Evaluating the Impacts of Expanded Trade and Investment in Mining on Forests: Customary Rights and Societal Stakes in the Copper Belt of Zambia

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ABSTRACT

This paper analyzes the implications of copper mining in Zambia on customary rights to land and forests, and the societal stakes associated with foreign investment in the mining industry. Copper mining affects forests, and in turn the people with customary rights to those forests, in a number of direct and indirect ways, from deforestation during green site development and selective harvesting of timber to the significant but indirect pressures over forests through infrastructure development and the population pull effect of mining towns. In addition to these localized impacts on forests and forest-dependent livelihoods, there are a number of potential externalities associated with mining investments as well as impacts of concern to society at large. While many such effects are positive, and may thereby be seen to justify the losses incurred to negatively affected stakeholders (including those losing customary rights), negative externalities of mining investments may also be significant. This study involved a comparative analysis of three copper mines: the recently established Lumwana Copper Mine (LCM) and Zamco mine and the long-established Konkola Copper Mine (KCM). Methods included stakeholder interviews with government officials and forest-based communities affected both directly and indirectly by mining. Results suggest that while mining has a key role to play in the national economy, local and societal stakes are high – suggesting that a series of governance reforms are needed to leverage greater benefits for rural communities and society at large, and to reduce the negative social and environmental externalities.

KEYWORDS

Copper mining; customary rights; ecological impacts; externalities; foreign investment; forests; Zambia

INTRODUCTION

One of the sectors least studied in terms of its influence on forests is the mining industry, despite the significant direct and indirect effects of mining on forests. Copper mining, a key driver of economic growth in Zambia, dates back to 1927 (Mwitwa *et al*, in prep) with the copper belt being Zambia's main production area. As Zambia's primary export commodity, copper's historical role in driving the country's development through

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contribution to Gross Domestic Product (GDP), to foreign exchange earnings, to the creation of formal employment opportunities and, to the development of other sectors (e.g. energy and manufacturing) through key backwards and forwards linkages, is well recognized (Bigsten and Tengstam, 2008). Fluctuations in the copper price have had and continue to have direct implications on the country's development (FNDP, 2006). In addition to these broader, societal implications of copper mining, there are also recognized implications at the local level. Copper mining has always been associated with livelihoods either through formal employment, employment in companies associated with mining entities, supply of NTFPs and agricultural produce to the residents of the mining towns, pollution effects related to the release of mining operations' effluents into the aquatic or atmospheric environment and, the corporate social responsibility (CSR) activities of the mining companies. These societal and local externalities have both positive and negative dimensions which need to be assessed more stringently given the increased interest (including foreign) in Zambia's copper resources. One notable, although perhaps less documented impact of mining relates to the implications of the issuance of mining licenses and related concession establishment on customary rights holders. Given the impact footprint of the mines (i.e. impacts are noted beyond the mine site itself), customary rights holders affected by investments in the mining sector extend beyond those directly impacted by the green site development although the nature of the impact on these customary rights holders remains largely unknown. The procedures of acquisition of mining licenses by the mining investors, involvement of communities resident in the targeted land in the process of land acquisition, displacement of customary rights holders and environmental externalities have largely remained contentious issues that have had mainly negative impacts on the loss of customary rights leading to altered livelihoods. The impacts have been influenced by the increasing global demand for commodities, this demand originating largely from the fast growing Asian economies. It is therefore prudent to investigate the relationship between mining concessions and changes in the bundle of rights and, positive and negative externalities. These impacts have significant influence on the livelihoods of affected customary rights holders by changing access and use rights to natural resources and land that constitute sources of livelihoods. The paper attempts to evaluate and provide an understanding of the impacts of expanded trade and investments in copper mining on customary rights and societal stakes by examining each of the following impacts: (a) expansion of trade and investment in commodities on customary rights and displacement of communities; (b) pressure exerted on forest products and services in customary land by the expansion of trade and investment in commodities.

LITERATURE REVIEW

Trends in copper mining and related effects on forests

The recent rise in global demand for raw materials, resulting in large part from rapid economic growth in Asia, has contributed to rising commodity prices and a "scramble" for natural resources across Africa (Broadman, 2007). Globally, the price of copper – the backbone of the Zambian economy – quadrupled between 2001 and 2006

(Financial Times, 2006, Figure 1). Although there have been some fluctuations in the value of mining commodities such as copper, Zambia has experienced an overall boom in demand for copper and positive per capita income growth rates which are believed to result from the same (Bigsten and Tengstam, 2008). While the global recession led to a significant setback in the Zambian mining industry, prices at the time of writing (October, 2010) were at US$ 3.8 per pound and Goldman Sachs predicts that copper will hit US$ 5.00 per pound within a year due to tight supplies and growing demand.[4]

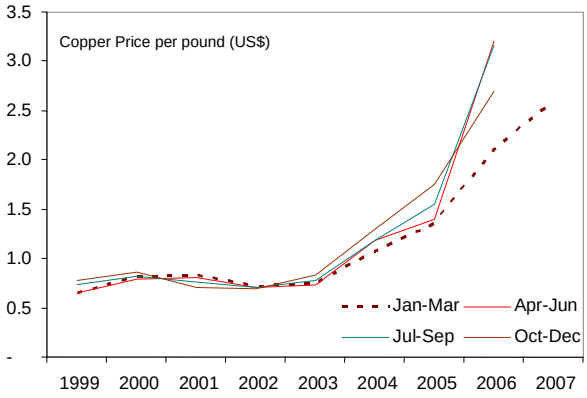

Figure 1: Trends in global copper prices

As a pathway to economic development and to capitalize upon the opportunities provided by global demand for Africa's natural resources, African governments are strengthening and formalising their efforts to attract foreign direct investment. This has led to the rapid expansion of investment in diverse sectors (e.g. mining, agriculture and biofuels), which has in turn become a predominant factor shaping forests and land use on the continent (Geist, 1999; World Bank, 2010). Many countries, including Zambia, have failed to leverage the potential of past commodity booms for meaningful social and economic development (Bigsten and Tengstam, 2008; O'Connell and Ndulu, 2006).

Mining affects forests and forest livelihoods through, for example, displacement of forests and customary land uses in the mining site, consumption of timber, the effects of sulfur dioxide on the stunting of vegetation, and the indirect effects of road expansion and mining-induced population growth on forests (Caritas, 2009; Mwitwa *et al*, in prep). Evidence suggests that indigenous timber species are preferred for underground support, rail sleepers and platforms due to their superior strength and durability relative to plantation timber (Mwitwa *et al*, in prep). The use of private contractors to source timber, often from forests far removed from the mine site itself, allows mining operators to distance themselves from the associated impacts on forests and the communities that depend on them. Global trends in trade and investment in minerals therefore have a direct effect on forests and the goods and services they provide (Mwitwa *et al*, in prep).

[4] See: http://www.metalprices.com/FreeSite/metals/cu/cu.asp and http://www.dailyfutures.com/metals/ (accessed Oct 27, 2010).

While mining represents a crucial source of income for many African nations, including Zambia, a host of factors undermines its potential as an engine for lasting economic development. First, foreign affiliates were responsible for virtually all production in 2005 in many African countries (Botswana, Gabon, Ghana, Guinea, Mali, Namibia, Tanzania and Zambia) (UNCTAD, 2007). It is argued by Fraser and Lungu (2007) that in the case of the Zambian extractive industry, mining companies have taken advantage of the state's desperation to secure new investments, as evidenced by low mineral royalties (0.6 percent of gross revenue), tax rebates lasting more than 15 years and the weakening of internal regulations governing the social and environmental impacts of mining. This resulted, in large part, from the weak bargaining power the government was in when two of the largest mining companies pulled out at the end of the 1990s.[5] Consequently, mining-related revenue is considerably less compared to revenues in the initial decades post independence (Bigsten and Tengstam, 2008). Similar to timber, most of the added value is also made outside of the region, depriving African countries of a major source of revenue and contributing to limited formal sector employment[6]. Finally, lack of transparency in negotiations on terms of aid for major infrastructure projects and of investment in the sector, together with the reliance on a single individual (the Minister of Finance) to raise loans on the country's behalf, expose Zambia to a high level of uncertainty on what it is getting in exchange for its mineral resources (JCTR, 2008; Mwitwa *et al*, in prep).

