

Public Disclosure Authorized

**Armenia**  
Sector Issues Paper

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**First Thematic Paper:  
Sustainable and Strategic  
Decision Making in Mining**

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*Decision Making in Mining—Sector Issues Paper*

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## Abbreviations

ALAC	Asociación Los Andes de Cajamarca
BAU	business as usual (scenario)
CIA	cumulative impact assessment
CSR	corporate social responsibility
EA	environmental assessment
EIA	environmental impact assessment
EITI	Extractive Industries Transparency Initiative
EMP	environmental management plan
FTF	foundations, trusts, and funds
FDI	foreign direct investments
GDRP	gross domestic regional product
ICMM	International Council of Mining & Metals
IFC	International Finance Corporation
IMF	International Monetary Fund
IUCN	International Union for Conservation of Nature
MAC	marginal acceptable concentration
MCDT	Mozal Community Development Trust
MENR	Ministry of Energy and Natural Resources
MNP	Ministry of Nature Protection
NEAP	National Environmental Action Plan
NGO	nongovernmental organization
NSS	National Statistical Service
NSSRA	National Statistical Service of Republic of Armenia
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PES	payments for economic and ecological services
PIP	project implementation presence
RA	Republic of Armenia
REA	regional environmental assessment
SD	sustainable development (scenario)
SDP	sustainable development program
SEA	strategic environmental assessment
SESA	strategic environmental and social assessment
SNCO	state noncommercial organization
TEV	total economic valuation
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission of Europe
US\$	U.S. dollars
USEPA	U.S. Environmental Protection Agency
WAMSSA	West Africa Minerals Sector Strategic Assessment
WTP	willingness to pay

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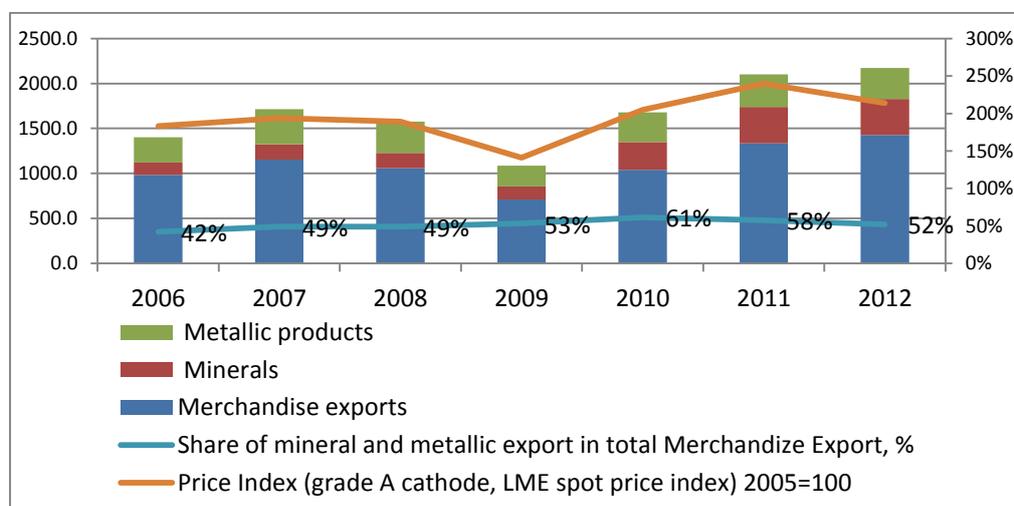
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## 1. Introduction

This paper aims to inform Armenia’s policy dialogue on environmental and social issues in the mining sector. The paper is based on the premise that for the mining sector to have positive, long-term impacts in Armenia, it is necessary to take into consideration the short- and long-term environmental and social impacts of the sector and to promote strategic planning and efficient management of natural resources. The mining sector in Armenia has yet to adopt global best practices in this sector, and this paper aims to provide guidance on some of the mechanisms that can be adopted to improve the governance and overall impact of mining in the country.

Recently, there has been much emphasis on the positive contribution of the mining sector to the Armenian economy. During the recent economic crisis, mining remained one of the few stable drivers of growth in Armenia. According to the National Statistics Service, in the years between 2000 and 2007 the mining sector contributed to around 2 percent of GDP, while this number grew up to 10 percent in 2008 to 2010.<sup>1</sup> Furthermore, the IMF indicates that the economic growth increased to 7.2 percent and remained strong in 2013, predominantly due to the mining, services, and agriculture sectors.<sup>2</sup> In 2011 mining products, precious metals and stones, and nonprecious metals and items manufactured from them amounted to more than half of the total exports of goods (55.2 percent)<sup>3</sup> from Armenia. Mining and quarrying accounted for 17 percent of the value of total industrial output for 2010 and 2011 (not accounting for manufacturing and processing of ores).<sup>4</sup> Based on the Ministerial Report of the Ministry of Nature Protection, the gross value of available mineral deposits amounts to more than US\$120 billion, with the cost of extraction for explored and preestimated reserves (without fresh waters) totaling some US\$90 billion.<sup>5</sup> The mining sector attracted 45.6 percent of FDI during January–September 2012, while in the same period in 2011 it was only 10.4 percent. An increase in the global commodity prices for copper, gold, molybdenum, and other valuable metals would therefore subsequently increase the demand and drive for the further development of the mining sector in Armenia.

Figure 1-1: Share of Mineral and Metal Exports in Total Merchandize Volume (expressed in US\$ million)



Source: NSS and IMF

<sup>1</sup> Grigoryan, Aleksandr. 2013. “The Impact of Mining Sector on Growth, Inequality, and Poverty: Evidence from Armenia.” Paper presented at the American University of Armenia Symposium, “Emerging Issues in Environmental and Occupational Health,” April 22–23.

<sup>2</sup> IMF (International Monetary Fund). 2013. *IMF Country Report 13/238, Republic of Armenia*. <http://www.imf.org/external/pubs/ft/scr/2013/cr13238.pdf>.

<sup>3</sup> UNDP (United Nations Development Programme). 2012. *Armenia Development Strategy for 2012–2025*. Report. Yerevan.

<sup>4</sup> National Statistical Service of the Republic of Armenia. 2012. “Armenia in Figures.” <http://www.armstat.am/en>.

<sup>5</sup> Ministry of Nature Protection. 2011. “Ministerial Report.” [http://www.mnp.am/images/files/nyuter/2012/report2007-2011\\_eng.pdf](http://www.mnp.am/images/files/nyuter/2012/report2007-2011_eng.pdf).

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The large contribution of the mining sector in Armenia and the potential for large-scale, short-term economic gains through investment in the sector often overshadow the possible impacts of the mining sector on the environment and on society. When social and environmental issues are considered in mining, the benefits of the sector are far more nuanced. Mismanagement or lack of consideration of social and environmental concerns can lead to limited benefits and large costs, including costs of long-term environmental degradation, inequality in benefit distribution, and poor governance. Many citizens and civil society organizations, as well as some government institutions, have in fact already expressed concerns about the lack of attention to social and environmental concerns in Armenia which are supplemented by the historical and legacy sites from the old mines in Armenia, most of which are still operating and some, following privatization or FDIs are being modernized and some are even expanding. This is the case with the Zangezur copper molybdenum complex that has invested in 2011 in a new mill aimed at improving performance and increase productivity. According to the USGS 2011 Minerals Handbook Issue for Armenia (2013), Armenia is a significant producer of molybdenum and is ranked seventh in the world in mine output for 2011. Furthermore, in 2011 Armenia has produced 30% more gold than in 2010. During this year, production of other minerals had also increased, salt by 21.09%, primary copper metal by 16.12%, molybdenum concentrate by 11.12%, molybdenum metal by 11.09%, barite by 9.0%, zinc concentrate by 8.54% and copper concentrate by 8.16%.

Any future development of the mining sector therefore has to be accompanied by critical measures for inclusive and environmentally sustainable economic growth. Putting these measures in place in Armenia could require far-reaching reforms in decision-making processes and supporting tools even before right policies are formulated.

Reforms in the mining sector have already started. The government has developed a new Mining Code with the assistance of the World Bank, in the framework of the policy and economic reform measures supported by a series of development policy operations. The Mining Code emphasizes the importance of certain environmental and social considerations. It also puts in place institutional and administrative mechanisms, which if implemented properly could pave the way to reducing rent-seeking behavior and social tensions. Greater transparency could be achieved through the Extractive Industries Transparency Initiative (EITI), which the government can put in place to strengthen revenue management in line with international good practices and to further strengthen sector governance.<sup>6</sup> The government is revising the Law on the Environmental Impact Assessment (EIA) to reflect good EIA international practice.<sup>7</sup> This paper will define additional environmental and social management mechanisms and tools that could be used to guide Armenia's institutions to further enhance and develop sound and sustainable mining practices.

This paper is meant to inform policy makers and government officials responsible for enforcement of regulations in the mining sector. However, private-sector stakeholders could also use the information in this paper to develop mechanisms to protect the environment and population around mining areas and to involve people in benefit-sharing and environmental protection. Private-sector stakeholders and government officials could also use this paper as guidance for how to engage with social and environmental issues more broadly. Civil society could also use this paper as guidance for best practices in the sector and could hold the government accountable for reforms.

## Organization of the Report

This paper has a narrow focus on the interaction between the mining sector as an economic activity and the environment, in particular areas where increased attention to environmental protection and social considerations could lead to greater availability of environmental services, natural resources, and protection of public health and result in improved quality of life without diminishing the economic benefits. The report does not aim to assess local environment problems in the mining areas but uses “best practice” examples, publicly available data, and literature to highlight problem areas

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<sup>6</sup> World Bank. 2010. *Armenia—Second Development Policy Operation Program*. Report. Washington, DC.

<sup>7</sup> World Bank. 2013. *Armenia—First, Second, and Third Development Policy Operations Project*. Report. Washington, DC.

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and possible policy and regulatory solutions. The report also lays out the current situation in Armenia, based on research and quantitative data collected in the country using a survey instrument.

By describing tools, processes, and policies that contribute to improving the impacts of the mining sector, this paper aims to provide the government of Armenia with guidance for the reform of mining policies, regulations, and processes. The document is structured as follows:

1. Chapter 1 presents an introduction to this thematic paper.
2. Chapter 2 provides an overview of the mining sector in Armenia, including its underpinning institutional and regulatory framework. It also singles out policy gaps and regulatory inconsistencies that need to be addressed.
3. Chapter 3 presents some useful lessons of the application of SESA as a tool for sustainable planning of mining development in the country. This chapter also compares uses of an SESA versus Environmental Impact Assessments and defines the need and use of CIAs.
4. Chapter 4 describes the principles of valuation of natural capital as a means to complement traditional cost-benefit analysis and comparisons of development alternatives in the decision-making process.
5. Chapter 5 looks at the design and implementation of benefit-sharing mechanisms to ensure that the mining activities lead to positive social impacts across the country.
6. Chapter 6 looks at the process of determining and dealing with the social costs of mining in Armenia.
7. Chapter 7 provides a series of conclusions and recommendations as well as implementation challenges that would summarize the application of such recommendations in present-day Armenia and its mining sector.

Boxed examples throughout the paper provide brief descriptions and examples of SESA used as a policy tool for strategic decision making in a number of countries where the World Bank was directly involved, in particular with the mining sectors. Additional guidance on this process is provided in Annex 1 of this paper, including some of the implementation challenges that have been faced.

The paper brings together the social and environmental concerns as related to the mining industry through the prism of strategic planning, linking issues current on the ground with the legislative requirements, international practices that could be applied, and best available global practices. For the social aspects, the paper analyzes both the benefits and costs, looking at the short term and long term. For the environmental aspects, the paper can only focus on environmental costs and associated revenue-collecting mechanisms that could channel funds into the remediation and mitigation works. Even though mining may have a positive social impact in employment and improvement of local infrastructure, the environmental impacts of mining remain negative unless specific and targeted investments are made to remedy the associated impacts.

Before describing the social impacts of mining in Armenia, however, it is important to highlight the difficulties in establishing these social costs and benefits, as well as the importance of doing so. In summary, social costs and benefits are difficult to identify because they are often externalities, and therefore are outside of the control of mining companies. Social costs may be by-products of negative environmental effects; these particular effects can be wide-ranging and affect people in large geographic areas and over the course of many years. It is also difficult to gauge the health impacts of the sector, since evidence of negative impacts may not be present for years. Social benefits, on the other hand, can be difficult to estimate because there is often no counterfactual: It is difficult to determine if the jobs created by the mining industry are better or worse than those that would have been created through other sectors or with similar amounts of government or private investment. Some of the benefits of investments made by the mining sector on infrastructure are perhaps easier to quantify, but they are difficult to disentangle from other effects of mining. The quality of institutions also seems to matter in determining whether effects are positive or negative, and assessing institutional effectiveness can also be difficult.

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## Methodology and Limitations

This issues paper was to be based on a combination of literature review, data collection, and analysis of existing data. However, after the initial collection of literature for review, the existing information—and specifically numbers that relate to the mining sector in Armenia—were scarce, if available at all. The rest of the literature reviewed focused on best global practices on socially and environmentally sustainable mining. In order to compensate for the lack of official and readily available data, as well as to overcome the different numbers and information coming from different sources, a questionnaire was developed and sent out to the identified key and most relevant stakeholders in the mining industry. This questionnaire directly posed questions related to environmental management, mine closure plans, community investments, and so on, and was sent directly to mining companies. These companies are under no legal obligation to publish such information, and if such data are available, it is mostly from the international corporations that are investing in Armenia’s mining. A separate questionnaire with similar questions was also sent to the local authorities (*marzpetarans*) in places where the mining companies operate, as well as to Aarhus Centers. This questionnaire also included sections on benefits received by communities in order to help establish the flow on environmental and social investments in local communities. Only one completed questionnaire (from Gegharqunik marz) was returned. All other *marzpetarans* responded that they were willing to provide the data if supported by a request from the Ministry of Territorial Administration. Despite these limitations, the literature review and available information allowed qualitative interpretation of information and helped the paper reach many useful conclusions.

This paper also aimed to understand the social costs and benefits of the mining sector. To carry out this work, existing datasets were gathered and analyzed, including data from the Caucasus Barometer (individual) dataset, the Household (member) Survey Dataset collected by the National Statistical Service of Republic of Armenia (NSSRA), and the regional-level dataset for Armenia collected by the NSSRA. The Caucasus Barometer dataset was used to assess the overall satisfaction of individuals working in mining, with their work conditions and income relative to the satisfaction of workers in other industries. These data were also used to understand potential interest in migration as well as potential health effects and effects of the mining sector on skill losses/gains. The main shortcoming of these data is that they include relatively few individuals who work in mining. The Household (member) Survey Dataset was used to assess the compensation, education, health, and overall life satisfaction of those working in mining versus those working in other industries. These data serve to confirm the analysis of the data from the Caucasus Barometer datasets. Finally, the NSSRA data were used to assess the overall impact of mining on economic performance from a socioeconomic perspective. The difference in performance of marzes was analyzed, and the impacts of mining on poverty, inequality, and migration were then determined. This same dataset was used to understand the extent to which mining companies internalize the costs of building a skilled workforce and the environmental protection required in a socially and environmentally sustainable mining operation.

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## 2. Policy and Institutional Framework for Mining in Armenia

*The issue of sustainability of Armenia's mining industry is addressed through the policies and institutions that deal with mining as a natural resource, and then through the policies and institutions that deal with protection of environment. In addition, Armenia is a signatory to several international conventions on the mining sector or which imply governance or regulatory requirements for mining-sector activities. Because of the importance of mining as a driver of economic growth in Armenia, the sector is mentioned in strategic development plans; however, there are no specific development plans made for mining. At least 16 laws and a newly approved Mining Code regulate the activities of the mining sector. This framework is then applied mainly by two ministries but involves a large number of other state entities, including ministries responsible for budgets and finance, as well as those for local development. Local (marz) government institutions as well as institutions responsible for local service provision (including schools and health centers) are also impacted by the mining sector. This chapter describes the policy and institutional framework for mining in Armenia.*

### 2.1. International Commitments

A number of international conventions and agreements can be applied to the mining sector. Some of these agreements are related to the governance of businesses to ensure environmental protection and the promotion of human rights. Others are related to the transparency of governments and business in key sectors. The majority of these conventions and agreements are not specifically monitored or reported on by governments or by sponsoring institutions; however, they signal an attempt to adhere to international best practices.

Perhaps the most comprehensive framework that aims to promote socially and environmentally sustainable business practices is the United Nations Protect, Respect and Remedy Framework. That framework was unanimously welcomed by the members of the Human Rights Council in 2011 and has since enjoyed extensive uptake by international and national governmental organizations, businesses, NGOs, and other parties. The Guiding Principles on the implementation of the framework provide governments with direction on how to take more proactive ownership of their human rights responsibilities and provide stability, clarity, and consistency to citizens and businesses. The Corporate Responsibility to Respect principles provide a blueprint for companies on how to know and show that they are respecting human rights. And the Access to Remedy principles are about assurance, making sure that states and companies are held accountable.

The United Nations Protect, Respect and Remedy Framework uses a broad definition of human rights that includes key areas potentially affected by the mining sectors, such as environmental protection, labor rights, and land rights. The Guiding Principles clarify the responsibility of governments to protect their citizens through regulation of businesses and enforcement of laws that directly or indirectly foster business respect for human rights and also point out that it is the businesses themselves that in most cases have the most control over whether rights are respected. The Guiding Principles underscore the need for policy coherence, for businesses to have in place mechanisms that enable them to respect rights, and for states to have in place mechanisms for remediation for those negatively affected by business activities.

Armenia has been a signatory to several other international agreements related to the governance and performance of the mining sector. First, Armenia is a signatory to the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Armenia signed the Aarhus Convention on June 25, 1998, and ratified it 2001. The Aarhus Convention is a multilateral environmental agreement that builds on the principle that citizens and future generations, as well as the public at large, have the right to access environmental information and live in a healthy environment. It aims at enhancing environmental governance by creating a mechanism to empower civil society to access environmental information unobstructed, participate in decision-making processes, and have access to justice.

Armenia is also a signatory to the Kiev Protocol on Strategic Environmental Assessment that supplements the UNECE Convention on Environmental Impact Assessment in a Transboundary

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Context. Armenia signed it on May 21, 2003, and ratified in 2011. It requires its signatory countries to evaluate environmental consequences of their official draft plans and programs, irrespective of whether they are likely to have an impact on the territory of another state. The protocol also addresses policies and legislation, though the application of SESA to these is not mandatory.

## 2.2. National Strategies and Policies

*In the minerals sector, sustainable development means mining investments that are financially profitable, technically appropriate, environmentally sound, and socially responsible. Around the world, businesses involved in extracting of nonrenewable resources have come under mounting pressure to embed the concept of sustainability into production processes and operations and to develop a range of appropriate stewardship initiatives. By and large, with an adequate regulatory framework, environmental impact and social responsibilities could be managed, while at the same time maintaining productive relationships between the regulator, industry, and stakeholders. Setting an objective to promote ‘good way to do businesses’ if embraced by leaders, policy makers, and decision makers of Armenia could steer major public support to further development of the mining sector.*

### *Mining*

Armenia’s Strategic Plan for Long-Term Development 2012–2025 sets the country’s development priorities. Mining is identified as a key priority for Armenia,<sup>8</sup> and the plan details the need for economic policies for the sector more specifically.<sup>9,10</sup> As for the mining sector in particular, there are no approved or officially accepted plans and strategies that target further exploitation of the underground reserves of metallic compounds and other minerals.

Although never approved or realized, the Concept of Mining and Mineral Resources Utilization of Armenia was drafted by an interdepartmental group following a resolution of the prime minister of RA and subsequent governmental decrees. As a follow-up, the development of draft framework of Mining Sectors’ National Policy and Development Strategy was launched in 2010 (see Annex 4 for list). To date, this draft framework document remains the main source of information related to the strategic development of the mining sector, even though it has never been publically discussed or officially adopted. The draft framework presents an assessment of ore reserves and economic life expectancy of the currently operated mineral resources. This is 100 to 120 years for copper-molybdenum reserves, 25 to 30 years for gold reserves, and 20 to 25 years for lead-zinc reserves. The framework singles out the need for establishing the Metals and Minerals State Strategic Reserve Fund and the development of concomitant ore components with commercial significance.

The draft framework includes provisions on the mining resource reserves as well as the reserves of vital resources (such as fuel, fresh water, salt), improved technological solutions for higher percentage of ore usage, mine closure plans, establishment of an integrated system of the general state expertise of mining projects, application of international standards, and best practices in environmental and social management, to name a few. The framework also presents the legislative gaps and discrepancies, including reform measures that guided the development of the new Mining Code. The last part, named “Environmental Protection,” emphasizes the significance of environmental considerations. This not only includes shifting to mining technology based on the application of internationally recognized standards, introducing environmental management, and monitoring system and controls at all stages of mines’ exploitation, but also using a cumulative approach to identify risks and mitigation measures of adverse environmental impacts of mines.

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<sup>8</sup> Strategic Plan for RA Long-Term Development for 2012–2025. 4 Economic Development Strategy, 4.2: Sector Development Direct Policies, par. 133, p. 48;

<sup>9</sup> Strategic Plan for RA Long-Term Development for 2012–2025. 4 Economic Development Strategy, 4.2: Sector Development Direct Policies, par. 131–133; 4.2.1. Industry strategy, par. 136–141, pp. 47–49.

<sup>10</sup> Mining Code (adopted 2011), Chapter 1 General provisions, Article 4, par 1, 3), Article 6, par 1- 3; Chapter 2, Governmental Regulation of the Mining Sector, Article 15, par 2, 1),

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Consequently, many of the progressive provisions from the draft framework were translated in the new Mining Code. Nonetheless, without a national strategy for planned and sustainable development of the mining sector, the use of Armenia's mineral resources would continue to generate significant environmental and social concerns. Such a document could help improve the sector governance by (a) providing a long-term development vision for exploration and exploitation of the mineral resources; (b) limiting unplanned expansion of the mining industry, based on balancing benefits and impacts, including economic, environmental, and social impacts; (c) limiting the political motivation of regulating the mining sector and environmental compliance of mining companies; and (d) increasing the openness and responsiveness to public concerns.

### *The Mining Code (2011)*

The new Mining Code ensures certain provisions that would guarantee sustainable development. For example, it strictly prohibits mining activities unless a positive conclusion of the state expertise on environmental, geological, and technological safety is issued. Furthermore, according to the code, the environmental management plan, a mine closure program, and a social program with a timetable of implementation and specific measures are all part of the contract with the extractive company. The initial environmental assessment and environmental programs are part of the exploration program and contracts with exploration companies.

