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Institutional aspects of artisanal mining in forest landscapes, western Congo Basin

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ABSTRACT: This contribution examines the multiple impacts of artisanal mining in the high-biodiversity forest of the Congo Basin's Sangha Tri-National Landscape (TNS), and proposes measures for improving livelihoods in the area. It was concluded from a literature review, interviews and site visits that: diamonds and gold are an important but highly variable income source for at least 5% of the area's population; environmental impacts are temporary and limited, mainly caused by mining inside the parks; overlaps between artisanal small-scale mining (ASM), large-scale mining (LSM), timber concessions, and national and trans-boundary protected areas have intensified competition for land resources; and despite the existence of legal frameworks, ASM is largely informal. Cross-boundary agreements concerning the TNS do not address mining, albeit a regional approach of mining policies is recommendable to reinforce beneficial outcomes for the landscape and the area's population.

1 INTRODUCTION

1.1 *Artisanal mining in the Congo Basin*

Small-scale mining employs over 13 million people in developing countries; and an additional 100 million people are dependent indirectly on this sector for their livelihoods (CASM 2009, Danielsen 2000). Artisanal and small-scale mining (ASM) refers to mining by individuals, groups, families, or cooperatives with minimal or no mechanisation, often informally and/or illegally (Hentschel *et al.* 2002). Of over 40 different minerals that are exploited by artisanal miners, gold and diamonds account for more than half of the number of people involved. Sub-Saharan Africa produces over 60% of world's artisanally mined diamonds. In general, ASM provides cash income for poor people, requires few financial and technical inputs and is labour intensive, with modest levels of production and efficiency. Miners are generally simultaneously engaged in other activities, such as agriculture (CASM 2009).

Gold and diamond deposits have been found throughout the Congo Basin and are the two major minerals exploited in the Sangha Tri-National Landscape (TNS) in Cameroon, Central African

Republic (CAR) and the Republic of Congo (RoC). The mineral sector of CAR and Cameroon is relatively small compared to major producers such as Angola and the Democratic Republic of Congo (DRC), and is confined to mainly artisanal, small-scale production (Sale 2006). The 700 km border area between Cameroon and CAR is diamond rich (Gweth 2006). Gold mining started in Cameroon in 1933 and between 1934 and 1984, output was in the range of 20 tons, equating to an annual production average of 400 kg, which has a value of two billion FCFA (US\$4.3 million) (Lang 2007). In CAR, mining also started in the 1930s with alluvial discoveries, with gold production peaking in the early 1980s at 521 kg and diamonds at 609,360 carats in 1968. Recent data are shown in Table 1. Since 2003, investors have been increasingly interested in industrial mineral exploitation, and a number of companies have been granted exploration licenses in Cameroon and CAR (e.g. for Cameroon: African Aura Resources Ltd. of the United Kingdom (gold), Geovic Cameroon Plc of Canada (cobalt-manganese-nickel), Hydromine Inc. of the United States (iron ore), Mega Uranium Ltd. of Canada (uranium), and Sundance Resources Ltd. of Australia (iron ore); for CAR

Table 1. Key data on the artisanal mining sector in Cameroon and Central African Republic.

	Cameroon	CAR
Main minerals	Bauxite, cobalt, iron ore, nickel, gold, sand, and uranium (1, 5)	Clay, diamond, gold, limestone, and sand and gravel (2)
Producing regions	East, Centre, Sud-Nord (1, 5)	Berberati, Haute-Kotto, and Haute-Sangha (2)
Quantity diamonds produced (2008)	12,000 carats (1)	377,209 carats (3)
Value diamonds produced (2008)	US\$1,519,124 (7)	US\$47,752,282 (3)
Quantity gold produced (2008)	1200–1800 kg (4, 1)	10 kg (2)
Value gold produced (2008)	US\$99,783,761–149,675,641	US\$831,531
Number of artisanal miners	20,000–30,000 (5)	50,000 (6)

Sources: Newman (2009)(1); Bermúdez-Lugo (2009)(2); Kimberley Process (2009)(3); Sale (2006)(4); CAPAM (2006)(5); Dietrich (2003)(6); estimation (7).

diamonds: Energem Resources Inc. of Canada, Gem Diamonds Ltd. of the United Kingdom, and Pangea Diamondfields Plc. of the British Isles) (Newman 2009, Bermúdez-Lugo 2009).

1.2 Artisanal mining impacts

ASM is labour intensive and requires few capital and technical investments, which means it typically provides a substantial contribution to local development in the form of employment and cash income. Its importance to livelihoods has become increasingly acknowledged after decades of criminalisation, informality and this sector of the economy being overlooked in the majority of developing countries.

However, besides the potential of the sector to contribute further towards poverty reduction, recent studies have underlined a range of negative issues related to its operations. These are primarily associated with social and environmental impacts, with frequently raised concerns about:

- Miner's health and safety (Banchirigah 2006, Walle & Jennings 2001);
- Informality and lack of legal status (Siegel & Veiga, 2009, Sinding 2005). Criminalisation of

informal mining activities causes exclusion of miners to participate in decision making that concerns their lives (Tschakert 2009);

- Child labour (Hilson 2008, ILO n.d.);
- Poverty traps and dependence, particularly in rural communities with a heavy reliance on mining as the sole economic engine, reinforced when miners cannot reinvest, middlemen control finances and (specific groups of) miners have little bargaining power (Hilson & Pardie 2006, Fisher 2007, Sinding 2005);
- Conflicts over land and resettlement, mainly between government, small-scale miners, large-scale operations and the local population who practice agriculture at the same site (Hilson & Potter 2005, Hilson *et al.* 2007) and;
- Environmental impacts: water and air pollution (notably from metals and chemicals used, such as mercury for gold amalgamation) (Shandro *et al.* 2009, Babut *et al.* 2003, Limbong *et al.* 2003), river and dam siltation, unrecovered open pits (which can trap animals, cause accidents and create a breeding ground for mosquitoes) and loss of biodiversity (deforestation, over-fishing and poaching) (Hentschel *et al.* 2002, Labonne & Gilman 1999, UNESCO 2003).

These concerns about the impacts have arisen in response to an increase in artisanal mining activity, especially in areas characterised by high biodiversity, sensitive landscapes and where people are poor (World Rainforest Movement 2002).

Poverty and environmental conditions can be closely linked, as Labonne & Gilman (1999) highlight: poverty results from a denial of choices and opportunities and implies living on marginal and vulnerable environment, as well as further exhausting this environment. Most rural poverty is exacerbated by a lack of access to sufficient resources such as land, productive soils and water. Sustainable livelihood strategies imply that the economic needs of individuals and communities are integrated into the maintenance and improvement of the environment.