Contribution of Forests to Livelihoods

Forests in Zambia provide a range of ecosystem goods and services which contribute to both livelihood security at the local level and to the country as a whole. According to MTENR (2010), with more that 60% of Zambia's population classified as poor (CSO, 2009), more than 3 out of 5 households may be classified as having "forest-dependent livelihood systems". According to a study conducted by Mutamba (in prep) in Mafulira (Copperbelt Province) and Kabompo (Northwesten Province), households derive more than 50% of their income share from unprocessed and processed forest products. Forest products contribute as energy sources (charcoal and fuelwood), food (fruits, tubers, vegetables), herbal medicines, and shelter (poles, timber, thatch, fibre) (Ng'andwe *et al*., 2009; Mwitwa, 2009). According to Ng'andwe *et al* (2009), wood fuel consumption from Zambia's indigenous forests is estimated at 0.59 m^3 per capita per annum. Forest products contribute to livelihoods through direct use and sale but also through the provision of an important safety-net function (Paumgarten, 2005), with vulnerable households such as those headed by women and those affected by HIV/Aids especially dependent (Shackleton *et al*., 2006). For many households the sale of forest products is an important source of cash income. Ng'wandwe *et al*. (2009) estimated that more than 60% of Zambia's economically active population earns their livelihoods from forest related activities. The Zambian forestry sector also makes an important (although often unrecognized) contribution to the national economy. Ng'andwe *et al*. (2009) further reports that the total GVA by the forestry sector in 2006 was projected to be

[5] November 11, 2010 interview with Owen Ngemezulu of the Ministry of Labor and National Planning
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approximately US$ 421 million, representing 5.2% of the national GDP; the value added by the forestry sub-sector is approximately US$ 12 million per annum, with indigenous forests representing 4.7% and, that industrial round wood consumption is approximately 0.07m^3 per capita per year from indigenous forests. Forest sector employment includes 1,100 persons by the state, 9,000 in the manufacturing sector, 152,000 in wood energy and 888,806 in NTFPs, bringing the total employment in the forestry sector to 1,050,906 (Ng'andwe *et al*., 2009). Zambia's forests also provide important (although generally unquantified) ecosystem services, including watershed protection, biodiversity and carbon sequestration. These services benefit forest-dependent communities but also the nation at large and in certain cases, beneficiaries across national boundaries. Given the reliance of rural households in Zambia on forest resources and the contribution of the forestry sector to the national economy, the loss of these resources as a result of commercial pressure from mining and other sectors can have significant impacts on the sustainability of rural livelihoods and the economy at large.

The effects of commercial pressure on forests on customary rights

Over 70% of Zambia is officially designated as customary land, which falls under the jurisdiction of 240 chiefs, 8 senior chiefs and 4 paramount chiefs (MTENR, 2010). Freehold title does not exist under Zambian law; however, approximately 29% of land under state ownership is held under leasehold agreement by private entities. Although the bulk of the land is under customary tenure, the state retains the right to eminent domain for sub-surface resources, implying that customary rights may be revoked once an area is designated as a mining concession. According to the Lands Act of 1995, the President shall not alienate land held under customary tenure without first: (i) taking into account local customary law on land tenure which is not in conflict with the Act; (ii) consulting the Chief and local authority; (iii) consulting any other person whose interest might be affected; and (iv) if an appellant for a leasehold title has not obtained the prior approval of the chief and the local authority (Republic of Zambia, 1995). The Lands Act also requires the applicant, and not the state, to obtain prior approval from the Chief. Although the 1995 Act ostensibly recognises and protects customary land rights, "the Act is designed to permanently diminish the amount of land held under communal tenure and to open up more land for investment. Once a villager or investor is granted a leasehold title for a piece of land, it ceases to be customary land and becomes state, essentially private, land. Customary rights are extinguished and the land cannot be reconverted back to customary tenure" (Brown, 2005: 87).

The framework by Schlager and Ostrom (1992) is widely utilized to assess the distribution of customary property rights, given their focus on diverse dimensions of ("bundle" of) rights to any given resource. These include rights to access, withdrawal, management, exclusion and alienation to land and the resources it contains. Commercial operations requiring sizeable tracts of land place pressures on customary "bundles of rights" in a number of ways. Industrial-scale concessions may limit access, withdrawal and management rights through privatization and restrictions on access for a specified time period or through permanent transfers from customary to state ownership

(German *et al*, 2010). While some concessionaires allow a restricted set of access and withdrawal rights (e.g. collection of firewood, grazing) as commercial operations proceed, others may restrict access entirely. Industrial-scale concessions may also affect rights to exclude others if communities are given no discretionary authority over the granting of concessions and how they operate, or if they have limited understanding of what is being negotiated (Freeman *et al*, 2008). Finally, alienation rights can also be undermined if no compensation is paid to communities when rights are transferred to industry, or when compensation is less than its livelihood value.

Yet in addition to industrial scale concessions directly occupying land governed by informal customary or statutory rights, industries can also exert significant pressure on forest resources through high levels of demand for forest products for construction or energy (Cunningham *et al*, 2008; He and Barr, 2004). Industrial-scale demand for forest resources such as timber and fuelwood may limit withdrawal rights by depleting resources of local importance, as in the extirpation of valuable timber species of interest to industry, furniture makers and local communities alike (Mwitwa *et al*, in prep.). Management rights may also be undermined by subjecting forest areas to the discretionary authority of commercial actors (Mwitwa *et al*., in prep) while rights to exclude may be undermined should decisions to grant access to industrial actors or intermediaries be taken by local government or local elites in the absence of more widespread representation.

While Schlager and Ostrom (1992) offer insights into the nature of customary rights that may be at stake with mining operations, other complementary perspectives are needed in relation to both local and societal "stakes." As is highlighted in the framework paper (German, in prep), industrial-scale operations have implications for rights that go beyond local "bundles of rights." Other local externalities – both positive (e.g. benefits distribution) and negative (e.g. impact on forest environmental services of local concern) – must be considered. Furthermore, the extent to which extractive industries and foreign investment generate the purported benefits to society is increasingly being subject to scrutiny due to their high-stake nature and tendency to under-deliver on purported benefits (Castel-Branco, 2010; Huse and Muyakwa, 2008; Schoneveld *et al*, 2010). To the extent that large-scale investments involve public resources (e.g. sub-surface mineral rights and state land), concerns about how these resources are governed – and the extent to which the true economic value is being leveraged for societal (as opposed to foreign) benefit and governed in the public interest also comes into play (Mwitwa *et al*., in prep). Furthermore, whether the activities of large-scale corporate actors lead to economic, social or environmental externalities of national concern (e.g. air and water pollution and related effects on public health, the "resource curse") must also be considered (Auty, 1993; Collier, 2007; Mwitwa *et al*, in prep; Sachs and Warner, 1995).

METHODOLOGY

Research Site

The study involved a comparative analysis of three mines, two recently established (Lumwana Copper Mine, Zamco) and another well-established (Konkola Copper Mine, or KCM) (Table 1).

