediately.

The problem of dealing with the rights of Indigenous and Maroon peoples is also analyzed in relation to the need for an integrated policy dealing with this issue. If no agreement is reached on the basic policy principles for protecting the land and resource

rights of tribal peoples, controversy will continue, and it will be very difficult to reform the sub-sector. Similar observations are made with regard to migrant miners.

In the section on government institutions, the following lessons can be taken away from this discussion:

1. Limited information on conditions in the field has resulted in perceptions and a government approach to the sub-sector that is not sufficiently grounded in the reality of today's SSM industry.
2. As a consequence of the above, the Government of Suriname fails to take a fair share of the production earnings.
3. The SSM sector does have the potential to evolve into a more viable sub-sector, but a strategy needs to be developed to demonstrate this.
4. Once the potential of the sub-sector becomes apparent, leaders are much more likely to give the various government sections with responsibilities vis-à-vis SSM the necessary man-power, skills, and financial resources to study, regulate, and control the sector.

These four conditions are keeping Suriname mining authorities trapped in a vicious circle of negative cause and effect, a model presented by Noetstaller at the World Bank Roundtable on Artisanal Mining in 1995 (see Chapter VII). The limited value attributed to the SSM sector is unfortunate because solutions to sector-related problems will require public dedication and support. Moreover, each day the SSM sector is not regulated translates to lost revenues and taxes for the government.

The 1986 mining law does not secure a fair government stake. Fees for services, taxes, and penalties are very low, expressed in the local currency, and frequently not collected. Concession holders may refrain from paying their annual fees for years without consequences. They also may submit reports with misleading information, or no reports at all, without ever being controlled, let alone paying the penalty set by law (art. 71). Wages paid to GMD managerial and regular staff are sub-standard. It has been suggested that paying low wages to staff who control valuable assets such as gold mining concessions encourages extra-legal survival strategies, such as assistance to miners in the preparation of reports required by the mining law. This sets up a conflict of interest situation that does not serve the government and the sub-sector.

Current national legislation with regard to SSGM is outdated. The draft Mining Act of 2002 provides for better protection of the environment and of workers in SSM than is the case in the Mining Decree of 1986. The proposed provisions regarding the rights of Indigenous peoples and Maroons, however continue to negate their rights as stipulated under international law. If accepted, this omission is likely to become a source of conflict between forest peoples –including local miners, who claim customary rights to the land, and the holders of formal mining rights.

In the absence of updated and transparent mining laws, adequate control mechanisms, and sanctioning possibilities, few operations respect international labor, environmental,

and social laws. An intricate system of customary laws regulates various aspects of mining life, including claiming stakes, compensation to communities, and payment systems. These regulations, however, fail to protect: gold miners from unsafe and unhealthy working conditions; the natural environment from pollution; and Indigenous and tribal communities from various adverse mining effects. The lack of government influence on the mining sector aggravates negative mining impacts on miners, their families, communities surrounding the mines, and the natural environment.

Another consequence of failing mining regulation is that the government fails to reap optimal financial benefits from SSGM. The Department of Taxes has no strategic action plan to collect revenues from small-scale miners. This is unfortunate because foregone tax payments could be used to equip the GMD, pay for labor inspections, fund awareness campaigns on workers' safety and clean mining technology, provision police and military presence in the mining zones, and support other projects that facilitate the transition to a more sustainable SSM industry. It appears that the CBvS has been more successful in its efforts to obtain royalties from miners. As we will see in the next section, this success is largely due to the Bank's willingness to learn from and adapt to customary practices in the gold trade.

No single institution has SSGM as its primary focus. There have been proposals for a Minerals' Institute, to function independent of but in collaboration with the government. This institute would coordinate legislation, law enforcement, security, marketing, labor conditions, environmental management, and other aspects related to SSM. This institute was never established. Other proposals have suggested a governmental institute with the same objectives. The proposed Inter Department Units' (IDU) for example, were to include representatives of the various ministries as well as police and military. As of today, none of these efforts have materialized, and the responsibility for SSM issues - including regulation, control, health, and labor- lies with a variety of Ministries and Departments.

A lack of communication and collaboration between these institutions is hampering SSM regulation. Moreover, none of the institutions covers capacity building and training for small-scale miners. We will argue in the last chapter that the government should adopt a "carrot-and-stick" approach. Without incentives (carrot), there will be little motivation for miners to follow restrictive rules and undergo control (stick). This is one of the key basic principles on which reform efforts should be based. The suggestions under the section on education could do much to rectify this situation.

The government has no vision on how the transition from illegal and informal mining to legal mining should occur. There also is no national strategy to secure safety in the mining zones. A plan and regulations, to ensure that part of the resources collected from SSM is invested back into the sub-sector, is essential.

Chapter VI

THE GOLD TRADE

In this chapter we follow the gold marketing chain, from the miner to its possible final destinations: a jeweler, a foreign gold refinery, or an unclear foreign recipient. After a discussion of the CBvS, licensed gold buyers, and the relations between these two stakeholders, we discuss jewelry and export trade. We conclude with comments on illicit trade, which continues to plague the sector and reduce state revenues.

6.1 The CBvS

The Central Bank began buying gold in 1994. One of the reasons for buying gold was to make the sector more transparent. Until the Central Bank started buying gold, it was very difficult to even estimate gold production. The first two to three years were difficult. The Central Bank had problems with the amount of impurities in the unrefined gold that was bought. In 1996 gold purchasing agents were licensed to buy gold. Most of these companies contracted expertise from abroad and between 1997 and 2004 an average of seven tons of gold was bought per year. Of course, these figures are not an accurate reflection of the amount of gold actually produced in Suriname. It is certain that gold is smuggled from Guyana to Suriname in order to avoid higher government royalties and levies (7% versus 1%). It is likely that illegal miners in French Guiana also smuggle gold into Suriname. Still, the gold buying figures are important because they give the government figures to work with. By combining information from Guyana, Suriname and French Guiana, it will be possible to generate much more accurate estimates of gold production in the Guianas and in the various countries. This is one of the objectives of the WWF program.

The CBvS is responsible for the final collection of royalties from gold miners, and for the administration of the weight, quality, and value of gold produced. Since September 2002, this institution itself no longer buys gold. Instead it relies on legal dealers to purchase gold from miners. These dealers sell the gold to licensed exporters, who register it at the Central Bank before exporting. Since the introduction of this system, the volume of gold passing through the Central Bank has increased (Table VI.1). It is impossible to say if the change in purchasing policy caused this increase. Nevertheless, the trend is positive because it has resulted in increased state royalties, both in absolute terms and as a percentage of the Gross Domestic Product.

