Ensuring Sustainable Outcomes from Mining Investments in Africa:
Going Beyond 'Responsible' Mining.

アフリカにおける持続的鉱山事業投資を確保するための環境基準
―「責任」から「持続性」に向けて

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Introduction.

When carrying out research into the United Kingdom's management of the environmental impacts of mining in the 1970s, the only readily available references were two books: one on tailings reclamation and another on the extent of derelict land sterilized by the mining activity of previous decades. An acceptance prevailed that environmental degradation was an inevitable consequence of mining. It was the predestined cost of the benefits of creating jobs, , growth, revenues and products.

The responsibility for the negative environmental and social impacts of mining were externalized to society's account rather than internalized into the mining entrepreneurs' balance sheets. If there was any 'environmental management' it was limited to *post facto*, cleaning up the mess left behind by the mines and smelters that had fuelled the industrial revolution for over two hundred years - but even this amelioration was an exception and often had to await funding from agencies such as the European Union.

If we turn to Africa, where capital intensive mining was progressively opening up richly mineralized regions, there was even less information available on any environmental impact assessment and management of mining projects. Clearly the same notions prevailed on the South African Witwatersrand, Zambian Copper Belt, Ghana's Gold Coast as did in the United Kingdom.

As mining expanded into Africa sites were developed as enclaves[1] with the larger share of the benefits leaving the host country and little left behind for the people who had a reasonable claim to the resource as theirs. Community engagement was almost non-existent and remoteness and lack of scrutiny by authorities allowed mines and smelters to operate with relative impunity for any environmental misdemeanors.

Expectations have now changed dramatically. The management of environmental and social impacts of mining is now invariably a component of mining policies, legislation and permitting requirements etc. Africa is no exception, with environmental and social considerations solidly entrenched in the African Union's "African Mining Vision 2050" of 2008 and subsequent 2011 Implementation Action Plan.

There can be few sectors that have been subject to more initiatives to improve their environmental and social performance than the mining sector. Speaking, almost in desperation, at the 2012 Mining Investment Indaba in Cape Town, a

[1] This enclave mentality was emphasized in some countries by the responsibilities for EIA approval of mining projects that were being developed being given to mining ministries rather than more independent options – a classic case of judge and jury.

representative of Anglo American famously pleaded for a new initiative – the NMII initiative - or the 'No More Initiative Initiative'!

This paper focuses on the bio physical dimensions of the environment. It, however, recognizes that an holistic interpretation is needed. Especially if the required deepening of mining's relationship with society beyond responsible to sustainable mining is to be achieved. In this new relationship the interplay between biophysical, social, political and economic factors must be given appropriate consideration in strategic decision making. This will help ensure that today's opportunities presented by mining for economic development do not become tomorrow's environmental and social problems.

This paper draws a distinction between *responsible* mining and *sustainable* mining – although the two concepts are, of course, intricately inter dependent: Responsible mining has to be framed by a vision of sustainable mining, Sustainable mining, in turn, will only be achieved with responsible mining at its core.

Nature of Mining and its environmental impacts.

Unlike other forms of natural resource exploitation mining exploits a finite, non-renewable resource. Geologists may disagree but, in human time scales, mineral resources cannot be perpetuated by extracting sustainable yields – as is the goal with renewable resources, for example, fisheries or forestry. At best, metals can be recycled (and this should be maximized to reduce the need for new, virgin sites).

The mining process is one of converting natural capital (the resource in the ground or under the sea) into other forms of capital (human and man-made capital). It is essential that this process produces opportunities for sustainable development. This represents the legitimacy for mining to have a role in the sustainable development dialogue.

The diversity of mining can be categorized in many different ways:

- Material mined – metalliferous or non – metalliferous (gemstones, industrial minerals, fossil fuels etc)
- Value of mined material – eg small volume/ high unit value (gemstones, gold etc) through to high volume /low unit value (industrial minerals)
- Nature of mine – open cast, deep, quarrying for construction materials etc
- Level of technology- artisanal or large scale
- Level of capitalization – capital intensive multi-national enterprises through to labor intensive artisanal mining etc

Perhaps the most significant difference to be noted is in the scale of operation. This ranges from labor intensive, low technology, artisanal and small scale mining (ASM) though to capital intensive, operations. Artisanal mining has been around for most of the history of mankind, multi-national operations are relative new-comers. The majority of people (if not finance) engaged in mining in Africa are mining artisanally and this is where development issues are most obvious. Artisanal mining operations have rudimentary health, safety and environmental standards – if any at all.