Table 1: Summary information on cases studies

Mine	**Location**	**Parent Company**	**Year Established**	**Concession Size** (km^2)	**2009 Production Volumes** (MT)
Konkola Copper Mine	Chingola (12^o 53' S; 27^o 85')	Vedanta Resources (51%); ZCCMI (20.6%); ZCI (28.4%)	1927	117.6	135, 027
Lumwana Copper Mine	Lumwana (12^o 26' S; 25^o 85' E)	Equinox Copper Venture (sub. Equinox Minerals)	2005/6 (green site development)	1,355	108,985
Zamco Mine	Mufumbwe (13^o 92' S; 24^o 90' E)	Unknown	2010 (green site development)		unknown

The comparison of the three cases (Figure 2) had a number of advantages, among these: (i) the ability to compare mining practices between newer and older mines (specifically those practices which impact on forests, e.g. different timber or charcoal utilization and sourcing practices); (ii) capturing more profound impacts associated with more well-established mines; and (iii) enhancing informant recall by capturing perceptions associated with early processes of mine establishment.

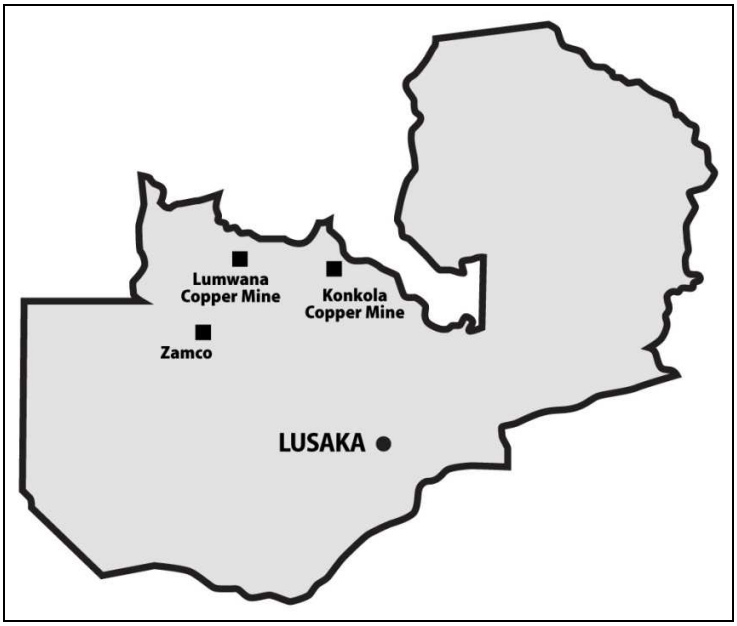

Figure 2: Location of case study sites (not to scale)

Research Framework

The methodology for this research drew on the framework for evaluating customary rights and societal stakes associated with globalized trade and investment in commodities shaping forests (German, in prep). It therefore evaluated four components of customary rights and societal stakes associated with mining operations in the copper belt of Zambia, namely: (i) shifts in customary bundles of rights in forest areas shaped by mining; (ii) the magnitude and distribution of local externalities in forest areas shaped by mining; (iii) the governance of public goods relating to mining operations, such as the sub-surface resources and revenues derived therein (and any public lands and surface resources affected by these operations); and (iv) societal externalities.

For each mine, an attempt was made to capture forest-related tenure transitions associated with three major types impacts of mines on forests: (i) green site development; (ii) peri-urban forest transitions associated with the growth of mining towns; and (iii) the sourcing of timber or charcoal by mines (either directly or through independent contractors) in distant forests. In practice however, this was not possible for each mine. In the more established mine (KCM) it was not possible to locate customary rights holders who lost land during the process of green site development because it occurred long ago (circa1927) and affected households could not be traced. For this site, the study therefore focused on: (i) peri-urban forests located near the mining town; and (ii) customary rights holders in forests where timber is or used to be sourced by the mine. In the newer mines (i.e. LCM and Zamco), the third group of customary rights holders – those residing in forests where timber could be sourced by the mine – could not be captured because LCM and Zamco do not source timber from indigenous forests for their mining operations. Research thus focused on: (i) customary

rights holders affected by green site development; and (ii) customary rights holders in degraded forests that produce charcoal for residents of mining towns. For each type of impact, two types of customary rights holders were interviewed: chiefs and forest users. Local and societal externalities were also considered and for these local authorities, chiefs, forest users, mine representatives were interviewed.

Research Questions

To adapt the framework to the mining sector, we generated research questions to help operationalize the framework in forests shaped in different ways by mining activities (Table 2).

Table 2: Research questions applied to each type of forest impact

Type of impact	**Research questions**
I. Forest conversion due to green site development	
Local Stakes	− How has green site development shaped the customary bundle of rights to land and forest products? − Have customary rights holders exercised rights to alienate and to fair compensation? In what ways have they been compensated, and to what extent has the level of compensation covered the opportunity cost of foregone land uses? To what extent was the local governance of this compensation considered equitable? − To what extent have local benefits from mining (e.g. formal employment) been equitably distributed among negatively affected customary rights holders? − Has green site development had any effect on environmental services of local concern?
Societal Stakes	− What benefits have derived from green site development for society (e.g. mining royalties and taxes, use of revenue for societal benefit, employment generation)? − Has green site development had any impact on environmental services of national concern?
II. Increased pressure on peri-urban forests from mining-induced population growth	
Local Stakes	− What have been the effects of increased pressure on peri-urban forests on the customary bundle of rights to land and forest products? − To what extent were chiefs or other customary rights holders consulted with respect to changes in customary rights or forest access by outsiders? − If cash or other compensation was made to those losing customary rights (e.g. via reduced productive value of forests where charcoal is sourced by mining towns), to what extent was this governed in an equitable manner? − To what extent have customary rights holders benefited from the increased demand on forest resources (either directly, e.g. by engaging in the charcoal trade, or indirectly through compensation paid by other forest users)?

	− Has increased pressure on peri-urban forests had any discernable effect on environmental services of local concern?
Societal Stakes	− What societal benefits have been derived from increased economic activity in peri-urban forests (e.g. revenue or employment generation from increased charcoal burning or agricultural expansion)? − Has increased pressure on peri-urban forests had any discernable impact on environmental services of national concern?
III. Timber sourcing for or by mines	
Local Stakes	− How has timber sourcing for mines shaped the customary bundle of rights in source forests? − Were local chiefs and other customary users with jurisdiction over forests where timber is sourced by mining companies or contractors consulted on whether to allow timber harvesting? − Has any money been paid to local communities by contractors or concessionaires in exchange for the rights to harvest timber? How has compensation been governed locally? Does the level of compensation offset the opportunity costs of displaced resources or uses? − Have customary rights holders been employed in timber extraction? If so, under what conditions? − Has timber sourcing by/for mines had any discernable effect on environmental services of local concern?
Societal Stakes	− Has the sourcing of timber in distant forests by/for mines produced any discernable benefits for society (e.g. revenue from timber conveyance fees, employment generation for traders)? − Has timber sourcing by/for mines had any discernable impact on environmental services of national concern?

FINDINGS

Customary Bundles of Rights in Case Study Sites

Prior to the designation of the concession area, access to goods and services in customary areas was open to all members of the community. The bundle of rights that existed in customary lands, before designation of the area as a mining concession, include access rights, use rights for land and natural resources, management rights for land according to the Chief's designated use, exclusion rights of access and use of resources found on the land and withdrawal rights resided in the Chief. Plots, designated by the headmen (with approval from the chief) for agriculture and settlement, were the only areas where land users could practice rights of exclusion (Chileshe, 2005). Customary rights holders exercised access to and use rights of the resources found on the wider landscape (i.e. open access). Conversion of the land and other forms of management rights were not allowed on the wider landscapes. Communities were therefore able to graze animals, fish and collect NTFPs on the wider landscape. They were however not allowed to produce charcoal in the areas not assigned to them by the Chief. However, outsiders could also have access and use rights on the open access land for purposes of fishing and collection of NTFPs. When

issuing land to other customary land users, the Chiefs stipulate the designation of the land use and may withdraw rights if the user does not adhere to the designated use. Historically, the sale/lease of customary land by the Chiefs has not been common practice in Zambia.