It is difficult to estimate what share of local production eventually ends up at the CBvS. Some sources believe that the CBvS only buys about 25% of gold produced, but others believe the share is much higher. Almost none of the gold that is valued at the CBvS stays in Suriname. The CBvS keeps a small volume of gold behind as samples to cross-check the quality and weight of gold production reported by the exporter. In addition, the Bank reserves a small amount for local jewelry producers, based on their self-reported needs.

Table 11. Economic importance of placer gold mining for the Republic of Suriname

Year	1997	1998	1999	2000	2001	2002	2003	2004	Average
Gold purchase by legal dealers, recorded by the CBvS (Kg)	4059.6	6478.1	7004.2	6551.7	4605.1	2531.8	11558.8	12738.5	6941.0
Gold price (US\$/gram)	10.6	9.5	9.0	9.0	8.7	10.0	11.7	13.2	10.2
Value of gold purchase (Million US\$)	43.0	61.5	63.0	59.0	40.1	25.3	135.2	168.1	74.4
GDP: Market prices, incl. informal Sector (*mln US\$)	798.0	1122.1	766.0	885.2	783.7	839.8	1066.2	n.a.	894.4
Royalties as % of GDP	1.39	0.77	0.71	0.59	0.45	0.25	1.24	n.a.	0.77
Royalty from gold mining (*1000 US\$)	1105.9	866.6	546.6	518.8	355.4	210.4	1325.2	1643.3	821.5

Sources: CBvS; www.kitco.com; ABS Statistical Yearbook 2003

The CBvS executes little control on the various steps of the chain. Initially an inspector was stationed in each gold buying agency. This strategy did not function because many agencies bought after-hours, when the inspectors were gone. Moreover, it became impossible to position a Bank representative in each and every buying center after the market for buyers had opened. At first the CBvS continued to send inspectors for random unannounced checks, but this strategy proved not adequate because these checks only took place sporadically and during office hours.

Today the CBvS merely relies on the honesty of the gold buyers and exporters. A high-ranking official at the CBvS said he believed there is little reason to smuggle because the CBvS asks such a small share (1%) of potential earnings in royalty. On the other hand, he also acknowledged that the regular arrests of individuals –mostly buyers- who are smuggling gold out of the country suggest that this trust is being violated.

6.2 Licensed gold buyers

Only buyers licensed by the CBvS (CBvS) are allowed to buy gold from miners. Buyers have to be Suriname firms, though many work in partnerships with Brazilian companies in the so-called juridical form of a Naamloos Vennootschap or NV. The partly Brazilian-owned firm Ourominas was the first legal buyer to enter the gold market since the CBvS began purchasing gold in 1994. In 1997 more legal buyers were invited to the market, and gold purchasing became more efficient and better registered. Since 2002 the market is open to any firm with the appropriate gold purchasing license.

There are no buying agents in the mining areas. The buying centers in Paramaribo may have their connections in the interior, but they find it too dangerous to establish a post in the forest in the absence of police and military protection or other law enforcement. There are some buyers who will send their personnel to the interior to buy, but these agents do not stay overnight. In the period 1997-2004, legal dealers purchased on average 6941 kg of gold/year, ranging between 2,531.8 kg of gold in 2002 to 1,2738.5 kg of gold in 2004 (Table VI.1).

Gold miners select their buying center on the basis of the price offered, reputation, and familiarity. Brazilian miners typically sell at firms with a Brazilian connection and Brazilian(speaking) personnel, such as Ourominas. The buying agent buys the gold, cleans it, makes it mercury-free, and determines the gold-content, before he will determine the price to pay to the miner. When the CBvS was still involved in buying, it deducted 2% for overhead costs (administration, transport, control) and 1% in royalties. Today the individual buyers decide how much administrative costs they calculate in addition to the 1% royalty. The buyer sells the gold on to the exporter.

6.3 Jewelers

In 1998, about 2,700 jewelers and gold companies were registered at the Chamber of Commerce. The Central Bank has asked jewelers, most of who are of Chinese descent, what amount of gold they would need for production. The reported figure was very low

and likely underestimates the real amount of gold being made into jewelry locally. In fact, most golden jewelry sold locally comes to Suriname as mass produced jewelry from China. Jewelers who do manually produce tend to buy their gold directly (and illegally) from the miners, for a slightly higher price than the CBvS. This presents a health hazard because the jewelers themselves clean the gold after purchase, usually in a backroom of the store without appropriate safety measures.

6.4 Gold exporters

Virtually all Suriname gold is exported. Six legal exporters are active in Suriname, all of whom are Suriname companies. They buy the gold from the buying centers and, after registration at the CBvS, sell it to brokers for international gold refining companies, among others in Belgium and Dubai. These companies refine the gold, determine the quality (carat) and weight, and then pay the exporters. Of course, the exporters themselves will have conducted their own analysis as well.

6.5 Illicit trade

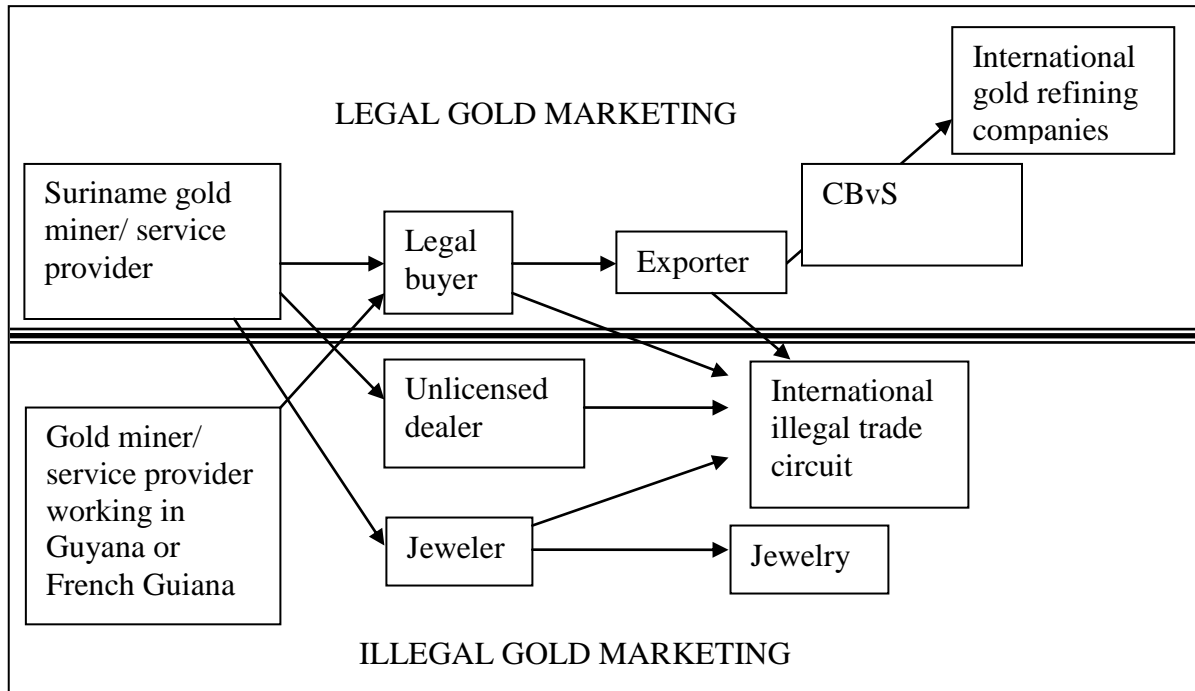
Illicit gold trade goes two ways: in and out of Suriname. For Guyanese miners, it is more profitable to sell their gold in Suriname, where they will fetch a higher price. Brazilian miners working without papers in French Guiana may opt for selling in Suriname because the chances of being caught are much smaller here. Both groups tend to sell to licensed dealers familiar to them. On the other hand, some gold find its way to Brazil and the US (Miami) where prices are higher. As mentioned above, another share goes directly to jewelers, not only in Suriname but also abroad. A neighborhood in East-Amsterdam, for example, features several Chinese-Suriname golden jewelry shops. It is likely that some of the produced gold has found its way directly to these shops. How much gold is traded illegally warrants more in-depth investigation.

