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9.3 Challenge 2: Environmental and Social Impacts

The conventional view is that the environmental and social footprint of mining is greater than that of the hydrocarbons sector. With the rapid expansion of the hydrocarbons sector in the early 21st century into many new countries around the world, both on-land as well as in offshore waters, this view needs revision. During this period, many oil and gas companies have joined the international mining industry in designing and publicizing best practices in these areas. Sometimes the results have even been published jointly.

In the sub-sections below the range of potential impacts are enumerated first with respect to environmental subjects and secondly with respect to social issues. In each case, those which are peculiar to oil and gas, and those peculiar to mining are noted, even though in the real world overlaps exist, and where possible these have been highlighted. Also noted are the different points in the lifecycle of an investment at which they are likely to materialize, and/or at which efforts need to be undertaken to mitigate and prevent them. In practice, environmental and social impacts will often by managed together rather than separately but for analytical purposes, they are on the whole treated separately below. A legally binding approach to management of environmental risks with penalties for non-compliance is common, but for social issues this is less usual. The reason is that environmental risks are well understood and measurable, so that the compliance criterion can be clearly defined. Social impacts however, tend to be more complex and as a result are not always subject to quantification or empirically measured compliance criteria.

The following sections of this chapter address first tools (9.4) and then responses (9.5) to the problems.

9.3.1 The Environment

Good practice in managing environmental impacts of extractives activity involves the continued and dynamic development of an overall sector policy framework. An important part of that framework should concern how to address social and environmental impacts, health and safety, and the interests of internal stakeholders such as employees and contractors. Protection of vulnerable groups such as children should also play a role in the overall policy framework.

Identification of the likely or actual impacts of an oil, gas or mining project is clearly one of the first orders of business, since the goal will be to avoid or at least minimize negative

impacts and to maximize the potential positive impacts. Some impacts may be readily defined, while others are less known or are contingent on what may actually occur in the affected areas, and indeed dependent on whether an initial investment moves on from the exploration stage to full development. Even so, *the process of identifying impacts is generally more straightforward for environmental than social concerns because they are at present better understood*. Social impacts are more complex and elusive, and the tools for addressing them less tested than environmental ones.

Environmental impacts take place along the entire Value Chain, but will vary in their impacts according to the life of the project. Depending upon the kind and size of extractives activity, and also their location and the technology they deploy, they will generate a mix of positive and negative impacts. In general, the larger the project is, the greater the risk of environmental impacts. If it is located near ecologically sensitive areas, such as a national park or pristine rain forest, the impacts are likely to be more complex.

9.3.1.1 Oil and Gas

Even at the early stages in the life cycle of an oil or gas investment, there can be environmental impacts. For example, the seismic testing and test drilling of exploration wells can generate various, short term impacts, often in remote and environmentally sensitive areas. Seismic survey activity will generate loud and low frequency sound waves that can disorient marine life and impact upon their behaviour and movements. Reduced catches of fish have been observed in areas of seismic activity.

If the activity moves on to other stages such as development and production, the impacts will grow. Their extent will vary according to several variables: the nature of the project; characteristics of the site and its environment; and the effectiveness of the implementation of environmental management instruments to prevent pollution and to mitigate and control impacts[1]. The main impacts from oil and gas activities are typically[2]:

- Atmospheric impacts derived from flaring and venting of excess gas; combustion processes through the use of diesel engines and gas turbines, and fugitive gases from operations for loading and tankage;
- Aquatic impacts through the generation of liquid waste in drilling fluids, chemicals for well treatment, drainage water, sewerage and sanitary waste, spills and leakage and cooling water;
- Terrestrial impacts by contamination from spills or leakage, solid waste disposal, or site construction;

[1] UNCTAD, Economics of Commodities Production and Trade, (2012), p.10.
[2] E&P Forum/UNEP, 1997: 12-16.

- Ecosystem impacts on various components of the biosphere that affect the animal habitat which in turn affects the ecology of the site;
- Deforestation from on-site operations, oil leakages spilling throughout the supply chain and accidents that have polluting effects on the natural life of the area, the land and water and the economic activities based on the environment such as fishing or tourism over a long period;
- Decommissioning of installations and structures at the end of their commercial life is also a potential source of negative environmental impacts, particularly if it involves structures in offshore waters.