1.3 Institutionalisation of artisanal mining

A second body of work on ASM has dealt with the institutionalisation and organisation of the sector. To counter negative impacts, an array of technology, support-related and poverty-reduction projects focussing on ASM have been implemented over the past 15 years. Whilst difficult to generalise the outcomes of these interventions, because every mining site and country has its very own specific characteristics, many efforts have been criticised for having inadequately addressed miners' needs (Sinding 2005, Hilson &

Banchirigah 2009). Common lessons that can be drawn include:

- Albeit an often observed flaw of external intervention projects, ASM support projects have been rebuked for focussing too much on technical assistance or providing alternative livelihoods without taking into consideration the actual needs of miners (Hilson & Banchirigah 2009, Tschakert 2009). Childs (2008) contends that 'Fair Trade' initiatives could help in demonstrating alternative approaches to manage the sector by supporting participation and partnerships.
- Power relations between and among households and local organisations need to be taken into account and miners need a voice to avoid further exclusion of already vulnerable groups while institutionalising mining activities (Fisher 2007). The role of women and children in contributing to miners' household incomes is also often not acknowledged. Hilson (2005) argues that a poor understanding of the demographics of target populations has led to negative outcomes. Improved policy and assistance in the sector should be on the basis of accurate data on the number of people operating in ASM regions, their origins and ethnic backgrounds, ages, and educational levels.
- Formalising ASM may have become more difficult over the last decade, as Hilson (2009, p. 3) estimates, because 'foreign-controlled large-scale mining economy is now firmly entrenched in sub-Saharan Africa, and shadow networks long in place in diamond and gemstone production chains have become even more rooted'. It is not always clear whether legalising mining activities have actually helped the poor. Assistance programs often start by scaling-up activities and applying techniques which in the end require less local labour. A better understanding of the conditions for 'effective formalisation' is needed to know, how, and, under what conditions, this can contribute to economic and social development (Siegel & Veiga 2009).
- ASM reforms should encompass good sector governance, although implementing these policies on the ground requires institutional capacity and complex and sometimes expensive, monitoring mechanisms (Sinding 2005). Often the dynamics behind past sector reforms and how these have led to the expansion of ASM are poorly understood. Focus on large-scale mining (LSM) and privatisation have caused job losses and land evictions that pushed people in ASM (Banchirigah 2006). A major challenge is when artisanal mining takes place in poor or post-conflict countries where capacity

for organising the sector is lacking (Maconachie 2009, Vlassenroot & van Bockstael 2008).

Governments can play an important role in redistribution revenues from mining (from royalties, taxes and license fees) to finance government services. Prerequisites for this are 'good governance' and appropriate policies, regulations, and fiscal regimes in the country together with mechanisms and capacity for implementation. A legal framework defining the rights of miners and communities, setting standards for environmental impact assessment and mitigating measures, and requiring financial and social obligations for new mining operations is also crucial. For artisanal mining, the challenge is to improve organisation and techniques and channel a proportion of resulting revenues to promote alternative, sustainable activities, given the finite nature of the resources. All of these aspects co-determine the eventual outcomes of mining for development and the environment.

Enabling positive governance outcomes at different levels entails understanding 'institutions'. Institutions can be defined as 'regularised patterns of behaviour that emerge from underlying structures or sets of rules in use' (Leach *et al.* 1999, p. 266). Institutions can be found on the international, national, regional and local levels. Wiersum (2009, p. 4) distinguishes '1. Formal institutions (or bureaucratic) based on official rules or even established by law. [and:] 2. Informal institutions (or socially embedded) in the form of unwritten codes and rules' and describes institutions being part of an ongoing dynamic process of transformation manifested in local and external institutional arrangements. The latter 'informal institutions' also seem especially relevant in the ASM sector that is often characterised by customary law and practices.

1.4 Objective

The Center for International Forestry Research (CIFOR) was requested by the International Union for the Conservation of Nature, Central and West African Office (IUCN-PACO) to research the impacts of artisanal gold and diamond mining on livelihoods and the environment in the TNS area. This study was part of the multi-partnership "Landscape and Livelihoods Strategy" (LLS) initiative, where the consequences of mining were of particular concern in the Sangha Tri-National Landscape (TNS).

The economic activities of the 191,000 people living in the vicinity of the TNS include logging, hunting, fishing, collection and sale of non-timber forest products, slash-and-burn-agriculture and artisanal gold and diamond mining (Tieguhong &

Ndoye 2007). All of these activities are critical to sustain people's life, but at the same time impose potential threats to the valuable landscape.

As information about management of natural resources in the Congo Basin is limited and the scale to which activities affect the landscape and lives of people is poorly understood, this poses difficulties for implementing appropriate policies (Tieguhong & Zwolinski 2008).

The aim of the study conducted in 2008 and 2009 was to provide information on the problems, functioning and prospects of artisanal mining and to provide recommendations for supporting a future small-scale mining sector that provides equitable access to the resource for the miners in the most sustainable manner.

This chapter provides an overview of the impacts of ASM in the TNS Landscape and looks

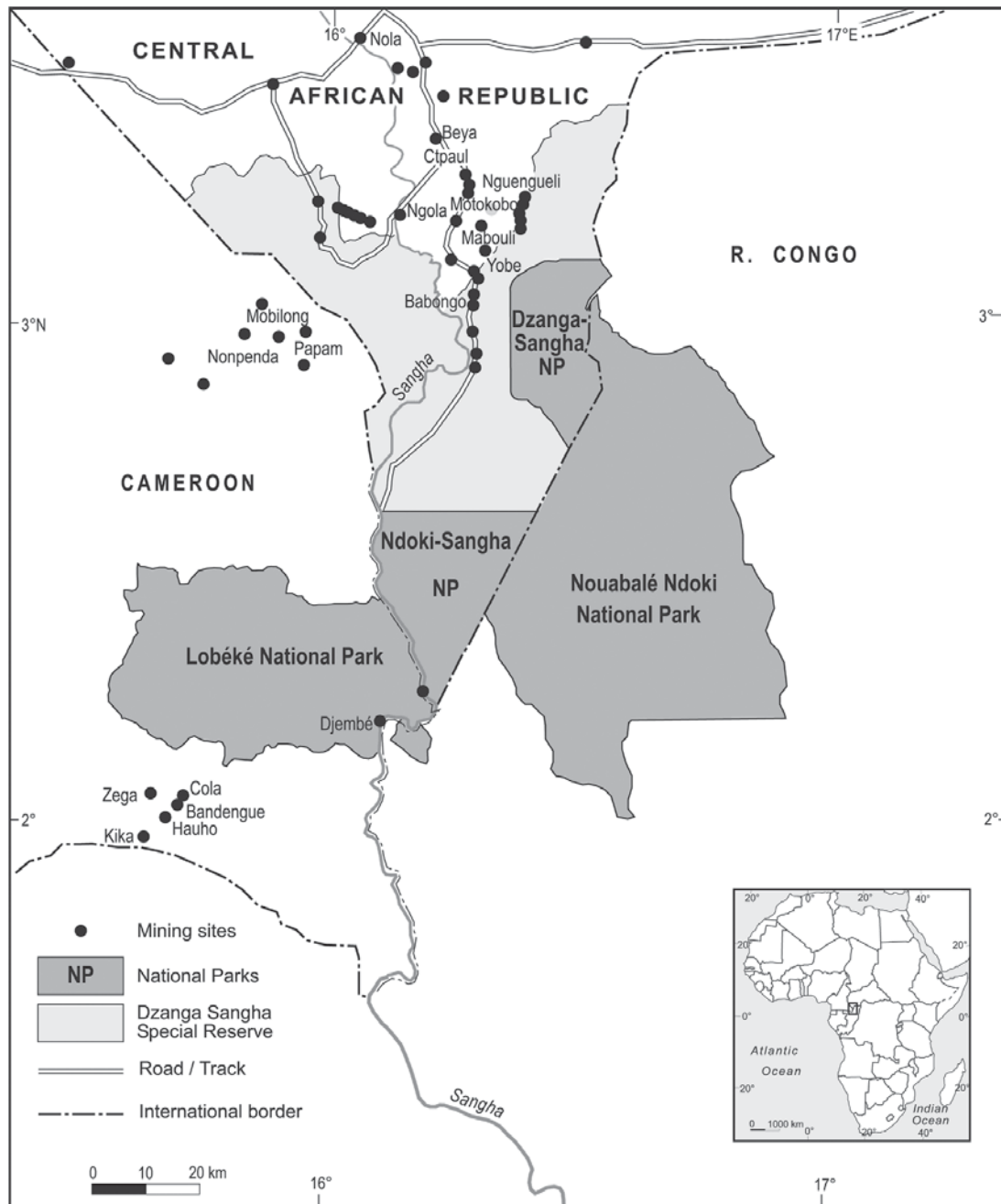


Figure 1. Artisanal mining sites in the Sangha Tri-National Landscape.