The Mining Code includes provisions and definitions for initial environmental assessment, environmental management plan, land recultivation works, and requirements for complete and reasonable use of the mineral resources. Furthermore, the Mining Code declares adherence to the principles of social and environmental safety of the affected population, thus linking the law to other environmental and social general legislation, state expertise of mining projects, and application of national technical and environmental standards and norms. The code sets forth requirements for permanent monitoring and defines the responsibilities of other governmental and local authorities on environmental protection from mining activities.

The Mining Code also provides for implementation of environmental and social due diligence based on the international best practice for optimal use of main and concomitant ore components, thus ensuring resources losses, nature protection, and better economic results. Further elaboration that environmental management comprises measures for disposal and storage of removed overburden and exhausted ore, as well as restoration and rehabilitation of the damaged landscape is needed. The law includes provisions on changes of scope of mining projects, financing and fines, license fees, monitoring of and payments for extracted minerals, inspection and oversight; social assessment and social benefits to local population affected by a resettlement program, social improvements through mining companies' socioeconomic programs; safeguarding of occupational health and safety of employees. The mining company has to implement nature protection measures, including those for protection of bodies of water (including provisions on sanitary zones for protection of groundwater), air quality, landscapes and land resources, flora and fauna. The mining company must also prescribe proper handling, disposal, and treatment of wastes and hazardous materials, as well as compliance with established procedures of statistical reporting, calculation of payments, and contractual commitments.

Public discussions of the draft Mining Code raised numerous concerns about sustainable development and the mining sector. Specific concerns have been voiced by NGOs about the compatibility of the mining legislation with Armenia's sustainable development strategy. Some of the concerns were explicitly incorporated into the Mining Code and other mining-related legislation. Nevertheless, the extent of compatibility could be further assessed against the IFC's Policy and Performance Standards on Social and Environmental Sustainability, introduced in 2006, as well as against the International Council of Mining & Metals (ICMM) sustainability principles.<sup>11</sup>

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<sup>11</sup> The ICMM sustainability principles being not mandatory for nonmember companies could be used as a guideline for screening for compliance of mining legislation and a mining company's performance to the sustainable development strategy.

## *Sustainable Development*

Prior to the adoption of the sustainable development program (SDP)<sup>12</sup> in Armenia in 2008, the country did not have a single document targeting sustainable development. The first National Environmental Action Plan (NEAP) was completed, and a second NEAP followed in 2008 with support by the UNDP. Sustainable development principles are recognized as fundamentals for strategic planning for development of economic sectors in accordance with the Republic of Armenia Sustainable Development Program (2008). This program links a number of tools that would be based on adopted strategies for specific sectors and will be based on annual plans. The degree to which existing growth and economic disproportions are addressed will ensure the goals set up in the SDP for accelerated development of weak regions<sup>13</sup> are met. The concept of targeted territorial development<sup>14</sup> of 2011 supports the development of the mineral sector in economically depressed areas. The government finds that the SDP should become the main long-term strategic development document and the basis for other strategic programs (particularly those concerning sector development).

## *Policy Framework*

A number of laws concerning environmental protection have linkages with the new Mining Code adopted in 2011. A list of the most pertinent laws is provided in Box 1. It is important to note while these legal acts comprise the core legal framework and translate respective policies, these should be further supported by bylaws and regulatory acts to ensure the laws could be properly implemented. Currently, more than 60 governmental decrees are in place for specific procedures and actions related to the mining sector (Annex 4).

### **Box 1: Overview of the Legal Framework Relevant to the Mining Sector in Armenia**

#### *Laws governing the mining sector*

- RA Mining Code, adopted November 28, 2011<sup>15</sup>

#### *Laws governing safeguarding of environment and protection of local livelihoods*

- RA Law on Targeted Use of Environmental Charges Paid by Mining Companies, adopted 2001
- RA Law on Environmental Impact Assessment, adopted November 20, 1995
- RA Law on Administrative Infringements, adopted June 12, 1985
- RA Law on Nature Protection and Nature Utilization Payments, adopted December 28, 1998
- RA Law on Rates of Nature Protection Payments, adopted December 20, 2006
- RA Land Code, adopted May 2, 2001
- RA Forest Code, adopted October 24, 2005
- RA Law on Specially Protected Natural Areas, adopted November 27, 2006
- RA Law on Wastes, adopted November 24, 2004
- RA Law on Land Taxes, adopted February 14, 1994
- RA Law on Nature Protection Control, adopted November 4, 2005
- RA Law on Governmental Dues, adopted December 2, 1997
- RA Law on Lake Sevan, adopted May 15, 2001
- RA Law on Governmental Regulation on Technical Safety, adopted October 24, 2005
- RA Law on Specially Protected Areas, adopted in 2006
- RA Law on Fire Protection, adopted April 18, 2001

Source: Authors

<sup>12</sup>The sustainable development program was adopted in Armenia in 2008 in pursuance of the RA Government Decree N 1207-N, October 30, 2008.

<sup>13</sup> Armenia Sustainable Development Program, 2008. 1. Key results of poverty reduction strategy paper. Implementation and justification of strategy paper revision, 1.4 Goals and strategic priorities of sustainable development program, par. 69, p. 32.

<sup>14</sup> Protocol Resolution of RA Government session N 25, held on June 30, 2011.

<sup>15</sup> This replaced both the Mining Code (2002) and the RA Law on Concession of Surveying and Mining for the Purpose of Exploiting Useful Ores (November 5, 2002) and the RA Law on subsoil resources adopted on November 6, 2002.

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### *Law on Targeted Use of Environmental Charges Paid by Mining Companies (2001)*

The law states that mining companies are responsible for payment of environmental fees. The companies pay nature protection fees, which are not considered as pollution fees or taxes but fixed payments calculated based on a given unit pollution charge that is multiplied per the volumes of the pollution generated, emitted, or disposed. The payments are made to the state budget. Part of it is allocated through subventions to the communities' administrative and fund budget as a separate budget line. The list of communities and the amount of allocations are subject to approval in the annual state budget. The law provides for mining companies to finance environmental- and health-protection measures in communities directly impacted by the negative effects of mining operations. However, accountability, transparency, and measurability of shared benefits of such financing could remain obscure in the absence of clear implementation rules.

In 2012 environmental fees were received from only eight of the larger mining and processing companies and were based on the charges per unit of emissions or discharges multiplied by the volumes. The funds are earmarked for implementation of environmental and health protection measures in the communities. Currently, the programs are developed by the head of the community, based on an officially approved socioeconomic development program, local environmental action plan, or other strategic documents for the development of relevant province (marz) for elimination of environmental problems resulting from mining. The activities could include measures to address impacts on bodies of water, air quality, and land resources inside the administrative borders of the community, such as the handling and neutralization of the harmful effects of generated wastes and wastewater, protection of biological resources, forests and protected areas, as well as the implementation of population health and ecological awareness-raising programs. The total amount of subventions allocated to 26 communities and Yerevan for implementation of environmental programs amounted to 733.7 million drams in 2007–2011, including tree-planting initiatives, construction of solid-waste landfill for Alaverdi, improvement of the internal gas-supply network of the village of Haghpat, restoration and maintenance of forest areas, cleaning of flood-drainage canals, construction of sewerage networks, district heating systems, and even installation of energy-saving solar water boilers in selected public buildings.<sup>16</sup> In addition, the new Mining Code (2011) sets forth a different set of payments that are to be made, including royalties, nature protection payments, and different fees.

#### **Box 2: Budget Support to Communities Affected by Mining Operations**

According to the Law on Targeted Use of Environmental Charges Paid by Mining Companies, a total of 271.6 million drams was provided to 13 communities as subventions for environmental programs in 2012, which is 98 percent of the planned amount. This is an increase over the level of subventions in 2011, which was 151.2 million drams provided to 11 communities (94.3 percent of the planned amount). The budget support for 2012 has increased by 79.6 percent, or 120.4 million drams.

In 2012 the largest support was to city of Alaverdi in the amount of 94.4 million drams, followed by 23.6 million drams to Aqori, Haghpat, and Odzun communities and 8 million drams to Hagvi community. A total of 126 million drams went to communities impacted by the Armenian Copper Programme (ACP) company in Lori marz. ACP company paid 1.8 billion drams to the state budget. About 10 percent of the payments made by the company into the state budget were spent for improvement of environmental situations in neighboring communities.

Support of 79.2 million drams was provided to Yerevan to compensate for the the damage caused by the “Armenian molybdenum production,” “Clean ferrouse,” “Gadj,” “Nairit.” Budget support provided to other communities includes: Akhtala (1.5 million drams), Hrazdan (1.23 million drams), Charentsavan (1.5 million drams), Metsamor (770,000 drams), Sotq (2.33 million drams), Kapan (14.5 million drams), and Syunik (2.4 million drams).

Based on the provisions of the law as well as the new Mining Code (2011), mining companies do not pay disposal fees for the mining residues and tailings dams. One of the reasons quoted by the Ministry

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<sup>16</sup> Strategic Plan for RA Long-Term Development for 2012–2025.

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of Energy and Natural Resources is that mining residues are not considered to be waste but simply production remnants awaiting reprocessing, and they are not subject to documenting per the government decree “On procedures of issuing passports to the wastes.” Consequently, the Mining Code stipulates that generated mining residue is not required to be listed in state registers, since the overburden and exhausted ore and low-grade mineral residues are not considered to be wastes. The latter is in contradiction with international practice. For example, the USEPA Resource Conservation and Recovery Act of 1976 and Hazardous and Solid Waste Amendments of 1984 define all discarded materials as solid waste, regardless of whether the material is solid, liquid or gas. USEPA’s definition of solid waste also includes materials that are “abandoned,” “recycled,” or “inherently waste-like,” all of which are defined in separate regulations. The same USEPA legislation determines that all extraction and beneficiation wastes, as well as 20 large-volume mineral-processing wastes, be regulated as nonhazardous waste. Given the chemical reactivity characteristics exhibited in metallic mineral residues, the decision makers should put in place regulatory requirements with quality standards and controls to avoid the risks and impacts of unattended overburdens and tailings. This includes regulation of primary copper and lead smelters to prevent hazardous air pollutants by installing the maximum available control technology.

Furthermore, the tailings are considered as “man-made mines” as per the Mining Code (2011) and their future and anticipated re-processing constitutes recycling, which is a positive environmental concept. However, a time-frame for such re-processing needs to be established, and the tailings need to be adequately managed during their “storage” time. This is further elaborated in the second report of this series – Environmentally Sound Management of Mine Tailings.

#### *Land Code (May 2, 2001)*

The RA Land Code contains provisions for protection of land resources and safeguarding community and individual landowners’ user interests. To that extent, the Land Code could be considered relevant to mining. The land is to be used strictly in accordance with the land use category. The government, however, could permit the target category of the land to be changed to industrial for mining purposes. According to this law, the land plots for mining purposes are allocated conditioned on the company’s positive record on rehabilitation of previously assigned land plots. The damages or losses suffered by the landowner as a consequence of expropriation of property, temporary use, or quality deterioration are subject to compensation. The law also includes temporary use and compensation provisions for exploration purposes. Most western states have separate laws on surface-mining control and land reclamation, which provide strict requirements for standards for building sedimentation facilities, postmining land use, characterization of overburden and ores disposed on land, prediction of acid drainage and management of acid-generating materials for stabilization and land reclamation, establishing vegetation reference areas, and provisions for permits. Considering such provisions would address concerns about land degradation of mining areas.

#### *Water Code and Other Pertinent Laws*

The use and protection of water resources is regulated by the RA Water Code in accordance with the adopted Water Policy and National Water Program. According to the Water Code, permits for water use—including bodies of water—for effluent discharges are subject to public disclosure. Chapter 7 of the same law regulates transboundary water use, which is highly relevant to mining activities that cause externalities that go beyond the specific watershed where the mine exploitation takes place. The cumulative effects on bodies of water and aquifers from multiple mines in a single watershed could have a significant negative impact if mining discharge facilities are not properly designed and operated. Discharging facilities include solid waste-disposal facilities, mine tailings, and leaching operations. Mining permits will have to include requirements that discharges be in compliance with water-quality standards, including provisions for discharge limitations monitoring, record keeping, compliance schedules, and contingency plans.

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The Forest Code (October 24, 2005), the Law on Flora (November 23, 1999), the Law on Fauna (April 3, 2000), the Law on Specially Protected Natural Areas (November 27, 2006), the Law on Atmospheric Air Protection (October 1, 1994), and the Law on Wastes (November 24, 2004) also contain provisions applicable to mining as a type of economic activity that impacts the environment. For example, the Law on Specially Protected Natural Areas explicitly forbids geological exploration activities that could disturb the landscape and land cover layers, as well as mining and ore-processing operations in state nature preserves and state national parks. In addition, protection of state sanctuaries forbids activities that could adversely impact the ecosystems. The relationship between these laws and bylaws is further described using practical examples in Chapter 4.2, *Application of Economic Valuation in Armenia*.

### 2.3. Institutions

The overall institutional responsibility of the mining sector lies within the Ministry of Energy and Natural Resources (MENR)<sup>17</sup> through the State Mining Department and comprises the following divisions:

1. *The Mining State Inspectorate* carries out inspections of mining permits and licenses for violations of regulatory provisions; it checks for cases in which permitted extraction quantities have been surpassed and aims to prevent cases of selective operation of mines.
2. *The Mining Agency* issues and awards mining permits and licenses, keeps records of permits issued in a registrar, manages implementation of government programs, considers mining project applications, and applies for initial environmental assessment and examination.
3. *The Mineral Resources Agency* carries out feasibility assessment of the mineral deposits and revaluation of reserves of deposits during mining operation.

The Ministry of Nature Protection (MNP) is also responsible for areas related to environmental impact assessments of mining operations and environmental protection through the following:

1. *The Department of Underground Resources and Land Protection Policy* develops legal acts, technical standards, and procedures related to mining; calculates damages caused as a result of mining activities; carries out studies on adverse impacts and monitoring of mining activities; issues conclusions on EIAs of mining projects; manages waste-disposal issues; and so forth.
2. *The State Environmental Inspectorate* carries out inspections of violations of environmental legislation caused by mining activities.
3. *The State Environmental Expertise* is responsible for EIA reviews for development and investments projects. There is a need for capacity building of this body's experts to avoid capacity bottlenecks in adoption of good EIA practices.

### *Mining and Environmental Permits*

Three different license types are issued by the Ministry of Energy and Natural Resources' Mining Agency. The *application for geological explorations* is issued for new research on subsoil deposits. The information obtained through this license must be shared with the State Geological Fund. Many companies opt for an *application for geological explorations for further exploitation*. This license is provided for companies that want to build on existing data of deposits from the State Geological Fund. Based on a feasibility study for further exploitation of the mine, mining rights are granted through a *permit for exploitation of mines*, which is an extension of the permit for geological explorations.

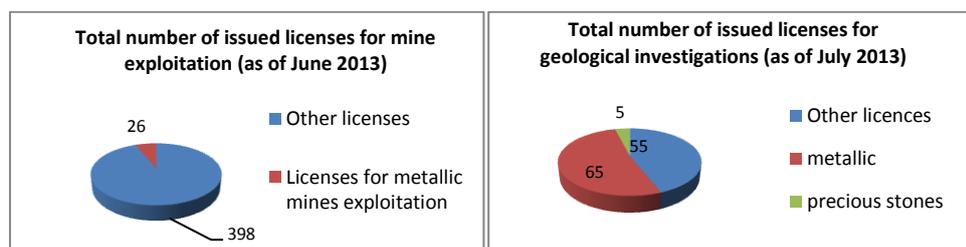
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<sup>17</sup> RA Government Decree N 653-N "On the new responsibilities delegated to the Ministry of Energy and Natural Resources" issued May 15, 2008.

Exploitation permits are issued provided the company submits an initial environmental examination and environmental management plan (EMP) after the exploration permit is granted. For exploitation permits the application package also needs to include an application for an EIA and State Environmental Expertise. The EIA report is developed either by the mining project initiator or by a company hired to prepare the report. According to the Mining Code, operational permits for a mining project should include permits for mine opening and operation (based on international best practices), an EMP, a mine closure plan, and a social program.

Currently, the state inventory of mineral resources includes more than 670 solid mineral mines, including 29 metal mines. Based on official data, 400 mines are currently operated, of which 21 are metal mines. This includes 7 copper-molybdenum, 3 copper, 13 gold and gold-polymetallic, 2 polymetallic, 2 ferrous, and 1 aluminum mine.<sup>18</sup> Unfortunately, there are no data on the number of mines that have been shut down or those that are operating and at what capacity, so the data received may actually be different from the actual status of the mines.

Figure 2-1: Total Number of Issued Licenses for Mine Explorations and Exploitations (as of June–July 2013)



### Environmental Impact Assessment

The application of Environmental Impact Assessment (EIA) as a policy and regulatory tool in Armenia is governed by the EIA Act adopted in 1995. (A new EIA Law has been approved by the government and awaits Parliamentary approval.) The EIA Act stipulates activities across various economic sectors that require environmental impact assessment by placing them in three categories concerning potential impacts. The new law will approximate the implementation of EIA practice in Armenia with international best practice by including improvements in the methodology for impact assessment and economic valorization of environmental damages, reviews and enforcement of EIA implementation, and improved transparency and public participation. The new law will address long-standing concerns of direct financing linkage between the State Environmental Expertise<sup>19</sup> reviews and fee payments levied on the EIA review procedure. Public concerns about environmental degradation were also a driving force for the revision of this law.

### Environmental and Social Sustainability Challenges

Even though current mining and environmental/sustainability legislation has provisions for firms' responsibilities for social programs and mine closures, effective implementation of these provisions to benefit the mining communities could remain questionable unless clear rules for prioritization, inclusion, implementation, accountability, reporting, and monitoring of the results of such programs are developed. Likewise, effective implementation of the environmental management plan will require strong regulatory oversight, rules for reporting and monitoring, and the participation of communities affected by mining activities. The shortage or lack of publicly available information on such programs was pointed out as one of the limiting factors in the development of this paper.

The EIA legal provisions require environmental impact assessment to be prepared and reviewed on a mine-by-mine basis. While the impacts of a single mining project could be manageable, the

<sup>18</sup> Draft Design of the Framework of RA Mining Sector National Policy and Development Strategy. 2010.

<sup>19</sup> World Bank. 2009. *Armenia Country Environmental Analysis: Institutional Capacity, Incentives and Constraints*. Report. Washington, DC (unpublished).

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cumulative impacts of multiple mining developments in a given area or in a shared watershed could, in aggregate, be significant and affect the quality of environmental services<sup>20</sup> provided by the ecosystem. The use of the CIA tool could be considered for assessing “the carrying capacity” around ecologically sensitive areas or watersheds where downstream users could be affected by multiple upstream mining activities. The Law on Targeted Use of Environmental Charges Paid by Mining Companies does not have provisions for fees for the disposal of mining residues and tailings dams. Assigning clear responsibility with accountability rules, to ensure safe management of the tailings dams, and an agreed-upon plan for time-bound reuse of the tailings would be in line with environmentally sound management practices of mine tailings. Without such provisions in place, it is likely that the tailings will continue to have substantial impacts on all elements of the local environment.

### Gaps

Mining is generally perceived as a significant sources of environmental degradation in Armenia. Even though legal and practical provisions are in place for environmental payments that still need to be properly defined (see Chapter 4.2, *Application of Economic Valuation in Armenia*), these are only related to some companies and partial areas of impact from the mining industries. According to the Ministry of Energy and Natural Resources, there are 15 existing tailings ponds, covering an area of 700 hectares, for disposal of residue. Large amounts of concomitant ore components remain unutilized in the disposed overburden. Most of the tailings are poorly managed, with little oversight to limit the exposure of such sites to weather conditions. A Toxic Site Identification Program—a joint effort led by the Blacksmith Institute, the American University of Armenia, the World Bank, the European Commission, and other development partners—evaluated sites where toxic pollution may impact human health. The sites that were investigated included 7 mines, 12 active or abandoned tailings, and 1 abandoned smelter. Thirteen impacted communities in 5 marzes were interviewed. Water and soil samples were taken and analyzed in a licensed laboratory in the United Kingdom. Among many other observations, the Toxic Site Identification Program points out that key impacts on the environment and human health originating from the tailings leachate include contaminated soil, groundwater, and surface water; and children’s exposure to contaminated soils and bodies of water. Toxic chemicals such as cadmium, chromium, arsenic, and lead get into the food chain when abandoned tailings are used as pastures or cultivated land and polluted rivers for irrigation. Local communities use tailings residues as construction materials. Valuable species are disappearing in polluted rivers. As such, the existing system of environmental payments (see above under “Law on Targeted Use of Environmental Charges Paid by Mining Companies”) is not able to compensate for the damage caused by mining operations and needs further strengthening.

The mining sector in particular has been under a lot of scrutiny and pressure from nongovernmental organizations and civil society. With the historic and present-day lack of transparency, inadequate information sharing, there are growing concerns that for any future development in mining, the associated environmental and social impacts may not be properly assessed or evaluated. As such, one of the main recommendations in increasing transparency and data availability is to join the Extractive Industries Transparency Initiative (EITI). Armenia is not a member country, nor is it a candidate. The EITI is an international standard that ensures transparency in governance of mining sector, including revenues from oil, gas, and mineral resources. It is developed and overseen by a multistakeholder coalition of governments, companies, investors, and civil society organizations. Benefits for implementing the EITI include improved investment climate, strengthened accountability, and greater economic and political stability. This in turn is beneficial for business, since investments are capital intensive and dependent on long-term stability to generate returns.

In short, the key challenges that Armenia needs to address before scaling up development of mines concern sector governance with regard to environmental and social impacts, with a focus on strategic

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<sup>20</sup> Per OECD, the definition of the term “environmental services” refers to the qualitative functions of natural, nonproduced assets of land, water, and air (including related ecosystems) and their biota. Three basic types of environmental services include: (a) disposal services of natural environment acting as an absorptive sink, (b) productive services, and (c) consumer or consumption services for physiological and recreational needs of human beings.

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planning of the sector with sustainability concerns in this process, as well as reforming the legal oversight practice, transparency, and enforcement mechanisms to ensure all mining operators conduct their operations in line with the best globally available mining practices.

Nonetheless, without a strategy that assigns higher priority to optimal use of mineral resources as a long-term driver for growth and socioeconomic development over immediate increases in productivity, Armenia may fall prey to the “resource curse.” Having a sector strategy is important from several perspectives. It will promote geoscientific research and exploration, as well as sustainable practices in the mining sector that will reduce industrial pollution, water contamination, air emissions, biodiversity loss, floods, erosion, and desertification. It will also contribute to “leveling the playing field” for environmental policies that currently take a backseat and will change the rhetoric from how costly environmental policies are to implement to how important they are for public health, society, and economy.