Some aspects of oil and gas activities require particular attention since their potential impacts are significant or particularly complex to address or both[3]; four are noted below.

Oil Spills The very large spill of oil in the Gulf of Mexico involving the rig called Deepwater Horizon drew attention to the risks arising from offshore exploration and production of hydrocarbons in frontier areas (see **Box 9.3**). Spills of oil are not unusual, but

Box 9.3: The Macondo Oil Spill

A major oil spill occurred in 2010 in the US Gulf of Mexico, and led to a loss of oil of 53,000 barrels a day for many weeks. The oil spill covered an area of 6500 square kilometers, involving five million barrels of oil. The Deepwater Horizon field was operated by BP under a Joint Operating Agreement (JOA) with Anadarko Petroleum and Mitsui Oil Corporation. The owner of the rig was Transocean and the cementing contractor was Halliburton Oil Well Cementing Company. The blowout began on 20 April 2010 and the well was capped on 15 July, with well cementing completed by 5 August 2010. The resources required to remove over 800,000 barrels of oil liquid and 265,000 barrels by controlled burns amounted to 28,400 personnel and more than 4,000 vessels and dozens of aircraft.

The financial consequences of the oil spill are still being managed but BP created a US$20 billion escrow account on 16^{h} June 2010 and the cost of response measures was at least US$8 billion.

There is no international legal framework in place to deal with the question of liability arising from pollution in the event of pollution following a blowout. In the past, international law on environmental pollution has usually been concerned with oil pollution from tankers. As a result of this lacuna, it is left to national laws to deal with this matter. Such laws vary enormously, both in the way that the law itself deals with it and with the way contractual indemnities are interpreted and enforced, or not as the case may be.

[3] For a more detailed overview of the environmental effects of the oil and gas industry, see: David Waskow and Carol Welch (2010), The Environmental, Social and Human Rights Impacts of Oil Development, in Covering Oil, Revenue Watch/Open Society Institute, pp. 101-123.

the source is commonly from tankers, pipelines, storage tanks and barges. Usually, the spill occurs during transport, as oil is being loaded on to a tanker, or being taken from a railway to a storage facility, for example. The spill in the Gulf of Mexico was not the first time a spill had occurred from a deep-water well, but spills from that source are unusual. For a growing number of countries, such as the emerging producers in West Africa, the fact that their hydrocarbons reserves are located in deep water, with complex geological structures, will raise concerns about the adequacy of available technology to address the risk of a well explosion and its consequences. The limited capacity in government institutions draws attention to this issue.

Flaring of Gas Around five per cent of the gas produced around the world is being flared or vented on existing producing oil fields, mostly in developing countries[4]. However, of this figure only five countries are responsible for about 60 per cent of the total (Russia, Nigeria, Iran, Iraq and Kazakhstan[5]). The flaring of gas found in association with oil is generally considered to be a practice to be strongly discouraged. It releases into the air carbon monoxide, nitrogen oxides, and sulphur oxides, which can cause smog and acid rain. Where gas is not flared, it may be vented into the atmosphere, releasing large quantities of methane gas. The trend is for flaring and venting to be reduced, not least due to government policy and the influence of multilateral initiatives such as the Global Gas Flaring Reduction program, a public-private partnership[6].

Climate Change Climate change remains an important global environmental issue. Petroleum operations are major emitters of greenhouse gases, particularly through the flaring of natural gas. However, CO2 emissions can occur in each segment of the oil and gas supply chain. Concerned governments have responded in a variety of ways, including taxes and penalties and mandatory flare reduction, or 'flares out' requirements. The complex of issues involved in 'climate change' concerns not only the countries that produce oil and gas but also those that are highly vulnerable to the environmental impacts of climate change, due to geographical location or to a lack of available investment for mitigation. A key success factor in efforts to reduce GHG emissions is engagement by oil and gas companies to develop best practice guidelines for emissions monitoring, reporting and management, and to develop and implement new technology for sustainable energy options.