In considering sustainability in mining and the environmental impacts of mining in Africa it is not sufficient to focus only upon the large scale producers. However, this diversity (even within the ASM sector alone) precludes any 'one size fits all' approach to environmental management in mining.

Environmental Impacts of Mining.

The environmental impacts of mining are influenced by:

- Types of mineral extracted
- Technology used and capital availability
- Scale of operation
- Location of projects
- Extraction techniques
- Geological situation

The potential environmental impacts of mining include:

- Land take limiting other land use options.
- Deforestation
- Soil contamination
- Disruption of ecosystems, species, habitats and migration.
- Ground and surface water abstraction that can reduce water availability and deplete fossil water resources.
- Ground and surface water pollution (eg acid rock (mine) drainage takes place where mine dumps and acidic host rock come into contact with water – increasing its acidity.
- Discharges of effluents containing toxic chemicals used in processing or released by mining activity. Chemicals include cyanide, leached heavy metal oxides (eg lead and zinc oxides) acidic effluents – seeping into water bodies and subsequently impacting communities and aquatic life and others using the water resource.
- Physical alteration of water courses or other physical features (eg glaciers, mobile sand transport systems etc).
- Physical alteration of topography and associated risks eg landslides and subsidence etc.
- Introduction of alien and invasive species.
- Opening up of remote and wilderness areas.
- Increased population around mines adds risk of increasing the bush meat trade by supply (poaching) and demand as well as illegal logging etc.
- Solid waste (including hazardous waste)
- Abandoned mine sites leaving toxic and hazardous conditions.

It could be argued that physically, although there are some noticeable open cast exceptions.[2] that a mine site does not usually have a large geographic or

[2] For example the Catoka diamond mine in Angola is the world's 4th largest in terms of surface area stretching 20 kms across and is estimated to move more than a ton of material for every carat recovered. (UNEP 2008).

ecological ‘footprint’ as compared to, for example, some other land uses such as forestry and palm oil plantations or agriculture which cover much larger areas.

However, mine sites even if not of great magnitude can be of great significance – eg if located in or near an area of high biodiversity or at the head of a water course. A pollution incident in a river system could originate from a relatively small mining operation but impact many people and aquatic organisms downstream. Some forms of mining - eg artisanal mining - may be very small as individual units but when considered accumulatively may spread over large areas.

Additionally, in spatial terms the infrastructure associated with mining may be more extensive than the mine itself. Mining infrastructure often gives rise to corridor developments which present both opportunities and threats.

Mines are, of course, constrained in their location options by needing to be in close proximity to the resource to be mined. This lack of flexibility in location decisions inevitably can lead to environmental conflicts.

Bio diversity.

A little over 2 years ago over 200 Environment Ministers met here in Japan at Nagoya and agreed a landmark deal on biodiversity and ecosystems. The summit of the UN Convention on Biodiversity adopted targets to halve the loss of natural habitats and to increase the amount of protected land form 13% to 17% by 2020. Countries had to come up with binding targets that are operable by 2012 and then develop National Biodiversity Actions Plans.

Biodiversity is defined as all life on earth as well as the variety of genetic material they contain and the diversity of ecological systems in which they occur. Biodiversity underpins the health of the planet and has a direct impact on all our lives. It is the link between all organisms on earth, binding each into an inter-dependent ecosystem, in which all species have their role. It is the web of life. Biodiversity offers multiple opportunities for development and improving human well-being. It is the basis for essential environmental services upon which life depends. Thus, its conservation and sustainable use are of critical importance.

Biodiversity is usually considered at 3 levels:

1. Eco-system diversity
2. Species diversity
3. Genetic diversity

Why Africa?

Africa is well endowed with both variety and abundance of living things including some iconic endemic species such as gorillas and lemurs. A quarter (1,229 species) of the world's approximately 4,700 mammal species occur in Africa, including about 960 species in sub-Saharan Africa and 137 species in Madagascar alone.