Local Stakes

Shifts in Customary "Bundles" of Rights

a. Conversion of Customary Land to Mining Concessions (green site development)

The Konkola Copper Mine (KCM), Lumwana Copper Mine (LCM) and Zamco case studies have impacted on the customary bundle of rights to varying degrees[7]. The extent to which access, withdrawal, management, exclusion and alienation rights have been affected is influenced by the developmental stage of the three mines with the KCM case being the most advanced followed by LCM and finally Zamco. In the KCM and LCM cases customary ***access, withdrawal and management rights*** (to the concession area itself) have been completely ceded to the company. The concession area has been clearly demarcated and access is carefully controlled and limited to those engaged in the mining operations. Reasons given by the mines for this ban on access include concerns related to safety (in terms of mining explosions) and theft. Customary land users have lost access to a range of goods and services associated with the area including forest products, grazing land, agricultural land and access to key water sources. The loss of access to quality water in the Mushishima river has potential negative implications on livelihood security. Communities are not able to collect water nor cultivate and consume agricultural products near the river as has been the practice. Although the Zamco mine still has to clearly demarcate the boundaries of its concession, discussions with community members as well as representatives of the mine suggest that access to the concession area will also be prohibited once mining activities begin in earnest. For the time being the community continues to access the area despite the issuance of the mining license. Although the Zamco mine applied for (and received) a license in 2008, there has been limited activity in the concession area to date. As such the impacts associated with green site development have yet to be felt in the area. The three cases highlight that customary land users were given no discretionary authority over the granting of concessions due to the principle of eminent domain or limited understanding of what was being negotiated.

Green site development in the three cases also undermined ***exclusion and alienation rights***. Discussions with respect to exclusion and alienation rights in the KCM case are difficult to support with evidence given that that the mine was established in 1927 and identifying customary rights holders affected by the loss of these rights at the time was not possible

[7] In the case of the Lumwana concession, it should be noted that prior to the issuance of the concession, 25% of the current concession area was designated as national forest and while communities accessed these areas informally, they held no formal rights to these areas.

The first issue to consider in terms of the right to exercise exclusion is whether the customary right of chiefs to cede access to others was upheld. A key framework for evaluating the right to exercise rights to exclusion (and alienation) is the principle of free, prior and informed consent (FPIC) – namely, the extent to which local residents were consulted on whether the mining concession should be allowed, and under what conditions. Focus group discussions with the community members, interviews with the traditional leadership and with representatives of the three mines revealed some difference of opinion on the matter. However, in general the findings suggest a lack of consultation or consultation after the fact (i.e. only after the mining licenses had been issued in Lusaka). According to the traditional leadership in the three sites, there was no consultation regarding the conversion of their customary land to mining concessions prior to the issuance of licenses. In the KCM case, the traditional leaders indicated that government, current and colonial, tend to inform rather than consult. In the Zamco case, the chiefs were only alerted to the mine when the mine started its initial recruitment of workers. These statements by the traditional leadership however contrast with statements from the concessionaire that the chief is in fact involved in the mine and therefore benefiting from its presence. The contradictions between statements by community members and the concessionaire arise from the fact that concessionaires *inform* the chief and the community about future development *after* authority had been obtained from the state. According to those land users neighboring the Zamco site there was no consultation prior to the issuance of the license or even after the license and the initiation of operations (i.e. the opening up of the road to the Zamco mine site and the arrival of the mining equipment). These statements by the community may be seen to contradict those given by the operations manager of Zamco who indicated that the community was *fully informed* (although not consulted) about the accession of land for mining through the traditional leader. These disconnects are due to two key misunderstandings – one related to what constitutes “community”, and the other related to the difference between *informing* and *obtaining consent.* The fact that the traditional leader chairs the company board is in itself a compromise of procedure and process of free, prior informed consent. It is suggested that the concessionaire avoided a fully participatory consultation process by including the chief on the board and that the chief is not accountable to his people, failing to include them in decisions related to the mine and in discussions regarding appropriate compensation.

Conflicting statements on whether or not the customary land users were consulted are also evident in the Lumwana case. According to the chief, he was approached prior to the initiation of mining activities but not prior to the issuance of the license. As such the Chief was allowed to voice his opinion on the development of the concession area and its surrounds but not on the area set aside for the concession. During discussions regarding the development of the concession area, the chief raised certain reservations, yet his concerns and requests were overturned by the mine. Particular concerns included the boundaries of the concession area: the chief requested that the boundaries be determined by the river course and certain tributaries to allow continued access to these resources. Another issue raised by the chief was that of continued withdrawal rights from the vast forest resources maintained within the concession area. Continued access to the concession was vetoed by the mine, with security concerns being argued

as a compelling factor. Customary land users indicated that they too were not consulted but informed by the chief once the license was issued. It is clear from these cases that right to exclude is undermined when decisions to grant access to industrial actors are taken by the government prior to informing affected rights holders, when "informing" is limited to the local leadership, and when developments can move forward when the terms proposed by customary rights holders are ignored.

A second issue to be considered with respect to the loss of customary rights (alienation rights in particular), is whether customary rights holders have been compensated for the loss. Alienation rights are undermined when the compensation for the rights transferred is less than the true value of the land. Ideally the level of compensation should be compared to the full opportunity costs associated with activities foregone during the concession period and beyond (e.g. opportunities lost due to the degraded state of the resource). As noted in the section above, in neither the LCM nor Zamco case were were customary land users compensated for land. Rather, the licenses were issued nationally, with none of this revenue retained by or returned to customary land users. Discussions with customary land users surrounding the Zamco concession highlight that there is little precedent in Zambia for compensation for lost rights and therefore limited expectations of the same. With respect to the Lumwana case, there has been some compensation to those land users directly displaced by the concession area; however, this compensation was given not for land but for improvements on the land (e.g., to those households with agricultural produce and infrastructure). Customary land users were not compensated for loss of access to forest resources, water resources, grazing land, etc. and the full opportunity cost of activities foregone during the concession period and beyond were not taken into account. In addition to this customary land users confirmed that not all those displaced from their farms within the LCM concession area have been compensated. One respondent stated that he had been waiting four years for compensation and still had not received it. In general, land users noted that the compensation was insufficient.

A third consideration is the extent to which any compensation payments – if paid – are distributed equitably among customary land users. Discussions with respect to compensation suggest a degree of elite capture whereby the traditional leadership in both the LCM and Zamco cases has benefited to some extent from the mining concessions. Although in both cases the chiefs stated there was no compensation given to the royal establishment, there is evidence to the contrary. For example in the Zamco case, the chief is (according to the mine operator) the chairman of the board. The District Council in the area also indicated that the chief is collecting levies from mining trucks entering/exiting his chiefdom. The use of these levies was unclear and it was suggested that trucks from the Zamco mine were not levied, only those from other mines in the area – giving Zamco a unique advantage in the sense that Zamco does not incur the cost of paying levies. In the Lumwana case the mine built the chief's house, financed several traditional ceremonies and the chief has a contract to provide certain services to the mine. This raises concerns that mines are intentionally buying chiefly loyalty to gain privileged access to resources. Although it is difficult to establish whether there was elite capture in the initial stages of KCM, currently KCM supports the

traditional leadership in various ways. In general however, these benefits are not commensurate with the net economic and cultural value of what has been denied through the loss of customary rights.