Biodiversity Oil and gas activities present challenges for biodiversity (the variability among living organisms within a given ecosystem). It requires an identification of areas in which biodiversity may be adversely affected by operations but also a willingness to modify

[4] LeLeuch, Gas Guidance Note, EI Source Book, pp.11-12.
[5] For a recent review of gas flaring rules and practices, with a case study of Kazakhstan, see A Nurbekov and A Van de Putte, An Ambitious yet Realistic Roadmap to Virtually Eliminate Gas Flaring and Venting in Kazakhstan, J of World Energy Law and Business (2014), 499-526.
[6] GGFR: A Public-Private Partnership: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/EXTGGFR/0,,menuPK:578075~pagePK:64168427~piPK:64168435~theSitePK:578069,00.html (last visited 11 May 2016)

business practices and operations to minimize risks and maximize opportunities to contribute to biodiversity conservation and improve ecosystem services.

Decommissioning Onshore oil and gas operations present few problems for decommissioning and require limited workforce and supplies. Offshore structures are by contrast very complex and technical, and require advance planning to be decommissioned. Over several decades the expansion of oil and gas activity into offshore waters has led to a proliferation of structures and pipelines that are likely to prove costly to remove[7]. The high costs may prove daunting to some foreign and domestic investors: the risk of default on decommissioning obligations is to be taken seriously. In contrast to most infrastructure projects involving removal and disposal, it is the legacy hazard that marks out these projects: toxic materials left in the installations need to be disposed of safely.

There is a body of international guidelines, and an established set of good industry practices that require companies and governments to make plans for decommissioning and carry out actions to ensure it is done to a high standard. Walking away from an operation that is no longer deemed to be commercial is not an option for the company but neither is it an option for a government to let a structure rust. Decision-making is complicated by oil price movements which can accelerate or decelerate the timing of decommissioning. More and more governments have to prepare for eventual decommissioning and ensure that the costs are provided for according to some formula that the parties agree to in advance.

9.3.1.2 Mining

The typical environmental effects of a mining project are landscape alteration (erosion, formation of sinkholes), air, soil, and water pollution (groundwater and surface water). Mining is a water intensive industry (like fracking), and its sole utilization of this resource could be particularly critical in areas where water is scarce, or is heavily used by other local activities such as agriculture or drinking, or by ecosystems. At a later stage in the cycle the decommissioning and closure of mines can also be a source of negative environmental impacts, although there is considerable experience of this, yielding lessons about its optimal management. As is the case with hydrocarbons, there is an element of the unknown to grapple with: planning ahead is done on the assumption that a project will be deemed commercially viable on the basis of data obtained at an early stage.

Thinking about environmental effects has also undergone a change with respect to the miners themselves. In the more recent literature, attention has shifted from a focus on the

[7] A contrast is with the US Gulf of Mexico where more than 1,000 small structures have been removed to date with no significant adverse effects. This cannot be taken as a precedent for decommissioning in deepwater areas.

impacts of large-scale, capital-intensive mining (LSM) to the major environmental challenges presented by the activities of artisan and small-scale miners (ASM). ASM communities often operate in a context without any environmental safeguards, due to a lack of resources to manage environmental (and social) impacts. ASM activities therefore contribute either directly or indirectly to environmental degradation: through deforestation, loss of biodiversity, wildlife poaching for bush meat, soil erosion, dust, and noise, and habitat destruction, introduction of invasive species, siltation, and pollution of water bodies or alterations to rivers' regimes. As one commentator has noted: "(t)heir activities leave legacies of hazards and dereliction"[8].

Water The most significant impacts of a mining project are likely to be in terms of water pollution and the creation of scarcity. The very large consumption of water by mining activities is the source of the problem. It will lower the water table and dry up rivers and lakes in parts of the world where water is scarce. The impact on water quality as well as availability will be very significant. Toxic elements such as mercury from ASM may well infiltrate the water table from surface mining and processing operations, especially in tropical or temperate countries with high water tables. The question then arises whether such water is fit for humans, plants and animals. Downstream or nearby communities can also be deprived of the water they need by the use, diversion or pollution of water in mining operations, with destructive effects on farmland.