The Cape is a centre of plant diversity of global importance and the Central Zambezian Miombo woodlands (located in Zambia, the Democratic Republic of the Congo and Tanzania) is a centre of bird diversity. The eastern and southern savannahs host large populations of mammals, including at least 79 species of antelope. More than 2,000 bird species occur, constituting over a fifth of the approximately 10,000 bird species in the world. That biodiversity, with some exceptions, is currently in a better condition than in many parts of the world but it is severely threatened. Apart from their inherent value Africa's ecosystems and species support thriving tourists industries.

The generally accepted biodiversity goal of mining activities should be – *no net loss.* Calculations of exactly how to measure this are still rudimentary[3] but a mine's Biodiversity Action Plan should contribute adequate resources to protect the biodiversity and the ecosystem services that they unavoidably de grade during their operations. These Action Plans should be founded on baseline studies undertaken as part of feasibility and planning studies. These should identify biodiversity values and hot spots and determine key risks to biodiversity and areas to be protected *in situ* wherever possible. Restoration programmes and costs for eventual mine closure should be factored into the planning and design of

[3] The UN Economics of Ecosystems and Biodiversity Initiative guestimates that the natural world provides services ranging from water purification to crop pollination, flood prevention and climate regulation. with an economic value of between 2000 billion and 5000 billion US Dollars. However, analysis by the consultants Trucost suggests the world's top 3000 companies cause environmental damage costing $2,200 billion per year.(UNEP 2008)

the mine when any restoration cannot be undertaken sequentially during the operation of the mine.

While by no means is the deterioration of biodiversity laid solely at the door of mining companies in Africa – mining operations, like all others, have an obligation to do what they can to protect it. Biodiversity management is not only an ethical issue; it also makes good business sense. The mining industry is reliant on healthy ecosystems (or 'ecological infrastructure') - eg good quality water for processing and staff welfare. The failure to manage biodiversity or avoid negative impacts of operations poses threats and risks that can materially affect business operations.

It is also very likely that payment for ecosystem services and more rigorous calculations of compensation to local communities for any deterioration in the quality of these services will be a feature of mine licensing in the near future. Biodiversity off-sets have already emerged as a compromise where mining permission is being sought in protected or sensitive areas. This should be a last resort rather than a default option when mining potential comes up against areas of high conservation value and the 'no go' for mining option should be seriously considered where scientifically justified. (S.Brownlie, N.King and J.Treweek (2012)

Selected examples of large scale Mining in Sensitive Areas in Africa.		
Fort Dauphin, Madagascar	QMM Ilmenite mineral sands project. Dredge mining and processing facility producing titanium from coastal sands. Infrastructure includes a new port.	Coastal rainforest removal in one of the last remaining fragments of Madagascar's littoral forest- including endemic species of flora and fauna.
Ambatovy, Madagascar	Nickel and Cobalt mine – set to be one of the largest lateritic nickel mines in the world. Includes process plant, pipelines and port.	Located within a species-rich region of Madagascar at the southern end of the remaining Eastern Forest Corridor. A multi-component biodiversity offsets program is being implemented that will achieve no net loss and possibly a net gain, of biodiversity while ensuring socioeconomic benefits for local populations. The

		Biodiversity Action Plan includes management of a RAMSAR site in close proximity to the mine
Sangaredi, Guinea -	Open pit bauxite mine (Guinea's most profitable) in the upper Guinea's Forest region and aluminium smelter.	Falls within one of the world's most biologically rich, but threatened, ecosystems (mine and proposed alumina smelter).
Simandou, Guinea.	Iron ore mining project together with extensive rail road and port facilities. Projects on this scale are transformative.	Source of four important rivers including tributaries of the Niger. There is a commitment to achieve a net positive impact on biodiversity. A biodiversity Action Plan exists.
Cameroon and Congo Brazzaville, Congo Basin	Iron ore mining and extensive associated infrastructure of rail and port facilities, hydro power dam etc.	Pristine tropical forest will be lost impacting gorilla, elephant and turtle populations.
Kenya, Mombasa	Long established quarry and cement operator.	Created a Nature Park: bio-reserve, fish farm and various ecological education facilities in or adjacent to worked out quarries.