Equitable distribution of benefits must also be looked at in terms of who accesses employment in the mines. In all three cases there is evidence of the mines giving first priority for employment (and service contracts) to individuals recommended by the chief. As such, those close to the chief (including relatives) gain employment with limited competition from other customary land users. In the case of LCM, where local residents have been given service contracts, it is the educated, business people and those that are influential within the community that have benefited. Many of the displaced and those who have lost rights have not benefited from these service contracts.

b. Urban Pressure on Forests from the Growth of Mining Towns

While green site development is the most direct and tangible impact of mining investments on customary rights, there are associated developments which also need to be taken into consideration when assessing the impact of such investments on the "bundle" of rights. The population "pull" effect of mines (i.e. as people migrate to the area in search of employment and other opportunities) and development of mining-related infrastructure places increasing pressure on those forests surrounding the concession area itself and peri-urban forests surrounding the mining towns which develop to supply the mine. With respect to urban pressure on forests from the growth of mining towns, the observed impacts were again variable depending on the developmental stage of the respective case studies. For example, in the Zamco case, because operations have yet to start in earnest, there is currently no pull effect to the area and therefore currently no increased pressure as a result of urban development and demand. As such, there has been no impact on the customary bundle of rights in these forest areas to date.

The Lumwana case is starting to show the impacts associated with increasing urban pressure. Discussions with local community members highlighted that an increasing number of outsiders have moved into the Lumwana area and the increasing numbers has resulted in increased pressure on the forest resources directly adjacent to the concession and especially along the main road linking Solwezi and Mwinilunga (impact noted along a 30km stretch of road). The influx of people is recognized by the establishment of a local council where there was none before, and by plans at the provincial level to engage in some level of urban planning. Although the influx is still limited to small stretch of land along the main road, it is likely that as the mine develops, this will expand. As such, currently there is no significant impact on the rights of customary land users as a result of urban pressure. However, there are limited indications of active land/resource management and there are risks of unsustainable extraction rates if rights to exclude are not enforced. Evidence suggests that the right to exclude others from land allocated to a customary right holder pertains only to use of the land for charcoal production, growing of crops and other management aspects.

However, outsiders have access rights to NTFPs found on the land that has been allocated to specific households by the Chief. …

Urban pressure on forests as a result of the growth of mining towns is most evident in case of Chingola where KCM is located. Here the pull factor of the mine is apparent and the development (and degradation) of land extends well beyond the concession itself. As result of this transformation of forest land to urban development (for example) and due to the increased population density in the area, remaining customary forest is under increasing pressure. The pressure on resources stems from the consumption demand by the mine, consumption by mine employees and residents of the town that are indirectly connected with the mine. This has resulted in forest degradation and the need for customary rights holders to travel further afield to access forest resources. Furthermore, the markets provided by the mine and the town have shifted the nature of consumption from subsistence to commercial. The resultant degradation impacts on those customary rights holders who are original inhabitants. In particular their withdrawal, exclusion and alienation rights have been compromised. Outsiders are expected to gain permission from the traditional leadership to convert forest for agriculture or for charcoal production. This indicates that it is not only customary rights holders that have the right of exclusion to allocated plots but traditional leaders also have the right to exclude outsiders and customary rights holders. Customary rights holders can be excluded on the basis of changing the designated management regimes for allocated land. . Although customary land users claimed to be able to exclude outsiders from plots designated for agricultural production, they have been unable to exert their right to exclude outsiders from accessing customary forests for the harvesting of forest products because it is a traditional and cultural practice to allow transitory access to land for the purpose of accessing NTFPs. Not being able to exclude outsiders from customary forests and manage their use of the forests, impacts on the withdrawal rights of those who have traditionally relied on that particular forest for forest goods and services.

c. Selective Timber Harvesting for Mines

It is apparent that mining operations (green site and post-green site) exert significant demands on timber and non-timber forest resources through direct consumption of forest resources by the mines. Timber is used in the various operations of the mine, particularly in pit mining where timber is used for pit props and as rail sleepers (Mwitwa *et al*, in prep). The pressure resulting from this demand for timber can (in certain cases) be noted several hundred kilometers away where local timber resources have been depleted, as in the case of KCM.I If locally available timber does not suit the requirements of the mine and surrounds, timber may be sourced from elsewhere. This section explores the impact of this timber sourcing on the customary bundle of rights.

As noted in the sections above, there are differences between the case studies determined by their developmental stage. Differences may also be noted in terms of the level of commitment of different mining operations towards environmental sustainability and the nature of mining taking place (i.e. open cast versus pit). The

respective company representatives indicated that at the present time, none of the mines use timber sourced from indigenous forests for their operations. Both KCM and LCM currently consume timber sourced from plantations in the construction of mining infrastructure. Hardwoods are rarely used by LCM because it is an open-cast mine and there is limited need. That timber that is used in LCM operations is obtained from plantations located at a distance of about 250km from the mine. According to who KCM??, it also adheres to strict environmental standards related to timber sourcing from indigenous forests. This however was not always the case. Both KCM and LCM relied on indigenous timber during the early years of operations sourced from concession areas and customary forests closer to the mine. KCM used to directly source timber from natural forests in the Copperbelt Province and indirectly through timber companies from as far away as Solwezi (200 km from the mine, in Northwestern Province). KCM changed its dependence on timber from indigenous forests when Vendata purchased controlling rights in 2000 in the Chililabombwe, Chingola and Nampundwe copper and cobalt mines. As outside sourcing of timber from plantation resources has limited impact on customary rights[8], this analysis focuses on historical practices related to indigenous forests.

Customary rights holders indicated that sourcing of indigenous timber from communal forests led to loss of access, withdrawal and management rights within the source forests. Timber was initially sourced informally from communal forests. When these communal forests could no longer supply the required timber volumes, mining companies started sourcing timber from concessions in protected forest areas as well as in communal forests located more than 50 Km away – in the case of KCM. Customary rights to exclude timber harvesters within timber concessions could not be exercised as the timber concession license provided authority of exclusion to the license holder, who was not legally bound to provide compensation for customary rights that were displaced or for the timber extracted. As a consequence, customary rights holders lost access to a range of goods and services.

The Magnitude and Distribution of Local Externalities

In addition to shifts in customary rights, a host of secondary benefits and costs ("externalities") – both anticipated and unanticipated – accompany any industrial-scale intervention through direct and indirect influences in green sites, peri-urban and timber source areas. Some of these relate to the flows of benefits associated with industrial-scale activities, whether in the form of employment (number of jobs and terms of employment), revenue (proportion of revenue returned to the local level, and how it is governed to derive local benefits) or markets for products and services created through the stimulation of economic growth. Others relate to the magnitude of costs – whether social (e.g. prevalence of conflict, disease and other social ills), economic (loss of economic opportunities) or environmental (e.g. air and water pollution). With respect to the magnitude and distribution of local externalities, it is also important to understand how these benefits and costs are distributed among the local population, and how they

[8] Although it can be argued that the creation of plantations resulted in the loss of customary rights, as the land was under customary tenure prior to its occupation by the forestry company.

shape the livelihoods of both customary residents and others in green sites, peri-urban forests and timber source areas.

As above, the magnitude and distribution of local externalities was influenced by the developmental stage of the three case studies – with the externalities being most significant for KCM and LCM. The following section discusses these with respect to the three case studies.

a) Magnitude and distribution of local externalities in green sites

Employment and Revenue Flows to Customary Rights Holders. The principle positive local externality is the creation of direct employment opportunities. The number of jobs created in the three cases again varies according to the development stage and size of operations. KCM has in excess of 15,000 employees, and LCM has1,200. The Zamco manager indicated that the mine will employ 100 people once fully operational, but at present only a few jobs have been created to clear roads. Additional employment is generated by KCM and LCM through the large number of people employed by contractors providing services to the mines. Increased incomes and the influx of people to Lumwana and Chingola have also resulted in a growing private retail and hospitality sector.