Toxic Materials and Acid Drainage Mining operations produce large quantities of solid and slurry waste, with different kinds of waste being produced at different stages of the process. Large quantities of waste rock will be removed so that the miner can reach the minerals, and stored on the land surface or in abandoned mine pits, or even underground. The amounts of waste relative to the minerals extracted can be very large[9]. Another waste product called *tailings* results from concentration or treatment of the mineral, and can include heavy metals, cyanide, chemical processing agents, sulphides, and suspended solids. Such waste needs to be contained, sometimes for decades, and well beyond the life of the mine, to allow for decomposition and settling.

Air Pollution Mining operations can generate significant amounts of dust with the risk of airborne pollution. If there is a smelting plant, there is the further risk of gas emissions which can be toxic and a long-term risk to human life and wellbeing. Where the smelters are older, such as lead-zinc ones in Australia or Peru, the risk is much greater.

Biodiversity The impact on biodiversity from mining operations can change the relative populations of species in the same ecosystem, but not evenly. Some species are more

[8] J Hobbs (2014), ASM in Africa – 10 Policy Principles and their Environmental Relevance (unpublished) paper presented at the Inter-Governmental Forum on Mining, Metals and Sustainable Development's Regional Meeting on Artisanal and Small scale Mining, Cape Town, 5 February 2014.
[9] Mining Contracts, p.114.

tolerant than others to land disturbance and loss of habitat and exposure to metals and acid. Habitat fragmentation is more likely than wholesale destruction of habitats.

Mine Closure and Rehabilitation of Mined Areas The global trend is towards 'progressive reclamation', so that disturbed areas become reclaimed during the life of the mine, as well as after it has been closed. Good practice now is to design closure from the project start-up to make reclamation easier and also more effective. Monitoring is required, however, from the outset to ensure that mechanisms are in place to cover the ultimate costs of rehabilitation of the mine.

Climate Change Mining is one of the most intensive users of heavy fuel oil, a contributor to CO2 emissions. Where coal mining takes place for use in generating electricity, it is ultimately responsible for substantial quantities of greenhouse gas emissions. In these ways, mining is a major contributor to global warming. Countries that host mining activities may also be vulnerable to the effects of global warming, due to geographical location.

Areas of Particular Vulnerability Governments may wish to protect certain areas of land or sea based on considerations of physical beauty or uniqueness, maintenance of biodiversity, protection of game, or cultural heritage. Petroleum or mining activities may be prohibited, or permitted in protected areas, subject to rules and conditions of access. The IUCN defines such protected areas as "a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values"[10]. It can include a national park or wilderness area, a community conserved area, or nature reserves. In Africa, for example, mineral operations in forest areas have been particularly controversial. It has been estimated that the global network of protected areas stores at least 15 percent of terrestrial carbon[11]. ASM is a particular problem for such areas, since it frequently encroaches into remote, pristine protected areas, as the ASM-PACE program revealed (see **Box 9.4**). A source of tension can arise between the short-term needs of governmental authorities and the influence of mining companies on the one hand and legitimate environmental concerns on the other. This is a "charged context for decision-making"[12].

[10] IUCN Definition, 2008: http://www.iucn.org/about/work/programmes/gpap_home/pas_gpap/ (last visited 11 May 2016)
[11] Ibid. Industry has been sensitive to issues arising from activities in protected areas. For examples of literature on oil and gas activities in protected areas, see: Australian Petroleum Production and Exploration Association Limited (APPEA), Australia's Oil and Gas Industry Operating in Protected Areas and Code of Environmental Practice (2008); IPIECA, The Oil and Gas Industry: Operating in Sensitive Environments; E&P Forum (1991), Oil Industry Operating Guideline for Tropical Rainforests, Report No 2.49/170.
[12] Minerals and Africa's Development, p.52.

Box 9.4: Work of ASM-PACE Project: Artisanal and Small-scale Mining (ASM) - Protected Areas and Critical Ecosystems (PACE)

ASM-PACE is a partnership program between Estelle Levin Limited and the World Wide Fund for Nature (WWF) to address the environmental impacts of ASM in some of the world's most important ecosystems.