6.6 Lessons learned

The objective of attaining better insight into gold production in Suriname was realized through the gold buying program initiated by the Central Bank. The authorities now have a much better indication of the amount of gold that is produced in Suriname and in the region, though smuggling still clouds the statistics.

We discussed the roles of the various stakeholders in gold marketing. Figure 6.1 depicts the relations between these parties in different stages of the marketing process. The marketing chain starts with the gold miner or mining service provider, who may be working in Suriname or abroad. Assuming a legal chain of events, this person sells to a licensed buyer, who in turn sells the gold to the exporter. The exporter sells the gold to international gold refining companies, after a value-check and receipt of royalties by the CBvS.

Figure 6.3. Gold marketing chain



Gold can follow many routes to end up in the illegal circuit (Figure 6.1). The miner or service provider may decide to sell to a jeweler, usually of Chinese descent, or another unlicensed buyer. Jewelers may use a share of this gold to produce jewelry, but most of this gold ends up on the international illegal gold market. The exporter also may decide to bypass the Central Bank and royalty payments, to instead sell illegally to international buyers. This requires that the exporter or his or her connections smuggle the gold abroad. The arrest of smugglers at the international airport several times a year suggests that illegal gold marketing continues to be a lucrative business.

An evaluation of changes in gold purchasing policy shows that the CBvS has been quite adaptive to customary practices in marketing. From being the sole purchaser, a position that was impossible to hold, it has now opened up the buying market. Today the Bank itself merely serves as a regulatory body and collector of royalties. This policy appears to work fairly well, though the control of buyers and exporters remains problematic. The Bank's involvement has shifted from strict control, with a presence in all legal buying centers, to a more removed position. The role of licensed private sector involvement should be extended to the interior, so that better control can be exercised at the source of production. Perhaps a more active involvement of the concession leasing enterprises or a miner's association could help government get a better grip on the gold trade in Suriname. The role of mine inspectors in the process of gold buying in the interior is also critical, once again indicating the importance of a government presence in the remote mining areas.

Chapter VII

DISCUSSION AND RECOMMENDATIONS

7.1 Summary of the findings

Between 75 and 150 million US Dollars worth in gold is produced by small-scale miners in Suriname each year. Most of the mining is extra-legal. Even on mining areas covered by a permit most of the mining is extra-legal: parts of exploration permits are being leased to miners for exploitation. The Peruvian economist Hernando de Soto noted that 70% of the world population lives outside of the law. In the SSGM sector in Suriname this number is probably over 90%. Several key issues stand out in the sub-sector:

- No fully developed integrated SSM policy
- No zoning of mining regions, making planning and regulatory control difficult
- Out of date legislation that does not reflect the current realities in the gold mines
- Weak institutional structure with limited representation in the field
- A negligible government take from the sub-sector
- Extra-legal operations throughout the interior and massive environmental destruction that results from unsound ore extraction and processing techniques.
- Health, security and social threats emerging in unstructured mining regions and zones

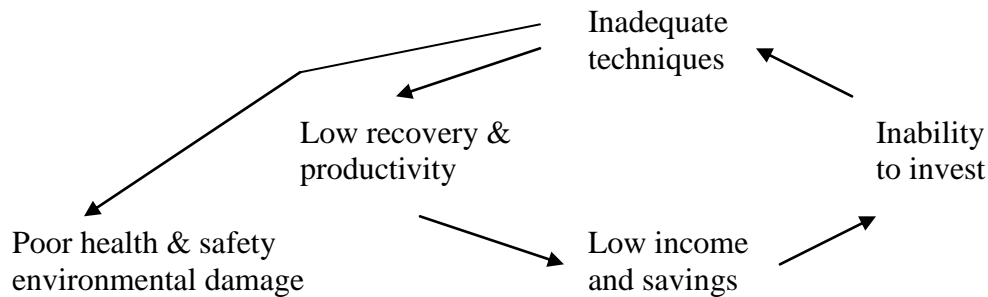
In the preceding chapters the causes of these problems have been analyzed and discussed at length. We have reviewed the history of gold mining in Suriname, analyzed the social dimension of the sub-sector, discussed the economics of SSM and reviewed the role of the private sector and State in the sub-sector. The many problems that were identified all revolve around one basic question: how can we transform the extra-legal polluting resources of the informal miners to a legal and sustainable source of employment and income? How can the State, the private sector, civil society and the miners themselves help the sub-sector break out of the negative circles of cause and effect that have been identified in the foregoing chapters?