### 3. Policy Tools for Environmental and Social Sustainability in Mining Development

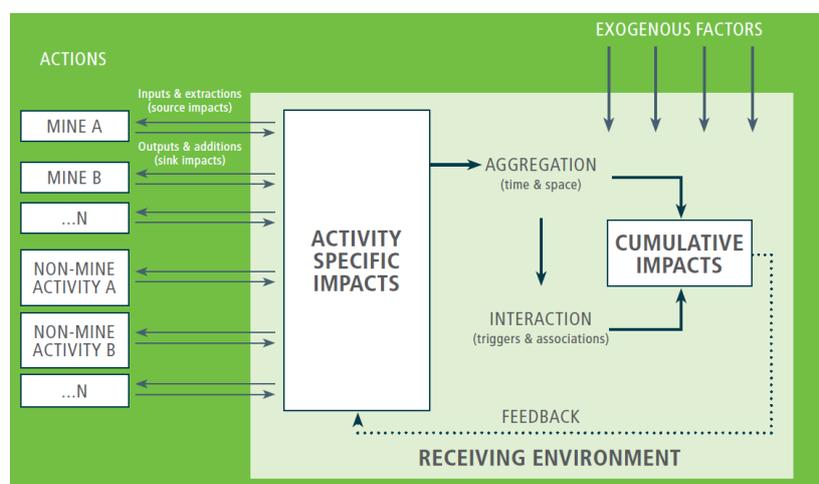
The environmental impact assessment is a process for scoping, identification, and proposal for mitigating potential environmental impacts. As a policy and regulatory instrument, it is fairly familiar to a broad stakeholder audience. All countries have some form of an EIA system mandated by national legislation and complementary bylaws. However, the EIA process is limited to a single development objective or a single site. The development potential of the mining industry in Armenia calls for a holistic approach to strategic development and planning of the sector. This approach includes decision making that looks at the potential environmental impacts and challenges involved. Several tools, widely used in countries that face the same challenges, are reviewed here. The key instrument for development planning discussed here is the SESA. Another instrument used to analyze the impacts of a given activity and intricate potential linkages with other activities in a larger area and their cumulative impacts is the CIA. SESAs and CIAs are essential tools to inform policy and planning decisions that do not compromise on environmental and social objectives.

#### 3.1. Cumulative Impact Assessment

The process of identifying cumulative impacts simply means that an activity such as mining that is viewed as a single activity with its own environmental impacts is now placed into a given real-world environment and that interactions with other elements of the environment and their combined impacts also need to be taken into account. Cumulative impacts arise from aggregating activities of a single operation or multiple mining and processing operations, as well as from the interaction of other nonmining-related activities in a given area. CIAs aim at identifying the potential interactions between existing and proposed projects so that the resulting negative impacts can be considered and mitigated as early as possible in the selection and design of sector policies (rather than downstream through project management and end-of-pipe solutions<sup>21</sup>). Cumulative effects can be best assessed as part of an SESA or can be integrated into the individual EIA report. Cumulative impacts are changes to the environment and society caused by an intervention, in combination with other past, present, and future activities.

In the mining context, the nature and scale of cumulative impacts vary depending on the type of mining activity, the proximity of the mines to each other, the extent of other contributing activities, and the characteristics of the surrounding natural, social, and economic environments. The compounding effects of multiple mine closures can be challenging for regional communities and economies. The conceptual framework for conducting a CIA process is given below in Figure 3-1 and can easily be applied to the mining industry.

Figure 3-1: Conceptual Framework of Cumulative Impacts in Mining



Source: Cumulative Impacts a Good Practice Guide for the Australian Coal Mining Industry (Franks et al. 2010)

<sup>21</sup> World Bank. 2011. *Strategic Environmental Assessment in Policy and Sector Reform Conceptual Model and Operational Guidance*. Report. Washington, DC.

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## *Use of Cumulative Impact Assessment for Mining Development*

Cumulative impacts are incremental effects of past, present, or future activities combined with the proposed project. Indirect impacts are the environmental secondary effects caused by economic and social processes that have been induced or influenced by a specific policy, program, or project. The CIA can ensure that such impacts are taken into consideration in the decision-making process.<sup>22</sup> The cumulative impacts for development of mines are assessed based on system interactions of different mines and their tailings dams with the elements of a given area in their totality. These impacts are assessed in a spatial context delineated by natural boundaries (for example, airshed, watershed, or bioregion); most of these impacts are local, with the exception of air quality (notably greenhouse gas emissions). The aggregate impacts, direct and indirect, need to be assessed in combination with other developments (existing or planned) in addition to the proposed mining and in relation to the receiving environment of the area. The process needs to involve communities and other users of common natural resources.

The assessment of cumulative and indirect impacts is tied to all major phases of SESA and EIA.<sup>23, 24</sup> The assessment, whether for one location (through EIA) or for a sectoral strategy program (through SESA), will start with scoping of the proposed activities. Defining the receiving environment and analyzing it based on the baseline conditions would delineate spatially and temporally the area of activity, generated impacts, and external factors. The baseline should include similar activities in the region or activities that may have indirect or cumulative impacts with the proposed development. Following these steps, the magnitude and significance of such impacts could be established. In the assessment of cumulative impacts, it is important to include economic policies. Taxes and subsidies applied on extraction and use of natural resources, for example, may influence the extraction rates and consumption patterns. Changing such variables may alter the significance of environmental impacts more prominently than technical or other changes.

The detailed steps for each of the phases are given below:

### **Scoping**

- Identify significant issues of concern associated with the proposed policy, program, or project.
- Establish the geographic scope for the analysis. The study area should be large enough to allow assessment of all relevant environmental and social components that may be affected. Each component may have a different study area.
- Identify temporal boundaries for the analysis.
- Identify other past, present, and reasonably foreseeable actions in the region that could affect the resources, ecosystems, and human communities of concern.

### **Identification and Evaluation of Impacts**

- Define the baseline conditions for the regional resources (ecosystems, communities).
- Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand adverse impacts.
- Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
- Determine the magnitude and significance of cumulative impacts. These impacts should be analyzed by quantitative techniques, along with a qualitative discussion based on best professional judgment.
- Determine the degree to which impacts are highly uncertain or involve unique or unknown risks.

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<sup>22</sup> World Bank. 2012. *Sample Guidelines: Cumulative Environmental Impact Assessment for Hydropower Projects in Turkey*. Report. Washington, DC.

<sup>23</sup> National Oceanic & Atmospheric Administration National Marine Fisheries Service. 2012. *Guidance on Cumulative Effects Analysis in Environmental Assessments and Environmental Impact Statements*, by Larry W. Canter. Report. Gloucester, MA.

<sup>24</sup> World Bank. 2012. *Sample Guidelines: Cumulative Environmental Impact Assessment for Hydropower Projects in Turkey*. Report. Washington, DC.

## Mitigation Measures

- Modify or add alternatives to avoid or mitigate adverse significant cumulative impacts arising from project activities.
- Identify opportunities to work with other stakeholders (within different sectors and administrative jurisdictions) to avoid or mitigate adverse effects caused by nonproject activities.

## Monitoring

- Determine the significance of residual effects (that is, effects after mitigation).
- Monitor cumulative impacts of the selected project alternative and apply adaptive management.

Table 3-1 provides examples of positive and negative impacts from mining that have the potential to become cumulative. Therefore, several important arguments to use the CIA to assess the cumulative impacts of mining operations could be considered:

- Cumulative impacts are what the communities and the environment experience in reality;
- With the expansion of mining in a number of Armenian provinces, cumulative impacts will be assuming a growing importance. Adding mining activities to new regions would contribute to the already occurring impacts on the local ecology and communities;
- Proactive (and preventive) management of cumulative impacts allows better planning of mitigation and enhancement of mitigation measures early in the decision-making process.<sup>25</sup>

Table 3-1: Examples of Mining Impacts with the Potential to Become Cumulative

Negative impacts	Positive impacts
<ul style="list-style-type: none"> <li>• Price inflation (for example, housing and rents) and disproportionate impacts on residents not employed in the mining industry</li> <li>• Overloading of existing social services (for example, child care, health care, and education)</li> <li>• Loss of community identity due to demographic change</li> <li>• Increased dust and associated-air quality issues</li> <li>• Reduced water quantity (groundwater draw and water table impacts from multiple mines and industries)</li> <li>• Traffic congestion and road degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Increased employment and economic investment</li> <li>• Local business development from mine procurement</li> <li>• Road and infrastructure upgrades</li> <li>• Investment in biodiversity offsets and rehabilitation</li> <li>• Population increases that create a critical mass for better services and infrastructure (for example, schools and sporting teams)</li> <li>• Development of human capital (skills, employment, and training)</li> </ul>

Source: Franks et al., 2010.

## Cumulative Impact Assessment in Armenia

The RA Law on Environmental Impact Assessment does not contain explicit legislative requirements to implement the CIA in the scope of EIA. It is supposed to be the task of state environmental expertise conducted by the RA Ministry of Nature Protection’s Environmental Expertise SNCO. In particular the law says that the expert conclusion on EIA should be issued based on the study of all negative and positive impacts of the project, as well as their interactions. Subsequently, the permits on maximum emissions and discharges are supposed to be awarded to the company based on assessment of cumulative impacts, which is not the practice. This is evident from EIA reports such as those for the Teghut copper- molybdenum mine, the Bardzradir gold mine, the Karaberd gold mine, the Tejsar nepheline syenite mine, the Dastakert copper-molybdenum mine, and the Lichq copper mine, as well

<sup>25</sup> Franks, D., M., D. Brereton, C. J. Moran, T. Sarker, and T. Cohen. 2010. *Cumulative Impacts—a Good Practice Guide for the Australian Coal Mining Industry*. Centre for Social Responsibility in Mining & Centre for Water in the Minerals Industry, Sustainable Minerals Institute, University of Queensland. Australian Coal Association Research Program. Brisbane.

as the most advanced EIA for the Amulsar gold mine. The EIAs most frequently contain a section on the summary description of the environmental situation in the project area; the potential for CIA is usually handled through vague descriptions in this section. For example: “the current environmental situation could be assessed as satisfactory,” “no industrial or other enterprises are operating in close vicinity and the area is free of anthropogenic and techno-genetic adverse impact,” “the geographical location of the area is favorable for dispersion of general background pollution,” and so forth.

In some cases the baseline data on air and water pollution taken from the database of the RA Ministry of Nature Protection’s Environmental Monitoring Center SNCO are being provided in the general description of the natural environment section, and the calculation of polluting amounts is being provided in the probable impacts on the environment section. However, the maximum permissible concentration standards, the analysis of the extent the emissions exceed the standards, and the assessment of the probability of cumulative effects due to generation of new hazardous substances are missing.

### 3.2. Strategic Environmental Assessment

A Strategic Environmental (and Social) Assessment is a distinct but also complementary process to the standard EIA. The key difference is that an EIA is based on a single operation or activity in a single environment, whereas the SESA takes a “higher up” approach and is done at the policy, program, and planning levels. A properly conducted SESA can help define a goal and shape the process of how that goal is going to be met, while accounting for the potential environmental and social issues in the given region or country. As a summary, the EIA process can help better define project design, whereas the SESA helps define and increase environmental and social sustainability of a strategy. In addition, an EIA process is based on the known and associated impacts, while the SESA can only forecast and account for a number of environmental and social impacts linked to a given sector. Some of the key differences between the EIA and SESA (or SEA) process are given in Table 3-2 below:

Table 3-2: Fundamental Differences Between SEA and EIA

SEA	EIA
The perspective is strategic and long term.	The perspective is of execution in the short and medium term.
The process is cyclical and continuous.	The process is discrete and motivated by concrete intervention proposals.
The purpose is to help build a desirable future, not to attempt to foresee the future.	The intervention project has to be known, with a suitable level of detail.
The definition of what is intended is vague, there is a large amount of uncertainty, and the data are always quite insufficient.	The definition of what is intended is relatively precise, and data are reasonably available or can be collected through fieldwork.
Follow-up is performed through the preparation and development of policies, sector plans, programs, and complex projects.	Follow-up is performed through the construction and implementation of the project.
As a supporting tool, SEA measures to address impacts may not be put into practice, since the actions established in development plans and programs may never be implemented.	Projects requiring an EIA are executed once their environmental feasibility is guaranteed.

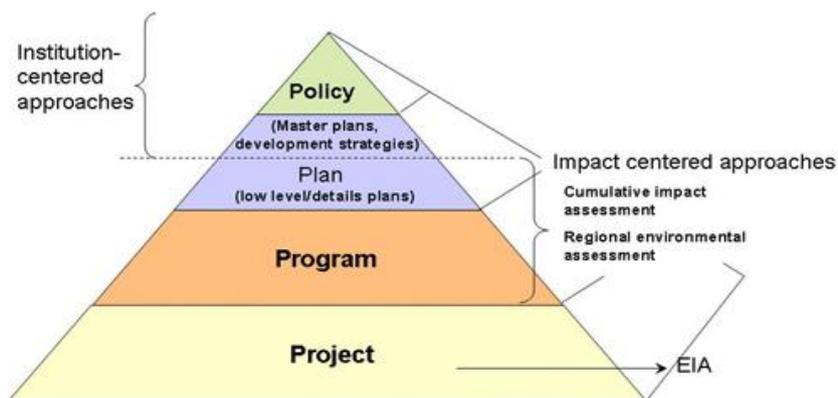
Source: Strategic Environmental and Social Assessment of Oil and Gas Development in Mauritania, June 2011.

In essence, SEA is a higher-up decision-making process that is not bound by the limitations of single-project EIAs, which normally do not address cumulative impacts of successive projects, the timing and impacts of policy decisions, or assessment of potential alternatives. These issues are especially relevant in situations of policy reforms that would affect sector development prospects or in the absence of a sector strategy that aims at economy-wide economic and social gains. Several reforms recently launched by the government of Armenia—in the mining sector and the environmental legislative framework—present an opportunity to use the synergies and benefits of putting the sector on a sustainable path. Applying an SEA to devise a mining-sector strategy that balances pro-growth

objectives with environmental and social sustainability could inform decision making at all levels of the administrative hierarchy (see Figure 3.2).

There are several approaches that apply to SEA and are designed to support policy makers and decision makers:

Figure 3-2: Types of SEA



Source: World Bank

**Institution-centered SEA (also known as policy-based SEA) is a process to establish a policy dialogue for mainstreaming environmental and social considerations in policy and sector reforms.** When policy-based SESAs are undertaken as a part of policy reforms, their objective is to assess the capacity of institutions and adequacy of the existing policies to manage environmental and social risks in a timely and effective manner. In the process, environmental and social priorities become linked to economic or development outcomes already at a high level of policy making.<sup>26, 27</sup>

**Impact-centered SEAs assess the potential environmental and social effects of policies, plans, and programs. The results contribute to the design of protection and mitigation measures accordingly.** Another application of the impact-centered SEA is as a tool for alternatives analysis. Investment options are identified and assessed against sustainability criteria in order to inform the selection of an optimal or adequate choice.

**Regional and sectoral environmental assessments (REAs and sectoral EAs) are impact-centered SEAs that pay particular attention to potential cumulative impacts of multiple activities.** They examine direct and indirect impacts associated with a proposed policy, plan, or program, or with a series of projects for a particular region (for example, an urban area or a watershed) or sector (for example, mining or transport). They evaluate and compare the impacts against those of alternative options, assess relevant legal and institutional aspects, and recommend measures to strengthen environmental management in the region or sector.<sup>28</sup> Section 2.1 explains CIA in more detail.

Sectoral and regional environmental assessments present a variant of the “cumulative assessment” tool. They look at potential impacts of multiple activities within a sector or region. Table 3-3 summarizes the advantages of applying these tools upstream in the decision-making process, and Box 3 presents an example of the application of a sectoral environmental assessment in Argentina.

<sup>26</sup> Ahmed, K., and E. Sanchez-Triana. 2008. “Using Strategic Environmental Assessments to Design and Implement Public Policy.” In *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*, eds. K. Ahmed and E. Sanchez-Triana. Washington, DC: World Bank Group.

<sup>27</sup> World Bank. 2012. *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Report. Washington, DC.

<sup>28</sup> World Bank. 2012. *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Report. Washington, DC.

Table 3-3: Advantages of Sectoral and Regional Environmental Assessments

Sectoral environmental assessments	Regional environmental assessments
<ul style="list-style-type: none"> <li>• offer an opportunity for sector-wide environmental analysis before investment priorities are determined;</li> <li>• support integration of environmental concerns into long-term development planning;</li> <li>• are suitable for analysis of institutional, legal, and regulatory aspects related to the sector;</li> <li>• consider cumulative impacts of multiple ongoing and planned investments within a sector, as well as impacts from existing policies and policy changes;</li> <li>• allow for collecting and organizing environmental data into information and, in the process, identifying data gaps and needs at an early stage;</li> <li>• result in comprehensive planning of general sector-wide mitigation, management, and monitoring measures; and</li> <li>• help identify broad institutional, resource, and technological needs at an early stage.</li> </ul>	<ul style="list-style-type: none"> <li>• move environmental analysis upstream in the policy-planning process, at a stage in which major strategic decisions have yet to be made;</li> <li>• offer an opportunity for regional analysis based on ecological, socioeconomic, administrative, or other boundaries;</li> <li>• analyze the institutional and legal framework relevant to the particular region;</li> <li>• provide a basis for collaboration and coordination across administrative boundaries and between sector-specific authorities, thus helping avoid contradictions in policy and planning;</li> <li>• serve as a vehicle for public participation in shaping the future development of a region, thereby building public support for the process; and</li> <li>• help identify broad institutional, resource, and technological needs at an early stage.</li> </ul>

Source: World Bank, *Environmental Assessment Sourcebook Updates 4 and 15*.

**Box 3: Sectoral Environmental Assessment of Mining Activities in Argentina<sup>29, 30</sup>**

The World Bank provided technical assistance to Argentina (from 1995 to 2011, in two phases) for mining-sector reforms. The objective was to develop and support the federal and provincial governments' policies and regulatory and institutional reforms that encourage the environmentally sound expansion of private investment in mining.

As part of the initial preparatory activities, a comprehensive sectoral environmental assessment was carried out in 1993.<sup>31</sup> It encompassed the following:

- policy, institutional, and legal environmental frameworks for mining, including the applicability of EIA procedures and health and safety regulations;
- interfaces with mining trade associations and NGO interests;
- analysis of the impact of current mining activities on the environment;
- predictions of possible future environmental and social impacts; and
- recommended priority actions for inclusion in an environmental management plan (EMP).

The findings and recommendations from the sectoral environmental assessment were considered in the design of the technical assistance. They formed the basis for developing and implementing the regulatory framework for mining activities at the provincial level, strengthening environmental management capacity at the national and provincial levels, and undertaking targeted baseline studies on the physical and social conditions in potential mining areas to support sound environmental management.

A project evaluation in 2003 revealed the following positive significant outcomes attributed to the technical assistance:

- a 33 percent increase in mining investments over five years;
- an improved appreciation of the relationship between mining development and local/regional development, as well as of the importance of community participation at an early stage of mining development; and
- a strong sector work (the Sector Review, in this case) that can greatly improve the quality of project preparation.

<sup>29</sup> World Bank. 2002. *Implementation Completion Report. Argentina—Second Mining Development Technical Assistance*. Report. Washington, DC.

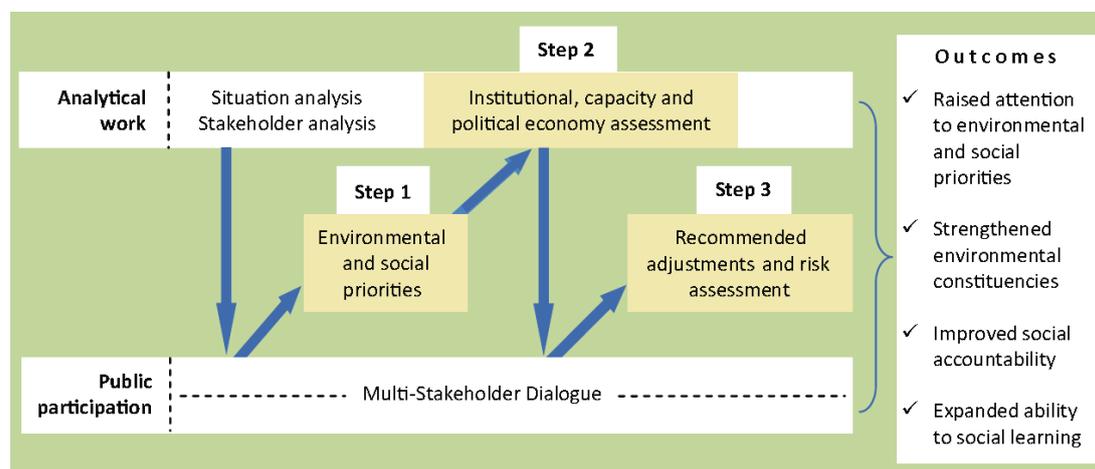
<sup>30</sup> World Bank. 1998. *Environmental Sourcebook Update 22*. Environmental Department, Washington, DC.

<sup>31</sup> World Bank. 1993. *Argentina Mining Sector Review*. Report. Washington, DC.

## Importance and Benefits of Strategic Environmental Assessment

SEA provides a framework for **systematic evaluation** of environmental and social consequences of proposed policies, plans, or programs in order to ensure that they are adequately addressed “upstream” in the decision-making process (that is, from the earliest possible stage), along with economic and financial considerations. The steps of a strategic assessment are illustrated in Figure 3-3. When implemented adequately, the process results in a range of beneficial outcomes.<sup>32, 33</sup>

Figure 3-3: SESA Components and Processes



Source: World Bank

SEA considers environmental issues from an economic and social perspective and applies quantitative approaches such as cost-benefit analysis and economic valuation of ecosystem services **to evaluate policy and project alternatives** and to determine **key development priorities**. For example, quantifying the cost of environmental degradation as a percentage of the gross domestic product can be the ultimate trigger to incorporate specific environmental considerations in reform packages to reduce pollution in various sectors.

SEA involves a participatory method to facilitate **the dialogue process for multiple stakeholders** and to understand how environmental degradation affects different groups of the population, including the most vulnerable. Diverging stakeholder expectations are often at the core of conflicts in the mining industry. Using SEA will allow for participatory planning, negotiations, and inclusive decision making. SEA allows for assessing **cumulative and indirectly induced impacts** within a sector, within program or a larger territory, and over time, thus reducing uncertainty about future developments. More detailed analysis of CIA was provided in Section 2.1.