Active since 2010, the program is focused exclusively on addressing the impacts of ASM occurring in Protected Areas and Critical Ecosystems (PACE). ASM occurs in/ impacting: a wide range of critical ecosystems, including arctic landscapes (e.g. Greenland), tropical rainforests (e.g. Brazil and Gabon), and coral reefs (e.g. Philippines) - in sum, in approximately 80 different countries globally; in PACE in 32 of 36 countries studied by the project; and in or around 96 of 147 of the protected areas in these 36 countries. Affected sites include at least 7 natural World Heritage Sites and at least 12 WWF Priority Landscapes.

9.3.2 Social Impacts

Social impacts from the extractive industries will vary according to the life cycle of the project. They can be positive as well as negative: for example, in terms of job creation, education and skills development, fostering of urban and trade centres, and investment in the improvement of local infrastructure and services. The challenge is to ensure that these positive impacts are sustainable and have longevity.

Some issues are common to oil, gas and mining projects: community relations, the acquisition of land and resettlement; and human rights abuses. Those social impacts that are more usually associated either with oil and gas or mining are addressed *separately* in the sections below. The impacts of each can be expected to differ. For example, the financial flows from royalties and taxes will be orders of magnitude greater in oil and gas than in mining; the physical footprint from oil and gas extraction will usually be less than for solid mineral extraction, even though infrastructure and processing plants take up land space. The impact of pipeline networks will be more linear in impact than with any comparable mining structures. The impact on employment will be less in oil and gas than in mining.

Community Relations Given the high impact of extractives projects on the surrounding area, there have been instances of relations between investors and governments with local communities that have been fraught with tension. Without a so-called 'social licence to operate', or the free and informed consent of the communities concerned, the risk is that the project will become hard and even impossible to run. Oil operations in the Niger Delta are an infamous example of this kind of tension and

breakdown in community relations leading to youth violence and armed militias. Poverty too can follow from a degraded environment on which communities have to depend.

Indigenous Peoples Indigenous peoples can be regarded as a distinct type of stakeholder for oil, gas and mining companies. They have rights under international law and under some national legal systems, and have usually experienced a history of marginalization and discrimination. They will usually have distinct cultural, economic and political practices. Impacts on indigenous peoples from oil and gas operations will vary between oil, gas and mining, but both industries now have a consensus that this is a group of stakeholders that require special attention when designing a project proposal.

Definitions of 'indigenous' can be controversial. A recent study has noted four key elements in the concept of 'indigenous': priority in time, with respect to occupation and use of a specific territory; cultural distinctiveness, applicable to language, social organisation, spiritual values, laws and institutions; self-identification, as well as recognition by other groups or by state authorities, and experience of subjugation, including discrimination or marginalisation[13].

The rights of indigenous peoples in the context of resource development pose special moral and political issues for investors and governments alike. The issues derive from the perception that indigenous peoples have inherent rights derived from their distinct ethnic and cultural identities, and their close and special attachment to ancestral lands. Ideally, the rights and customs of indigenous peoples should be fully protected by law. However, even in countries where this is not the case, investors will usually be encouraged to respect the rights and culture of indigenous peoples and undertake exploration or mining activity only if they have well-documented evidence that their activities have broad support of the concerned indigenous peoples. Resettlement of indigenous peoples with cultural ties to the land is particularly sensitive.

Land Acquisition and Resettlement A source of social resentment against a project can be the displacement of populations and resulting disruption of livelihoods. Disruption can be caused by land purchases, leading to forced evictions, which may extend beyond the area of the project to land needed for transport corridors and transmission lines. A physical relocation of communities may also be entailed if the project is to proceed, entailing a loss of their livelihoods and sources of income. Involuntary resettlement of populations to allow a project to proceed 'for the greater good' raises ethical issues, and can have significant harmful effects for the local community if not well-managed. Impoverishment of the communities may also happen. Good practice argues that it should be avoided, or at least minimized where feasible, by exploring all viable alternative project designs and mitigation strategies.

[13] Max Planck/BGR study (2016), ibid, p.12.