7.2 The World Bank Model

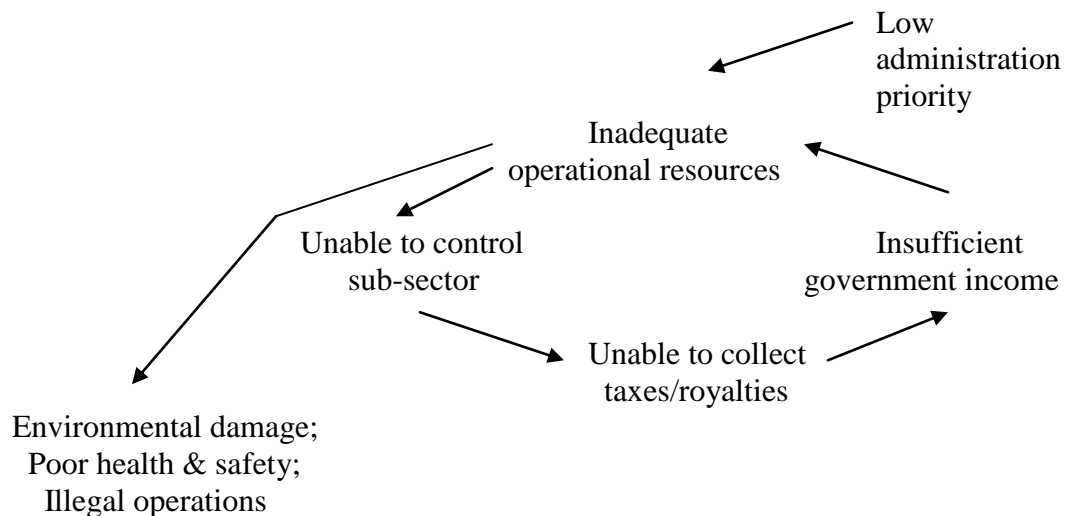
In the World Bank Roundtable on Artisanal Mining in 1995 Richard Noetstaller pointed out that “both informal miners and governments are caught in negative circles of cause and effect.”

With regard to the miners, he pointed out that “the use of inadequate mining and processing techniques and equipment leads to a low productivity of operations and low recovery of valuable minerals which in turn results in low revenues and the inability to accumulate funds for investment. The lack of funds to improve methods and acquire appropriate equipment traps artisanal miners in crude, inefficient mining and processing,

closing the first negative cycle shown below.” It is clear from the economic analysis in Chapter IV that these conditions apply to the SSGM sub-sector in Suriname.

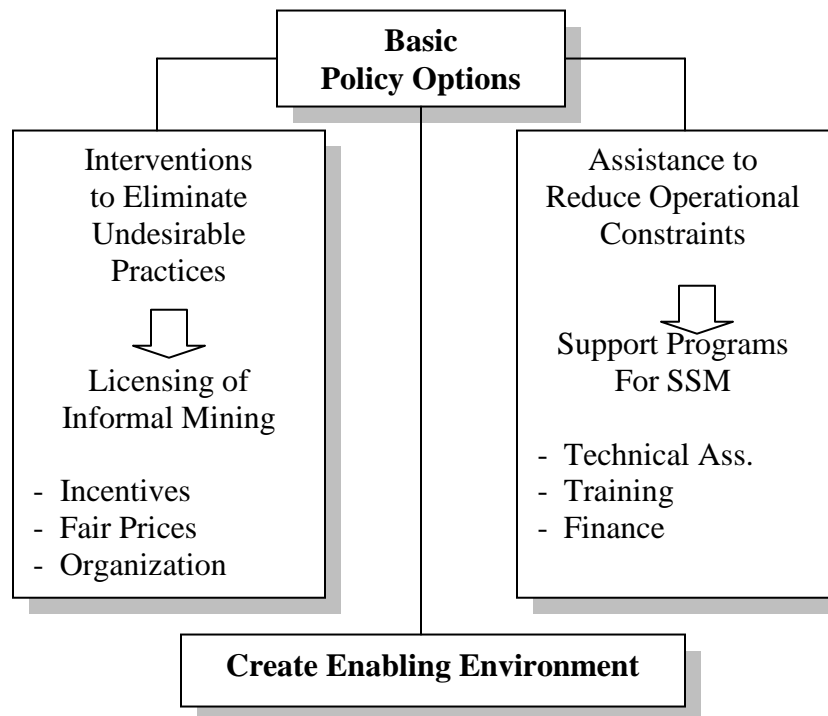


With regard to mining authorities, “lack of adequate operational resources prevents officials from enforcing existing regulations. The inability to enforce existing regulations results in illegal operations, poor environment, health, and safety standards and a loss of fiscal revenues from this activity. The lack of funds from fiscal revenues limits the ability of the government to perform its regulatory function and perpetuates uncontrolled artisanal mining.” The negative circle affecting the mining authorities is shown below. As indicated in Chapter V, we have added the low priority assigned to the sub-sector by the government.



Having outlined the challenges facing the main actors – the mining authorities and the miners, Noetstaller goes on to argue that “a policy designed to promote SSM in developing countries essentially has to combine two elements: **intervention** and **assistance**. Intervention and *control* is required in order to eliminate unacceptable work practices typical for informal SSM activities; assistance is a prerequisite for the removal of operational constraints limiting productivity and competitiveness.” Noetstaller also points out that “an indispensable initial step in replacing informal wildcat mining is

the *legalization of the activity* through recording and licensing.” The following figure was prepared to illustrate this two-prong approach:



Three key words stand out in the outline of this approach: *assistance*, *control* and *legalization of the activity*. Control is to be attained through recording and licensing. Licensing and compliance with existing regulations, however, require up-to-date and functional SSM legislation. The foregoing analysis has revealed that the mining laws are not up-to-date and functional, and that there is a very limited government presence and infrastructure in the field. Article 39 of the current mining code commits the Geological Mining Department to provide technical and administrative assistance to miners. Assistance and support programs also require a presence and infrastructure in the field.

It is suggested that the policy recommendations of Noetstaller are adopted. However, the dual trajectory of control and assistance needs to be expanded in the case of Suriname. We noted in Chapter V that the absence of reliable information from the field and an integrated gold mining policy makes it difficult to develop a broadly supported policy framework that can guide the legislative drafting process and the process of institutional reform.

7.3 Expanding the World Bank model

As the example from the 197-1999 “Operation Goldfinger” demonstrates, having sufficient operational resources to fund the mining authority are not enough. Part of the resources collected in the sub-sector should be re-invested on a regular basis. Assistance schemes are also critical. There also have to be equitable and functional codes and miners

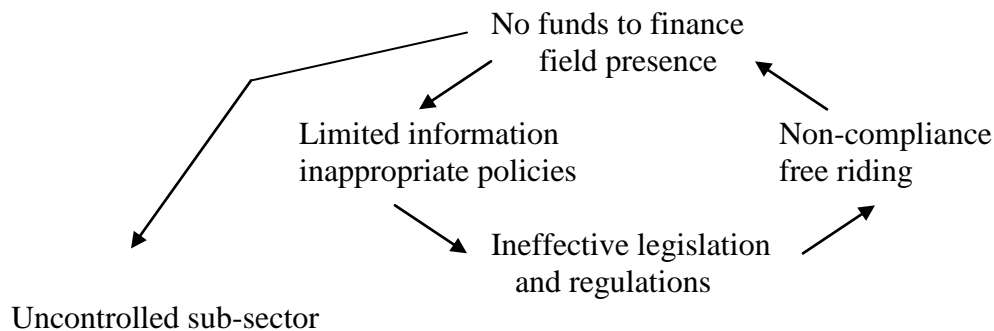
have to be motivated to observe the rule of law. Security is also a key issue in the mining zones. In many mining areas the rule of law has to be re-established, not only with respect to immigration and labor. Crime rates must be reduced significantly, and this is an important opportunity for gaining the support of miners who live and work under continuous threat in many places in the interior. The new legal instruments and institutions have to provide tenure security, but also ensure the safety of miners. Recently the chairman of the Association of Brazilian Garimpeiros in Suriname (COGASUR) suggested in the media that the registration fee should be re-introduced. At least it provided some semblance of legality.