We also considered other possible measures by which revenue generated by the mines has benefited customary rights holders. Two aspects in particular that are considered include the provision of contracts by the mine to promote the flow of revenues to local business people, and the benefits associated with the corporate social responsibility (CSR) programs of the respective mines. Customary rights holders losing the “bundle of rights” through either displacement or absolute prohibition of access to resources have been given no preferential treatment in terms of contracts to supply products of services to KCM (related to descendants of customary rights holders at the time of mine establishment) or LCM, nor have they been able to capture these activities on their own accord. Outsiders are often better placed to maximize on the opportunities as a result of higher education, past experience, better access to disposable assets or loans for investing in business opportunities. This can create negative competition with customary rights holders, particular those whose livelihoods were negatively affected by green site development. Skilled employees are almost always recruited from outside affected communities given low levels of education in rural areas. The local employment that is created is primarily for the unskilled, for which remuneration is much lower. Casualisation and poverty wages are entrenched in Zambia’s mining sector. In Lumwana it was indicated that LCM had established contracts with local business associations for the supply of packing materials for the raw ore. KCM has a similar arrangement, yet benefits are primarily targeted at former employees who were retrenched. Variations in KCM and LCM CSR policies also produce differentiated effects. KCM CSR policies do not necessarily require recipient communities to make a proportional contribution contribution whereas that for LCM requires communities to make up 25% of the contribution of the total capital outlay by LCM. Even though the schools and clinics that are constructed through the LCM CSR are supposed to benefit

the whole community, it was reported that some members of the community are located too far to access the facilities and some cannot afford the minimal service charges that are required before treatment or associated with school attendance. Additionally, community members complained that they cannot make up the 25% demanded by LCM as their contribution as it is too high. The required 25% puts the CSR in question as it is targeted at customary holders some of whom have been displaced and not compensated.

None of the informants, not even representatives of mining companies, were able to indicate how mining royalties and taxes contribute to local government budgets – if at all. Taxes and royalties are banked centrally and with no system of fiscal decentralization in place, mining towns are given no preferential treatment in terms of annual budg*et al*locations from the national treasury (Fraser and Lungu, 2007). However, some levies are charged at district level on mining-related transport. In the Zamco case, some disagreements arose as to the rightful recipients of these levies. The District Council was supposed to be charging levies on trucks transporting copper through the district; however, this caused conflict with the chief who was charging separate levies. Discussions with the Council suggested that the levies collected by the chief do not benefit the local communities but rather a select group within the royal establishment.

Markets for products and services. Markets for products and services, with the exception of those that arise through contracts with the mine, have increased in the case of Lumwana and Chingola (towns where LCM and KCM are located). The increase in population resulting from the pull factor of the mines has increased the demand for products at the local level while the improved access to the area as a result of infrastructure (i.e. road) development has improved access to markets further afield. For example, charcoal traders in Lumwana noted that the improved road has resulted in a market for charcoal to passing traffic. Dried mushrooms and agricultural produce were traded along the roadside. While farm-gate or roadside prices are usually low compared to town markets, increased market demand generates clear benefits for local community members. The major products that have markets are charcoal, agricultural produce and NTFPs.

Social conflict and lost opportunities. Customary rights holders indicated that the populations of Lumwana and Chingola have been growing every year due to immigration of people in search of opportunities. This creates competition between the two groups, and creates a number of negative social impacts such as increased consumption of alcohol, crime, violence (often related to alcohol) and incidence of HIV/AIDS. At Lumwana, displaced and other residents expressed concern over increased competition, crime and other social ills associated with the increasing urban culture that evolves with a developing town. Other social effects result from the relocation of displaced communities. For example, former customary rights holders to the green site have to seek land elsewhere, sometimes distant from the original settlement, from either their own chief or a neighboring chief – thus transferring demand for goods and services from forests areas that were displaced.

Environmental externalities. In the case of Zamco, because operations have not fully started, no environmental externalities were noted other than the clearing of trees for an access road. In Lumwana, however residents reported experiencing a number of negative environmental externalities with groundnuts feeling as though they had been cooked due to the release of harmful effluents into the Lumwana river. It was also reported that for the first time trees near river courses have started to dry and lose their leaves. Other environmental problems that have been noticed include a decline in the population of small game ascribed to noise from mining equipment and increased deforestation and forest degradation.

b) Magnitude and distribution of local externalities in peri-urban forests

The one case study with meaningful peri-urban impacts is the KCM mine. KCM does not target people in peri-urban forests for jobs in its mine. As discussed earlier, mining revenue is not retained at source but paid to the state where it is centrally administered. However, increased demand for agricultural and forest products is a significant indirect benefit to the local community. Products produced and traded in peri-urban forests include agricultural and forest (including timber and non-timber) products.

The main negative economic impact in peri-urban forest areas is the increasing demand for farmland by residents of nearby mining towns. Access to land in peri-urban forests results, in many cases, in seasonal and permanent residence. Residents of Chingola and Solwezi could be found as far as Lumwana and peri-urban areas located at more than 50 km from their areas of residence. The human movements are not restricted to former mine employees but can include people that are in active employment with the mine who create satellite residences associated with seasonal agriculture. Traders from Chingola and other mining towns were also found to move into peri-urban forests to purchase agricultural and forest goods.

Timber supplies to meet the Chingola town's domestic demand for furniture and joinery products are sourced from beyond Mufumbwe which is more than 250km from Chingola. Wild mushrooms and caterpillars are also sourced from forests located in Mkushi, over 300km from Chingola. The population shifts in Lumwana and Chingola have placed pressure both on local forests and forests located away from the developing mining town. The residents of Chingola source part of their charcoal from forests located around Lumwana, increasing the pressure that mining indirectly exerts on forest resources. Selective timber harvesting associated with Chingola takes place in forests located more than 200km from town. The depletion of valuable species compounded by the demand for agriculture land and human settlements have forced timber operators to travel far distances to access timber resources, presumably with widespread social and environmental effects (effects which were, however, outside the scope of this study). Downstream impacts from mining have been reported to occur at KCM on the Mushishima river, affecting the quality of water required for human consumption and agriculture.

c) Magnitude and distribution of local externalities in timber source forests

Customary rights holders who lost their rights during plantation establishment to supply timber to the growing mining industry, including KCM, are not direct beneficiaries of jobs created by the KCM mine, nor do communities residing in source forests enjoy the same level of infrastructure development or market opportunities as those residing in areas close to the mine. Some benefits are derived from (seasonal and temporary) employment by timber companies, yet remuneration is minimal. Loss of access rights to timber concession areas also results in the need to travel much further to access NTFPs. Respondents also reported erosion gullies caused by heavy vehicles transporting timber and dust during the dry season, with effects on respiratory health (increase in coughing). Erosion gullies were perceived to have long term impacts on the soil, potentially rendering the land unusable for other purposes. Loss of forest cover and natural regeneration due to the creation of logging tracks and worsening of already poor roads due to their use by heavy timber transportation equipment were also cited as concerns.