at the institutional arrangements for mitigating those impacts and promoting sustainable livelihoods. First, it presents the main findings about the livelihoods and environmental impacts of artisanal mining. Detailed findings about these socio-environmental impacts of ASM in the TNS areas are presented in a full report (Tieguhong *et al.* 2009). Secondly, the institutional framework at local, national and regional levels is analysed to respond to the question of whether the current institutional set up is adequate to deal with issues around artisanal mining in the TNS Landscape.

2 MATERIALS AND METHODS

2.1 Study area

The study area is the Sangha Tri-National Landscape (TNS) shared by three countries: Cameroon, the Central African Republic (CAR) and the Republic of Congo (RoC) (located at 2°00′–3°32′N; 15°28′26″–17°34′8″E see Fig. 1). The landscape covers an area of 36,236 km² and has an elevation of 330–700 m asl. The Congolese section of the Landscape extends over the administrative departments of Sangha and Likouala. It covers 21,470 km² and includes Nouabalé-Ndoki National Park plus five forest management units (FMU), which cover an overall area of 17,280 km² and form the buffer zone of the national park. In the north, the area is delimited by the FMU of Mokabi; in the south by the FMUs of Pokola and Toukoulaka; in the east by the FMU of Loundougou and in the west by that of Kabo. In the west, Nouabalé-Ndoki National Park borders on Dzanga-Ndoki National Park and Dzanga-Sangha Special Reserve in CAR. The CAR section covers 4644 km² and includes Dzanga-Ndoki National Park and Dzanga-Sangha Special Reserve. The Cameroonian section is centred on the Lobéké National Park.

The TNS contains a rich variety of flora and fauna. It is comprised of 93% dense rainforest, 5.6% mixed swamp forest and 0.3% of the area is grassy clearings. Less than 0.6% of the area is forest cultivation mosaic. The forest is rich in tree species with commercial value such as *Terminalia superba* (Limba), Sterculiaceae, in particular *Triplochytton scleroxylon* (Ayous), and Ulmaceae; and, is a sanctuary for some endemic or vulnerable tree species such as: *Austranellacongolensis*, *Pericopsis elata* (Afromosia), *Diospyros crassiflora* (Ebony) and *Swartzia fistuloides* (Pao rosa or African tulip wood) (on the IUCN Red List of Threatened Species) and *Entandrophragma* and *Khaya*, *Aningeria altissima* (Anigre), *Mansonia altissima*, *Pausinystalia macroveras* (Tsanya) and

Gambeya pulpuchra (Longhi). In the CAR sector, 105 species of land mammals have been identified, among which are key protected species such as the gorilla *Gorilla gorilla*, hippopotamus *Hippopotamus amphibius*, and the African forest elephant *Loxodonta africana cyclotis*. Especially in Bayanga (CAR) and Nouabalé-Ndoki (RoC), elephant and gorilla populations offer important income-earning opportunities through ecotourism. The forests of the Landscape, with protected areas covering 21.5% of the entire area (752,000 ha), have been recognised as one of the priority areas for forest conservation in the northwest Congolese forests ecoregion. In 2000, the three countries signed a cross-border cooperation agreement with a view to improve conservation of the protected areas. The governments and international organisations, such as World Wildlife Fund (WWF), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Wildlife Conservation Society (WCS), International Tropical Timber Organisation (IITO), International Union for the Conservation of Nature (IUCN) and United Nations Educational, Scientific and Cultural Organisation (UNESCO), actively engage in the conservation of the protected areas and work towards sustainable management of the buffer zones.

The TNS has about 191,000 inhabitants with a very low average density of 0.7 inhabitants/km². Population growth in the South East Technical Operation Unit (part of which lies in the TNS), has been estimated at 1.88% (Sandker *et al.* 2009). Miners in the TNS have diverse ethnic backgrounds. In the Cameroonian part, indigenous people (Baka and Bangando-also known as Bagongo) comprised 27% of the artisanal mining population. The largest immigrant ethnic group were the Mpiemo of CAR, Foulbe or Haoussa, Kako and Mvongmvong. In CAR, 71% of the miners were indigenous groups (Ba'aka, Bosongo and Sangha-Sangha) and the Bilo, Bossangoa and Ngondi constituted the main immigrants.

The major economic activities around the landscape include: logging, mining, hunting, fishing, agriculture, livestock breeding, gathering, conservation, tourism and trade (in small commodities such as soap, cigarettes, palm oil, salt and palm oil) (CBFP 2006, Tieguhong *et al.* 2009). Direct threats to the landscape emerge from many of these activities, in combination with improved access to forests due to logging roads and a population increase. Household surveys conducted in 2008 in the South East Technical Operational Unit indicate an average income of US\$250 per capita per year, which is substantially lower than the average Cameroonian per capita income of 1010 US\$ (Sandker *et al.* 2009).

2.2 Methods

The methodologies used to collect the data presented in this chapter included:

- Field visits to 17 mining sites between August and December 2008 (13 in Cameroon and four in CAR) located within 50 km of the TNS for observation, mapping and photographic documentation. The Republic of Congo's nearest mining sites (Boloko, Golana and Pandama) were not within the 50 km distance of the TNS and therefore not part of this study.
- Interviews with 131 (63 gold and 68 diamond) miners (a 24% sample), and complementary semi-structured interviews with key actors (such as the park conservators, government representatives in charge of mines, forest and the environment, and representatives of international non-governmental organisations). Topics covered in the interviews included: general perceptions on mining activities and other income earning activities, and perceptions on environmental degradation, benefit flows, characteristics of mining and governance of the sector.
- A literature review of scientific studies, reports of ministries and support organisations, national laws and regulations, and mining permits.

Data were analysed using twelve equations in the calculation of annual quantities of minerals, costs of production, gross and net revenues, as well as the aggregation of observed values. Field data entry was done in the CPro version 3.0 typing mask and transferred using Stat-Transfer version 5.0 into SPSS Program version 12.0 for analysis. STATA version 8.0 was used for the logistic regression analysis. Miners were dichotomised into those who were highly dependent on artisanal mining and those with a lower dependence on mining. The Gini coefficient was used to test inequality associated with dependence on mining income. Information provided by partners and field organisations was recorded as their perceptions and later used to cross-check data provided by artisanal miners.