Three basic lessons can be learned from this experience:

1. Sufficient operational resources were available to fund the SIDU undertaking, but the resources by themselves were not enough to guarantee success. Reinvesting a legally specified percentage of sub-sector revenues would provide a more predictable basis from which to plan, organize, and execute control type interventions.
2. The effort did not sufficiently emphasize Noetstaller's second critical condition – support programs for miners to reduce operational constraints and improve security. This is a critical condition for securing miner's support as well as fending off criticism in the media that puts the government under pressure to retract its policies and strategies. The effort first honed in on securing fiscal revenues, when a support program was urgently needed to help miners attain legal status and improve their mining methods. Giving priority to an assistance program to reduce the negative environmental impact of the sub-sector could have helped enlist broad public support for a reform effort.
3. There is a lack of an up-to-date and functional mining legislation that reflects the realities of the sub-sector. The law does not sufficiently acknowledge the limitations faced by miners in the field, and underestimates the institutional framework that must be in place before the sub-sector can be brought under control. The absence of a strong and broadly supported policy base will make it difficult to enforce new regulations that are based on the new draft law.

Therefore, in the case of Suriname, a third negative circle may be needed to clarify the root causes of the problems plaguing the SSM sector: a negative cycle resulting from the lack of funds to finance a field presence, limited government information resulting in inappropriate policies, ineffective legislation leading to non-compliance and free riding. The diagram on the next page outlines this negative cycle.

Basic principles of mining legislation from other countries must be studied and applied, but when used, these principles must also be carefully adapted to the day-to-day reality of the SSM sector in Suriname.



The legislative drafting and approval process in Suriname is time consuming. It makes no sense to traverse the lengthy legislative development and approval route every other year to get new legislation approved in order to accommodate a rapidly changing sub-sector. Therefore, many issues should be regulated at the ministerial rather than at the legislative level. However, to be effective, the basic regulatory principles on which the ministerial regulations are based must enjoy broad support from stakeholders. Therefore, a well developed mining policy is the first essential ingredient in the regulatory process. Again, we stress the significance of developing a gold mining policy.

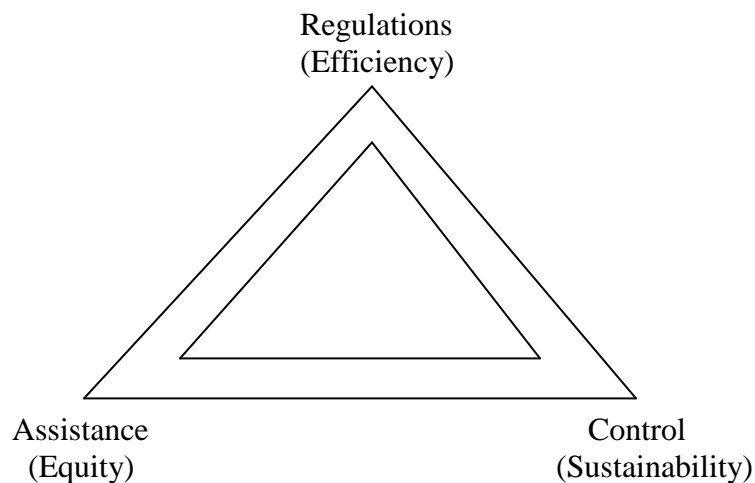
Evidence collected in the field suggests that miners are more than willing to live by the miner's law and any new rules that are drafted, but these codes have to be grounded in reality; they should be functional. Every miner wants to be protected by codes and an enforcement agency using reasonable and equitable rules. The alternative is to run the risk of getting robbed, injured or killed by gangs now stalking the mining areas and access roads to the interior.

Reform efforts cannot rely solely on new regulations. Ongoing economic, organizational, technical and social assistance will also be needed to transform the alluvial mining sector into a safe and less destructive means of earning a livelihood. To create an enabling environment for SSM in Suriname, a three-prong approach will be recommended. In developing its basic policy options, it is suggested that GOS develop at least three interdependent avenues of approach:

- 1) Functional legislation and regulations that enjoy broad stakeholder support
- 2) Institutional capacity to intervene and eliminate undesirable practices
- 3) Assistance to miners to reduce operational constraints and improve security

The diagram below illustrates the interdependent relationship between these three regulatory and support dimensions, as well as the qualities they should possess. It is not enough to have regulations, they must be functional and the administrative infrastructure must be present in the field to apply them efficiently. Assistance should also be provided

in the field, because that is where alluvial mining takes place. The rules should be equitable, but the provisions of assistance should be made available to all miners on an equal footing. Finally, control should not focus only on collecting fiscal revenues. Assistance schemes to help develop sustainable mining practices and reduce negative environmental impacts should receive equal priority.