Societal Stakes

Natural resources owned or controlled by the state are a form of "public good" for which certain rights should apply to citizens. The governance of these resources to fulfill functions considered in the public interest is of concern of all citizens. One of the primary concerns for developing country citizens should be how these resources are harnessed for meaningful economic development – jobs, market opportunities and social services. The terms of trade and investment deals matter, in terms of tax rates paid and percentage share on royalties from resources exploited by industry. Also of concern is how tax revenues and royalties from resource exploitation are governed – and whether it is in the society's interest. The transparency and terms of investment agreement and financial flows to and through government agencies are of paramount importance to the question of civil rights around natural resources. Similar to local communities, externalities from industrial-scale activities carried out in forest areas may also have repercussions for society at large. This may be in the form of economic stimulus provided by industrial-scale labor and service demands. Large-scale externalities may also include negative impacts on environmental services of national concern (e.g. water and air quality), negative macro-economic spill-overs or social conflict. Recent studies into the "natural resource curse" have highlighted why natural resource wealth tends to undermine economic performance, including the reduced competitiveness of other sectors and weakening of governance (Auty, 1993; Collier, 2007; Sachs and Warner, 1995). Similar to local-level externalities, it is important to know how these externalities are shouldered by different sectors of society.

Governance of Public Goods vis-à-vis the Public Interest

a) National economic benefits

Although international trends in base metal prices have played a large role in determining the contribution of the mining sector to the Zambian economy, it is has remained the primary driver of economic development in the country since the 1940s (FNDP, 2006). Copper has historically dominated Zambia's exports, reaching a peak in the early 1970s before declining dramatically over the next thirty years (Republic of Zambia, 2007; DFID, 2006) to one third of its peak (Sida, 2008). Reasons for the decline in production in the 1980s and 1990s include "poor reinvestment into new and existing mines, and unsupportive policy and management practices" (FNDP, p 62). In recent years there has been a dramatic increase in exports (Sida, 2008) with current exports contributing approximately 70% of total foreign exchange earnings (FNDP, 2006). Reports on the mining sector's contribution to Gross Domestic Product (GDP) vary from 6% to 15% (FNDP, 2006; Sida, 2008).

b. Terms of trade and investment agreements (tax rates, revenue share)

The tax revenue collected directly from the mining (copper) sector has varied significantly over the years and according to Bigsten and Tengstam (2008) current resource rents accruing to the Zambia government are considerably less than those received in the decades immediately after independence. This has important historical causes. In 1991, the Government initiated a far-reaching economic restructuring of the industry aimed at privatization (FNDP, 2006). This led a few of the major mining companies such as Anglo American Corporation and the Binani Group to pull out, putting the government in a difficult place as the mines contribute about 80% of Zambia's foreign exchange (FNDP, 2006; Mgemezulu, pers. communication). Desperate for new investors, the government set very attractive terms and extensive tax exemptions for new investors who bought struggling copper companies – resulting in "the whole fiscal regime for minerals [being] too generous to the existing mining houses" (Bigsten and Tengstam, 2008: 17). *Development Agreements* or contractual documents between the national government and the investor stipulated the details of these terms, including tax rates, share of revenue, retention of foreign earnings from exports and recoupment of investment costs. According to Fraser and Lungu (2007), despite the legislation governing mining stipulating mineral royalties of 3% and many other conditions, these *Development Agreements* specified:

- A 0.6% royalty for those holding large scale mining licenses;
- Carrying forward losses for 15 to 20 years on "first in, first out" basis;
- Deductions of 100% of capital expenditure in the year in which it is incurred; and
- Exemption from payments of duties or taxes on importation of machinery and other goods.

In addition to undercutting the revenue benefits associated with the extraction of Zambia's mineral wealth, the specific details of these agreements were never made

public, undermining transparency and making it difficult to assess whether they were in the public interest.

Opposition to the low tax rates for their limited contribution to national economic development, together with a boom in copper prices, led the government to introduce a windfall tax for mining companies in 2008. At the same time *Development Agreements* offering particularly favorable conditions were nullified (The Post, 2010). This took away from investors most of the incentives they had earlier enjoyed (The Post, 2010). The renegotiation of copper contracts was a contentious issue with the private sector. They opposed such reforms on the basis of the considerable investments (acquisitions of mining equipment, rehabilitation of infrastructure, opening up of new fields) (FNDP, 2006). These pressures in conjunction with the 2009 drop in copper prices led to the abolishment of the windfall tax (The Post, Feb 2010), justified as a means to give relief to struggling mining companies and maintain investment interest in the sector. With the resurgence of the international copper price there have been calls to reinstate the tax. However, government has been reluctant to do so, concerned that too many changes in the fiscal regime may discourage future investors (The Post, Feb 2010). The current fiscal regime governing the sector is as follows[9]:

- 100% deduction of pre-production expenses and other capital expenditures as defined in the Income Tax Act.
- Exemption from customs, excise and VAT duties on all machinery and equipment required for exploration or mining activities.
- Unrestricted repatriation of all profits, dividends and royalties, although a withholding tax of 15% is levied.
- Unlimited carry forward of losses.
- Royalties at 2% of the market value of minerals, less the cost of smelting, refining and insurance, handling and transport from the mining area to the point of export. Royalty payments may be deferred if the cash operating margin of a holder of a Large Scale Mining License falls below zero.
- Corporate tax of 35% of taxable income for copper and cobalt, and 15% for mineral and "non-traditional" commodities. Companies listed on the Lusaka Stock Exchange are levied at 30% of taxable income[10].
- Income tax deductions on the following expenditures:
  - Capital expenditure (allowances of 25% on plant, machinery and commercial vehicles; 20% on non-commercial vehicles; 5% on industrial buildings)
  - Prospecting expenditure under special circumstances
  - Mining expenditure under special circumstances
  - Mining expenditure on a non-producing mine
  - Mining expenses incurred by a mine of irregular production close to the end of its life

[9] Ministry of Mines and Minerals website: http://www.zambiamining.co.zm/index.htm (accessed Nov 23, 2010).
[10] According to the Zambia Revenue Agency, any mining company holding a large-scale mining license for mining base metals is taxed at 30% and all others at 35% (see: http://www.zra.org.zm/Tax_Incentives.php).

The Zambia Revenue Agency also states a 0% taxation on corporate dividends for companies holding a large-scale mining license[11].

While the government remains committed to ensuring an investor-friendly climate with fiscal regime that will "promote stability, future growth and job creation in the sector" (The Post, 2010), there are voices of discontent who argue that taxes charged are far too low and that the windfall tax should be reinstated. Given the increasing interest in the sector, there is sufficient competition between investors for Zambia not to be concerned that the reintroduction of higher taxes will undermine investments (The Post, 2010). The Bank of Zambia also announced that the country received US $77.7 million in tax revenues from copper sales revenue earnings of US $2.9 billion in 2009, less than five per cent of total export revenues (The Post, 2010). According to some analysts, the failure of governments to collect sufficient rents from the mining sector undermines the economic diversification needed for sustainable economic development in countries highly dependent on extractive resources (Castel-Branco, 2010; Bigsten and Tengstam, 2008).

c. Employment creation

The mining sector currently contributes in the order of 40,000 jobs (7%) to formal sector employment, and during the peak of world copper prices the sector's contribution to formal sector employment reached 56,000. The role that the mining sector plays in national development is enhanced by its backwards and forwards linkages with other sectors. In this regard the mining sector's contribution to wealth and job creation in the economy is far-reaching. The importance of mining-related employment can also be evidenced in the migration to mining towns (FNDP, 2006)[12]. Yet heavily reliance of the population on a single sector also creates risks; with the collapse in copper prices in the late 1990s resulting in a marked population decline in Copperbelt Province as people sought opportunities elsewhere. Subsequent increases in the copper price have resulted in an influx of people back into the province and into the neighboring Northwestern Province where new mines are opening up (FNDP, 2006). During the recent economic downturn, formal sector employment in the sector dropped by 10,000[13].

d. Use of revenue vis-à-vis national development priorities

Mining revenues, accounting for less than 15% of total revenue earnings from the sale of copper (Fraser and Lungu, 2007), are collected by the state treasury. Mining revenues are not prioritized for use in developing the source areas such as Chingola or Lumwana. The state decides how to apply the mining revenues that put together with

[11] Available at: : http://www.zra.org.zm/Tax_Incentives.php (accessed 23 Nov 2010).
[12] Copperbelt Province has the highest population density of Zambia's nine provinces, with 50.5 people/km^2 (FNDP, 2006).
[1313] According to Owen Mgemezulu, Chief Planner in the Labor Department, ILO included wider job losses including by contracting companies and estimated a loss of 22,000 jobs in the August, 2008 to May 2009 period (Nov 11, 2010 interview).

revenue from other sources. In a lot of cases, the application of state revenues for infrastructure development also has a political inclination. Secondly, areas of national priority such as tourism, agriculture, health and, primary and basic education receive precedent in areas outside the revenue source areas.