3 RESULTS

3.1 Socio-economic impacts

Most of the miners interviewed had permanent or temporary residence in Zega (CAR), Mboya (CAR), Nguenguili (Cameroon) and Ngola (Cameroon). The majority of mining activity took place year-round but activities (especially the alluvial mining in the Sangha River) reduced in the rainy season when flooded conditions impeded the work. Most mining camps had agricultural

crops planted, and in some cases livestock (fowls, goats and sheep) were reared. The livestock was particularly important for the ritual of making sacrifices to the god of diamonds.

Two types of artisanal miners were observed during this study: divers and diggers. Diggers are those who dig pits in the soil to extract economic minerals, and divers are those who dive into the Sangha River to scoop sand and soil (from the riverbed) to get their diamonds. Although miners come from diverse ethnic groups, the vast majority (95% in Cameroon and 87% in CAR) are permanently based in nearby towns and villages. The average age of miners is 36 years old, and miners generally have many years of experience in the ASM sector (17 years of experience in CAR and 9.5 years of experience in Cameroon). In CAR, no women lead mining activities, whereas in Cameroon 13% of the head miners are women. However, in both countries, most miners are married, and assisted by (family) labour, involving many women and children. Education among the miners is generally low, with over 70% of the miners with only primary schooling level or having had no formal education at all (Tieguhong *et al.* 2009).

The main finding related to socio-economic outcomes was that the livelihoods of at least 5% of the area's population, totalling 4600 people (517 miners, their dependents, and labourers), are based primarily on artisanal mining. Although the income generally pays for important household needs, the range of income gained among miners is highly disparate. All minerals extracted in the region on an artisanal scale are sold unprocessed. The mean annual net revenues from gold and diamonds—after reduction of the costs of production materials, labour and transport—were 575,338 FCFA (std = 461,913) (US\$1130) and 812,644 FCFA (std = 676,487) (US\$1596), respectively, in Cameroon. This represents more than four times the income of the average 'non-miner' in the region (of about US\$250) (Sandker *et al.* 2009). On the CAR side of the TNS, diamond miners profited less with an average annual net income of 368,084 FCFA (std = 904,427) (US\$723).

Ethnicity was a major factor in explaining a higher income from artisanal mining. As expected, migrant miners with skills, capital, better education and more experience could earn more from artisanal mining than indigenous Bangandos and Ba'aka/Baka pygmies.

In both Cameroon and CAR, over 90% of miners used their income to meet four to six basic needs, including food, education, healthcare, radio/TV (information tools), clothing and housing construction. Meeting these needs fits some of the most important Millennium Development Goals (MDGs) of reducing poverty.

The calculated Gini coefficient (from a scale of 0 indicating complete equality to 1 showing inequality) for absolute income was 0.50, and for absolute non-mining income, was 0.43. This means that there was a higher income disparity between miners than between the other people in the region. With a standard deviation of up to three times the average income, actual revenues ranged from considerable profit to significant losses. Net annual losses of up to 1,032,450 FCFA (US\$2028) were found in CAR and 400,000 FCFA (US\$786) in Cameroon. The risks of losing income were of special concern because most miners did not save any of their income. Additionally, the results of the logistic regression analysis indicate a significant dependence on mining incomes ($p < 0.05$). Ethnic groups, educational levels and time spent mining were the main variables that determined level of mining dependency.

Mining was the principal activity for 79% and 88% of the artisanal miners in Cameroon and CAR, respectively, although mining is often part of a multiple income generation strategy, combined with between one to six other activities. Agriculture was the second important source of income, followed by non-timber forest product gathering in Cameroon and fishing in CAR.

Small-scale miners in the TNS offered different views on production trends and problems encountered. In Cameroon, miners believed production was increasing and related that this was mainly a result of increasing prices, hiring labour and purchasing of new tools. On the contrary, miners in CAR said that production was decreasing, blaming over-exploitation and a lack of external support. Miners reported a variety of problems related to their daily activities, the most pressing of which are: lack of food and medicine, harassment by conservation officials, dishonesty of their sponsors, low production, harsh government laws and actions, an inability to detect materials and minerals, price fluctuations and lack of capital. In Cameroon, the three major problems (stated by 76% of interviewees) were: a lack of materials for detecting and exploiting minerals, a lack of food and medicines at the sites and low production. In CAR, the two main problems identified, expressed by 65% of interviewees, were: low production and lack of materials for detecting and exploiting minerals.

The fact that over three-quarter (90% in Cameroon and 77% in CAR) of the overall income of small-scale miners originates from natural resources—not only minerals, but also NTFP gathering, hunting and fishing—shows the enormous contribution of the natural environment to miners' livelihoods. This raises the question of how environmentally-sustainable these activities are, and how artisanal mining activities impact upon

the very same natural environment that miners depend on?

3.2 *Environmental impacts*

Local stakeholders interviewed indicated that miners, albeit a small percentage, were operating within the interior of the reserve, especially in the northern section of the Dzanga-Ndoki National park in CAR and the southern part of Lobéké National Park in Cameroon. Several related environmental risks and impacts were noted, such as: water and soil pollution, disturbing of fish breeding grounds, an increase in infrastructure in the forest environment, un-recovered exploited mining pits and poaching of wild animals. The research findings confirmed that some miners operate within the parks. In Cameroon, 20% of the miners indicated that they (also) mined inside the reserve, in contrast with only 1 (out of 32 miners) in CAR. However, the overall scale and conduct of artisanal mining in the TNS Landscape was found not to drastically threaten environmental values.

Environmental impacts from artisanal mining in the TNS Landscape appear to be of limited scale and duration. The majority of mining took place along streams, causing direct but insignificant impacts such as diversions, siltation and sedimentation of water sources. Only a limited felling of trees or land clearance was observed. Small surfaces were cleared during the period of mining, which was often seasonal, with only limited farming activities taking place. The indirect effects of working in the forest areas included timber and non-timber forest product exploitation, including bush meat and medicinal herbs, by 21% of Cameroonian and 28% of CAR respondents, who indicated that such activities provided alternative sources of income. No miner reported using mercury or cyanide for gold extraction, nor had these polluting activities been observed by any of the stakeholders.

This conclusion of small-scale and temporal environmental impacts due to artisanal mining could, however, change in the future. An expected increase of the number of artisanal miners (migration and an overall estimated population growth in the region of around 1.88% per year) and the influx of large-scale mining operators are expected to place increasing pressure on the landscape. This, combined with a lack of environmental awareness among the miners, could cause destruction. In both countries, over 53% of the artisanal miners stated that gold and diamond had infinite resources, and 67% believed that mining had no negative environmental impacts whatsoever.

Another concern linked to future impacts, raised by some stakeholders, was the fact that the

Table 2. Types of government support of ASM in TNS.