Examples of specific tools applied in the SEA framework to achieve comprehensive evaluation, ensure full stakeholder engagement, and analyze and compare alternatives are presented in Annex 2.

### 3.3. Applying SEA in the Mining Sector

Sustainable development requires a number of different actors, including the government, economic actors, and citizens, to work together. In general, regulation for sustainable development needs to be forward-looking. As one of the key drivers of economic growth for Armenia, mining will continue to

<sup>32</sup> Sadler, B., and R. Verheem. 1996. “Strategic Environmental Assessment: Status, Challenges and Future Directions.” Publication 53. Ministry of Housing, Spatial Planning and the Environment, The Hague.

<sup>33</sup> Floroiu, R., and A. Damianova. 2012. “World Bank SEA Experience in Europe and Central Asia: The Mixed Effects of Regulation.” In *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Washington, DC: World Bank.

have economic value. However, along with its recognized economic value and benefits come the unavoidable environmental degradation and costs, as well as the social implications. Furthermore, with the lack of a clear and transparent approach to increasing sustainability in mining, the potential for a number of environmental and health-related issues to be incorrectly linked to mining is substantial. By using EIA, CIA, and SEA, decision makers can achieve potentially large gains to provide regulatory response that protects the surrounding environment and society in multiple ways and throughout all project phases (summarized in Table 3-4; presented in more detail in Annex 3).

Table 3-4: Environmental and Social Impacts of Mining Are Relevant for All Project Phases

Project phases in mining	Environmental impacts	Social impacts
<ul style="list-style-type: none"> <li>• Exploration</li> <li>• Access to site and site clearing</li> <li>• Ore extraction</li> <li>• Disposal of overburden</li> <li>• Beneficiation</li> <li>• Site reclamation</li> <li>• Closure</li> </ul>	<ul style="list-style-type: none"> <li>• Acid mine drainage in surface and groundwater</li> <li>• Cyanide and other chemical leaching</li> <li>• Erosion</li> <li>• Change of soil composition</li> <li>• Dust emissions</li> <li>• Habitat loss and fragmentation</li> </ul>	<ul style="list-style-type: none"> <li>• Resettlement and loss of property</li> <li>• Migration</li> <li>• Uneven distribution of benefits</li> <li>• Impacts on livelihoods and public health</li> <li>• Governance impacts</li> </ul>

Source: Authors

At various stages of mining developments, consideration of environmental and social protection and impact mitigation can take the form of: (a) a bottom-up approach relying on sustainability practices that individual companies have, and (b) a top-down approach by policy-making and decision-making processes that promote and incentivize sustainable practices. A number of effective steps of the SEA process can directly contribute to sustainable mining through:<sup>34</sup>

- elevating environmental and social issues politically by linking them to the issues of economic development and by integrating the agendas of environmental ministries with those of economic ministries;
- creating political space for policy debate with appropriate support from top-level officials and encouraging participation of multiple public agencies to reconcile interagency tensions on environmental policy issues while improving coordination and resources;
- putting effective transparency mechanisms in place to make information available to citizens in ways that can influence their political choices;
- monitoring and evaluating the policy-making and implementation processes to facilitate learning; and
- maintaining stakeholder engagement and networks after completing a policy-formulation exercise in order to ensure long-term learning and dialogue.

### *Evidence of SEA Contributions to Environmentally and Socially Sustainable Mining*

Table 3-5 summarizes some of the outcomes of policy-level SEA applied in the mining sector and discusses the extent to which three expected consequences were actually realized:

- **Raised attention to environmental priorities:** This outcome is directly related to public participation, since interest groups and communities are central figures in setting the priorities.
- **Strengthened environmental constituencies:** Without strengthened and effective environmental constituencies, laws and regulations risk being short-lived and only partially applied—or even completely ignored—during policy implementation.

<sup>34</sup> Ahmed, K., and E. Sanchez-Triana. 2008. “Using Strategic Environmental Assessments to Design and Implement Public Policy.” In *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*, eds. K. Ahmed and E. Sanchez-Triana. Washington, DC: World Bank Group.

- **Improved social accountability:** Reinforcing social accountability is a key mechanism to ensure that commitments made through policy design are implemented and last over time.<sup>35</sup>

Table 3-5: Summary of the Outcomes of Policy-Level SEA Applied in the Mining Sector

	Raised attention to environmental priorities	Strengthened environmental constituencies	Improved social accountability
a.	Environmental and social priorities informed the preparation of a loan to support mining reform. Priorities were selected by stakeholders in provincial workshops informed by the results of case studies and interviews. National priorities were drawn from the provincial priorities and validated by stakeholders in a national workshop.	SESA initiated a multistakeholder dialogue on the environmental and social dimensions of mining-sector reform. However, involvement of local mining communities and customary authorities in the dialogue was limited.	SESA has influenced the J4P initiative in Sierra Leone. J4P's program has acknowledged SESA's important contribution to its activities, which includes fostering public debate on issues of accountability.
b.	The pilot contributed to better dialogue over environmental and social issues, including elaborate techniques for involving local, national, and regional stakeholders in the ranking of priorities. It built support for a regional approach to addressing environmental and social priorities in the context of mining reform.	The SEA process appears to have opened up examination of the institutional mechanisms used to deal with regional planning and harmonization. The process strengthened civil society organizations working in the mining sector by promoting discussion of a regional agenda for mining reform.	Stakeholders proposed a sophisticated framework that became a "home" for the policy dialogue begun during WAMSSA consultations. It included a series of multistakeholder bodies from the regional, national, and local level to ensure transparent participation and social accountability for mining decisions.
c.	Environmental and social priorities were discussed by stakeholders during a workshop, but time restrictions constrained participants' ability to fully examine priorities as part of the rapid SESA. The workshop helped move environmental and social issues up on the reform agenda.	The stakeholder workshop encouraged some weaker stakeholders, notably from civil society, to claim larger stakes in the mining-sector reform process and in specific mining operations.	Against a background of deep mistrust, the efforts to collect and share information on key environmental and social concerns in the rapid SESA were small but highly relevant for strengthening social accountability.

Source: World Bank

SEA approaches for assessing risks and mitigation strategies that represent replicable approaches in the mining sector are included in the following boxes. These examples come from other countries where abundance of minerals and mining called for a sustainable and integrated development approach.

Box 4 presents lessons from the SESA of the mining sector in Sierra Leone. The **inclusive dialogue platform** was essential in determining regional and national priorities. The key lesson from this example is that the SESA process helped deepen the policy dialogue around mining reform. The greatest challenge lies in sustaining the dialogue and delivering on the recommendations. To address this, SEA has to be designed as a continuous process leading to a document (report) and also influencing decision making. The SEA needs to focus on one or a few key sectors under a framework for long-term policy dialogue and complemented by an effort for institutional strengthening. Unless these conditions are met, it is unlikely that SEAs will make a lasting contribution to environmental and social sustainability.

Box 5 describes how the strategic assessment for spatial planning in Papua Province, Indonesia, was used as a first step in the decision-making process. It mainstreamed environmental and social issues

<sup>35</sup> World Bank. 2011. *Strategic Environmental Assessment in Policy and Sector Reform Conceptual Model and Operational Guidance*. Report. Washington, DC.

by applying **economic valuation of the natural capital and social impacts** of the development options. The lessons learned from this example include the following: With the four scenarios, the challenge is to arrive at a spatial development decision that maximizes the benefit for Papua Province, even if that may not necessarily bring the maximum financial benefit to the central government. The SEA methodology allowed for the generation of scenarios as part of an inclusive process between government, private sector, and civil society. The SEA report concluded by describing eight steps for following up the assessment and reaching concrete decisions.

Box 6 describes the process of the SESA for the West Africa Minerals Sector Strategic Assessment (WAMSSA) that was used as a tool to ensure sustainability and shared prosperity of the mining development in West Africa. The WAMSSA is an SESA intended to identify policy, institutional, and regulatory adjustments required to integrate environmental and social considerations into mineral-sector development in Africa.

Box 7 describes the SESA of oil and gas development in Mauritania. It was driven by the aim to strengthen the legal and regulatory framework and improve environmental governance. To support this objective, an SEA was used to ensure sustainable development of the oil and gas boom in line with the best international practices and standards.

#### **Box 4: Strategic Environmental and Social Assessment of the Mining Sector in Sierra Leone<sup>36</sup>**

The SESA was undertaken to support legal and policy reforms for expanding the mining sector in Sierra Leone and to enhance the environmental and social benefits arising from mining development. The most notable achievements of the process are listed below.

**A dialogue platform for all key mining stakeholders, including traditionally sidelined interest groups like villagers, civil society organizations, and NGOs.** To properly analyze potential impacts of mining-sector reforms, the motives of each of the stakeholder groups were considered, as well as how they could influence reforms. Particular attention was paid to the most vulnerable groups—for example, children, females, and youth. All stakeholders—the Ministry of Mineral Resources, government agencies, town chiefs, mining companies, vulnerable groups (women, children, and youth), landowners, local communities, and NGOs—participated in the discussions about prioritizing and ranking economic, social, and environmental risks and formulating intervention actions.

**The environmental and social priorities in the mining sector were identified using a ranking methodology based on a comprehensive cross-analysis of issues and regions.** A situational analysis performed within the SESA framework focused on each of the mining subsectors—large-scale, small-scale, and artisanal—and helped pinpoint the key distinct environmental and social issues for each of them. The SESA ranking methodology ensured that equal weight was given to vulnerable groups in the ranking procedure. Priority concerns were defined for each of the participating provinces, and five issues were acknowledged as national priorities: (a) land and crop compensation and village relocation; (b) sanitation and water pollution; (c) deforestation and soil degradation; (d) child labor; and (e) postclosure reclamation.

**Capacities for addressing the key regional and national priorities were evaluated in the context of the proposed mining-sector reform. An action plan was developed to enhance this capacity during the implementation of the mining reform.** At the time the SESA was launched, the existing mining policies were not effective in addressing the environmental and social priorities in the sector, mainly due to lack of clarity, consistency, and implementation capacity. The SESA discovered critical governance weaknesses that went beyond mining-sector reform. The recommendations were: strengthen environmental governance and institutions, create mechanisms for contribution of mining to local development, and pilot initiatives for the effective incorporation of artisanal miners.

<sup>36</sup> Loayza, Fernando. 2012. “Sierra Leone: Strategic Environmental and Social Assessment of the Mining Sector.” In *Strategic Environmental Assessment in Development Practice: A Review of Recent Experience*. OECD Publishing. <http://www.oecd.org/countries/vietnam/strategicenvironmentalassessmentindevelopmentpracticereviewofrecentexperience.htm>

### Box 5: Strategic Assessment for Spatial Planning in Papua Province, Indonesia<sup>37</sup>

The assessment was undertaken in 2007 as a first step to outline potential spatial planning policy options for the Indonesian province of Papua. It followed an analytical and participatory approach for mainstreaming environmental and social issues into the decision-making and implementation processes.

**The stakeholder analysis was driven by three aims, one of them being the identification and assessment of vulnerability to adverse development impacts and risks, especially those faced by the indigenous Papuan and other vulnerable groups.** Stakeholder interviews and workshops were organized all through the SEA process; for example, to identify economic, social, and environmental priorities; to discuss the findings of the SEA report, and to explore decision options.

**A range of options for spatial development were produced,** each with a set of different assumptions on growth, development policies, and environmental quality. Some of these options were presented to stakeholders visually by means of maps to facilitate the discussions and obtain an informed input from them. Each option had two scenarios: business as usual (BAU) and sustainable development (SD). The SEA team **assessed the cumulative and induced economic, environmental, and social impacts of each scenario over a 5- to 10-year time frame.**

**The development options highlighted in the SEA report covered four potential intervention areas—transport, mining, forestry, and preservation of the Mamberamo region.** As a part of the scoping exercise, the following recommendations for the mining sector were formulated: Any new mining venture should take as its point of departure the potential benefits for the population and the environment of Papua; and efforts should be made for a more equitable sharing of taxes, royalties, and profits from mining ventures so that Papua's high economic growth figures are translated into poverty alleviation.

**A corrected gross domestic regional product (GDRP) was one of the parameters used to compare the economic impacts of the BAU and SD scenarios.** The corrected GDRP factors in the environmental and social benefits and costs associated with the economic activities, in addition to the conventional GDRP. The total economic value (TEV) approach<sup>38</sup> was used to correct the GDRP. Looking at the forestry scenarios, for example, the following projections for 2020 were made:

BAU scenario, conventional GDRP: US\$5.8 billion (based on revenue from palm oil and timber)

BAU scenario, corrected GDRP: US\$4.6 billion (conventional GDRP deducted by environmental and social costs of deforestation)

SD scenario, corrected GDRP: US\$8.9 billion (including the tangible and intangible benefits for forests to society; for example, clean water, carbon sinks, and biodiversity habitats)

### Box 6: Strategic Environmental and Social Assessment for the West Africa Minerals Sector Strategic Assessment

The WAMSSA is a strategic environmental and social assessment intended to identify policy, institutional, and regulatory adjustments required to integrate environmental and social considerations into mineral-sector development in Africa. The study focused on three Mano River Union countries: Guinea, Liberia, and Sierra Leone. These are categorized as mineral-rich countries that have the potential to earn significant revenues from exports of bauxite, iron ore, rutile, gold, and diamonds. The WAMSSA combined an analytical component with an extensive consultation process in order to initiate policy dialogue on improving mineral-sector governance and enhancing the benefits of mineral-sector development in this region.

The WAMSSA is characterized by a wide array of stakeholders and by guidance provided to the African Mineral Governance Program and the Extractive Industries Transparency Initiative Plus Plus (EITI++). It was aimed at regional harmonization of mining-sector development; its approach was to regard the mining potential in regional and transboundary clusters. In addition, the WAMSSA also analyzed approaches of smaller and larger mining companies and the options that each has. For example, smaller companies have less opportunity for a developed environmentally and socially sound operation, but their impacts, if many smaller companies are present in a limited area, can be rather significant.

<sup>37</sup> World Bank. 2008. *A Strategic Assessment of Spatial Planning Option for Papua Province*. Report. Washington, DC.

<sup>38</sup> The TEV is explained on more detail in Section 4.1.

## Box 7: Strategic Environmental and Social Assessment of Oil and Gas Development in Mauritania, June 2011

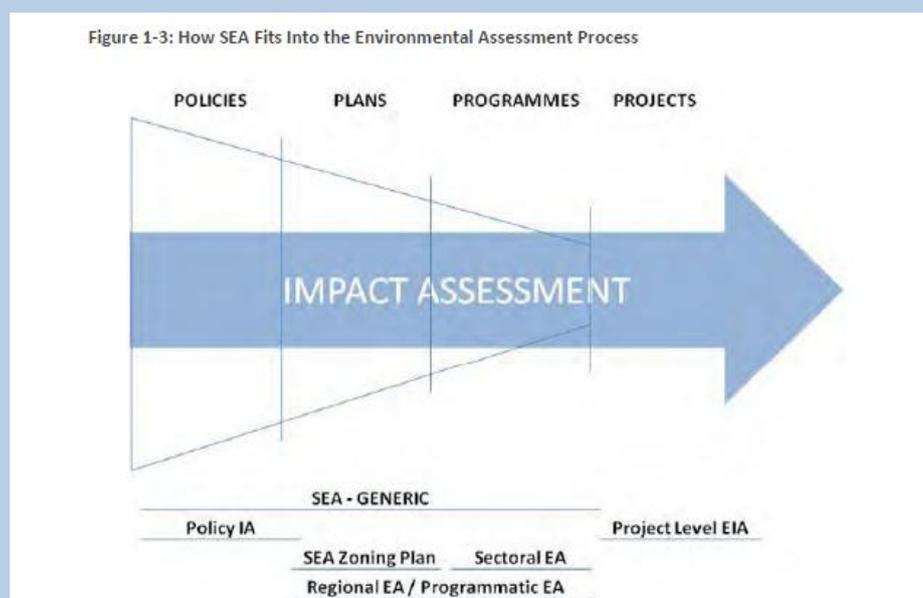
The Republic of Mauritania, aiming to join West Africa's recent energy boom, used the opportunity provided by the rapid offshore development of the Chinguetti oil field, discovered in 2001, thereby raising the country's hopes for oil wealth. Five years after the discovery of Chinguetti, the field came into production, while a number of other offshore gas and oil deposits were discovered. Simultaneously, the focus was on the innermost part of the country and the abandoned drilling there. The hopes were that Mauritania would become a global oil and gas player.

A priority for the government was to strengthen the legal and regulatory framework and improve environmental governance. As such, an SEA tool was used to ensure sustainable development of the oil and gas boom in line with the best international practice and standards.

The SESA of oil and gas development in Mauritania offered two different development scenarios: comparing the associated environmental impacts and assigning priorities and associated costs. The SESA built on the government's vision and strategy for sustainable development of mining and listed 20 recommendations with estimated costs, time lines for implementation, and action plans. Priorities were structured into immediate, short term (one to two years), and medium term (three to five years). The immediate measures included capacity building, institutional strengthening, increased transparency, and cooperation with other governments and countries with developed oil and gas sectors.

**Cumulative Impacts:** The Mauritania SESA cites the Netherlands Commission on the definition of cumulative effects and states that the cumulative effects must be greater than the sum of individual impacts. The SESA also calls for a separate management plan of cumulative effects. The Mauritania SESA builds on the fact that

EIA's have structural weaknesses in the sense that they are applied too late in the decision making process. At this point, decisions on whether, where and what type of a project should occur have already been decided, often with little or no inclusion of environmental or social considerations. Another benefit of SEA is that when applied at the policy level, it can significantly reduce the amounts of project level EIA's and subsequently reduces the strain if institutional and/or expertise capacity is limited. (Dalal-Clayton and Sadler 2005)



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### 3.4. Applying Strategic Environmental Assessment to the Mining Sector in Armenia

The examples of SEAs implemented in countries endowed with mineral resources suggest that there are a number of ways that mining can contribute to social and economic development without harming the environment. Expectations that mining can boost economic and employment opportunities in rural areas, assist with infrastructure development, and promote development of upstream and downstream activities with positive effects on communities can only materialize by good governance of the sector that can unlock the multiple benefits of the mining industry.<sup>39</sup>

There is sufficient evidence that SEA is a useful tool for strategic planning that complements the planned, strategic development of the mining sector by factoring in environmental and social conditions on the ground, including different demands and pressures on the natural resources. With respect to mining development in Armenia, the aspects that need to be analyzed under an SEA of the mining sector are aligned with environmental priorities of the second Armenian National Environmental Action Plan (NEAP-2).

1. **Land Resources:** Land resources of Armenia are diverse and include semidesert, dry steppe, steppe, forest, and alpine land. Agricultural and forest lands are under growing pressure from industrial and urban development. Mining development directly affects land resources through permanent alteration of land use, land contamination by leaching of heavy metals from mine tailings, and land erosion triggered by denuding. In the face of limited land resources, these issues should raise concerns, especially in terms of protecting agricultural or grazing lands. An even more serious concern will be the widespread impact from tailings dams on the watersheds and aquifers.
2. **Biodiversity and Forest Resources:** Armenia's endowment of globally significant flora and fauna species and approximately 10 percent of the country's territory as protected areas calls for special attention while developing mines. The impact on the flora and fauna can be direct and far reaching through the tailings leachates, spoil heaps, destruction of vegetation and forests, dust, noise, and vibrations during mining operations.
3. **Water Resources:** Protection of Lake Sevan, as the only long-standing body of water in the country, is an ultimate strategic priority. Protection of the quality of rivers and groundwater are no lesser a priority, given the scarce resources for water supply. Some 560 rural communities are not included in the national water-supply system and obtain water through water-carrying machines or through water wells. The pressure on water resources from mining development could cause further deterioration of vital resource on which these communities depend. Impacts on water resources could be from runoffs and leaching of tailings, floatation installations, siltation in bodies of water carrying sediments from heap piles, and excavations.
4. **Hazardous Substances and Waste Management:** Waste legislation includes some 29 secondary legislation acts to enforce waste management. Arguably, the residual material from mining is not considered waste. However, taking up land for tailings, overburden heaps, leachate pans, and dust from dried materials need proper management, especially residual material that displays the characteristics of solid waste. The impacts from flash floods carrying contaminated materials could be disastrous to the livelihoods of neighboring communities.
5. **Underground Resources:** The NEAP-2 singles out management of underground resources as an important priority. Exploitation of nonrenewable deposits without sound geo-economic assessment or technical and economic valuation could undermine the vary foundations of long-term growth. Extraction of mineral resources from existing tailings dams—located in

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<sup>39</sup> World Bank. 2010. *West Africa Mineral Sector Strategic Assessment (WAMSSA)*. Report. Washington, DC.

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Syunik (10), Lori (1), Ararat (1)—and Ararat gold mining plant tailings are the only ones being exploited. Expanding this practice with plans for follow-up rehabilitation would address long-standing environmental problems.

6. ***Atmospheric Protection and Climate Change:*** Mine operations generate air pollution from dust and small particulates from excavation and associated processes. Use of heavy machinery and vehicle emissions further contribute to the deterioration of air quality. Secondary processing of ores in smelters and processing facilities in conjunction with mine operations emit toxic pollutants that contribute to acid rain and acidification of the soil and bodies of water.

## 4. Value of Natural Capital in Enhancing Livelihoods and Local Economies

*Environmental economics plays a key role in identifying options for efficient natural resource management that facilitates sustainable development. It is an essential bridge between the traditional decision-making techniques and the more environmentally and socially sensitive approaches.<sup>40</sup> Economy-wide policies, both macroeconomic and sectoral, play a significant role in the rate of resource depletion and the level of environmental degradation. Economically valuing the physical impacts on the environment is a major step in understanding the complex environmental economic linkages. A few basic concepts and valuation techniques that frame the environmental economic decision making are discussed below.*

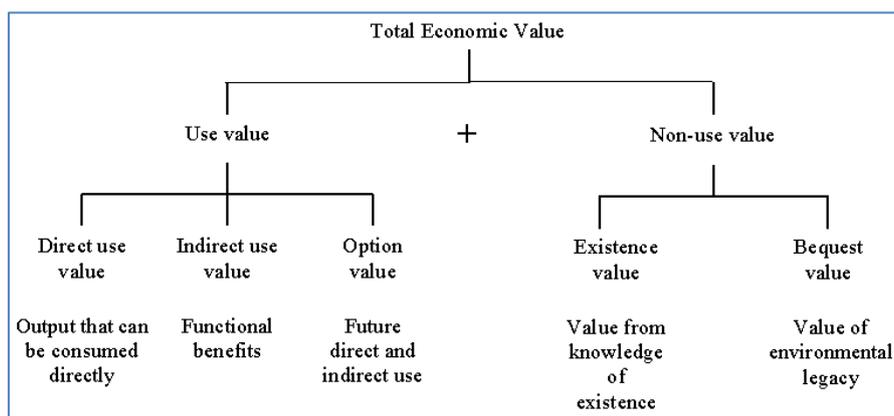
### 4.1. Principles of Economic Valuation

The economics of sustainable development uses total economic valuation (TEV) as one of the approaches to estimate the value of ecosystem services, recognizing that the value of an environmental resource consists of the sum of its **use value** and **nonuse value** as depicted in Figure 4-1.