Who is WWF?

WWF (or the Worldwide Fund for Nature) is a conservation organization supported by 5 million people and active in over 100 countries on five continents. WWF's mission is "to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by conserving the world's biological diversity; ensuring that the use of renewable natural resources is sustainable; and promoting the reduction of pollution and wasteful consumption." In seeking to fulfill this mission, WWF has chosen to focus its efforts on conserving biodiversity in 35 priority places. Comprised of large, natural landscapes, these places are home to irreplaceable or threatened biodiversity.

In Africa the key areas are Coastal East Africa (the Swahili Coast), the Congo River Basin, The African Great Lakes, Madagascar, Miombo Woodlands, Namib Desert, South African fynbos, West African Marine Environment.

In many cases, they are also rich in valuable natural resources, such as minerals and timber.

Why are WWF concerned?

The mining sector has a significant impact on biodiversity, and a 'business as usual' trajectory would pose a serious threat to WWF's long-term conservation goals.

WWF's latest 'Living Planet' index shows a 30% decline in biodiversity since 1970, while the 'Ecological Footprint' Report indicates that consumption of renewable resources exceeds the Earth's capacity by more than 50%.

African bio-diversity is already under significant pressure from poachers, wildlife trade and habitat loss caused by agricultural and infrastructure expansion. All of the above regions are also being explored because of some form of oil, gas and mining potential, and this situation is the same in almost all of WWF's priority regions world-wide.

The growing demand for energy, minerals and other natural resources is putting pressure on bio-diversity and the ability of ecosystems to provide the services that meet the needs of all people - the poor and vulnerable in particular.

We have witnessed an 'economic super cycle' developing over the past decade in Africa. Although 2012-13 has started to see some prices declining, the overall trend in metals and minerals prices, such as gold, copper and iron ore, has reached new heights and demand is expected to continue driven, in large part, by China's appetite for natural resources from, amongst others, Africa.

This has led to an increase in exploration for new mineral deposits in new areas. Some of these areas are relatively remote, pristine, and sensitive wilderness areas home to some important (and often rare) species and ecosystems. These are often protected areas or areas of high biological/ conservation importance not yet

with protective status. They may be areas that support the livelihoods of the people living in them and who may be especially vulnerable to their degradation or loss.

Of increasing concern is the growing interest in marine mining. Africa has already experienced the irreversible impacts of coastal zone and off-shore diamond mining/ dredging in South Africa and Namibia. Marine mining and submarine tailings disposal are of particular concern because only 1% of the world's seas and oceans are protected, administration of the oceans is confused and our knowledge about them still very limited – until a reasonable threshold of data has been collected a precautionary approach is needed.

Not only are new deposits being found (it is estimated that Africa has considerable mineral resources yet to be discovered) but the distance which it now becomes economic to develop infrastructure and transport materials (such as iron ore) from inland mine sites to coastal port facilities for export has increased.

In other areas, where the easier and richer ore deposits have been worked out, the mining of lower grade material will present further environmental problems; such as a larger ratio of inputs to outputs and consequent generation of wastes etc.

Conflicts between competing land uses (including protected areas), competition for access to resources, between companies and communities etc are increasing and likely to get worse. Mining companies cannot relocate in the face of these conflicts. This may be compounded by having to operate in situations of poor governance – a situation in which voluntary commitment such as corporate social responsibility may become the *de facto* ruling regime.

There are also regular calls, alongside those for fairer shares of benefits for host countries in mining deals, for greater value addition through beneficiation (ie creating downstream processing operations in African host countries). This, however, runs the risk of the exportation of polluting operations (such as

smelters) being migrated to countries where environmental controls are less stringent, thus increasing the environmental burden and risks on to Africa.

According to Paul Collier (Professor of Economics and Public Policy at Blavatnik School of Government and former Director of Research Development at the World Bank.); “We are now moving from a decade of exploration into a decade of extraction”. (Speaking at the Natural Resources Charter Conference, Kuwait, May, 2013).

African governments and organizations like WWF need to be ready to ensure that this is done according to the principles of good governance and the highest environmental and social performance standards. Investment and management frameworks (such as that drafted by the Inter-Governmental Forum on Mining, Minerals, Metals and Sustainable Development 2012) need to be in place and effectively implemented.