Government support or program	Frequency	Percentage by country (%)	Overall percentage in TNS (%)
<i>Cameroon</i>			
Education	1	1	1
Technical training	28	28	21
Exploration equipment	4	4	3
No support	66	67	50
Total	99	100	76
<i>CAR</i>			
Education	9	28	7
Technical training	4	13	3
Exploration equipment	2	6	2
No support	17	53	13
Total	32	100	24
Total	131	100	100

buffer zone of the Lobéké National Park has been attributed to mining operators under research permit titles. A WWF map shows the overlaps of mining and timber concessions with national parks in Southeast Cameroon (WWF 2008). These multiple allocations of land for different uses, with no coordination between the ministries issuing permits or land use rights, demonstrate the lack of coordination between the responsible authorities and the potential for conflicting interest, not just between timber and mining operations and protected area managers, but also between LSM and the activities of the local population. One example of the latter is the operation of C&K Mining, a joint Cameroon-Korean company that has explored potentially huge diamond deposits (estimated volume of 740 million carats) at Mobilong in the East Province (Gweth 2008). Local miners in this area, none of whom possess official mining titles, are wary of the presence of the company, fearing they could be evicted if the company starts mining operations.

These socio-economic and environmental impacts of artisanal mining can be placed in the institutional context of local, national and regional forms of organisation that co-determine the managing of risks and opportunities and the eventual outcomes for the population and the landscape.

3.3 Institutional framework at the local, national and regional levels

How formal and informal forms of organisation are perceived and structured at the local level is

first presented, followed by an analysis of the key institutions at a national and international level.

3.3.1 Local institutions

Of the miners interviewed, over 70% and 63% in Cameroon and CAR, respectively, worked for themselves. Mining in groups or cooperatives was unusual, except for the recently introduced project by the Cameroonian Support and Promotion Framework of Mining Activities Organisation (CAPAM). About 29% in Cameroon and 37% in CAR were working for sponsors, who purchase materials, food and medicine for their workers. Mining sites are commonly headed by a site chief (*chef de chantier*), usually the oldest or the most experienced person, who retains special mining rights and exercises leadership at the camp. For example, the chief of a diamond mining site in Ngola (CAR) was informally entitled to 25% of sales. Formally, the chief is obliged to pay an annual government tax of 30,050 FCFA (US\$59).

There was correspondingly no organised sale of products in the TNS; each miner sells winnings individually to buyers. The buyers, generally known as collectors, travel to buy the minerals at pre-determined prices and as the miners have little bargaining power, they are largely price takers. Price variability, especially for diamonds, is large and miners lack knowledge and tools to determine their value and prices themselves. Small-scale miners who work for sponsors generally do not even know the unit price of their product. About 32% of Cameroonian and about 47% of CAR miners obtained financial support for their operations from either a village sponsor or an external sponsor. Sponsored miners were unaware of how much business capital had been provided to them, claiming they were basically fed and paid to perform their job, indicating how individual buyers control miners through sponsorship. The miners, in turn, are expected to be loyal and sell their products exclusively to their sponsor; harassment results when a miner has been discovered selling to another buyer. Miners related that transport to market usually was problem free, explained by the fact that the small volume—high value of the product makes it largely undetectable by government officials.

When asked about government support for small-scale mining in the TNS, 67% and 53% of miners in Cameroon and CAR, respectively, indicated that it was completely absent. However, 29% in Cameroon mentioned education and technical training, specifically making reference to the diamond miners in the Mboy region, where the government agency CAPAM has been providing equipment and technical assistance to small-scale miners since 2006. At Mobilong, CAPAM gave

motorised pumps to artisanal miners free of charge, which otherwise are rented at 5000 FCFA (US\$10) per day. The miners of this site attributed the fact that they have accumulated capital to the support they received from CAPAM. In CAR, education and technical training accounted for 40% of the government-support identified by miners (Tab. 2).

When artisanal miners were asked if they had experienced problems during operations, 91% and 66% in Cameroon and CAR, respectively, stated they had no disturbances of any kind. Further questioning on the nature of problems faced, however, revealed that government agents, conservation officials and individual buyers as control agents caused harassment. Government agents are the major source of harassment in CAR, but conservation agents were the leading source in Cameroon. Strategies for dealing with such problems in Cameroon were to run away (22%), bribe the controller (11%), speak angrily (33%) or stay quiet (33%).

In CAR, artisanal miners react either by speaking angrily (64%) or show their papers to prove they are operating legally (36%). This underscores not only the weaker legal position of miners in Cameroon but also the general level of corruption in both countries.

Artisanal mining in the TNS region is informal and largely illegal. This is particularly the case on the Cameroonian side, where none of the interviewees confirmed having paid tax of any kind or having a legal mining permit. The delegate of mines, for the Boumba and Ngoko division in Cameroon, indicated that miners do not want to follow the rules and regulation of the sector and refuse to pay the yearly 5000 FCFA (US\$10). However, in the CAR, a little over 56% of the artisanal miners pay the labourers' tax and possess an annual mining card, miners pay an annual labourers' tax of 2000 FCFA (US\$4) and the site head pays an annual tax of 30,050 FCFA (US\$59). Collectors or buyers normally pay an annual tax of up to 1,100,000 FCFA (US\$2160). The higher level of legality in CAR demonstrates that regulation is possible. Yet, about 62% of the artisanal miners in Cameroon and 81% in CAR reported not being aware of the respective country's mining code and allegedly could not comment on its enforcement. Local stakeholders expressed the need for sensitising miners on the code and legalising of their operations. Most miners (64% and 67% in Cameroon and CAR respectively), however, said it was not easy to obtain legal mining papers. Paradoxically, most of those who said it was easy to obtain legal papers did not actually have them at the time this research was carried out. The miners who had legal papers in CAR mentioned that the benefit of having the papers was basically the freedom to exploit

and sell minerals. Despite the fact that 'harassment by conservation agents' and 'harsh government laws and actions' are mentioned as problems, miners still see the government as the main actor with power to assist. The question that remains to be answered is whether interventions directed at these problems can break the vicious cycle of informality and dependency to enable small-scale miners to earn more profits from mining. Miners cited a number of opportunities for resolving such problems, which are detailed in Table 3.

Over two thirds of the miners in both Cameroon and CAR believed that the government should help them obtain materials such as tools or ensure sensitisation of the mining code, Artisanal miners called for greater transparency in sales offices, reduction in the costs of obtaining legal papers and stabilisation of prices. Stakeholders in the TNS are often

Table 3. Opportunities suggested by artisanal miners in TNS for resolving problems.

Opportunity/ Request	Frequency	Percentage by country (%)	Overall percentage in TNS (%)
<i>Cameroon</i>			
Assistance to obtain working materials	55	49	38
Assistance to obtain legal papers	26	23	18
Open a sales agency in village	10	9	7
Stabilise prices	6	5	4
Create a cooperative	9	8	6
Receive training in modern mining techniques	7	6	5
Total	113	100	77
<i>CAR</i>			
Assistance to obtain working materials	12	36	8
Assistance to obtain legal papers	10	30	7
Open a sales agency in village	4	12	3
Stabilise prices	1	3	1
Create a cooperative	6	18	4
Total	33	100	23
Total	146	200	100

advised to organise the miners and formalise their activities as a first step to solve some of the issues. Groups could become trained on better technologies and environmental impacts.

3.3.2 *National institutions*

Cameroon and the Central African Republic, both have a foundation for good governance in the sector with a legal framework structured by a Mining Code, Tax Code, Land Tenure Code, and regulations on the environmental and protected areas.

In Cameroon, the main bodies dealing with geology and the mining sector are: the Ministry of Industries, Mines and Technological Development (MINIMIDT) which also has the responsibility for the national geological survey through the Direction of Mines and Geology, and; the Ministry of Scientific and Technical Research, an agency that oversees a variety of research institutions in the areas of geology and geophysics, hydrology, and energy. Mining activities are regulated by a legal framework comprising the following: the Mining Code under MINIMIDT; the Tax Code including customs, labour and investment codes under the Ministry of Finance; and the Environmental Code under the Ministry of Environment and Nature Protection.