Ecosystem services are the direct and indirect benefits that people obtain from healthy and functioning ecosystems. The **direct use value** refers to the consumptive use of resources (for example, food, water, and timber) and to the nonconsumptive use (for example, recreation). The **indirect use value** comes from ecosystem services that naturally regulate the chemical composition of the atmosphere and the climate, filter pollution, or control pollination. These ecosystem services are often not noticed until they have been compromised or lost. That is why measuring indirect use values is often significantly more challenging. The **option use value** reflects the significance people place on being able to use a resource in the future, even if they are not current users (for example, a national park).

**Nonuse value** is derived from the knowledge that the natural ecosystem is adequately maintained. Being adequately maintained is important, either because individuals appreciate a resource even if they do not actually plan to use it (that is, existence value), or because they appreciate that the ecosystem resource will be passed on to future generations (bequest value).

Figure 4-1: Total Economic Value



Source: World Bank

The valuation methods are determined according to the type of ecosystem value. Some examples are shown in Table 4-1.

<sup>40</sup> Munasinghe, Mohan. 1993. *Environmental Economics and Sustainable Development*. Report. Washington, DC: World Bank.

**Revealed preference techniques** value ecosystem services by looking at people’s actual preferences—that is, their willingness to pay the **market prices**—or by estimating changes in yield associated with altered ecosystems (**change in productivity**). Other examples include inferring the value of visitor trips based on time and costs incurred getting to a site (**travel-cost method**), and establishing a price premium associated with environmental attributes, such as the fact that houses near clean rivers are worth more (**hedonic pricing**).

**Stated preference approaches** involve questionnaire surveys that ask individuals about their preferences. For example, **contingent valuation** asks individuals about their willingness to pay to secure their preferred environmental option; for example, recreational visits.

**Cost-based approaches** rely on market costs to provide a proxy for the true value. They are well suited for determining the value of provisioning or regulating services. The value of a wetland ecosystem for flood control can be estimated based on the cost of building a human-made equivalent (**replacement cost**) or based on the predicted flood damage it prevents (**damage costs avoided**).<sup>41</sup>

Table 4-1: Categories of Ecosystem Services and Typical Methods for Their Valuation

Ecosystem services <sup>42</sup>	Supporting	Provisioning	Regulating	Cultural
	<ul style="list-style-type: none"> <li>• Production of nutrients</li> <li>• Soil formation</li> </ul>	<ul style="list-style-type: none"> <li>• Food</li> <li>• Water</li> <li>• Fiber</li> <li>• Fuel</li> <li>• Genetic resources</li> </ul>	<ul style="list-style-type: none"> <li>• Climate regulation</li> <li>• Flood regulation</li> <li>• Water purification</li> <li>• Disease/pest regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Recreation</li> <li>• Aesthetic</li> <li>• Education</li> <li>• Spiritual</li> </ul>
Value	<i>Supporting services maintain the other types of services and are valued through the other categories.</i>	<ul style="list-style-type: none"> <li>• Direct use</li> <li>• Option value</li> </ul>	<ul style="list-style-type: none"> <li>• Indirect use</li> <li>• Option value</li> </ul>	<ul style="list-style-type: none"> <li>• Direct use</li> <li>• Option value</li> <li>• Nonuse value</li> </ul>
Valuation methods (examples)		<ul style="list-style-type: none"> <li>• Market prices</li> <li>• Replacement costs</li> <li>• Change in productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Avoided damage costs</li> <li>• Replacement costs</li> <li>• Change in productivity</li> <li>• Hedonic pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Stated preference surveys</li> <li>• Travel-cost method</li> </ul>

Source: Authors

## 4.2. Application of Economic Valuation in Armenia

Currently, the practice of economic valuation in Armenia is based on very basic calculations offered and required by a number of legislative acts. The Law on Targeted Use of Environmental Charges Paid by Mining Companies (2001) established the mechanisms of returning collected fees to the communities. The Law on Environmental Impact Assessment (1995) is further supplemented by the supporting bylaws and secondary legislation dealing with the impact on air, water and land resources, flora and fauna, and forests, including relevant calculations.<sup>43</sup> The current revision of the EIA Law may allow for further enhancements and new revisions of the subjected bylaws, as well. As already noted, there is a discrepancy between the management of mine tailings and their associated impacts, and calculations related to this segment of mining operations either has not been conducted or is not available for the purposes of this paper. Furthermore, these calculations do not reflect the far-reaching

<sup>41</sup> World Business Council for Sustainable Development. 2011. “Guide to Corporate Ecosystem Valuation.” <http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=104&NoSearchContextKey=true>.

<sup>42</sup> Definitions are based on the Millennium Ecosystem Assessment.

<sup>43</sup> Order of Assessment of Environmental Impact of Economic Activity on Air (2005), Order of Assessment of Environmental Impact of Economic Activity on Water Resources (2003), RA Law on Compensation of Damages Caused to Flora and Fauna by Illegal Activities (2005), and Decree on Minimum Rent Price for Forests Defined as State Ownership (2010).

impacts of mining operations and do not include clauses on the potential impact on human health and the costs of health-care provisions as related to the health impacts borne by the population.

The case study of the Teghut mine is used in this paper to illustrate the discrepancies in the calculations and valorization, as presented in Box 8. The case study was done as part of the EIA done by ACP—the company exploiting the Teghut copper-molybdenum mine—and also as part of the Working Plan of the company. The evaluation focuses on air-pollution damage, water resources damage, land damage, and soil resources damage. The economic damage, per the ACP evaluation, is calculated as a sum of the following components: annual damage caused by the air-polluting emissions, annual damage caused by water pollution, annual damage caused by destruction and contamination of land resources, annual damage caused by alienation of land, and annual damage caused by destruction of soil resources.

The calculations were analyzed and compared in the independent evaluation per the relevant damages to land, air, water, forests, and soil resources. No actual data collection or measurements were done, so the reevaluation signifies the recalculation of the economic damage indicated in the mentioned documents, unless the initial data sufficed to realize the estimation based on Armenian environmental legislation.

Some of the discrepancies noted included additions of sums (those based on area or volume) that do not readily add up; the air-polluting dust coefficient used has a wrong decimal point, which leads to lesser results (values); and the forestry impact is calculated solely on the basis of removed lumber. In addition, the Working Plan does not address all relevant environmental impacts and associated economic damages.

Furthermore, the guidelines that were used—the Methodical Guidelines for Environmental Impact Assessments of Mining Facilities` projects, Saint Petersburg-Moscow, 1992—appear to be outdated and do not account for more than 20 years of changed economic, environmental, and legislative requirements.

#### Box 8: Teghut Mine Comprehensive Economic Analysis<sup>44</sup>

The comprehensive economic analysis for the Teghut mine includes assessment and economic valorization of the damage caused to the natural resources, specifically land, air, water, forests, and soil resources. This analysis was not carried out based on data collection, but on the data provided by the Working Plan of the ACP, the Teghut mine operator, and the calculations set forth in the Armenian legislation. It is important to note that in such calculations, one must take into account the time period for which the concession has been granted and the reserve expectancy of the mine, and not only the time during which the mine has been operating.

**Air Pollution:** The total annual damage caused by the air-polluting emissions is calculated by ACP based on the Methodical Guidelines for Environmental Impact Assessments of Mining Facilities` projects, Saint Petersburg-Moscow, 1992, using the following formula:

$$Y = J \cdot k \cdot \sigma \cdot \sum_{i=1}^n f_i \cdot A_i \cdot m_i, \text{ where}$$

J refers to specific damage, with a conventional amount fixed at 2.4 Soviet rubles per ton;

k refers to a multiplicative coefficient, taking into account the price index compared to the 1984 price level fixed at 400 drams;

$\sigma$  refers to hazards of spread-out of polluting emissions;

i refers to the type of polluting substance;

$f_i$  refers to the nature of diffusion of the i-type polluting substance;

$A_i$  refers to relative aggressiveness of the i-type polluting substance; and

$m_i$  refers to annual amount of the i-type polluting substance.

The result of the calculation is the following: economic damage caused by air pollution equals 12,895,130 drams (US\$3,223.80) annually. The ACP Working Plan includes a section titled “Annual Environmental Damage Caused by Construction Works” in which the total economic damage from construction works is estimated by the ACP to be 21,010,240 drams (US\$52,525.60). This value does not include damages caused by air pollution and settling or airborne particles, nor the total damage of the associated environmental impact. The recalculated value of the economic damage from construction works comes out to be 65,103,450 drams (US\$162,758.60). The values of air-pollution damage

<sup>44</sup> Vardgesyan, Edita. 2010. *Economic Evaluation of the Ecological Damage Caused by Teghut Copper Molybdenum Mining Exploitation*. Report. Armenian State University of Economics. Yerevan.

estimated by the ACP need to be adjusted (increased) in order to account for using appropriate methodology as prescribed by pertinent legislation<sup>45</sup> and using correct values (fi and  $\sigma$  are not calculated correctly); the value of construction work damage to the environment were not adequately included in either the air-pollution calculations or the total environmental-impact calculations. In addition, the calculated values look at a yearly sum and not the damages incurred over the whole construction and implementation period.

**Water use and contamination:** The water damage section is devoted to assessment of damage caused by the pollution of water by various substances such as ferrous, ammonium, arsenic, calcium, and so on. The calculation is based on the rule:

$$Y = J \cdot k \cdot \sigma \cdot \sum_{i=1}^n A_i \cdot m_i, \text{ where}$$

$\sigma$  refers to the hazards of spread-out polluting wastage, in accordance with the basic methodology, which again is the Methodical Guidelines for Environmental Impact Assessments of Mining Facilities' projects, Saint Petersburg-Moscow, 1992; it is fixed at 2.37;

$A_i$  refers to the relative aggressiveness of the i-type polluting substance;

$m_i$  refers to annual amount of the i-type polluting substance;

$J$  refers to specific damages, with a conventional amount fixed at 2.4 Soviet rubles per ton; and

$k$  refers to a multiplicative coefficient, taking into account the price index compared to the 1984 price level fixed at 400 drams.

Then the result was multiplied by 25, the number of years the license is valid, so the total damage was found to be 165,502,500 drams, or about US\$413,756.

**Land resources:** No available data could be used for estimation based on the methodology prescribed by the law; hence, a similar methodology to the one used by the ACP was used to recalculate the values of damaged land impacted by the project and permanently altered—some 734,598 hectares (land area determined by the RA Government Decree N 1278).

**The result was 1,093,394,312 drams, or US\$2,733,485.78.** This value was calculated based on the coefficients reflecting the losses of the assimilation potential of the destructed land resources for different types of land and activity respectively (mining, flotation plant, tailings, and so on). Nonetheless, the total cost of land damages must also include the cost of restoring the land to its previous state.

Since the soil layer from the project site will be damaged or permanently removed,<sup>46</sup> the cost of the land must be determined as capitalized value multiplied by the affected land area, based on the average cadastral revenue of agricultural land for the duration of the project (from the start of activities until remediation of the soil layer), and by the regional coefficient of the environmental value of the land type, as well as by the coefficient of the economic damage to the land.

It is the mining company's responsibility to restore the land area back to a safe state and to make it usable for agricultural purposes, in accordance with RA Decree N 1347 15.08.1994 "On an order to use the earth resources." Some increased costs for productivity of adjacent land plots should be necessarily added in, since it is well recognized that the losses from reduced productivity are generally higher than the direct losses of the destructed area (normally some four to five times higher). Such a correction would considerably increase the total cost of the land damage. Added to this value should also be the decreased productivity of the adjacent plots caused by dust and other particles that are a direct result of mine construction or operation and that settle on adjacent land plots used for agriculture. The calculations are predominantly done for winter wheat, but a number of other crops that yield higher revenues (such as potato) need to be considered.

**Forests:** The evaluation of the damage to the forests is in the scenario used by the ACP simply based on the value of the harvested wood and does not in any form review the impact on the ecosystem services provided by the forests that are impacted by the project. Furthermore, the estimated volume of timber does not include the amount of sustainable harvest. No forest by-products (mushrooms, berries, medicinal and edible plants, wild fruit trees, and so on) are taken into account, although the by-products are of great importance for the survival and living standards of local population. The forest plays an essential role in nutrient cycling and carbon cycling, as well as in the hydrological cycle. The forest area that is going to be harvested is situated just on the origin of rivers and underground waters flows.<sup>47</sup> It also provides a habitat for plants, animals, and bacterial and fungal organisms, including rare and endangered species that are a source of genetic information. It has significant recreational, health, aesthetic, and historical-cultural functions. Also its soil-protecting function is of great importance for support of high productivity of adjacent agricultural land areas (on some international investigations estimation of similar problems the 15- 25 percent losses in soil productivity are possible). All these imperative functions of forest are absolutely ignored by project initiators. For instance, even if it is recognized by the ACP that the terrestrial slope of the forest area is up to 40 grades, this fact was totally ignored in the Working Plan while the RA Forest Code prohibits the harvest already by 30 grades even for sanitary purposes to avoid the breach of soil protective function of the forest, and consequently the damage caused was not considered.

<sup>45</sup> RA Government Decree N 91 "Order of assessment of the environmental impact of economic activity on the air."

<sup>46</sup> Point 20 of the RA Decree N 92 25.01.2005 "Order of assessment of the environmental impact of economic activity on the land resources."

<sup>47</sup> Hovhannisyanyan, Qnarik, and Artak Ghukasyan. 2008. *Analysis of Protection of the Environment from the Teghut Copper-Molybdenum Deposit Exploitation: The Problem of Teghut Deposit*. Opinion of NGOs and independent experts. Yerevan, p. 58.

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In addition to the research on the Teghut mine, a number of other projects and initiatives have looked into specific ecosystem valorization in Armenia. These include an Upper Hrazdan River Basin pilot, Lake Sevan modeling, but still have very little impact on the revisions of the pertinent legislation. A brief summary of these projects is given in Annex 4.

The Law on Nature Protection and Nature Utilization Payments of 1998 and the Law on Environmental Impact Assessment from 1995 both refer to a system of economic instruments to regulate environmental pollution and protect natural resources. A system of nature use payments was established and further enhanced through a Government Decree on Rates for Nature Utilization Payments (1998) and the Law on Rates of Nature Protection Payments (2006). A series of bylaws comprising the government decrees—such as on the assessment of environmental impact on air quality (2005), water (2003), land resources (2005); illegal activities on flora and fauna (2005), rents for forest use under state ownership (2010)—further detailed the economic valuation and price for environmental damage.

The revenue for implementation of environmental investments in Armenia is accumulated in a system of environmental funds. Allocation of payments for capitalization of the Environmental Protection Fund started in 2005, the resources of which are exclusively used for rehabilitation of land areas deteriorated as a result of mining extraction and research. As of January 1, 2011, the allocations to this fund amounted to 338 million drams.

An extra budgetary account of the Special Environmental Fund was created and functions using funds from voluntary payments, donations, and contributions made by legal and physical entities. During the period from 2005 to 2010, physical and legal entities made voluntary donations, contributions, and offerings to the fund in excess of 260 million drams.

In 2004 a Fund for Forest Rehabilitation and Development was established to support the process of forest rehabilitation in the Republic of Armenia and to create favorable conditions for maintaining forests in the country.

In 2011 a Fund for Rehabilitation, Preservation, and Development of Lake Sevan was established for reversing the degradation, restoration, and protection of the Lake Sevan ecosystem as a strategically important freshwater resource.

Furthermore, Article 61 of the Mining Code stipulates that mining companies must pay fees for implementation of environmental protection measures, contributions to nature, and restoration of lands damaged by mining activities, as well as fees for monitoring the program, ensuring the safety and health of people in mining areas, and disposing and storing industrial waste.

The legal framework established for payment for environmental damage done by the mining sector governs the payments from mining companies to the state budget. Based on the available data, the payments for including those for environmental damages are summarized in Table 4-2. Some of the funds are returned to the local communities around the mines through a series of locally defined investments for improving the environmental conditions. For the more targeted use of these payments, the Law “On the Republic of Armenia budget system” (2001) stipulates that the “total sum of budget funds earmarked for environmental programs shall be no less than the total of nature protection and nature use payments collected in the preceding second budget year.” While this principle reflects taxation policies that return rents for nonrenewable resources to the public, there are policy uncertainties discussed in this paper that can accelerate the rate of depletion of nonrenewable resources, thus countering the sustainability principle “that future generations are not worse-off.”

Table 4-2: Payments for Environmental Damage Made by Mining Sector (2008<sup>48</sup> and 2012<sup>49</sup>)

<b>Payments into state budget (2008)</b>	<b>Amount (drams) in 2008</b>	<b>Amount (drams) in 2012</b>
Natural resources use payments	2,426.1 million for 11.6 million tons ore extracted	2,154.4 million
Environmental fees	2,932.3 million	n/a
Value-added taxes	36.3 million	2,800.6 million
Profit taxes	6,023.9 million	15,410 million
Royalties	4,789.0 million	15,675 million (new royalties) 205 million (old royalties)
Expenditures for the environmental protection purposes (contractual liabilities)	123.3 million	935.64 million
<b>Other general indicators</b>	<b>Amount in 2008</b>	<b>Amount in 2012</b>
Total employment in metallic mines (number of workers)	3460	10,007
<b>Metallic industry output (total)</b>	85.3 billion	187,4261 billion
Metallic—manufacturing of product	104,955.3 million	
	7.9 billion	5,8979 billion
<b>Nonmetallic industry output (total)</b>	48,576.63 million	
Nonmetallic manufacturing of product		

There are two main shortcomings of the current system in which environmental payments, fees, and “compensations” for environmental damage are accumulated in the state budget. One problem is that the funds are used in a highly centralized manner. Another problem is that the charges collected for the purpose of funding environmental protection measures and programs are only partially used for this purpose. Analysis of the available data shows that more than half of the resources collected for environmental protection purposes are used to finance other priorities.

Policies that arbitrarily manipulate the cost of environmental degradation by keeping relatively low rates of environmental payments do not credibly reflect the genuine economic value of the resource and the cost of environmental damage. The Law on Targeted Use of Environmental Charges Paid by Mining Companies<sup>50</sup> (2001) recognizes the adverse impact of economic (mining) activity on the local communities and the necessity for compensation. However, payments stipulated therein are not based on economic valuation of ecosystem services and do not reflect the real livelihood loss. The inefficiency of the system of environmental payments and environmental protection interventions at the community level is officially recognized.<sup>51</sup> Therefore, the policy makers and decision makers need to make informed choices and set those rates at a level sufficient to address the impacts from the mining industry and stimulate behavior changes. Current policies refer to the need to develop regulatory instruments to ensure efficient (sustainable) use of natural resources.<sup>52</sup> Although this is a positive start, the efforts for effectively applying such instruments must not wane.

Figures from the Ministry of Nature Protection report from 2011 show that during recent years, nature protection payments have increased by 15 times, growing from 608 million drams in 1998 to 9,103 million drams in 2010. Nevertheless, these numbers are too low as a percentage of the GDP (some 0.26 percent) to truly reflect the rents collected for depreciation/damage of environmental resources due to economic activities. In addition, different values for the same period are available from the

<sup>48</sup> Draft Design of the Framework of RA Mining Sector National Policy and Development Strategy. 2010.

<sup>49</sup> National Statistical Service of the Republic of Armenia. 2012. “Armenia in Figures.” <http://www.armstat.am/en>.

<sup>50</sup> <http://www.parliament.am/legislation.php?sel=show&ID=1716&lang=arm>.

<sup>51</sup> RA. 2008. *Second National Environmental Action Program*. Report. Yerevan, p.19.

<sup>52</sup> Ministry of Nature Protection. 2011. “Ministerial Report.” [http://www.mnp.am/images/files/nyuter/2012/report2007-2011\\_eng.pdf](http://www.mnp.am/images/files/nyuter/2012/report2007-2011_eng.pdf).

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National Statistical Service and amount to 4,808.6 million drams in 2010. This is even less than the numbers stated above and amounts to only 0.14 percent of the GDP (for 2011 per the NSS, the numbers have slightly increased to 5,596.1 million drams and 0.15 percent of the GDP). In countries with similar economic parameters as Armenia, the cost of environmental degradation is in the range of 2 to 5 percent of the GDP. This means that the actual cost of the degradation of the natural environment exceeds the level of aggregate payments by more than 32 to 40 times.<sup>53</sup>

Other legal acts can benefit from strengthening of the principle of economic regulation for use, restoration, and protection of natural resources. For instance, the Water Code defines water resources, water supply, wastewater systems, and respective baselines for water-use permit fees charged for water intake and wastewater discharge. In practice, however, wastewater discharges only apply to piped wastewater discharges. The new Mining Code of the Republic of Armenia (2011) requires mining companies to restore deteriorated land at the level of its original state but does not explicitly mandate restoration of damaged ecosystem services like those provided by forests, watershed, and so forth—notwithstanding the general provisions for protection of the environment during mining and exploration. The Mining Code foresees payments for environmental protection purposes. The formulas for calculating these payments are included in the Government Decree N 1079-Ն “On procedures of calculation of charges for the establishment and spending of the authorized capital for environmental protection purposes, as well as for the membership of the professional commission” issued on August 23, 2012.

### *Revenues, Employment, and Poverty*

According to statistical reports provided by mining companies, a total of 7,479 people (including 1,219 women) were employed in the mining sector of Armenia in 2012, which is 1.8 percent of the total workforce.<sup>54</sup> According to the NSS integrated survey of the level of well-being of households, a total of 10,007 people (including 2,080 women) were employed in the Armenian mining sector in 2012, which is 0.9 percent of the total employed workforce.<sup>55</sup>

It is expected that new mine developments will employ more people, including in the auxiliary services, and will help reduce poverty. However, recent research<sup>56</sup> indicates that mining may have the opposite effect in the long run. According to research results, a 0.1 percent increase in mining’s share of the GDP leads to a 0.07 percent increase in poverty. The reverse is also true: A similar decrease in mining leads to a proportional reduction in poverty. The same research directly points to the need for a socially inclusive program and planning of mining developments supported by policies for benefit redistribution that contribute to raising the opportunities for prosperity of mining communities.