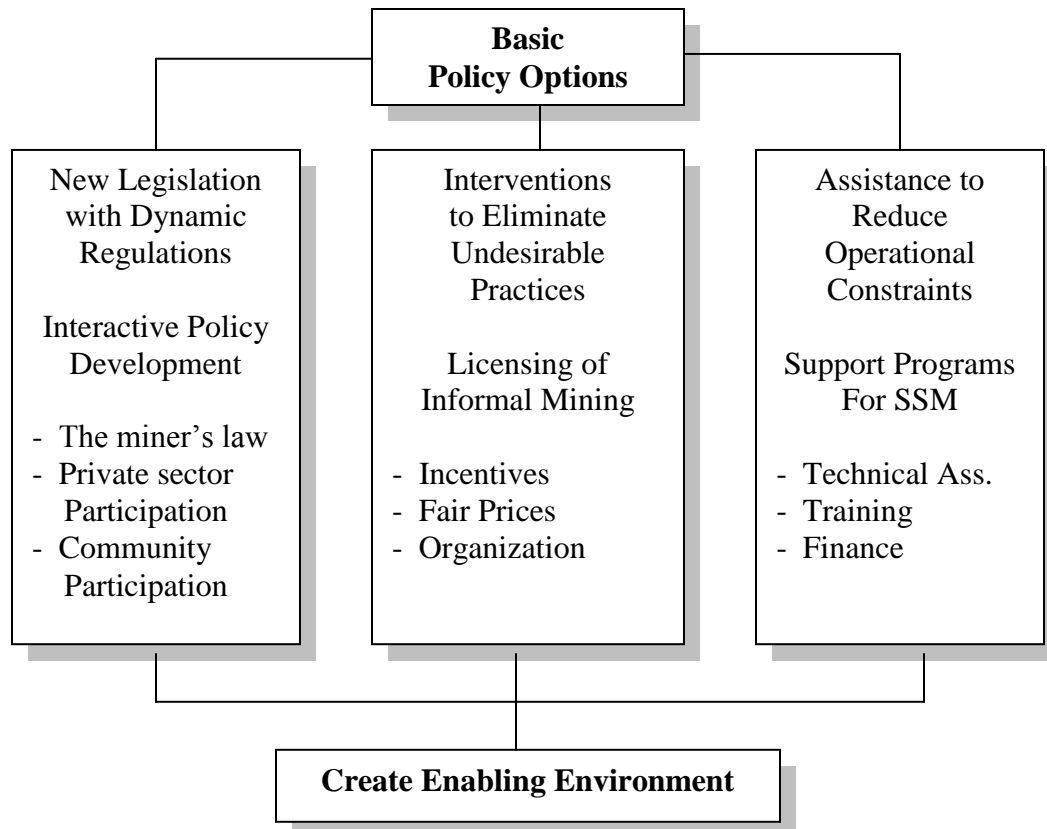
The stakes of the government must be also clearly defined and brought into focus. A government that sees limited benefits from the SSM sector will not be motivated to set up support schemes. Insufficient revenues will prevent the government from contributing to assistance schemes. In order to protect its interests, the government would do well to develop equitable and enforceable rules, set up a workable institutional infrastructure and provide support to miners. Licensing of alluvial miners is basic in this respect. However, there has to be sufficient institutional capacity to intervene. There have to be incentives; technical and organizational support that enables miners to comply with the new laws and regulations and that ensure substantial fiscal revenues from the sub-sector.

Finally, the diagram on the next page outlines the expanded three-tier relationship between the regulatory, control and assistance parameters. The basic approach outlined by Noetstaller is excellent. However, in the case of Suriname there is a critical need to develop new legislation and flexible regulations, in addition to the development and institutionalization of assistance and control schemes in the sub-sector.

7.4 The purpose and challenges of zoning

Analysis starts with classification. We need a way to partition up the gold mining regions of the interior into manageable regions and zones, first for the purpose of gathering information. As data from the field is gathered and analyzed, the process of zoning and the organization of the mining regions and zones can get underway. Zoning is a critical condition for realizing the main objectives identified by this report: 1) interactive policy

development leading to a practical and feasible regulatory regime, 2) the development of assistance schemes, and 3) the development of mechanisms of control.



We used the ideas of de Soto to explain why the new rules should incorporate constructive elements of the ‘miner’s law.’ These are the customs and practices of the miners working in the interior of Suriname. To be sure, there will be a number of basic principles on the basis of which new legislation can be developed. However, differences in the various mining regions or zones should also be accommodated in the new legislation. Here is where zoning becomes important. In Chapter IV we saw that there are different types of mining zones in which different customs and practices exist. By studying and classifying these different mining regions and zones the government will be in a better position to accommodate the different practices in the new regulatory scheme.

In Chapter V the issue of legal control over mining areas was discussed in more detail. It suffices to point out here that beyond strictly legal provisions of the Constitution and the mining code, historically various forms of control have been exercised over mining areas, some customary and some extra-legal. These forms of control are waning in some areas, in other areas they still stand firm or they are becoming stronger. In order to incorporate constructive elements from these different systems, we need good information from the field. Reliable data is critical in establishing a classification and zoning system that will facilitate the development of functional codes, assistance and control schemes.

Another key factor is the relationship between the various mining zones and the customary settlement areas. The greenstone belt, and the mining regions and zones associated with this formation, cross-cuts the customary residence areas of the Maroons (“escaped slave communities”) and indigenous settlement areas. Approximately 50 or more Maroon and indigenous villages are located in or very near this zone. Relations between miners from Paramaribo and the inhabitants of the settled areas vary from region to region. Some mining areas have been developed by villagers; other areas were developed by persons from Paramaribo and migrant miners, but employ persons from nearby communities.

The provisions of the Accord for National Reconciliation and Development of 1992, that brought an end to the interior conflict, stipulate that an economic zone would be demarcated around or near customary settlement areas, and that community members could get SSGM permits in these zones. Article 36.3 of the current mining code stipulates that SSM will only take place in zones set aside by the Minister of Natural Resources for that purpose. These are provisions that call attention to the need for zoning not only as a regulatory mechanism, but also as an instrument of conflict avoidance.

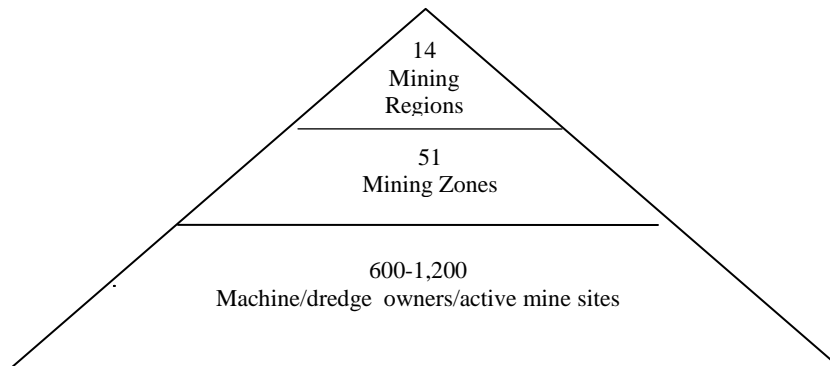
The issue is further complicated by the influx of migrant miners from Brazil. Prior to the interior war a considerable number of Guyanese miners were active in the Marowijne river region. During the interior war, the Rebel Leader promoted the recruitment of Brazilian miners in the Marowijne river basin, and after the interior war their numbers increased dramatically throughout the interior. The role and position of migrant miners has to be addressed in the new mining policy and legislation. Opportunities for legalization of status and attainment of mining rights should also be developed in the new legislation. In order to stimulate compliance, the procedures should be effective and efficient.