The legal framework for Cameroon's mining sector follows French law. The Mining Code consists of a law (1964) which regulates mineral substances, and another law (1978) which defines taxes, including royalties and mining taxes. The latter was supposed to define the fiscal framework for mining, but this did not happen until 2001 when the new Mining Code (Law No. 1 of April 2001) was promulgated with the assistance of the World Bank. It comprises the fiscal laws necessary for the regulation of the sector with provisions for investors to negotiate on a case-by-case basis for the establishment of mining companies. According to the code, all mineral resources belong to the state. Prospecting, exploration and mining activities for any mineral deposit are regulated by permits, which are awarded for quarrying, prospecting/research, exploration, exploitation, and mining concessions (Republic of Cameroon 2001). This legal framework has reduced administrative burdens and put the authorities in a better position to evaluate investment opportunities (which often require rapid decisions). One perceived advantage of the new code is a reduction in the role of the state in mining operations as well as its discretionary powers. On the other hand, there is an increase in the state's role as a supervisor and regulator of the mining sector.

The creation of the Support and Promotion Framework of Mining Activities Organisation (CAPAM), in 2003, followed a new provision of

the 2001 Mining Code enabling the setting up of an autonomous unit to facilitate, assist and promote small-scale mining and aid up-scaling to large-scale mining operations. In 2006, CAPAM channelled 50 kg of gold and 300 carats of diamonds in its market facilitation structure. The revenues are being used to invest in materials, pay tax (3% for gold, 8% for diamonds) and 15% is given to the local council, 10% to local population and 25% to the monitoring and control organ. One of the advantages for the miners would be greater certainty about prices for their production with help of sales according to an approved price list. This approach appeared difficult to implement; miners were not well informed about the price list and still had no capacity to determine the diamonds' quality and value category. In 2008, the purchase of diamonds from artisanal miners by CAPAM was suspended by the Minister.

The 2001 Mining Code of Cameroon differentiates between ASM and LSM but at the same time, gives provisions for the two to operate at the same site, recognising the importance of the livelihoods of local people and referring to the fact that the former goes to less profound depths than the latter. A related challenge recognised by provisions of the 2001 Mining Code is to mitigate problems caused by both ASM and LSM operations in the same area. However, there have not been any practical tools developed to date to deal with the situation of ASM versus LSM.

The mining sector in the CAR falls under the responsibility of the Ministry of Mines and Energy. The General Directorate of Mineral Resources implements the law and policies regarding mining permits. The Mining Code of 1961 was revised in 2004 in order to provide more flexible and attractive policies to stimulate investments in the sector, including fiscal incentives (e.g. tax exemption on equipment during exploration) and establishing an organisation responsible for geological exploration and prospecting claims (CAR 2004). By law, all mineral resources in the ground or at the surface are property of the State and access can be granted by means of permits. The new Mining Code defines six categories of permits, including artisanal mining. The permits serve different purposes, subjected to various surface areas, validity and delivery authorities, and provide for exclusive rights on the defined property; when a deposit is discovered, the right to mine is guaranteed to the owner of the exploration permit, which can be sold or transferred with the authorisation of the Ministry of Mines (CAR 2004).

The government maintains statistics concerning diamond production and trading through the *Bureau d'Évaluation et de Contrôle de Diamant et d'Or* (BECDOR). BECDOR was established

in 1982 to oversee the internal diamond market and to value official exports. It also maintains a database concerning all diamond production in the country. BECDOR estimates that there are approximately 50,000 licensed diamond diggers, or 'creuseurs', in the CAR. Labour taxes are collected from 56% of miners. The artisanal miners sell their production to about 160 certified collecting agents who, in turn, sell this production to two purchasing offices located in Bangui.

3.3.3 *International and regional institutions*

At the international level, artisanal mining and its potential for development have received increasing attention over the past decade. Focussing on the most relevant international and regional initiatives and the involvement of Cameroon and CAR, four are key to the ASM sector.

The Communities Artisanal and Small-scale Mining (CASM) is a global networking and coordination facility with a stated mission "to reduce poverty by improving the environmental, social and economic performance of artisanal and small-scale mining in developing countries". CASM is currently chaired by the UK's Department for International Development, and is housed at the World Bank headquarters in the United States. CASM Africa has its secretariat based in South Africa (CASM 2010). Central African countries can benefit from its facilities but until now, they have not really taken advantage of them.

The International Labour Organisation (ILO)'s Convention on Safety and Health in Mines, 1995 (No. 176), covers all mines and provides the minimum safety standards against which all mine operations should be measured. The Convention sets out procedures for reporting and investigating accidents and dangerous occurrences in mines. Governments that ratify it undertake to adopt legislation for its implementation, including the designation of the competent authority to monitor and regulate various aspects of safety and health in mines (Walle & Jennings 2001). So far, none of the Central African countries have ratified the convention (ILO 2010).

The Kimberley Process was initiated by African diamond-producing countries in May 2000 to develop an international certification scheme for rough diamonds in order to prevent conflict diamonds from entering legitimate markets (Kimberly Process 2004). This process, supported by the World Diamond Council and the United Nations, and implemented by a United Nations vote in 2003, requires the certification of all diamonds mined and upon every transfer of ownership of the rough diamonds. The Process brings together a broad range of international stakeholders in the diamond trade, including government officials,

industry representatives and non-governmental organisations. At present, Côte d'Ivoire is the only country under embargo by the United Nations for the export of conflict diamonds; this occurred in December 2005. The CAR, DRC, Gabon and Republic of Congo are currently member countries. In 2007 Cameroon affirmed its intention to join the Kimberley Process but this has not been put into practice yet. Cameroon joining the Kimberley Process will be important for improving monitoring mechanisms and monitoring cross-border trade.

The Extractive Industries Transparency Initiative (EITI) followed a 2003 conference to improve transparency of oil, gas and mining payments by companies to governments. The general idea is that revenues from oil and mining would become public information, and would be spent in a more transparent manner to benefit the country's population. At a country level, a first step is the foundation of a multi-stakeholders group with representatives of government, companies and civil society, which works towards an action plan with rules for disclosure and monitoring. Cameroon is currently a candidate country of EITI and has until March 2010 to undertake validation. Hitherto, Cameroon has only reported oil revenues in its 2006 and 2007 reports, covering the period 2001–2005. The country has promised to start reporting revenues from mining exploitation in its next report that would cover 2006–2009. Until now, ASM has not been part of the EITI discussion (Valéry Nodem, Coordinator *Réseau de Lutte contre la Faim*, member-organisation of Publish What You Pay (PWYP) Cameroon, pers. comm.). CAR also has the status of EITI candidate country with until November 2010 to validate its work plan. CAR has diamond mining companies as partners in the stakeholder forum. Other countries in the sub-region that are EITI candidate include Gabon, the Republic of Congo and the Democratic Republic of Congo (EITI 2010).