## **4.3. Valorization of Environmental Services in SEAs**

### *Integrating Ecosystem Services into SEAs*

The economic valuation of ecosystem services may improve the design of economic interventions by looking into costs and benefits and suggesting trade-offs to offset negative impacts or rationalize economic benefits. SEAs provide an integrated platform for ecosystem valuation. The ecosystem valuation approach is not a solution to fundamental problems such as poor planning, regulatory inefficiencies, or inadequate resource allocation. It can, however, be a powerful tool for policy makers to facilitate incorporation of environmental issues, which is why policy makers should be aware of its

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<sup>53</sup> Ministry of Nature Protection. 2011. “Ministerial Report.” [http://www.mnp.am/images/files/nyuter/2012/report2007-2011\\_eng.pdf](http://www.mnp.am/images/files/nyuter/2012/report2007-2011_eng.pdf).

<sup>54</sup> Information source: NSS, based on statistical reports submitted by mining companies. Nonpublic information provided by NSS.

<sup>55</sup> Information source: NSS, based on findings of integrated survey of well-being level of households. Nonpublic information provided by NSS.

The economically active population in 2011 was 1,440,900, including 1,175,100 total employed. The data for 2012 are not available yet.

<sup>56</sup> Grigoryan, Aleksandr. 2013. “The Impact of Mining Sector on Growth, Inequality, and Poverty: Evidence from Armenia.” Paper presented at the American University of Armenia Symposium, “Emerging Issues in Environmental and Occupational Health,” April 22–23.

complexity as well as the constraints of its application. The following addresses the advantages of using ecosystem valuation in strategic environmental assessments of programs, plans, and policies to shift development toward a more sustainable path. These are based on case studies<sup>57</sup> that used empirical data and qualitative information.

- **Integrated thinking:** Ecosystem services cover a number of different environmental components and inherently offer an opportunity to look at a variety of effects and complex causal interrelationships. At the same time, the integrated nature of ecosystem services could present certain limitations, due to the nonlinearity and uncertainties associated with the ecological processes.
- **Elevation of the position of environmental concerns in decision-making and assessment processes:** The scoping stage of traditional environmental assessments deals with the question, “What are the most significant likely environmental impacts of the plan, program, or project?” An ecosystem service approach would adapt this to, “What are the most important ecosystem services being provided in the area?” This is potentially a more effective framing of the policy questions that could influence strongly decision makers and stakeholders, since the environment is also seen as generating benefits.
- **Stakeholder engagement:** Framing discussions around ecosystem valuation by describing the benefits and uses is an effective tool to facilitate understanding of how communities perceive and value their local environments.
- **Reduction in conflicts between traditionally opposing environmental and economic arguments:** Ecosystem services emphasize the wider economic benefits of certain habitats and land cover types such as wetlands. Some practitioners voiced doubts about the legal weight of decisions based on monetary valuation of ecosystem services. If the future cannot be perceived clearly, arguments supporting the economic benefits of ecosystem services can be tailored around the uncertainties that are transformed into estimates of future risk and monetized.
- **Decision makers can reflect on the environmental impact of a plan, program, or project, rather than just vice versa:** It is possible to consider how ecosystem services support the objectives of a particular plan, program, or project, as well as how protecting or enhancing the environment may improve the designed results.

The valuation of ecosystem services can be embedded in all stages of the SEA process, as shown in Table 4-3.

Table 4-3: Valuation of Ecosystem Services in the SEA

SEA process	Gains in SEA process from valuation of ecosystem services
Screening	<ul style="list-style-type: none"> <li>• Economic valuations more clearly highlight the implications of ecosystem services for human well-being.</li> </ul>
Scoping	<ul style="list-style-type: none"> <li>• Mapping the relationship between ecosystems and the current or potential stakeholders (in terms of benefits) can influence the definition of the goal and scope of the assessment.</li> </ul>
Identification and evaluation of impacts	<ul style="list-style-type: none"> <li>• Analysis of the conditions and trends of relevant ecosystem services.</li> <li>• Costs and benefits for the different stakeholder groups of ecosystems changes.</li> </ul>
Comparing options <ul style="list-style-type: none"> <li>• Prioritization</li> <li>• Mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• By considering the economic valuation of ecosystem services, policy appraisals can take into account the full costs and benefits of the proposed measures. Alternatives and scenarios gain more distinctive features.</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Integration of ecosystem service-related indicators into monitoring systems.</li> </ul>

Source: Authors

<sup>57</sup> Baker, J., W. R. Sheate, P. Phillips, and R. Eales. 2013. “Ecosystem Services in Environmental Assessment—Help or Hindrance?” *Environmental Impact Assessment Review* (40): 3–13.

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## *Use of Environmental Services in Analysis of Alternatives*

Armenia has a legislative requirement in the EIA Law to carry out analysis of development alternatives in order to assess the severity of impacts of a proposed development against alternative solutions. The alternatives could include a scenario without the proposed development, as well as possible alternative approaches to the development itself. Going beyond the proposed development to compare other options of economic development in a given region is not done in EIA, since this should be addressed in higher-level strategic planning for a region, territory, or a sector.

*Environmental services* is not a term that is frequently used in the Armenian environmental legislation. Even though a number of strategic planning documents include calculations of associated environmental damages, none of them goes beyond a basic calculation of natural resource use to expand the focus on the environmental services provided by the forests, natural areas, land, and ecosystems. The sustainable development program (SDP), which was approved on October 30, 2008, reflects the main directions and priorities of economic development of the country and defines the main target indicators but says nothing on the evaluation of the ecosystem services as one of the ways of achieving them.

For the first time the term *ecosystem services* officially appears in the Republic of Armenia Proposal to the Rio+20 Summit document, which recommended inclusion in the summit's agenda of the discussion of payment for ecosystem services as a question to be reflected in the final outcome document.<sup>58</sup>

The Second National Environmental Action Plan (NEAP-2) (2008) does not suggest legislative improvements to include valuation of ecosystem services, although the NEAP-2 points to the need to improve the management of water, land, forests, and biodiversity. It does, however, call for improvement of the assessment of human-induced impact and valuation of damage to the environment, which in essence indirectly refers to ecosystem services.

### **4.4. Addressing Poverty Reduction and Equity**

*Recognizing the economic and social value of ecosystem services enhances transparent and engaged decision making. The process of ecosystem valuation can help highlight poverty and equity issues.*

The transparency of decision making is greatly enhanced when stakeholders are informed about, or preferably invited to, a planning process. The analysis of ecosystem services facilitates the identification of relevant stakeholders: Benefits and costs associated with ecosystem services can occur in areas that are geographically completely separate and can affect different groups of stakeholders, both of which would otherwise remain outside of the SEA scope. Expanding the opportunities for recognizing the potential positive and negative effects of certain changes is useful in gaining a new understanding of relevant poverty and equity issues.

Box 9 summarizes an example of applying ecosystem valuation techniques during the decision-making process. This eventually resulted in decisions that were beneficial for poverty alleviation and shared prosperity.

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<sup>58</sup> United Nations Conference on Sustainable Development, Rio+20. 2011. "Armenia." <http://www.uncsd2012.org/index.php?page=view&type=510&nr=187&menu=115>.

### Box 9: Lesson from the Nile Delta<sup>59</sup>

The government of Egypt had a plan to divert freshwater from the Rosetta branch of the Nile River in order to enhance agricultural output of a desert area where large investors have created an economy with annual value of US\$750 million (agricultural exports for the European market). The withdrawal of water would go at the cost of ecosystem services in the downstream Nile delta, where poor smallholder farmers and fishermen would suffer from deteriorating water quality and supply. Even though the investments in agriculture would make economic sense, the social consequences were highly unacceptable. A valuation study of the relevant ecosystem services revealed and quantified the consequences for the water resources.

The valuation study considered three alternative strategies for water supply to the project area:

- Strategy A0: Status quo, with unsustainable levels of groundwater pumping.
- Strategy A1: Surface water for irrigation (modest scale of the water diversion infrastructure) + groundwater use for peak demands.
- Strategy A2: No groundwater use at all + large-scale water diversion capacity to meet peak water requirements.

Simple quantification techniques were applied: net current value and benefit/cost ratio of investments at farm level, job creation, numbers of people negatively affected, and overall production losses in the Nile delta.

Some of the results are shown below:

*Net economic benefits of an average farm in the project area (quantitative):*

	A0	A1	A2
Benefit / cost ratio in 2017	0.99	1.07	1.05
Income per feddan in 2017 (LE/feddan)	-70	521	398
NPV (r=10%) million LE	975	1013	588

*Numbers of permanent and seasonal jobs in the project area (quantitative):*

Number of jobs	A0	A1	A2
Seasonal jobs	-29,809	273,255	210,070
Permanent jobs	0	54,607	41,897
Total jobs	-29,809	327,862	251,966

*Impact on drinking water availability (qualitative):*

Mahmoudia canal, taking water from the Rosetta branch, is the only source of public water supply to Alexandria, serving between 6 million inhabitants in winter and 8 million in summer. Any reduction in water supply will have severe consequences, as water supply is already under stress.

The results provided strong arguments for decision makers at the Ministry of Water Resources and Irrigation to reduce the scale of the initial project. The diversion of water from relatively poor smallholder farmers in the Nile Delta to large investors in the West Delta posed equity problems unacceptable both to stakeholders and government decision makers. The SEA study recommended adjusting the timing of the water diversion plan to the implementation of the national water resources management plan in order to avoid the equity problems. The final decision was that the water withdrawal project would have a phased approach, providing room to implement a water-savings program.

The use of an SEA at the earliest possible stage of the planning process guaranteed that environmental and social issues beyond the boundaries of the project area were incorporated in the design process.

<sup>59</sup> Commission for Environmental Assessment. 2008. *Valuation of Ecosystem Services and Strategic Environmental Assessment*. Influential Case Studies. Netherlands.

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## 4.5. Ecosystem Offsets—the Business Case for Ecosystem Valuation<sup>60</sup>

*Offsets specifically designed to deliver ecosystem services have proved to be a useful approach to environmental risk management for companies whose activities generate negative environmental impacts. Mining industry best practice involves compensation for impacts to some ecosystem services (for example, hydrology or community livelihoods); however, often these actions are not necessarily labeled as offsets.*

Offsets are part of the hierarchy for environmental mitigation measures. The mitigation hierarchy is the sequential framework in which impacts are avoided, minimized, and remediated and in which any residual impacts are offset. Biodiversity offsets can be designed to provide ecosystem services as their primary or secondary goal. Environmental offsets are a conservation measure and are meant to compensate for residual damages incurred as a result of adverse environmental impacts. Offsets are considered a solution only after the steps of avoidance and mitigation of impacts have been taken.

There are three main business drivers for (biodiversity) offsets in the mining industry: regulation, finance, and business risk management. Government policies now commonly refer to biodiversity offsets as a potential or required tool to meet government targets to balance development with environment: Almost 30 countries have offset-enabling legislation. Additional emerging drivers are broadening stakeholder expectations and more stringent financial lending requirements.

Box 10 describes a best-practice example of application of the mitigation hierarchy by the Rio Tinto Group in Madagascar.

### Box 10: Tsitongambarika Forest, Madagascar<sup>61</sup>

The Rio Tinto Group is investing in the Tsitongambarika Forest as a biodiversity offset designed specifically for biodiversity losses predicted for its QMM Ilmenite mining operations. In parallel, the mining company recognized that a range of ecosystem services would potentially also be provided by the biodiversity offset—for local communities, national government, and indeed global stakeholders in the case of forest carbon emission abatement. An economic valuation of the ecosystem services of the entire forest (larger than the proposed offset site) was undertaken by the International Union for Conservation of Nature (IUCN), which calculated that the ecosystem benefits include wildlife habitat (US\$2.9 million), hydrological regulation (US\$470,000), and carbon storage (US\$26.8 million). Potential ecotourism benefits (US\$2.5 million) were excluded from the analysis, due to uncertainties in tourism revenues. The study found that there were significant net economic benefits associated with forest conservation (about US\$17.3 million net for all costs), mainly due to carbon storage values.

A number of decision-making and good governance tools for environmental and social sustainability have been discussed in this section, and that can and currently are well integrated into the new mining development. An ongoing concern is the number of old mines that have been operational prior to the environmental legislation has been put in place. Retrofitting such mines and associated industrial complexes to meet the basic standards of environmental and social protection may be difficult to conduct and to supervise. Additional issues may arise from the ownership of the mines that have already been closed and the improperly managed tailing areas. Costs associated, in particular with the rehabilitation of the abandoned mines is directly linked to the formal ownership over the mines.

A number of good industrial practices, together with the legal provisions and requirements specific to mine closure, and financial instruments such as guarantees and financial sureties are discussed in the second paper of this series – “Enhancing Environmental and Social Sustainability of Mining in Armenia”.

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<sup>60</sup> International Council of Mining & Metals and International Union for Conservation of Nature. 2013. *Independent Report on Biodiversity Offsets*. Cambridge, UK: Biodiversity Consultancy.

<sup>61</sup> International Council of Mining & Metals and International Union for Conservation of Nature. 2013. *Independent Report on Biodiversity Offsets*. Cambridge, UK: Biodiversity Consultancy.

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## 5. Promoting Shared Prosperity Through Mining

*Resource extraction has led to economic growth and poverty reduction in several contexts, including in the United States, Australia, and Norway. In other contexts, however, the results have been more mixed. International experience shows that there are several preconditions for mining to result in positive social impacts. These include:*

1. an institutional setup that allows for efficient, transparent, and fair processes in the sector;
2. national-level, long-term vision and planning;
3. community involvement in the mitigation of negative impacts as well as in designing benefit-sharing activities; and
4. set-up and enforcement of measures to protect populations from the risks of mining projects.

This section describes best practices to promote shared prosperity through investments in mining.

### 5.1. Institutional Set-Up and Capacity

Positive impacts in the mining sector occur through institutions that are effective, accountable, and transparent. When there are questions about the effectiveness or accountability of institutions, perceptions of injustice arise that can erode support for the best initiatives. When institutions are not effective or accountable, the benefits of mining do not result in development and can instead create a great deal of social problems, including inequality, social tensions, alienation of some people from land and property, a reduced legitimacy of government, and negative environmental impacts.

It is important for institutions at all levels to be effective, accountable and transparent, for reasons presented below.

- At the national level, institutions that can authorize projects need to be transparent about the applications they receive, the criteria for approving or rejecting applications for mining projects, the negative social and environmental impacts expected from the project and their mitigation measures, the amounts that central and local governments will receive from mining, the additional benefits expected from the activity, and the processes for accessing benefits from mining companies. National level institutions then need to coordinate closely with local level ones to coordinate several activities, including consultations with affected communities, mitigation of negative impacts, resolution of grievances at the local level, the impact of the proposed activity on local level services, and local level benefit sharing.
- Local level institutions should be responsible for most activities taking place in affected communities and therefore also need to be capable of operating effectively, accountably, and transparently. The central government needs to place a great deal of focus on building the capacity of local level institutions in areas where mining will take place, since in many cases the responsibilities of these institutions will substantially increase because of the projects. Local level institutions should participate in organizing consultation activities (and ensuring participation of different social groups), monitoring activities to mitigate against negative impacts, and ensuring that companies are following established regulations and policies, benefits are being shared evenly at the local level, and benefits from mining activities are part of local development planning.

Because social impacts are felt mostly at the local level, decentralized decision making makes it easier for local institutions to take on a greater role in promoting shared prosperity and benefit sharing in the mining sector. Local level institutions need to have control over specific budgets and activities, and they need to have significant capacity to consult and promote community participation. These institutions also need enforcement and monitoring capacities.

Promoting accountable local and national level institutions also requires a vibrant civil society. For civil society to contribute to this process, it needs to understand the mining sector and its impacts, base its activities on promoting the greater good, and have the capacity to monitor the activities of local and national level institutions. These requirements can only be met if there is an appropriate

legal framework for civil society participation in a country, the government is transparent about its activities and revenues, and the government has entry points for civil society participation.

Mining companies can greatly benefit from a clear institutional set-up and from strengthened government capacities to use mining revenues for development. When this set-up is in place, the mining companies can rely on government institutions to use funds to meet the needs of citizens. Furthermore, citizens see the benefits of mining company activities more clearly and are more likely to support mining activities. Employees of mining companies, as members of local communities, are also more likely to benefit from better local services.

### Box 11: Benefit-Sharing Mechanisms in Different Countries

National level institutions can have very different roles in promoting benefit sharing in the mining sector. The two neighboring countries described below show different strategies for allocating benefits.

**In Colombia**, the central government receives applications from local governments, who propose projects to benefit their communities. The central government then allocates benefit-sharing funds according to the merit of the different applications.

**In Peru**, local governments in communities where there are mining activities receive funds from the mining companies and use these funds for their local priorities.

These set-ups reflect very different approaches to fair sharing of benefits. In Colombia, communities that are not impacted by mining also benefit, but perhaps there is a question about whether local governments who submit better proposals also have more capacity from the start. In Peru, communities that are impacted by mining benefit directly, which may be perceived as excluding communities where there are no mining resources.

The IFC has had a large role in helping promote the use of mining revenues for local development in its projects in these two countries. Some cases are described below:

**Ecopetrol, Casanare, Colombia:** Local communities requested that Ecopetrol provide services and infrastructure. The company worked with the IFC and the local municipality to improve the use of mining resources. The capacity of civil society to monitor the use of resources was also built. The result of these activities included a US\$8.5 million drinking-water project implemented by the municipality that benefited 10,833 people; a US\$10 million education project benefiting 3,200 people; a US\$9 million health project benefitting more than 10,000 people, and a US\$5 million sewerage project benefiting 2,700 people.

**Minera Yanacocha, Municipality of Los Baños del Inca, Peru:** Although the mining company was operating, there was significant opposition to mining activities in the area, and local communities did not think that they were benefiting from mining. There were questions about the accountability of the municipality. The IFC built the capacity of the municipality to invest revenues from mining, and also strengthened the capacity of civil society to hold the government accountable. Municipal investment grew from US\$1.4 million (2001) to US\$10.1 million (2009) as a result of these activities. Revenues from the mining sector were invested in rural electrification projects, water systems, health and education projects, and rural roads and bridges, among other activities. The percentage of citizens who understand the relationship between mining revenues and municipal investments also grew significantly, from 6.2 percent in 2005 to 31.2 percent.

Information from interview with IFC staff and IFC PowerPoint: *IFC Sustainable Business Advisory. Revenue Management: Enhancing Local Benefits from Extractives.*

**One mechanism that can help significantly increase the accountability and transparency of institutions in the mining sector is the Extractive Industries Transparency Initiative (EITI).** The EITI is an initiative launched in 2002 now based on a set of Standards that have been revised as of May 2013, to “promote and support improved governance in resource-rich countries through the full publication and verification of company payments and government revenues from oil, gas, and mining.” Through participation in EITI, countries can show a commitment to good governance, increase their scrutiny over revenue collection, and improve their investment climate. Implementing EITI, however, requires a commitment to transparency from the multiple institutions that manage revenues from the extractive industries, an agreement with mining companies to publish information

on revenues, and the capacity of institutions to verify payments and manage the dialogue about these revenues.<sup>62</sup>

### Box 12: Benefits of EITI

**The EITI** can greatly improve governance of the mining sector.

**EITI-implementing countries** benefit from an improved investment climate, providing a clear signal to investors and international financial institutions that the government is committed to greater transparency. The EITI also assists in strengthening accountability and good governance, as well as promoting greater economic and political stability.

**Companies benefit from the EITI**, since the process mitigates against political and reputational risks. Political instability caused by opaque governance is a clear threat to investments. In extractive industries, where investments are capital intensive and dependent on long-term stability to generate returns, reducing such instability is beneficial for business. Transparency of payments made to a government can also help demonstrate the contribution that their investment makes to a country.

**Benefits to civil society** come from increasing the amount of information in the public domain about those revenues that governments manage on behalf of citizens, thereby making governments more accountable.

Source: EITI Web site.

## 5.2. National and Local Development Planning

In a country like Armenia, where large parts of the national budget are expected to come from mining activities and where mining activities are expected to provide a great deal of employment in the short term, mining plans and strategies need to consider longer-term development objectives.

At the central government level, this means having a good idea of the mining resources in the country, the potential revenues that can be obtained from these resources, and which parts of the country will be most directly involved in mining. At this point, the government should build its own capacity to manage all of these resources and inform the population about these resources. Together with the population, the government can then prioritize the investments, based in part on potential revenues but also a careful consideration of the potential negative social and environmental impacts. Civil society involvement at this point is important, as its early participation and buy-in can improve social and environmental impacts and ease the process of implementing projects. The process of allocating benefits from mining should be clear and should be carefully communicated to the population. Transparency about the percentage of revenues returning to communities versus the percentage used for the central government is essential.

Table 5-1: Risks and Expectations of Different Stakeholder Groups

Governments	Industry	Local communities
<ul style="list-style-type: none"> <li>• Citizens expect governments to use mining revenues to their benefit.</li> <li>• Mining companies expect governments to manage relations with communities and act as representatives of citizens.</li> </ul>	<ul style="list-style-type: none"> <li>• Governments and citizens expect industry to manage social and environmental risks.</li> <li>• Citizens expect industry to have good business practices and operate transparently and accountably.</li> </ul>	<ul style="list-style-type: none"> <li>• Expected to support mining activities that bring about local benefits.</li> <li>• Expected to understand how to participate in local level decision making.</li> </ul>

Source: Authors

<sup>62</sup> World Bank, 2008. *Implementing the Extractive Industries Transparency Initiative: Applying Early Lessons from the Field*. Report. Washington, DC.

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Development planning is also essential at the local level in communities where mining activities will take place. Local government institutions should be the main point of contact between the mining operations, local community members, and the central government. They should have information on the amount of funds that will be received by the community from the central government and in some cases directly from the community. Local governments also need to know before the project starts how many workers the company is expected to employ and how many of these workers are expected to arrive from outside the community. This should inform their planning for schooling, health service provision, and economic development. It is important that gender issues be taken into account: In many cases mines attract people to communities who are seeking employment, but often these people are males who do not bring families. This can bring enormous changes in a society, as this dynamic also brings with it the opening of places of entertainment and can increase levels of prostitution and human trafficking in an area.