7. 5 A provisional model for zoning

The various gold mining regions in Suriname are usually depicted as large continuous blocks of mining activity. Using this classification system, researchers typically distinguish six to ten mining regions. The borders of these regions tend to be drawn rather arbitrarily. Insufficient consideration is given to the natural features and boundaries of the landscape, accessibility and transport networks, or organizational systems that are in place in the various mining areas. Instead, we suggest that a zoning system be developed that incorporates at least the following three criteria. The system must:

- 1) Reflect the natural pattern of alluvial mining which follows river beds in watersheds and other natural features of the landscape;
- 2) Acknowledge existing legally described areas, formal, informal and customary rules of organization, and
- 3) Be helpful to policy makers, assistance providers, monitoring and regulatory agencies.

Hierarchical zoning of SSGM



The proposed zoning system is organized hierarchically. It consists of 14 provisional mining regions that are divided in 51 mining zones. These zones are re-partitioned in approximately 800-1200 active mine sites, which are occupied by at least one mining unit. Based on field work and with the assistance of the ADEKUS mapping department NARENA, we came to the following provisional classification of Mining Zones by Region:

1. Commewijne River Region
 - 1.1 Lower-Tempatie basin
 - 1.2 Upper-Commewijne river basin
 - 1.3 Mapane Zone*
2. North-East Lake Region*
 - 2.1 Casipora
 - 2.2 Njun Lombe
 - 2.3 Boslanti Zone
 - 2.4 Winti Wai
 - 2.5 Boven Tempatie
3. North-West Lake Region*
 - 3.1 Upper Para Zone
 - 3.2 Marechall Creek
 - 3.3 Klaascreek
 - 3.4 Compagnie Creek
 - 3.5 Mindrineti Zone
 - 3.6 Brownsberg Zone
4. West-Suriname Road Region
 - 4.1 Kwakugron
 - 4.2 Loksi Ati

- 4.3 Goliath
- 4.4 Boven-Tibiti
- 5. Lower Saramacca River Region
 - 5.1 Njun Jacobskondre
 - 5.2 Murumuru Creek
 - 5.3 Klein Saramacca River
- 6 Middle- and Upper Saramacca River Region
 - 6.1 Jan Basi Gado Zone
 - 6.2 Upper-Saramacca River
- 7 Upper Suriname River Region
 - 7.1 Laduani Zone
 - 7.2 Duwatra Zone
- 8 South-East Lake Region
 - 8.1 Marowijne Creek
 - 8.2 Sara Creek Zone
 - 8.3 East Lake Zone
- 9 Lower Marowijne Region*
 - 9.1 Pakira Creek
 - 9.2 Jorka Creek
 - 9.3 Arawane Creek
- 10 Middle-Marowijne Region
 - 10.1 Tumatu Creek
 - 10.2 Nason Zone
 - 10.3 Gran Creek
- 11 Stoelmanseiland Region
 - 11.1 Bergi Zone
 - 11.2 Ndjuka Creek
 - 11.3 Lower- Tapanahoni
 - 11.4 Gonini
- 12 Upper-Tapanahony River Region
 - 12.1 Upper-Tapanahoni
 - 12.2 Toso Creek
 - 12.3 Jai Creek
 - 12.4 Anamu Creek
 - 12.5 Sela Creek
- 13 Lower Lawa River Region
 - 13.1 Abunasungu Zone

- 13.2 Langatete Zone
- 13.3 Cottica Zone
- 13.4 Lower Asisi Zone

14 Benzdorp Region

- 14.1 Benzdorp Zone
- 14.2 Njam Creek Zone
- 14.3 Kawemhakan Zone
- 14.4 Mappe and Schreuder Creek Zone
- 14.5 Upper Asisi Creek

* Road access

We choose demarcations with the objective of creating manageable zones in which the government and the mining authorities, private sector, a community, or a combination of the three, could establish or develop existing management systems, offer assistance and exert control. We noted in chapter I that the government does not have adequate administrative presence in the interior, and in most mining regions there is no presence at all. In the model developed by Noetstaller, it was noted that insufficient government income translates into inadequate operational resources. So even if the Minister of Natural Resources would want to establish a strong presence in the mining zones, under the current circumstances the costs would be prohibitive. The challenge is to break out of these negative circles of cause and effect.

One way to do that is to discover the organizational patterns per region. Once further field study has defined the most practical delimitation of the regions, consideration could be given to the establishment of organizational structures. Existing organizational systems and patterns should be taken seriously, as they could contain key elements that could contribute to the effective organization of regions and the constituent zones. Existing concession management systems that are effective could be used by the government as a basis for further organizational development. A key ingredient here is the organization of miners by region.

The organization of miners on a regional and perhaps even a zone basis, that is, bringing together, under an organizational umbrella, concession holder, equipment owners and individual miners who wish to join. The mining regions and zones should be surveyed and concession holders and equipment owners as well as miners could be consulted about setting up such an organization. It is critical that this effort not be seen as a trick by the government to register miners and collect taxes. The primary focus should be on assistance, to serve the well-being and interests of the members, and facilitate the promotion. and adoption of improved practices This should be a private sector initiative supported by the Chamber of Commerce and by other business and industry organizations.

With an organization of miners in place, consideration could be given to the establishment of assistance and support for improve practices and negative impacts

abatement,, preferably in conjunction with the management base of the region and constituent zones. We wish to emphasize in this context that any zoning system that is introduced should be functional not only from a regulatory perspective. The zoning system should also facilitate mining and community assistance schemes on an organized basis.

Regulatory needs are also key considerations in defining the boundaries of a zone. A given region could fall under the jurisdiction of one GMD Mine Inspection Unit (MIU) with support from a military division, police unit, or private security team. For example, the West-Suriname Road Region covers a strip of land surrounding the road to West Suriname and connecting logging roads. From a logistical perspective this is a practical way to define a region. For areas such as the South-East Lake Region, a combination of canoes and ATVs would be needed to control the region. Natural features and logistical considerations should play a critical role in defining regions and constituent zones that are practical to manage.

The mining regions marked with an asterisk (*), North of the Van Blommestein Lake and near the Nassau Mountains, are accessible by road. Travel to and from all the other mining areas occurs by boat, by plane, or a combination of air, water, and land travel. The main access roads and waterways frequently end at the entrance or landing of the mining zone. Further travel inward to the various mining camps typically occurs by All Terrain Vehicle or on foot.

We emphasize that the proposed zoning system is not final; we do not have all the answers to many very delicate problems in the sub-sector. Our map is meant as a tool for discussion, a visual aid to stimulate communication between key stakeholders about regulation and control of the SSGM sector. Do the suggested watershed boundaries make sense? Are the regions and zones deemed manageable and controllable, and by whom?