Resettlement may also impact upon the communities that receive the influx of new people. New mining projects can lead to an influx of people from neighbouring areas looking for jobs on the project or to set up businesses. Mining generates support and service jobs and if it leads to greater infrastructure, that in turn will attract more people. The pressures on water, land, housing, sanitation and social services which such an influx can bring, will have some negative impacts. Forward thinking strategies by companies can minimize the negative impacts however. Policies can be developed in cooperation with local and central government.

Economic displacement can also occur, whereby people's livelihoods can be lost or disrupted. Governments and companies can anticipate this by providing alternatives. Local content measures may also generate benefits here.

Social problems can arise from artisanal miners working without a licence in areas where large-scale miners operate, leading to confrontations and conflict if displacement is involved. Any such problems will be exacerbated by the fact that the artisanal miners are likely to be itinerant and even expatriate.

Human Rights Risks Many different kinds of human rights abuses have been alleged to be associated with oil, gas and mining activities, varying considerably from one country to another. A list of commonly cited ones would include arbitrary detention and torture, especially by private security units or militias; loss of land and livelihoods without negotiation or adequate compensation; forced resettlement; the destruction of ritually or culturally significant sites without compensation; violation of the right to a clean environment, labour rights violations and the disappearance of people. Although it can reasonably be assumed that extractives companies will treat respect for human rights as part of their social licence to operate, the scope and kind of the obligations imposed upon them by international and many national laws is unclear, since many of the former are addressed to states not companies. Moreover, it should not be assumed that the human rights risks are identical in the large-scale mining sector and ASM. They are likely to exhibit important differences.

The scope of human rights risks is potentially very wide. One study has tried to capture this by identifying human rights Risk Areas, where the risk of adverse human rights impacts is most significant[14]. It examines risks in industrial and large-scale mining and in artisanal and small-scale mining, but even so, there is a vast field of particularly affected groups, such as women and children, that can raise complex issues (child labour, for example) and constitute a sub-set of risks to be identified and monitored.

[14] Linkages in the Southern African Mining Sector: Domestic Procurement Challenges and Context, Max Planck Foundation for International Peace and the Rule of Law/BGR, January 2016. The focus of the study is on mining alone, "leaving aside oil and gas, which would require a stand-alone study" (p.7).

Women and child-specific aspects of human rights are particularly important in the extractive sector and have been the subject of research[15]. Child labour in the mining sector is almost exclusively found in ASM operations in Africa, Asia and Latin America, with more than one million children working in this sector[16]. Although the risks to health are the same as those for adult miners, the risks to immature bodies are more intense. Violations to their right to health and to education are common.

Indigenous peoples have been especially vulnerable to violations of their human rights in connection with the development of mining projects: environmental impacts can affect and destroy their ancestral territories, depriving them of the right to use these lands and the natural resources they contain, with effects on their identities and cultures. However, there are wide differences between such groups and differences of opinion about their composition, making generalizations with respect to human rights difficult.

Dependency Many communities become overly dependent on EI projects in their area; and without advance measures to address this issue, they will become vulnerable to a 'boom and bust' cycle, suffering contraction or even collapse when production ceases or when profitability declines. The key to success for sustainable development is to prevent these from happening. Thus, social aspects and their associated costs should be included in decommissioning and closure plans, and initiatives should be taken from the earliest days of production to develop economic activities in the community that are independent of the EI sector activity. Alternative business development in the area needs to occur concurrently so as to foster linkages within and outside the community, and reduce dependency. The aim should be for them to survive when production declines and eventually ceases.

9.3.2.1 Oil and Gas

Oil and gas activities can have social and cultural impacts when they affect communities and indigenous groups by changes in land use and traditional activities in local areas, their livelihood and lifestyles such as agriculture, logging, and fishing[17]. Disruption of community life will follow influxes of migrant workers, the introduction of changes and differences in income and social structures and uneven distribution of benefits and liabilities. Health risks

[15] For example, A Eftimie et al, 'Gender Dimensions of the Extractive Industries: Mining for Equity', Extractive Industries and Development Series No 8, World Bank, August 2009; J Lamber, 'Girls in Mining: Research Findings from Ghana, Niger, Peru and the United Republic of Tanzania', Bureau of Gender Equality, International Programme on the Elimination of Child Labour, International Labour Organisation 2007; K Ayassou Sawadogo et al, 'Women's Perspectives on the Impact of Mining on the Right to Food – the Human Right to Adequate Food and Nutrition of Women and Children of Communities Affected by Mining and Displacement in Essakane, Burkina Faso', Food First Information and Action Network, March 2015: www.fian.org/fileadmin/media/media_publications2015/FIAN_Essakane_270315_Ansicht.pdf (last visited 11 May 2016)

[16] Max Planck/BGR (2016), p.105, and references therein.