Local communities in areas where there is mining are likely to receive a large amount of funds as benefits from mining or as payment for the mitigation of negative impacts. Local governments need to plan for use of incoming resources. Involving the community in planning for the use of resources is important in ensuring that resources are used to address the priorities of the population. This can also increase the buy-in of the population for the project and can improve the relationship of the population with the local government, as well as the relationship of the population with the company. Local development plans need to include mechanisms to inform the community about process for distribution, seek the participation of a broad range of stakeholders in the process (including women and youth, as well as people of different socioeconomic status), and need to include grievance redress mechanisms that allow citizens to provide feedback on the use of incoming resources. This process of participatory local development planning can lead to longer-term positive social and governance impacts, as local governments and citizens learn to interact with each other and to establish and address priorities.

#### Box 13: Armenia’s Potential for Boosting Local Development Plans Through Mining Activities

Local governments in Armenia do develop plans for the medium term. In each marz, a three-year development program is designed based on poverty levels, the needs of the private sector, an analysis of social issues, an analysis of industrial and energy issues, agriculture, natural environment, tourism (rarely), urban planning, provincial and community-level infrastructure, and territorial management. The program provides an analysis of the present state and provides a program for implementation, assessment, and financing. Even though each program has a section devoted to natural resources and the environment, there is no assessment of the environmental services and their use. **These local development plans could be the basis for designing effective benefit-sharing mechanisms at the local level, however. With the right capacity building and support, marz-level governments could work with companies to determine the best use of funds.**

#### Box 14: Local Development Planning Versus Corporate Social Responsibility

There is often confusion about activities that contribute to local development and activities that companies carry out as part of their corporate social responsibility, or CSR. CSR can be defined as “[initiatives] to assess and take responsibility for the company’s effects on the environment and impact on social welfare. The term generally applies to company efforts that go beyond what may be required by regulators or environmental protection groups” (*Investopedia*). Although some CSR can fit in with local development, CSR is by definition company led. In many cases companies themselves decide what activities to support, often without coordinating with local government and without gathering information on local priorities and plans. Companies may also take into account how certain activities will impact their reputation and local community support, and not only whether an activity will have the best impact on a community.

Governments should aim to ensure that the mining sector contributes to local development planning more broadly. Local development planning should happen at the local government level, where local officials can gather the priorities of citizens, receive budgets from the government, and decide how best to use their resources, including those coming from mining activities, to benefit whole communities. Mining companies can choose to support these local development plans in ways that can improve their relationships with local governments and communities. This kind of activity goes far beyond CSR, focusing on the longer-term needs of a community and how best to fund community development.

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### 5.3. Preventing Social Risks

In countries where resources have led to positive social impacts, governments have in place clear safeguard processes that protect populations impacted directly by a project's activities. Social risks can be divided into risks for mining-sector workers and their families, risks for local communities, and national level risks. Some of the potential negative impacts of mining are listed below.

**Weak governance/corruption:** Mining can be extremely profitable, which can lead to corruption because some individuals may see these profits as an opportunity to benefit. Corruption may occur throughout the production chain: Individuals may see opportunities to benefit from processes of land acquisition, processes to obtain permits and licenses, enforcement of policies and regulations, and processes of taxing and distribution of mining benefits. On the other hand, companies may also see opportunities to facilitate mining activities through bribing officials, circumventing policies and regulations, or distorting profits. Weak policies in the sector can encourage this kind of behavior, which can ultimately have exponential effects in weakening the overall governance of a country.

**Inequality:** In most instances the mining sector is the main employer in the area where it operates. For the most part, the mining sector does not require people with high-level skills, but it does need some highly specialized individuals and some with management capacity. The bargaining power of those seeking low-skilled jobs in the mining sector is therefore limited: There are a large number of individuals who can work in those jobs and are willing to do so for low wages. Mining companies can therefore set low wages for these jobs and still have available labor. On the other hand, the pool of highly skilled individuals in communities where the mining sector operates is small. This means that the highly skilled individuals can negotiate their salaries more effectively. This could lead to high levels of inequality between those who have the skills in demand and those who do not.

**Less secure property rights/resettlement:** In cases where property rights are not clear or institutions to protect property rights are weak, property rights may suffer because of mining. In this kind of situation, mining companies have more power and resources than individuals and communities, which may lead to many losing access to land and property.

**Migration:** Mining could have an impact (positive or negative) on whether or not people choose to migrate. It may result in greater job opportunities (and therefore people may be interested in staying in their communities), or it could result in environmental or land losses that could convince some to migrate.

**Environmental damages/changes in land use:** Water, land, air, and biological resources are either not reproducible or have low rates of recovery, and the extraction of resources can lead to long-term damages. Environmental damage and changes in land use can also lead to lower agricultural outputs, lower rates of profit for tourism, and other similar effects.

**Health impacts:** Mining is likely to have impacts on health, either because of impacts on the environment and pollution or because of labor conditions in the mining sector.

**Skills:** The mining sector requires specific skills, depending on the technology it chooses to use. Workers in the mining sector may learn these very specific skills, which may have limited value in the broader labor market. Once specific mines cease to produce, or once workers can no longer work in the mining sector, in particular in areas where similar industrial skills are not needed, workers would be left without options.

**Dependence on the mining industry:** When the mining industry is present in a specific location, local communities can become dependent on it. The mining industry can have a large effect on all other economic activities in the community, which can also impact the educational system and infrastructure in an area.

All of these impacts can be limited to the local level (for example, a local mayor can be the central point of corruption) but can also affect the national level (if skills are skewed toward the mining sector, this can shape the development of a country's economy). Avoiding negative impacts is not easy, but several steps can be taken to mitigate against these risks, including:

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- **Assessing social costs:** Although it is difficult to determine the cost of many of the effects on people (both positive and negative), it is important to get an estimate of social costs before a project starts. In some cases social costs may greatly outweigh benefits, and in those cases a government may want to consider whether the project is in its best interest. In other cases mitigation of specific costs may be impossible, and a government would have to weigh whether these costs are acceptable. In the majority of cases, however, assessing social costs will lead to a greater understanding of how a community benefits and an understanding of the social groups that are likely to incur costs because of mining activities. Mitigation measures can then be put in place to prevent specific social groups and individuals from losing out. Measures can also be put in place to boost the positive impacts of a project (such as by encouraging the educational system to train individuals on the skills needed for employment in the mining sector).
  - **Establishing processes to compensate those directly affected by mining activities:** Modern compensation policies for people affected by a project should involve not only basic compensation for lost assets and lost access to resources, but also measures that aim at enhancing the livelihoods of the affected populations in the long term. This has been recognized in various national legislations as well as in international compensation policies and guidelines. There should be a clear process to establish who needs to be compensated, the amount of compensation they will receive, a process to ensure that the compensation was received, and measures to ensure that women and vulnerable groups are also obtaining adequate compensation. Because many of the negative impacts on individuals are likely to be tied to loss of lands and natural resources, governments can greatly reduce the negative impacts of the mining sector by ensuring that land rights are clear and that land and natural resource governance institutions operate transparently and accountably.
  - **Establishing and enforcing labor laws that protect working conditions:** Some of the negative impacts of mining on health are felt mostly by those working in the mining sector. Because many of those working in the sector are not highly skilled and do not have much leverage when negotiating with their employer, it is important for governments to have clear labor laws that protect workers. Governments should put in place and enforce laws that require companies to protect worker health, make it possible for workers to bring to light problematic working conditions without fear of retaliation, and let workers organize themselves to increase their negotiating power in relation to their employer. Governments should independently and transparently monitor working conditions in the mining sector and have sanctions for those companies where working conditions are not adequate.
  - **Using mining revenues to promote the development of alternative industries and skills:** Many of the national-level, long-term risks of mining can be mitigated through the development of industries other than mining and the promotion of skills in the population. If these alternative industries do well, the reliance of a country on the mining sector is reduced, which can prevent problems such as “Dutch disease” and can also make it possible for governments to prioritize protection of natural resources. Developing skills among the population can also help increase the employment options for citizens both within and outside of the mining sector.

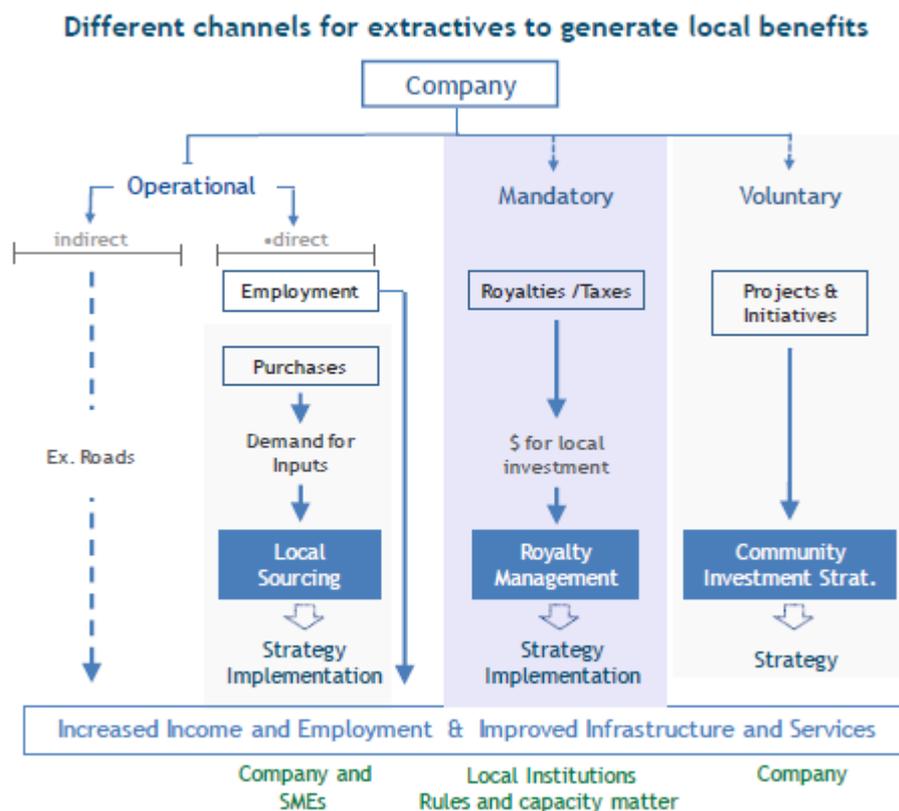
In addition to this, as mentioned earlier in this report, it is essential for governments to assess environmental impacts and make decisions about the suitability of investments based on this information. Environmental impacts can have great social costs, leading to long-term displacement of lands and livelihoods, as well as health impacts. Environmental impacts can affect people living far from mining areas, since water and air pollution can reach vast geographic areas.

#### 5.4. Sharing Benefits at the Local Level

Communities can benefit a great deal from the mining sector. Some of these benefits come directly from a company’s operations, such as through employment or compensation payments. Other times

benefits are indirect, such as when a community benefits from the infrastructure built for the project. Communities can also benefit from the use of revenues from mining, as has been described previously in this paper, or from corporate social responsibility activities. This section describes a comprehensive approach to benefit sharing, including examples of how communities have benefitted from mining in different contexts.

Benefit sharing refers to a commitment to channel some of the returns generated by the operation of the project back to the population of the regions/municipalities, where natural resources are exploited and infrastructure projects are developed. By receiving a share of the project benefits in addition to the compensation measures included in the project design, the project-affected people can achieve long-term improvement of their livelihoods. Mining projects can contribute to development through a number of channels. Some examples are presented below.



Source: IFC presentation: Revenue Management: Enhancing Local Benefits from Extractives

### *Indirect Benefits from Mining Operations*

Often, populations benefit a great deal from infrastructure put in place by mining companies for their own benefit. Mining companies often need to have good roads to be able to transport their products and may need to support health centers and educational facilities for their workers. Mining companies may also need to invest in landfills, sewerage systems, or water-supply infrastructure for their operations. Local communities sometimes benefit greatly from these investments, even if these are not designed to benefit their populations. Coordination between the mining companies and local authorities can increase these benefits both for the local populations and for the companies. Governments and companies can reach agreements so that infrastructure developed by mining companies can provide long-term benefits for communities, and in exchange governments can agree to share costs.

## Employment and Purchases

Local populations can benefit from mining development through direct employment opportunities and training. Many countries have legislative provisions that require local employment and skills development in companies.

In addition, indirect employment effects—such as through mining company purchasing and contracting—are also very important. A study by the World Bank and the IFC<sup>63</sup> demonstrates how employment in subcontracted firms that supply mines with goods and services is often equal to or much higher than direct mine employment: 14 times as high, in the case of the gold mine at Yanacocha (Peru). Estimated nonmine-related employment generated through multiplier effects is also much higher than direct or indirect mine employment: for example, 2.5 times as high as the others combined in the gold mine at Inti Raymi (Bolivia). Table 5-2 below summarizes the findings.

Table 5-2: Impact on Employment

Mines	Direct employment (no. employees)	Indirect employment (no. employees)	% filled by locals	Local nonmine employment	Total mine-related employment
<b>5 large</b>	5,100	14,500	~ 80%	18,700	3–25% of reg. employment
<b>3 medium</b>	380	865	> 30%	900	Small

Source: World Bank and IFC

## Royalties and Taxes

Mining companies pay corporate taxes and royalties to governments. The current global trend shows an increase in the overall taxation and royalties on mining companies, because governments view them as quite profitable in light of increased mineral prices.<sup>64</sup> The extent to which royalty collection and expenditure are decentralized from the general budget varies widely, as can be seen in Table 5-3:

Table 5-3: Examples of Decentralized Distribution of Royalties

<b>Madagascar:</b>	42 percent to communes of extraction; 21 percent to region; 7 percent to province
<b>Peru:</b>	20 percent to the district of exploitation; 20 percent to the province; 40 percent to other districts and provinces in the region; 20 percent to the region, including 5 percent to universities
<b>Indonesia:</b>	80 percent to the region (split into 64 percent to the regencies and 16 percent to the provincial government)

Source: Wall and Pellon

As has been mentioned earlier in this document, royalties and taxes provide benefits most efficiently if incorporated in local and national development plans.

## Projects and Initiatives

The benefits of mining are also shared through a mining company's own projects and initiatives. For the most part, however, it is better for communities if companies use their resource to support development plans. However, in cases where local capacities are limited, public services are absent or

<sup>63</sup> World Bank and IFC. 2002. *Large Mines and Local Communities: Forging Partnerships, Building Sustainability*. Report. Washington, DC.

<sup>64</sup> PWC. 2012. *Corporate Income Taxes, Mining Royalties and Other Mining Taxes*. Report. London. [http://www.pwc.com/en\\_GX/gx/energy-utilities-mining/publications/pdf/pwc-gx-miining-taxes-and-royalties.pdf](http://www.pwc.com/en_GX/gx/energy-utilities-mining/publications/pdf/pwc-gx-miining-taxes-and-royalties.pdf).

weak, and there is a need to demonstrate continued benefit from mining after operations have closed, foundations, trusts, and funds (FTFs)<sup>65</sup> can be a useful way to share benefits. FTFs are independent vehicles to channel revenues generated by mining operations to communities. FTFs can be used to deliver community investment programs for companies, facilitate the dissemination of government payments derived from mining for development, and manage compensation funds. Box 15 summarizes two examples.

### Box 15: Examples of FTFs

#### The Mozal Community Development Trust (MCDT), Mozambique

The MCDT is the community development arm of the Mozal aluminum smelter in Mozambique. The majority owner of the smelter is BHP Billiton. The MCDT was developed by the company and financed by an annual contribution of 1 percent of pretax profits, yielding approximately US\$2.5 million per year.

The MCDT is governed by the Mozal smelter's board of directors and is responsible for implementing the investment contributions and stakeholder engagement activities of the smelter. Although it is focused on projects in the immediate area of influence of the smelter, it has also delivered some projects in impoverished areas in the north of the country. Projects are identified in coordination with district-level government agencies, and several projects have been undertaken with significant cofinancing.

With a staff complement of nine, the MCDT represents a reasonably straightforward FTF model for the mining industry. By retaining complete control of governance, the company is able to exert significant influence over the activities of the MCDT, which is useful because the MCDT is the custodian of all community relationships for the smelter. Furthermore, at the time of the establishment of the trust, Mozambique had no national experience with mining FTFs at all.

#### The Asociación Los Andes de Cajamarca (ALAC), Peru

The ALAC is a corporate organization established as part of Minera Yanacocha's social responsibility program for the Cajamarca region of Peru. The ALAC was developed to increase corporate social investment within Yanacocha's area of influence, promoting participation by civil society, the state, and the private sector in sustainable development proposals.

The ALAC was originally intended to be a community foundation; however, due to opposition that emerged during the two-year community consultations, the ALAC eventually changed its model to a corporate foundation but kept its highly participative approach. The development of the ALAC was an addition to the community projects undertaken by Yanacocha. The continuation of existing programs gave the ALAC the time and space to develop its approach in a consultative and time-consuming, manner.

The participative approach is reflected in the governance structure for the foundation: three of the seven members of the board of trustees are from civil society. The ALAC plans to shift the balance of power from Yanacocha's owners (Newmont, Buenaventura, and the IFC) to civil society by changing the board's composition as the date of the mine's closure approaches. Also, the board receives guidance from an advisory panel with 10 representatives from civil society.

<sup>65</sup> Wall, Elizabeth, and Remi Pelon. 2011. "Sharing Mining Benefits in Developing Countries: The Experience with Foundations, Trusts, and Funds." Extractive Industries for Development Series #21, World Bank, Washington, DC.

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## 6. Establishing the Social Costs of Mining in Armenia

*Mining activities not only have environmental costs, they also have social costs and benefits. In many cases the activities of the mining sector are supported by policy makers who strongly believe in the positive short- and medium-term impacts of mining. This section will describe what we know about social impacts of mining in Armenia.*

Social costs associated with the mining sector can be divided into three different types of costs: costs for mining-sector workers and their families, costs for local communities and costs at the national level. As part of this study, work was done to establish some of the costs for workers and families, as well as costs for communities. Available datasets showing the health, education, employment, and overall satisfaction of different groups in Armenia were studied to understand some of these impacts. The work also tried to establish potential sources of inequality arising from mining-sector activities. The reasons for choosing these issues as areas for analysis are described below.

### 6.1. Social Costs of Mining in Armenia: Results

To carry out this work, existing datasets were gathered and analyzed, including data from the Caucasus Barometer (individual) dataset, the Household (member) Survey Dataset collected by National Statistical Service of Republic of Armenia (NSSRA), and the regional level dataset for Armenia collected by the NSSRA. The results follow.

**Health of workers in the mining sector:** Data from the 2009–2012 Caucasus Barometer Dataset indicate that health self-assessments for those working in the mining sector and those working in other sectors are similar. In both cases, on a scale of 1 to 5, individuals rate their health to be around 3.2 to 3.3. When those working in the mining sector are compared to those not working in the mining sector, both employed and unemployed, those working in the mining sector rate their health higher than those who are not in the mining sector. Household Survey (individual level) Data by NSSRA from 2009 confirms this result.

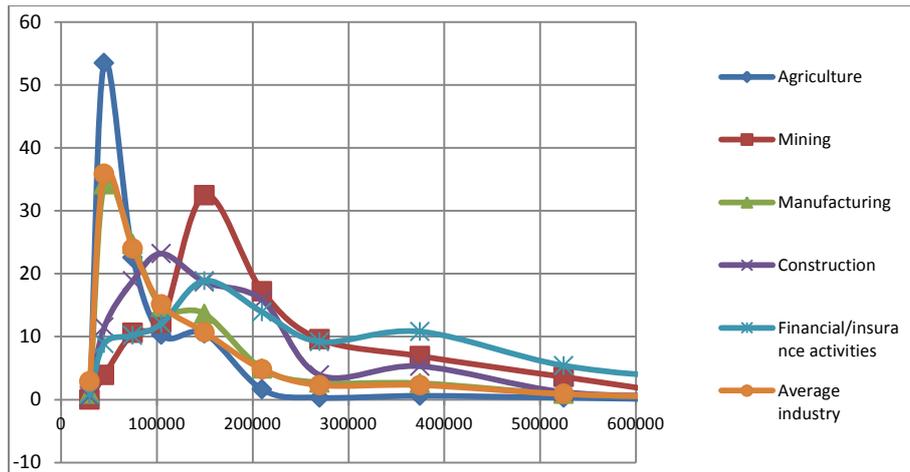
These data can be nuanced, however, by analyzing the rates of health of those in the extreme ends of the spectrum. When analyzing the highest end of the spectrum—those who believe they are in very good health—one can see that those who work rate their health lower than those that do not work. *Among those in mining, even less workers rate their health to be very good.* This points to potential negative health effects of working in the mining sector.

**Job quality:** The quality of jobs in the mining sector was also analyzed using the 2009–2012 Caucasus Barometer Dataset. According to this dataset, those working in mining are less likely than those working in other sectors to be satisfied with the quality of their jobs or with the compensation received. However, those in the mining sector have greater incomes than those working in other sectors. The mining sector also spends more per worker than any other sector except for finance, and it includes in its expenses skills training and development.

**Inequality:** Data do not clearly show mining’s impact on inequality. On the one hand, Grigoryan (2012) establishes a significant negative causal link between the mining sector and inequality for the period 2004–2010. On the other hand, the Gini coefficient for the marz with the greatest presence of the mining industry, Syunik marz, is low—indicating that in this marz, there is not a great deal of inequality. However, this discrepancy could be an indication that the impact of mining on inequality is local: While those working in the mining sector are better off than those in other sectors, those in sectors other than mining and affected by mining (such as agriculture) are worse off. When data are gathered at the marz level, therefore, one cannot see the impacts of mining on inequality. However, when gathering information by sector, one can see that mining promotes inequality between those working in mining and those working in other sectors. Within the mining sector, however, pay is high and few people earn a low wage, so inequality within the sector is low.

Figure 6-1 provides wage distributions for the key sectors.

Figure 6-1: Wage Distribution from 2010



Source: NSSA, RA

**Migration:** To understand the impact of mining on migration, this study compared rates of migration in areas of Armenia where the mining sector has a greater or smaller presence; the study also used the ETF Migration Survey to develop a model that estimates potential emigration intentions. Through both of these methods, the study found that mining reduces individuals' intention to migrate. This could be due to the fact that wages in the mining sector are high, which raises the opportunity cost of migration.