At a regional level, there are no specific initiatives on ASM although the similarity of the sectors throughout various countries of the Congo Basin suggests the usefulness of having such a forum for exchange on technical aspects. Moreover some cross-border issues ask for regional solutions. Cross-border smuggling can result from different institutional contexts or differences in mineral taxes between countries. For the case of Cameroon and CAR, the difference in institutional setting is the fact that Cameroon is no applicant of the Kimberley Process and has less visible institutional structures when it comes to ASM in the TNS region. Also there is a different official tax base for Cameroon with a diamond tax of 8% and CAR with a higher 12% taxes (Barthélémy *et al.* 2008).

The Yaoundé Declaration signed in 1999 by the governments of six Central African countries; Chad, Cameroon, CAR, Republic of Congo, Equatorial Guinea and Gabon, set the foundation of the Central African Forest Commission (COMIFAC) and became an important agenda for cross-regional conservation and development goals. It resulted in cross-boundary agreements, among which the agreement between Cameroon, CAR and Republic of Congo about conservation of the TNS Landscape. The 2005 Brazzaville Treaty and the adoption of the Convergence Plan (*Plan de Convergence*) by ten African countries—Burundi, Cameroon, CAR, Chad, Democratic Republic of Congo, Equatorial Guinea, Gabon, Republic of Congo, Rwanda and, Sao Tome and Principe—created the provision of free cross-border movement of park guards in the TNS (Carroll 2008). However, at no point do the agreements which followed the Yaoundé Declaration involve ASM as integral part of discussing conservation and development in forest landscapes.

4 DISCUSSION

In the Sangha Tri-National Landscape, artisanal mining activities have had both negative and positive impacts. It is questionable, however, whether the current institutional arrangements are capable of addressing the industry's negative aspects. Adequate institutional mechanisms not only refer to the laws and regulations of the countries but involve also the 'informal institutions' at various levels and their ability to deal with institutional challenges around ASM. As identified in the introduction, main challenges are: knowing the limits and opportunities of external interventions; understanding power relations between actors; and finding out what 'effective formalisation' and 'good sector governance' should entail in the specific TNS context.

The study results indicate that mining in the TNS landscape contributes significantly to livelihoods, as diamonds and gold provide on average higher levels of income than traditional alternative activities for over 4600 miners, labourers and dependents in the landscape. Nevertheless, the huge income range of miners shows the high financial risk some of the miners carry and overall incomes are still too low to lift households out of poverty. The challenge to educate miners on how to avoid wide income swings and losses, and improve incomes is not sufficiently embedded in current policies or activities of the government, development organisations or private sector in either country.

Armstrong's (2008) study of the artisanal diamond sector, lists some recommendations

for improving revenues, including improving knowledge about pricing and technology; improving access to lower-risk credit; making accessible and competitive licensed buyers or buying offices; joining fair trade initiatives; and value-added activities and local processing of the minerals. For knowledge transfer to be effective, programs should accommodate local needs and show its use in terms of profitability, simplicity and efficiency to increase benefits with minimum health and environmental risks (Hinton *et al.* 2003).

An expected outcome of making ASM more profitable through support initiatives is that more people will be attracted to the sector. This is even the purpose of the Cameroonian support agency CAPAM, which aims to increase the number of small-scale miners from the estimated 20,000–30,000 to a workforce of 60,000 (CAPAM, 2006). This carries the risk of increasing dependency of many on this finite source when it is not embedded in wider development strategies (Vlassenroot & van Bockstael 2008).

Diversification of livelihoods, often recommended as way to improve the sustainability of ASM (Hinton *et al.* 2003), would clearly be nothing new to the miners in TNS, who, although largely dependent on mining incomes, conduct between one to six additional income earning activities. Deliberate government or external support programs on diversification of income opportunities should build upon these activities that miners already practice.

A first step of outside intervention programs is often the organisation of miners in groups. The logic behind grouping miners is to have them share investment costs and benefits and at the same time to have an entity with whom the government or development agency can work. This often implies the transfer of ASM into larger-scale operations (Tarras-Wahlberg *et al.* 2000). Blore (2008), who studied miner cooperatives in Latin America, contends that the groups suffer serious constraints when it comes to sharing investments and revenues; however, they can benefit from working together in other areas such as sharing land and costs of mining claims and administrative procedures, exchanging information and working together on community development initiatives. The problem with organising miners is that it often builds upon a false assumption that the sector is 'chaotic and unorganised, when in fact it is highly organised' (Hilson 2008, p. 223). The picture drawn in this study confirms this, as it shows miners who have been in the business for a long time and although not 'formally', are already highly organised in mining camps. This level of organisation could offer a good entry point for supporting wider issues, such as the by the miners expressed wish for obtaining

tools and legal papers. A noticeable difference of perspectives on solutions between actors was that none of the miners expressed the wish for better organisation of miner groups while most of the external stakeholders (local NGOs and officials) mention this as one of the key priorities. This difference needs to be further explored before imposing types of organisation that might not fit the working structure of miners. Unfortunately, the lessons of PASAD, a project for technical support to ASM in CAR funded by *Caisse Française de Développement* (1996–1998), have never been evaluated (Barthélémy *et al.* 2008). However, current experiences of the activities of CAPAM in Cameroon and the USAID financed pilot project ‘Property Rights and Artisanal Diamond Development Program’ in CAR (Vlassenroot & van Bockstael 2008) will hopefully provide valuable context specific lessons.

A key point of institutional attention for any support program includes addressing power relations, between and among the actors, in order to avoid further inequality and marginalisation of certain groups. Logistical support must not only exist but need also to be considered accessible by the miners (Sinding 2005). Especially the process of issuing mining titles is prone to exclusion and can eventually lead to abuse of vulnerable groups by other miners and mining companies (Fisher 2007). The study findings show the average lower miner revenues of the indigenous Bangandos and Ba’aka/Baka pygmies compared to other miners. Currently there is no institutional arrangement to disseminate knowledge from the migrant miners with better skills, capital and educations to indigenous groups.

An aspect of power relations are the so called ‘vested interests’ in the valuable mineral sector, which should be identified before any reform takes place (Hilson 2009; Maconachie 2009). The actors with vested interests in mining in TNS are the miners, the site chiefs, middlemen and sponsors. Miners much depend on the site leader and sponsor for their revenues. The site chiefs, who receive a percentage of miners’ income based on informal arrangements, are not likely to support a permit system when this would endanger their revenues. On the other hand, awareness-raising about benefits of mining titles for miners could entice them to become part of a formalisation process and become less dependent on their current sponsors. Another potential source of future conflict clearly signalled in Cameroon is the overlap of ASM and LSM concessions, timber concessions and National Parks in TNS.

Formalisation is often considered as the way forward for integrating ASM into the national economy and building a mechanism to look into

sustainability and livelihood issues. With one fifth of miners already operating within protected areas of TNS and an expected increase of ASM and LSM activities in the area, maintaining the current low level of environmental impacts will only be possible if policy measures are enacted. Balancing improvements and formalisation in the sector with measures to discourage mining inside the protected areas are key priorities. Three elements for ASM formalisation are: ‘A legal and regulatory framework ensuring security of tenure and property rights, acknowledging the necessary participation of local authorities and backed-up by a sound geological survey and cadastral system; The delineation and creation of artisanal mining zones; The use of miners’ identity cards’ (Armstrong *et al.* 2008, p. 110). The first two elements are not sufficiently embedded in current ASM practises in CAR and certainly not in Cameroon where the sector is largely informal. Livelihoods are hazarded by the lack of coherence in the legal framework (Mining Code, Tax Code and Environmental Code) and the low or non-existent level of tax payments do not enable government agencies to channel revenues from the sector back to support it. Miners at the Cameroonian side of TNS do not carry mining permits. In CAR, 56% of the miners interviewed do possess a license and pay the annual tax.