[17] IPIECA (2011), Creating Successful, Sustainable Social Investment: Guidance Document for the Oil and Gas Industry; E&P Forum/UNEP, 1997: 11-12.

can arise from disease and the use of potentially hazardous chemicals. Like mining companies, oil and gas companies may be the first foreign investors that local communities encounter in areas in which services, health and education are poor and government processes are still evolving.

More dramatic impacts can be seen in the Niger Delta, for example, where human rights abuses by security forces have been documented, Communities have been largely unable to redress their grievances in the absence of an independent judicial system. The resulting confrontations between communities and oil companies have been considerable and intense. One result of these conflicts is that the time required to bring an oil project online has nearly doubled over the past decade, leading to a significant increase in costs[18].

9.3.2.2 Mining

The social impact of mining projects can be positive. For example, both large-scale mining and ASM can contribute to local employment and income and poverty reduction, often where few alternatives exist (see **Boxes 9.5 and 9.6 below**). However, it can also be negative, when during the exploration and development phases, disruption can occur in land tenure and access, road construction, river diversion and large numbers of people, including foreign workers, move into communities located near a project, creating resentments and conflicts.

Box 9.5: Re-framing the ASM debate: its integration into the EI Value Chain

These shifts in policy articulations of ASM have generally corresponded to specific political and economic global periods. Pelon and Martel-Jantin (2007) propose that since the post-colonial period, the position of ASM within mineral policy has transitioned from one of "isolation" to that of "integration". Such a transition was evidenced firstly by a firmer inclusion of ASM in national mineral legislation and policy starting in the late 1980s and into the mid- 1990s. This legislative reform focus was accompanied in several circumstances with technical assistance, such as small grant programs or credit and loan schemes to establish more viable small-scale mining operations. Furthermore, specific ASM government departments or agencies typically under the umbrella of the Ministry concerned with mining were established or further support to provide advisory and technical services to artisanal and small-scale operators.

[18] R Davis and D Franks, Costs of Company-Community Conflict in the Extractive Sector (2014), p.11 (citing a study by Goldman Sachs: 2008).

Such a mineral development-centered approach towards ASM further evolved in the late 1990s to one of poverty-alleviation and development (Pelon and Martel-Jantin, 2007). This approach took advantage of the Millennium Development Goals (MDG) framework. By aligning ASM more closely to the poverty-alleviation agenda, ASM support strategies changed significantly. Non-governmental organisations and even large-scale mining companies became more critical agents of intervention with reduced visibility of government institutions. Issues such as 'Fairtrade minerals' and conflict management between ASM and LSM operations were critically raised alongside concerns over child labour reduction and women's socio economic disenfranchisement (Pelon & Martel-Jantin, 2007).

Earlier concerns from the 1970s and 1980s such as improving environmental standards, appropriate technology, security of tenure, and access to finance remained highlighted agenda items. It was also an era in which the World Bank hosted a multi-donor trust fund for ASM, called Communities and Small-scale Mining (CASM).

Box 9.6 Opportunities generated by ASM

Are there political economic opportunities at present that find alignment with ASM?

Job creation: the global employment gap has renewed discussions on how jobs are defined and created. Of note in these discussions is evidence of the predominance of the informal sector as a main arena for employment at present. ASM has grown from 10 million in 1999 (ILO, 1999) to potentially upwards of 20-30 million (IIED, 2013). This increase, largely still in informality, provides a rich policy ground for promoting a good job agenda. This agenda focuses on making available the necessary knowledge and technological resources to increase productivity coupled with provision of social protection and fair labour standards.