Societal Externalities

a. Macro-economic effects

The Zambian economy is dominated by few sectors – with copper being Zambia's main export commodity (FNDP, 2006). Although historical growth of the mining sector has driven growth in national economic indices, analysts have noted a weak contribution between mining-related growth and poverty alleviation. Recent growth has been "concentrated in mining, wholesale and retail trade and construction, which are mostly urban based and capital intensive," rather than by sector such as agriculture upon which the majority of the poor depend (FNDP, 2006). Furthermore, excessive reliance on a single sector creates macro-economic and employment instabilities. The forward and backward linkages to other sectors of the economy mean that changes in the mining sector directly or indirectly impact other sectors. For example, the performance of the manufacturing sector was also negatively affected when copper prices fell and oil prices increased in the mid-1970s – with the sub-sectors linked to copper being the hardest hit (FNDP, 2006). Energy sector growth from 1990 to 2002 was also "constrained by the economic decline experienced during the period, especially in the mining sector, the biggest consumer of petroleum and electricity" (FNDP, p 131). Similarly, the steady decline in the share of merchandise trade in the GDP from the 1990s to the early 2000s has been attributed mostly to the poor performance of the mining sector (FNDP, 2006).

In light of this situation, the Government of Zambia aims to increase non-traditional exports by an annual rate of 20% (FNDP, 2006). Recent national development plans, while recognizing the contribution of the sector towards maintaining overall growth and foreign exchange earnings, have not focused on mining as a means to achieve pro-poor growth (FNDP, 2006). Thus, while the mining sector – copper mining in particular – is the pillar to the Zambian economy, it is essential that Zambia finds the means to diversify the economy.

b. Impacts on environmental services of national concern

A number of regulations are in place to ensure that potential environmental impacts are minimized, including the determination of likely impacts at the outset of project planning,[14] review and approval of projected levels of impact and environmental management plans by government, annual environmental audits and contributions of large scale mining projects to an Environmental Management Fund for rehabilitation. Zambia's mining policy also commits to reducing "the danger of ecological damage arising from mining operations as well as damage to health of workers and inhabitants

[14] Includes the development of an Environmental Impact Statement which should be approved by the Director of Mines Safety (with feedback from the Environmental Council of Zambia).

of the neighborhood through water, air and land pollution," and a framework for responsible development has been created through the publication of the Environmental Protection and Pollution Control Regulations. However, Zambia's FNDP (2006) recognizes the contribution of uncoordinated mining activities on what it describes as "alarming" levels of environmental degradation. While some of the negative environmental impacts undoubtedly result from past mining operations, a number of current environmental impacts are significant enough in scope to be of concern to society at large. These include the following:

Air and water pollution. – for example, "on the Copperbelt where mining is again picking up, air pollution is mostly felt in areas near Nkana mine smelter. Dust dispersal from the desiccated surfaces or tailings impoundments from mine areas also continue to contribute to air pollution" (FNDP, 2006).// "water ecosystems are polluted mainly from the release of dissolved substances, including heavy metals as well as oils, into rivers, wetlands and ground water. On the Copperbelt, the discharge of effluent with sediments from the mining industry continues to compromise the quality of water as well as threaten the Kafue river base due to sedimentation. Water contamination problems are more acute in the peri-urban areas than in the rural areas. High population densities in urban areas leading to smaller plots and consequently very short distances between latrines and open yard wells or hand pumps present considerable risk to subterranean and surface pollution of water" (FNDP, 2006). Both air and water pollution have implications for crop production in terms of both quantity and quality. In addition to generating negative health and livelihood implications in large areas near smelters and downstream from mining facilities, they shift the economic burden of clean-up to government – and thus to Zambian citizens as a whole, who must bear the tax burden of environmental remediation or the health burden associated with the failure to do so. The amount available as the environmental fund is not publicly disclosed. It can assumed that it is likely to be insignificant when one looks understands the scale of environmental degradation, in terms of the amount of tailings dumps and dams that are scattered over the Copperbelt.

Biodiversity. There are also significant impacts on biodiversity and on the livelihoods of those who depend on this biodiversity. Fish stocks have declined due to polluted rivers and dams. Agricultural crops and forest resources have also been highly impacted by high emissions of sulphur dioxide, which have resulted in vegetation stunting and in some cases complete "desertification" (FNDP, 2006). Yet in addition to the effects of air pollution, in the case of the Lumwana concession national forest area was permanently destroyed[15] - with the principle of eminent domain apparently displacing other social as well as ecological values.

Environmental Effects of Urbanization. In addition to these impacts, increases in population density associated with mining developments and the resultant urbanization and immigration, combine to "exert pressure not only on social and economic services, but also on land, resulting in deforestation, biodiversity loss, land degradation, and scarcity of agricultural land in some areas" (FNDP, 2006).

[15] 25% of the current concession area was designated as national forest.

DISCUSSION AND CONCLUSIONS

The study investigated the relationship between mining concessions and changes in the bundle of rights and, positive and negative externalities. An attempt was made to evaluate and provide an understanding of the impacts of expanded trade and investments in copper mining on customary rights and societal stakes by examining each of the following impacts: (a) expansion of trade and investment in commodities on customary rights and displacement of communities; (b) pressure exerted on forest products and services in customary land by the expansion of trade and investment in commodities. Three case studies were considered: Konkola Copper Mines (established in 1927 and more developed), Lumwana Copper Mine (green site development started 2005/6) and Zamco mine (currently under development, no green site developments).

The following were the findings:

- Transfer of customary land to mining companies and other direct and indirect impacts on customary land associated with mining operations have implications on customary rights and therefore on livelihood and rural safety-net functions
- Mining is the backbone of the Zambian economy, although over-reliance on one sector has a host of drawbacks such as (i) loss of many of the customary bundle of rights in forest areas, with most significant effects occurring in green sites and peri-urban forests; (ii) positive economic externalities for local economy, but few of these flowing to those worst affected – those losing customary rights to forest and agricultural land (due to prior awarding of licenses, no or weak consultation processes, limited compensation and weak downward accountability of customary leadership); (iii) significant negative environmental externalities for local communities and society at large.
- Poorly educated and skilled displaced customary rights holders are not competitive for competitive jobs and in terms capturing market opportunities.
- Traditional leaders are cashing in on the inability of communities to bargain for a share of mining profits by entering in share holding arrangements with investors
- Traditional leaders collect royalties for their personal gain, money that could have benefited the whole community had it been collected by the local government (municipal authorities)

The importance of mining to the economy means that mining is not going away, despite these negative social and environmental externalities. There is therefore an urgent need to: (i) leverage greater revenues from the sector, and govern this revenue so that diversification of the economy is enabled – thus generating meaningful long-term development benefits; (ii) make agreements with investors more transparent; and (iii) support meaningful FPIC practices with affected communities, and fiscal decentralization of mining revenues, so meaningful benefits flow to those losing customary rights and districts suffering the environmental and health impacts of mining.

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