For miners to voluntarily pay their licence, they first need to believe that the tenure and tax system will provide them with some benefits. This asks for real benefit transfer within the system and awareness-raising about these advantages. Benefits may come from tenure rights that offer miners security and a longer term perspective (Sinding 2005). Property rights are the ‘basis of legal redress when rights are violated by government or company as they frequently are’ (Siegel & Veiga 2009, p. 52).

However, the transaction costs of putting in place a formal system for ASM can be out of proportion with potential revenues it will create, as might be the case in Cameroon where revenues are modest and the number of miners relatively large and difficult to monitor. Sinding (2005) suggested the possibility of leaving out the smallest operators from the formalisation process for this very reason. But leaving them out of formalisation also means that they stay out of sight and remain excluded from accessing rights and support. A rather light structure for these type of miners combined with easy accessible logistical services seems more appropriate.

Another element brought to the forth by this study is the element of trust. Trust between miners and local officials and vice versa is needed for any of the more formal mechanisms to function. Miners in TNS report harassments of government agents (mainly in CAR) and conservation agents

(mainly in Cameroon). One advantage of having legal papers shows in CAR, where a third of the miners solve their confrontation with agents by proving that they operate legally. Other encouraging signs of a positive atmosphere for formalisation are that miners do propose 'having access to legal titles' as one of the solutions for improving their livelihoods.

The main challenge is to construct a flexible type of formalisation that accommodates the needs of miners, takes into account power structures and can be the operational arm of broader good sector governance.

Good sector governance in the context of TNS should first of all encompass more than one sector. Integrated resource management on a landscape and regional, cross boundary level, can help to balance the positive and negative impacts of ASM. The current competing and contradicting stakes and authorities in the TNS landscape increases the risk of degradation of the environmental values of the landscape and enhances the exclusion of less-represented groups who are the most dependent on these resources: poor, rural ethnic groups such as the Baka pygmies.

Frost *et al.* (2006) proposed eight guidelines for successful resource management, based upon experiences from the TNS landscape. These include a focus on multi-scale analysis and intervention; developing partnerships and engaging in action research; facilitating change rather than dictating it; promoting visioning and the development of scenarios; recognising the importance of local knowledge; fostering social learning and adaptive management; concentrating on both people and their natural resources, including biodiversity; and embracing complexity. Using these guidelines can help particularly in empowering local stakeholders to be more articulate advocates and active participants in their own development and conservation efforts.

Incentives, knowledge, and property rights are key point of attention for supporting outcomes of formalisation and 'good resource governance'. Property rights will stimulate investment in knowledge to minimise environmental risks and 'expanding existing mining areas creates incentives for miners to remain settled in their current locations, potentially limiting the ecological impacts of ASM to a particular zone' (Siegel & Veiga, 2009: 55). Property right systems should be well communicated made clear and understandable, enforceable and supported by a cadastral system that also includes prospecting of potential ASM and discloses information about mineral deposits (Armstrong *et al.* 2008).

Although ASM has received more attention in global policy debates over the past decade and

possible positive outcomes in terms of development have become increasingly recognised, there are few international frameworks in which the rights of ASM are being discussed. CASM is the only platform that specifically deals with ASM, but again, Cameroon and CAR are not yet active participants. The EITI can enhance overall transparency of the sector but focuses on large-scale mining and is still in a planning phase for both countries. The Kimberley Process is interesting when it comes to the diamond sector monitoring in CAR but also implies a backward position for Cameroon, which is not a member (yet) and therefore unable to access the international diamond market of the KP member countries (Barthélémy *et al.* 2008).

At the regional level, there are cross-boundary agreements about the natural services of the park. However, these TNS agreements are mainly conservation and forest exploitation based and they do not address mining activities. A regional integrated approach towards current issues in both the forest and mining sector would be highly recommendable and reinforce the outcomes of the TNS agreements. Regional collaboration around mining issues is especially relevant when it comes to monitoring shared mining deposits, such as the 'border-rivers with mineral rich alluvions: Mboumbé between Cameroon and the CAR; Sangha between the CAR, Cameroon and the Republic of Congo' (Barthélémy *et al.* 2008, p. 32) and mitigating smuggling of high value minerals. Formalising regional agreements that include harmonisation of taxes is seen as one of the solutions to minimise cross-border trafficking of high value minerals (Armstrong *et al.* 2008). Furthermore, countries could join forces in prospecting of geological deposits in trans-border zones, in the monitoring and organisation of commodity trade and offering support to artisanal miners. The Republic of Congo and CAR already signed an agreement in 1998 about common management of the diamondiferous zones in their border region but as this was never enforced, these plans would need to become revitalised first (Vlassenroot & van Bockstael 2008). Barthélémy *et al.* (2008, p. 39), in their study about trans-border issues around mining in Central Africa, advise the governments of the TNS countries, Cameroon, CAR and Republic of Congo to 'undertake together an ambitious project that could be called 'Control and Development of the Exploitation of the Diamond Resources of Central Africa' and use for this the existing structures of CEMAC (Economic and Monetary Community of Central Africa) and CEEAC (Economic Community of Central African States). Such a proposed structure, preferably not only on diamonds but also on gold and other valuable natural resources, seems of great

value, especially if it adopts an integrated natural resource management angle and could build upon the benefits of the existing trans-boundary TNS agreements.

5 CONCLUSION AND RECOMMENDATIONS

Key recommendations to regional governments, ministries, non-governmental organisations, private enterprises and development agencies are to improve the coherence of strategies across the mining and forestry sectors in order to enhance livelihoods and minimise environmental impacts. Special attention should focus on the mitigation of conflicting interests: between small-scale and large-scale mining activities; and with regard to mining activities in timber concessions and/or in protected areas. Mining companies should state explicitly how they will interact with local communities and artisanal miners during their daily operations and as part of their overall social responsibility.

By harmonising mining policies and resource governance strategies in the Congo Basin and in the three countries (Cameroon, the Republic of Congo and the Central African Republic) in the TNS in particular, a coherent approach to mining in the TNS area would enable the negative issues of artisanal and small-scale mining and trans-boundary trafficking to be more efficiently tackled. The COMIFAC countries are recommended to integrate the mining sector in their Convergence Plan (*Plan de Convergence*). The outcomes are expected to strengthen existing Park-related trans-boundary agreements on sustainable management that follow the 1999 Yaoundé declaration signed by Central African governments.

Empowering miners by informing and sensitising them about their rights under the national mining laws and how to access mining titles and obtain legal permits should increase their bargaining power with both buyers and when confronted by corruption and lack of knowledge by officials. Finally, miners' livelihoods can be improved by:

- Transferring knowledge about sustainable techniques, tools, valuation and prices.
- Helping them to further organise themselves, for example by creating forums for information exchange and sharing experiences about production, processing, financial management and marketing.
- Supporting profitable diversification of livelihood with alternative income activities such as gathering NTFPs, farming and raising livestock.

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