Yet the shift to new areas of resource exploitation (eg from Europe to Africa) is often also to where management regimes lack resources for the effective application of environmental policies and instruments. While usually existing on paper enforcement of environmental legislation and standards is lacking - an ‘implementation deficit’ prevails.

What does WWF want?

Resource-rich countries have a great opportunity to harness their natural wealth for transformative and sustained prosperity. Equally, if mis-managed, resource extraction can impart severe costs on a country and the integrity of its ecosystems and the survival of the species dependent upon them.. As custodians of their extractive resources, it is typically the responsibility of governments to manage those resources for both current and future generations. This is also the case for biological resources.

To achieve this, a series of key decisions must be taken by government that will affect different groups and set choices extending far into the future. To avoid decisions being made in a piecemeal fashion, and to build a shared sense of

direction, governments should, in dialogue with stakeholders, build a national strategy for resource management.

Countries hosting mining investments need to ensure that the window of opportunity that their mineral wealth is providing results in sustainable outcomes and is not a period of economic boom followed by bust and a legacy of environmental degradation.

WWF has worked with the Tanzanian Chamber of Mines and government to develop Guidance for inward investing mining companies (and the risks assessors working on their behalf) to highlight the environmental sensitivities and international environmental commitments that Tanzania. Kenya has just embarked on producing similar guidance.

The next step is to develop some form of screening for governments to help them evaluate the environmental credentials of potential investors and the compatibility of proposed investments – including mining proposals- with a countries conservation goals. (Brookes and Hobbs 2012).

With such a system in place a greater degree of transparency should follow and the opportunities for civil society to engage in and comment on investment decisions at the strategic stage be increased. Too often civil society is informed about mining projects when they are essentially a fait accompli but with the palliative that an EIA will be carried out- an exercise that will immediately be suspected of justifying the strategic decisions already made and making community conflicts almost inevitable.

WWF also wants to see a portion of the wealth and revenues accruing from the exploitation of mineral wealth reinvested in achieving greater protection of biodiversity and attainment of conservation goals.

From Responsibility to Sustainability.

Following several high profile environmental disasters[4], incipient pollution, legacies of derelict land, impoverished communities and environmental hazards, leading mining companies have long put in place pollution prevention and control systems – and if they have not- they should not be mining!

However, in progressing to the next stage of the agenda it is useful to draw a distinction between responsible and sustainable mining. Responsible mining tends to be about *doing things right* and eco-efficiency – whereas sustainable mining is more focused on *doing the right things* and eco-effectiveness.

- **Responsible Mining** is concerned with managing the tangible impacts mining has on the environment throughout the life cycle of a mine project. It tends to be a technical or scientific exercise – although with diverse stakeholder inputs. Leading multi-national mining companies have recognized that environmental issues are core business and not a peripheral concern. This realization is driven by enlightened self-interest as well as regulations because leading companies (including their investors and shareholders) recognize the very old cliché that good environmental management is also good business management. Environmental management helps companies reduce costs, manage risks and liabilities and identify new business opportunities. It helps their 'bottom line' as much as it demonstrates improved environmental responsibility.

Civil society – whether international or local - are going to be holding all actors to account for the rigorous custodianship of natural resources and the prudent exploitation of mineral wealth. In these days of social media and instant communication poor performers will be quickly exposed.

But it is clear that environmental responsibility is no longer adequate on its own. Mining cannot contribute to economic growth today while disregarding social and environmental considerations of tomorrow.

[4] For example: The Ok Tedi Mine, an open-pit copper and gold mine in Papua New Guinea located near the headwaters of the Ok Tedi River. Discharges from the mine have caused widespread and diverse harm, both environmentally and socially, to the 50,000 people who live in the 120 villages downstream of the mine. The Baia Marie cyanide plume release from a gold mine in Romania in 2000 that crossed 4 countries and entered the River Danube. killing large numbers of fish in Hungary and (the then) Yugoslavia.