These are questions that cannot be answered by this assessment. A Workshop and consultations with representatives of the GMD and other relevant government agencies, police, military, concession holders, mine operators, miners, local communities and civil society organizations are indispensable to the development of a useful zoning system. Surveys in the field can be used to prepare a provisional map of the mining regions and zones and to documents the different legal and extra-legal regions and zone management systems that have emerged over the past decade. The provisional map included in this report could serve as a point of departure for the mapping component.

The outcome of this mapping process could provide the backdrop for an interactive SSM policy development process. Reliable information from the field on the demography and mining activities of the regions and zones is also needed, as well as basic information on the region and zone management systems that are already in place. These systems could be more western oriented, or based on tribal organizational principles, or a customs associated with Brazilian alluvial mining traditions. Lessons learned from existing management systems are important tools for the development of a national management strategy for the gold mining regions and zones. Participation of the private sector is

critical, as use of their infrastructural resources that are already in place can significantly reduce the cost of setting up a national system.

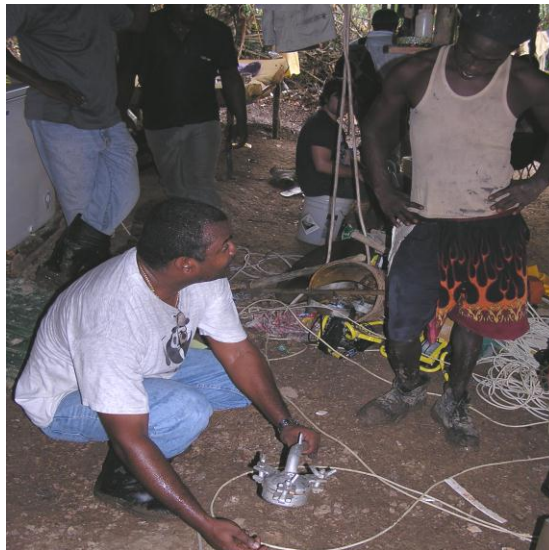
7.6 Outline of a short termed Action Plan

The draft or approve mining laws or regulations is the role of The National Assembly and the NH. The GMD with the assistance of its partners especially the WWF-Guianas Regional Program can, however, immediately develop an awareness campaign that will drive the point home that retort use is cheap, technically feasible and urgently needed. Such a campaign will not only influence miners but also members of the National Assembly, the administration and, who, in turn, could be motivated to draft a short and approve a brief law mandating the use of retorts.

The first battle is a mental one, the attitudes, beliefs, knowledge levels and practices have to be changed. Knowledge levels are relatively easy to influence, if culturally appropriate material is used that is attuned to the educational level of miners. Beliefs are much harder to change, but they too can be changed. Attitudes are the hardest to change, and if no results are achieved the rule of law is often the only way out.

The following is an outline of a proposed action plan that could be developed and executed under the on-going WWF-Guianas/GMD financial and technical assistance and support program:

- 1) Immediate action – a retort media campaign extolling the virtues of retort use, but also showing how easy it is to acquire and use a retort. A cartoon figure and a corresponding campaign could be developed by one of several advertising agencies. The character could have a funny name such as “Barbosa Bibber” (‘Shaking Barbosa’) who learns about retort use from a sexy lady. The campaign should also use rhetorical strategies to expel inappropriate beliefs about mercury and perhaps even satirize miners with a bad attitude.



FRAME 9: WWF GUIANAS RETORT PROGRAM AT NIEUW KOFFIEKAMP

- 2) Immediate action –radio-broadcasted information campaign for mining areas and villages surrounding the mines, based on the findings of the earlier WWF-study on environmental perceptions among Maroon miners and villagers affected by mining activity in the interior. Radio programs in the various local languages should focus on health and safety in the mines, best practices, mercury contamination, miners’ associations, the new draft mining law, and other topics discussed in this report.
- 3) Short-term: The organization of miners on a regional and perhaps even a zone basis, that is, bring together, under an organizational umbrella, concession holder, equipment owners and individual miners who wish to join. It is suggested that a project be developed to survey the mining regions and zones and to consult concession and equipment owners as well as miners about setting up such an organization. The existing GMD/WWF study on this topic and the proposed joint IADB/ WWG-Guianas “Establishment Suriname Gold Mining Association” can be used as a starting point.. The focus should be on assistance, to serve the well-being and the interest of the members.
- 4) Efforts to reform the sub-sector and introduce controls will be much easier and effective with such an organization in place. The organization will provide the government with a counterpart for the purpose of developing and structuring assistance and regulatory schemes. The organization of miners will provide a basis for the third action, namely the introduction of a zoning system in the mining regions of Suriname. As noted above, this initiative could be spearheaded by the outcome of a workshop of all key stakeholders in the sub-sector, followed by survey in the field and a mapping project component.
- 5) With a national organization of miners in place and with a zoning system of the mining regions that has thoroughly documented and mapped the sub-sector, the government will be in a much better position to develop a new mining policy. In fact, the work done under steps one, two and three will have produce significant input from the key stakeholders to already formulate a policy framework, but the process of interactive policy making should be institutionalized, as rapid changes will most certainly continue to occur in the sub-sector. With a solid policy basis, the new laws that are drafted will be much more practical and enjoy much greater support among the miners. The likelihood of compliance with existing regulations will have been significantly increased. It will also be much easier to design efficient and effective institutions that have a strong operational capacity in the field. The BGS has already developed a full proposal for the development of a Mineral Institute, and this work could be used as a point of departure in the preparation of a

revised proposal to reflect the outcomes of the actions taken in phases one, two and three.

The first, second and third action items, could be implemented almost simultaneously, and be completed within two years. It is estimated that an awareness campaign and radio programs could be designed and aired for about US\$ 20,000 each per year (total costs US\$ 80,000 for two years). The setting up of a national organization of miners would require more funds, perhaps as much as US \$ 150,000 or more will be implemented under the IADB/WWF planned “Establishment Suriname Gold Mining Association” project.

The fourth action item, zoning and mapping of the mining areas, could be executed over a two-year period. The cost of setting up a presence in each of the identified mining regions would initially require an investment of over one million US Dollars (US\$ 75,000 is allotted for setting up a station in each mining regions). The GMD should fund raise with the assistance of its partners for the implementation of this component

A provisional budget for setting up the Minerals Institute has already been prepared by the BGS, but of course, in the light of the new developments and findings, it should be adjusted accordingly. At least three years should be allotted for the execution of this program component. The GMD is the focal point for this institutional reform activity, but input from all key stakeholders is very important.

The above time lines and figures are only estimates; detailed plans to be developed in the future could include time lines and budgets that have been worked out in much greater detail.

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