Rural development: linked to the job agenda is ASM's added value as part of rural livelihood diversification strategies (Hilson and Banchirigah, 2010; Maconachie and Hilson, 2011; Hilson 2011), meaning the manner in which ASM is pursued alongside other income opportunities by individuals and families. Development research has demonstrated how ASM assists rural households in building more dynamic and resilient livelihood strategies portfolios by, for instance, 'dovetailing' ASM and farming economies. It furthermore more is a stimulus for trade and subsidiary business development around mine sites just as evidence in industrial or larger-scale mining operations. The question of linkages—how mining interplays with other aspects of local economies—and how to promote more integrated rural development strategies to capture mineral benefit distribution is equally an important question when concerned with ASM.

Renewed bi-lateral partnerships to assist national governments in ASM formalization: the work of CASM and its partners over the last decade helped in generating a perceptible increase in national governments country demands for ASM technical assistance programs (Source: CASM Evaluation). This entails further capacity building programs by international financial institutions and bilateral partners to address outstanding constraints facing ASM in mineral development. For instance, seven countries have specific ASM pillars in active World Bank projects. The Africa Governance Initiative provides national government with mining experts to build internal ministry capacity, including issues to do with ASM in such countries as Rwanda. The International Finance Corporation is extending its business advisory service tools to include an ASM checklist for baseline studies for its investment partners. The Kimberley Process adopted in 2012 an "ASM for Development "ASM for Development" framework, to be implemented by its member states. The African Union recognized ASM formalization as one of its six areas of engagement under its 2011 Africa Mining Vision. Other bilateral partners include GIZ, AusAid and CIDA, who work not only with national governments but equally with NGOs and regional governmental institutions.

Noise, Vibrations, Blasting: Local Effects These impacts will be upon the stability of infrastructure, buildings and homes of people living near mining operations.

Gender Increased gender inequality can result from unequal access to employment in mines, or a loss of male support for household work and with women requiring extra energy to access clean or available supplies of water and food because of degraded environment[19]. General disadvantages for women arise from the ownership and possession of land, mineral rights, capital and equipment. As one study notes, in the "relatively few instances that they have access to resources, women do not control them or the resultant benefits"[20]. Women are also often left out of community decision-making processes. In ASM they often have unique, specific roles which can lead to health and safety risks; in the ASM production chain "most women take part in the activities allocated to them by society (mainly men) and are barred from others because of cultural taboos".[21]

[19] For a review of these issues in the mining sector, see two studies: Eftimie, A., et al. (2009). *Gender Dimensions of the Extractive Industries: Mining for Equity*, Extractive Industries and Development Series No. 8. Washington, D.C.: World Bank Publications; Eftimie, A., et al. (2009). *Mainstreaming Gender into Extractive Industries Projects: Guidance Notes for Task Team Leaders,* Extractive Industries and Development Series No. 9. Washington, D.C.: World Bank Publications

[20] Minerals and Africa's Development: The International Study Group Report on Africa's Mineral Regimes, p. 74.

[21] Ibid.

9.3.2.3 Areas of Particular Vulnerability

Even when an EI sector project has support from the community leadership and brings benefits to them, all too often such projects make life worse rather than better for the disadvantaged and the most vulnerable sections in the community. This can include women, youth, children and the elderly, who might typically bear the risks of extractives activities while the benefits accrue to the more affluent and to men. However, impacts of EI sector projects on the *poorest and most vulnerable* are sometimes not part of the regular monitoring or reporting, and all too often occur out of sight of the government, the EI sector company, financiers and aid agencies[22]. Thus, proactive interventions are needed to gauge the impact on the poorest and most vulnerable and take corrective measures. Community leaders can make sure that representation is inclusive of the poorest (and not just an elite), and community women (not just men), have a voice in community decision-making[23].

The movement of land by excavation and population influx can create risks to cultural sites, either archaeological or spiritual in character. Protection of such sites can be required by means of the mining agreement and/or local laws, by requiring surveys and protective measures.

[22] See for example, Ross, M. (2001). *Extractive Sectors and the Poor.* Washington, D.C.: Oxfam America.

[23] Reference to some of the many tools and resources for managing the poor and vulnerable in communities.