- **Sustainable Mining:** Sustainability requires looking at the challenges through a different lens - one of scenarios and strategic choices in terms of development outcomes and how mining can contribute to their achievement. Critical to sustainability is the need to ensure decisions are not taken in isolation but in a partnership of multi stakeholder dialogues leading to shared responsibilities. This will bring about real transformational change in the sector. It is a programme of socio- political engagement rather than technicalities of avoiding or mitigating negative impacts.

Countries endowed with mineral wealth should be at the top of the league table for poverty reduction. and sustainable development. They should be leaders in attainment of the Millennium Development Goals. However, instead they are often found at the bottom, and plagued by conflict, corruption and civil strife.

This is more about helping frame the governance conditions for mining – within it is the need for responsible mining (the application of appropriate environmental and social performance standards) but the sustainability agenda is much broader and includes issues such as the equitable distribution of benefits, the protection of rights and good governance.

The recent Africa Progress Panel (chaired by Kofi Annan, former Secretary General of the United Nations) estimated that, due to the undervaluation of some assets by companies, $1.4 billion was lost to the Democratic Republic of the Congo (equivalent to 20% of its GDP) alone. It seems some mining companies are a long way from being partners in sustainable development. (Financial Times, May 10 2013)

Critical to good governance is transparency. This includes at the earliest stages of mining policy decisions not just about specific projects. Making the *strategic* choices about investing in mining more transparent (within the bounds of commercial sensitivity) is critical to partnerships and it will integrate economic, social and environmental factors in more balanced decision making that will have enhanced possibilities of achieving sustainable outcomes as a result.

This will move away from the prevailing situation where the protection of areas of high conservation value is determined by where mining cannot happen to a proper evaluation of the merits of mining versus conservation interests.

Sustainable mining is about mining companies, governments and civil society becoming development partners. Mining projects need to be more than just extraction operations they need to be development projects. Mining companies need to do more than avoid or mitigate negative impacts. It is an old cliché now – but they need to move beyond the 'do no harm' approach to actively seek to 'do good'.

The assessment of the benefits of mining proposals should go beyond creating jobs and paying taxes and royalties etc but should also explore the development potential that mining can bring. For example, instead of limiting attention to mitigating the negative impacts of a mine to port rail link explore the opportunities that such infrastructure presents to develop a multi-use growth corridor.

A sustainable mining company needs to be responsive to and support the tenets of development effectiveness contained in the Paris Declaration (2007). This would include;

- aligning behind the development priorities and commitments of the host country government not by-passing them.
- helping build the capacity of host country systems rather than always importing expatriate international consultants (where equivalence exists or can be developed).
- working in partnerships wherever possible.

Conclusion:

Modern society depends on mineral resources. Supplying these minerals provides the engine of growth and development for many developing countries. Although much can be achieved by recycling and reusing metals and increasing efficiency in their production and use – there is no doubt virgin territories will continue to be

opened up for mining activity for the foreseeable future. In fact, mining has a role in the desired transition to 'greener economies' as it provides many of the materials upon which more environmentally benign technologies depend.

There is still much to do on ensuring that appropriate environmental and social performance standards are universally adopted across the sector, throughout the life cycle of a project, and from mine to market supply chains. In particular, the newcomers, juniors, sub-contractors and artisanal miners must receive priority attention.

However, attention is deepening beyond environmental responsibility to ensuring the mining sector becomes a better partner in sustainable development. This transition is already underway. The relationship between mining and society is being analyzed – because it needs strengthening and fundamental transformation. Mining should not be only a driver of economic growth but is also sustainable development. The" African Mining Vision 2050" has established the framework for this this to happen on that continent.

Key to this transition are multi- stakeholder partnerships. These are developing agreements and collaborations to forge this new relationship between society and mining. Many multi stakeholder dialogues and initiatives have emerged such as the Extractive Industries Transparency Initiative (EITI), the Natural Resources Charter, the Voluntary Principles on Human Rights etc complimenting those that have been developed to address greater responsibility (IRMA, Responsible Jewellery Council and the Cyanide code).

Speaking at the 'Investing in African Mining' Indaba 2013 Dr. Mamphela Ramphele (former Chairman of Gold Fields) said a different business model was needed for "the mining industry of the 21st century"." It's time to think differently … the mining industry has no option but to make a fresh start (if it hopes to survive)."

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