#### Case Study: Social Concerns in Kajaran

Kajaran is a young town established in 1956; today it has 8,439 inhabitants. Around 65 percent of the labor force works at the Zangezur Copper Molybdenum Combine, located 10 kilometers from the town. The company, one of the largest in the world, processes molybdenum and copper. (In 2012 the company processed around 17 million tones of ore.) According to the new expansion project, the company plans to increase its production to 25 million tones. The strong dependence of Kajaran's inhabitants on the company has a two-sided effect. Salaries are much higher than the average salaries (for similar work and skill intensities) in the country. The community also receives certain benefits from the company in forms of social protection and environmental expenses.

As for social expenses, the company officially reported ([www.zcmc.am](http://www.zcmc.am)) total expenditures of 1,370,036,000 drams in 2009, which amounts to around 161,000 drams per capita for the town. A certain portion of these spendings (around 10 percent) go to local government entities. Expenses on environmental programs were 2,138,666,000 drams in 2010, which is 250,000 per capita (the corresponding numbers for 2009 were 1,362,076,000 and 160,000). Total expenses toward improvement in work safety and security in 2010 was 214,097,000 drams. High compensation and the social corporate responsibility of the company, together with expected large tax payments to the local budget in the form of land and property taxes reallocated back to the community, are the sources of the high standard of living compared to most of the towns and regions in Armenia.

When observing the revenue structure of Kajaran's community budget, no substantial amounts are reported for revenues from external sources. For example, subventions (a subsidy attached to a certain problem) in Kajaran amount to 314 drams per capita, while the average number for the country without Yerevan is 150 drams. Kajaran receives twice as much as an average community, but the number is still very small. This evidence points out the absence of viable mechanisms for resource reallocation from the central budget to a local budget, aimed at compensating environmental and health damages.

Table 6-1: Efficiency Indicators for Community Budget

	Country level	In mining areas	Kajaran
Actual 2012 budget revenues from internal sources (per capita drams)	8,728	11,216	20,645
2012 budget revenues from internal sources (per capita drams), planned in 2011	9,481	11,949	20,670
Actual revenues from property tax, 2012 (per capita drams)	1,415	1,060	4,202
Transparency/accountability score 1 (min = 0, max = 1)	0.386	0.305	0.5
Transparency/accountability score 2 (min = 0, max = 5)	1.780	1.308	2.0

Source: Ministry of Territorial Administration, RA.

The picture is somewhat different when comparing revenues from internal resources. Table 6-1 summarizes some of the facts about revenues from internal sources as well as transparency measures for communities, based on four underlying criteria of community activities.<sup>66</sup> Actual budget revenues from internal sources are 2.36 times more than the average in Armenia, and almost twice as high as in other communities with mining industries. A substantial part of this difference is due to the compensation for use of state and community lands, which is a short-term phenomenon. (This is not a collection of land taxes, which is a tiny number.) There is also a difference for the property tax: per capita 4,202 drams for Kajaran versus 1,415 drams on average and 1,060 drams in other mining areas.

Overall, we observe that people in Kajaran are substantially compensated for working in mining, a vulnerable sector toward health and environmental issues. The question is then, “Do these compensations, mostly coming from the company and local sources of budget revenues, cover all (or the main part) of social costs incurred by the extractive sector?” Expenses on environmental protection can be split into three categories: land (water included), air, and biological. Such expenses aim to decrease social costs both in the short and (especially) in the long term. One way to assess whether measurements initiated by the company and local community and state are sufficient to protect the environment is to observe the extent of degradation of natural resources. We do not find much information about air pollution in Kajaran. The town is covered by mining dust, especially right after mine explosions, when dust outflows from the mine. There is much evidence compiled by local media and researchers that insists that the extent of air pollution (molybdenum, quartz, lead, and other metals) in Kajaran is critical.<sup>67</sup> However, there is no official data series on air pollution in Kajaran and the surrounding area. We have found data only for 2009, according to which the presence of sulfur dioxide is less than the marginal acceptable concentration (MAC); but ammonium ion exceeds MAC by 18 times.

Table 6-2: Concentration of Toxic Elements in Voghji River

Voghji River	Number of times more than MAC					
	2008	2009	2010	2011	2012	
1.7 km above Kajaran						
	Copper	3	2.5	4	3	4.1
	selenium	3	3			3.9
1.8 km below Kajaran						
	nitrite-ion	1.7	1.4	1.4	1.5	3.5
	ammonium ion	18.5	2.6	9	11.3	17.1
	Aluminum	1.7	1.6	2.3	1.7	2
	vanadium		2			
	Manganese	2	4.8		2.1	2.7
	Copper	9	10	15	13	10
	selenium	3	5	5	4	1.2

Source: ArmEcomonitoring ([www.armmonitoring.am](http://www.armmonitoring.am))

<sup>66</sup> RA Ministry of Territorial Administration. 2013. “Community Budgets.” <http://www.mta.gov.am/hy/budgetary-performance>.

<sup>67</sup> Relatively early literature (articles, interviews, evidences) can be found in news articles on mining in Armenia (related to the Armenian Copper Program, Alaverdi Smelter, Teghut Forest). Compiled through May 5, 2007.

Instead, we have data series on toxic metal and other elements' concentration in surface water—namely, the Voghji River—flowing through Kajaran. Table 6-2 indicates the ratios by which the concentration of elements in the river exceed MAC. Though the numbers are fairly large, according to the criteria accepted for surface water resources, a high level of pollution is reported if concentration is higher than the MAC by 10 to 100 times. In Table 6-2 we see that ammonium ion and copper concentrations are large enough to assess the level of water pollution as high. We also observe a positive trend for most of the elements, which is worrying. On the other hand, a study launched by Yerevan State University in 2011, titled “The Level of Pollution by Heavy Metals and Aluminum in Meghriget, Voghji and Artsvanik,” found that Voghji River in particular contains a certain level of pollution, but it is not critical.

As noted above, the main concern is about the tendency, rather than current levels. Zangezur Copper Molybdenum Combine has plans to expand the volumes of processed copper and molybdenum. If current technologies are used for expansion of production, it is certain that environmental degradation will further expand, especially under the current tendencies shown in Table 6-2. According to nonacademic sources and observations, certain types of diseases vulnerable to existence of heavy metals in surrounding become dominant. To our knowledge, nevertheless, there are no systematic, data-driven studies, and therefore we remain silent about the issue. On the other hand, even if the current situation does not obviously cause health problems or such problems are for the most part effectively controlled by the company and the community, the long-term perspective will be challenging, since these toxic elements are accumulated in the environment and the absence of strict control of the tendencies will lead to serious environmental and entailed health damages. In terms of socioeconomic statistics, Kajaran is one of the richest towns in the country (if not the richest), but environmental and health issues are on the current and future agenda for the town's development. As a first step, much research based on high-quality micro-level data, should be carried out to determine the true state of the town in order to design policies addressing environmental and health protection.

The data from the study on social costs and the Kajaran case study presented above show that it is difficult to estimate social costs in Armenia, largely because of a lack of data. However, although it seems clear that there are clear positive impacts of mining on those receiving mining-sector wages and on those being trained to work in the mining sector, other effects remain less positive. Effects on worker health and job satisfaction are not negative, but could be improved through policies to monitor and regulate working conditions. Effects on inequality could be moderated through initiatives to promote sectors other than mining. Most importantly, however, there are indications that the social impacts related to environmental damage and the costs of resettlement and livelihood support to those affected by mining are not being calculated. This could mean that there are significant, long-term costs of the mining sector that are not considered when developing policies and regulations.

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## 7. Challenges, Conclusions, and Recommendations

*Sustainable development is a continuous process that involves multiple institutions and stakeholders that are committed to transparency and openness, and one that relies on forward planning. In order to ensure sustainable practices in the development of the mining industry—that is, to ensure long-term economic growth, development, and shared prosperity—the actual processes and strategic planning in Armenia need to account for—and carefully plan—integration of all social and environmental aspects. The true economic costs of social and environmental impacts need to be defined and assigned, and it is only based on these calculations and indicators that proper decision making can take place.*

This thematic paper has been structured in a manner where first the legislation and practice with respect to environmental and social impacts of mining in Armenia have been assessed. The paper then described a practical example of how to include assessment and economic evaluation of environmental damages in order to showcase the shortcomings of such a process. Furthermore, a series of planning tools and analyses were defined, using examples from other countries based on World Bank's involvement. As a conclusion of this paper, a number of steps and processes as outlined below have been established as general recommendations to the government of Armenia and the relevant ministries on ensuring sustainable development of the mining sector.

Through the recommendations made, the targeted audience of this paper are the representatives of the government of Armenia; but the civil society, private sector (mining companies in particular), and local population play an important role in establishing a dialogue and taking an active role in the development of the strategic planning documents and processes, as recommended in this paper.

For each of the recommendations there is an assigned responsibility between the two ministries that are primarily involved in mining development and impact assessment. . In addition, priority recommendations are ranked as “high” or “medium”. . A high priority may identify issues that need to be urgently dealt with, or for which the preconditions have been met. A medium priority may mean that the activity includes an ongoing and longer-term process, or that the recommendation may need to have one or a few preconditions in place prior to its commencement. The priorities are, as such, based on their need and the ability to be implemented rapidly.

### **Recommendation 1: Enhance Strategic Planning Through Development of an SEA for the Mining Sector**

**Responsibility:** *Ministry of Nature Protection in close coordination with the Ministry of Energy and Natural Resources*

**Level of Priority:** *Medium – dependent on the strategic planning documents for mining development (also a continuous and long-term process)*

An SEA is a process, more than a tool, and should be used in parallel with the development of formal mining-development strategy. The inputs and provisions that are provided in the SEA should be able to feed into the strategic document and vice versa, and the two should be closely interlinked. In addition, the case studies in this paper show that SEA processes have successfully led to:

- raised attention to environmental priorities,
- strengthened environmental constituencies,
- strengthened dialogue and constructive public involvement, and
- improved social accountability.

In essence, the SEA will allow an understanding of the development of mining from a perspective that is higher up than a simple EIA or multiple EIA studies. The SEA will look at each of the mining developments, clusters of mines, cumulative impacts, and direct and indirect interactions between impacts. It would also help establish the development priorities based on economic, social, and environmental gains. The whole process of an SEA is established in a manner where transparency, involvement of all stakeholders, and public input is ensured and valued.

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## *Challenges in Developing an SEA*

The challenges in developing an SEA for mining will most likely be reflected in the following:

- timing and coordination between all of the involved stakeholders, including a cross-sectoral approach;
- strong dialogue and constructive public consultation processes;
- practical focus on environmental and social issues on the ground; and
- adequate CIA and adequate valorization of the environmental aspects and ecosystem services, based on the best available international practices.

An SEA should not be perceived as a one-time obligation to be met. The SEA should be a process involving a broad spectrum of stakeholders that allows for constant feedback to improve the environmental and social sustainability of the mining sector. By using EIA, CIA and SEA decision makers can find ways to develop regulatory responses that protect the surrounding environment and society in multiple ways and throughout all project phases. The processes of CIA and SEA are also showcased in the boxed examples from other countries throughout this thematic paper.

### *Recommendation 2: Improve Legislation and Practice on Cumulative Impact Assessments and Ecosystem Valorization*

*Responsibility: Ministry of Nature Protection*

*Level of Priority: high – can be combined with the revisions of the EIA law*

The genuine economic value of natural resources, ecosystem services, and environmental damages needs to be assessed and calculated while using a more up-to-date methodology for such practices. The guidelines need to be clear and transparent, leaving little room for manipulation of the cost of environmental degradation. The Law on Targeted Use of Environmental Charges Paid by Mining Companies (2001) recognizes the adverse impact of economic (mining) activity on the local communities and the necessity of compensation. However, payments stipulated therein are not based on economic valuation of ecosystem services and do not reflect the real livelihood or ecological loss. The policies and methodology stipulated under this law need to be revised and updated in line with the current international practices.

CIA is a process that is an integral part of an SEA for the overall strategic development of mining. Furthermore, sections on CIA need to be incorporated into the Law on Environmental Impact Assessment, where development of one mine and its associated environmental impacts will be located in a given geographic area and the potential for cumulative impacts associated with other mines or other development in the area will be assessed. Establishing clear guidelines for CIA within the EIA process may also help develop the analysis of different development alternatives, which are an integrated part of the EIA and environmental permitting processes.

### *Challenges in Improving Ecosystem Valorization and Cumulative Impact Assessment*

The assessment of cumulative and indirect impacts on a site-specific basis is complex and not straightforward. The main challenges to account for the effects of multiple successive projects in a particular area or sector are:

- The impacts occur on a much wider scale than the site being assessed.
- It is difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired cumulative impact that should be avoided or mitigated.
- Impacts may simultaneously compound and offset each other.
- Evaluating the impacts and feedback effects between ecological change and human/social behaviors requires cross-disciplinary expertise.
- The main conclusion is that CIA needs to be better integrated into case-by-case EIA studies as well as an overall SEA for the mining sector. Both processes also need to have improved and

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increased cross-cutting assessments and economic valuation of environmental and social damages.

- Further assessment and development of this thematic paper has also pointed to the need to increase transparency and involve the public in a constructive dialogue on improvement of the sustainability principles, which are hinged on clear implementation rules and regulations.
- Furthermore, the issue of proper management of mine tailings is also one of the key constraints in ensuring sustainability of this sector and needs to be addressed based on best available international practice.
- The delivery mechanisms and transparency of allocation of funds from mining for environmental protection need to be improved.

The use of funds for environmental protection and potential environmental damage is stipulated in the mining legislation and related legal acts. Many countries stipulate the required amounts allocated in the state fund as a percentage of the operator's environmental protection budget. For example, in the Philippines it is 10 percent; in Mongolia 50 percent. The delivery mechanism is transparent and either through a designated government agency or private financial institution (for example, Vietnam and Cambodia). It is recommended that precise use of the state funds be tied in to the results of the EIA and EMP concerning separate mining processes. This will also require efficient monitoring of environmental performance of mining companies.

### ***Recommendation 3: Facilitate Dialogue and Information Sharing***

***Responsibility: Ministry of Nature Protection and Ministry of Energy and Natural Resources***

***Level of Priority: high due to public concerns over mining development***

Environmental and social sustainability need to be part of a dialogue to be held among a number of institutions that represent the regulatory and planning authorities and the mining industry. Effects that can be felt by the population need to be communicated to citizens and local NGOs; their inputs need to be systematically collected, and mining companies and government authorities need to respond to the feedback of these stakeholders. This step can also help establish mechanisms for the assessment, management, and monitoring of cumulative impacts. In addition, for policy-level SEA to have an impact in the long term, there is a need for local capacity development for environmental priority setting.

Facilitating dialogue and information sharing will also help ensure transparency and accountability. The development of the mining sector has already been under substantial scrutiny, with specific concerns being voiced by NGOs—in particular with regard to revisions of relevant legislation. It is important to note that accountability, transparency, and measurability of shared benefits of mining development could remain obscure in the absence of clear implementation rules.

### ***Challenges in Facilitating Dialogue and Information Sharing***

One of the key challenges is to be able to generate constructive dialogue and to guide it in a positive and constructive path. Ensuring that the concerns of various parties are addressed in a way that is transparent and timely will help generate constructive dialogue.

### ***Recommendation 4: Join the Extractive Industries Transparency Initiative***

***Responsibility: Ministry of Energy and Natural Resources***

***Level of Priority: high***

Efficient management of resource revenues is integral to ensuring inclusive growth and sustainable development. If managed properly, resource revenues can be used in infrastructure development, environmental restoration, and economic and social rehabilitation of populations impacted by the activities of extractive industries.

The EITI is a transparency standard introduced during the collection of taxes and revenues. Crucially, the transparency principles of the EITI provide stakeholders with vital information on economic, social, and environmental aspects and could inform the dialogue between stakeholders on sector-specific policies.

#### Box 16: EITI Principles

1. We share a belief that the prudent use of natural resource wealth should be an important engine for sustainable economic growth that contributes to sustainable development and poverty reduction, but if not managed properly, can create negative economic and social impacts.
2. We affirm that management of natural resource wealth for the benefit of a country's citizens is in the domain of sovereign governments to be exercised in the interests of their national development.
3. We recognise that the benefits of resource extraction occur as revenue streams over many years and can be highly price dependent.
4. We recognise that a public understanding of government revenues and expenditure over time could help public debate and inform choice of appropriate and realistic options for sustainable development.
5. We underline the importance of transparency by governments and companies in the extractive industries and the need to enhance public financial management and accountability.
6. We recognise that achievement of greater transparency must be set in the context of respect for contracts and laws.
7. We recognise the enhanced environment for domestic and foreign direct investment that financial transparency may bring.
8. We believe in the principle and practice of accountability by government to all citizens for the stewardship of revenue streams and public expenditure.
9. We are committed to encouraging high standards of transparency and accountability in public life, government operations and in business.
10. We believe that a broadly consistent and workable approach to the disclosure of payments and revenues is required, which is simple to undertake and to use.
11. We believe that payments' disclosure in a given country should involve all extractive
12. industry companies operating in that country.
13. In seeking solutions, we believe that all stakeholders have important and relevant contributions to make – including governments and their agencies, extractive industry companies, service companies, multilateral organisations, financial organisations, investors and non-governmental organisations.

The above are the EITI principles as listed in the EITI Standard 2013.

The EITI is based on the concept of the extractives industry value chain. It includes a five-step process to improve the impacts of the mining sector on development and to support the sustainable growth of the sector. The five steps include: discovering a mineral resource; awarding a concession and license; strengthening regulatory oversight leading to efficient depletion of the resource; leveraging investments in the extractive industry to achieve economic development; and enabling broader economic diversification in the economy. In order to support this value chain, the country needs absorption capacity to ensure all stakeholders (policy makers, private sectors, beneficiaries, civil society, local governments, and so on) participate in the planning and implementation of policies.

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### ***Recommendation 5: Ensure Shared Prosperity and Local Development***

***Responsibility: Ministry of Energy and Natural Resources with Ministry of Nature Protection***

***Level of Priority: high – (long-term process)***

Benefit sharing, or shared prosperity related to mining, is one of the key elements in sustainable strategies. Such processes are easily integrated into the SEA process and help define the associated benefits, costs, risks, and responsibilities related to mining while also establishing a future plan to ensure such benefits are adequately shared.

In countries where resources have led to positive social impacts, governments have in place clear safeguard processes that protect populations impacted directly by a project's activities. These safeguards were based on providing adequate compensation to land used for mining and offering assistance in rebuilding sources of livelihoods to affected population, among other things. Such safeguards and support were differentiated from the benefits coming into the communities as a result of revenues collected by the government and returned to the actual communities. Further assistance needs to be provided that would help mitigate current effects but also help combat health issues with the population that can be linked to mining activities. Disaster risks in an area that can be amplified due to the mining operations also need to be addressed.

The issues of employment, skills development, and the distribution of power in local communities also need to be carefully planned and addressed. Modern compensation policies for project-affected people should involve not only basic compensation for lost assets and lost access to resources, but also measures that aim at enhancing the livelihoods of the affected populations in the long term. This has been recognized in various national legislations as well as in international compensation policies and guidelines.

### ***Challenges in Striking a Balance Between Strategic National and Local Priorities***

The SEA adds value to decision making by recognizing priorities and pointing to their strengths and weaknesses. However, that does not necessarily mean that the process will end up with one final recommendation for action. The example from Sierra Leone (Box 2) shows how an SEA can assist in identifying regional and national priorities, which generally follow one line. That is not always the case: the Indonesian example (Box 3) revealed that the spatial development options that maximize the net benefit for the Papua province (including environmental and social factors) do not necessarily bring the maximum financial gain to the central government.

In addition, the SEA conducted for a complex and demanding sector such as mining needs to be regarded as an open and continuous process, rather than a one-time strategic planning event. The process needs to be open, readjusted if needed, and continuously updated.

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## References

- Ahmed, K., and E. Sanchez-Triana. 2008. "Using Strategic Environmental Assessments to Design and Implement Public Policy." In *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*, eds. K. Ahmed and E. Sanchez-Triana. Washington, DC: World Bank Group.
- Baker, J., W. R. Sheate, P. Phillips, and R. Eales. 2013. "Ecosystem Services in Environmental Assessment—Help or Hindrance?" *Environmental Impact Assessment Review* (40): 3–13.
- Commission for Environmental Assessment. 2008. *Valuation of Ecosystem Services and Strategic Environmental Assessment*. Influential Case Studies. Netherlands.
- Draft Design of the Framework of RA Mining Sector National Policy and Development Strategy. 2010.
- EITI (Extractive Industries Transparency Initiative) Standard, 2013. <http://www.eiti.org>
- Floroiu, R., and A. Damianova. 2012. "World Bank SEA Experience in Europe and Central Asia: The Mixed Effects of Regulation." In *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Washington, DC: World Bank.
- Franks, D., M., D. Brereton, C. J. Moran, T. Sarker, and T. Cohen. 2010. *Cumulative Impacts—a Good Practice Guide for the Australian Coal Mining Industry*. Centre for Social Responsibility in Mining & Centre for Water in the Minerals Industry, Sustainable Minerals Institute, University of Queensland. Australian Coal Association Research Program. Brisbane.
- Grigoryan, Aleksandr. 2012. "Impact of Mining on GDP Growth, Income Inequality, and Poverty: Evidence from Armenia, Mining and Socio-economic Development, Armenia's Choice." Paper presented at the American University of Armenia Conference, Yerevan, November.
- Grigoryan, Aleksandr. 2013. "The Impact of Mining Sector on Growth, Inequality, and Poverty: Evidence from Armenia." Paper presented at the American University of Armenia Symposium, "Emerging Issues in Environmental and Occupational Health," April 22–23.
- Hovhannisyan, Qnarik, and Artak Ghukasyan. 2008. *Analysis of Protection of the Environment from the Teghut Copper-Molybdenum Deposit Exploitation: The Problem of Teghut Deposit*. Opinion of NGOs and independent experts. Yerevan.
- IMF (International Monetary Fund). 2013. *IMF Country Report 13/238, Republic of Armenia*. <http://www.imf.org/external/pubs/ft/scr/2013/cr13238.pdf>.
- International Council of Mining & Metals and International Union for Conservation of Nature. 2013. *Independent Report on Biodiversity Offsets*. Cambridge, UK: Biodiversity Consultancy.
- Loayza, Fernando. 2012. "Sierra Leone: Strategic Environmental and Social Assessment of the Mining Sector." In *Strategic Environmental Assessment in Development Practice: A Review of Recent Experience*. OECD Publishing. <http://www.oecd.org/countries/vietnam/strategicenvironmentalassessmentindevelopmentpracticereviewofrecentexperience.htm>.
- Ministry of Nature Protection. 2011. "Ministerial Report." [http://www.mnp.am/images/files/nyuter/2012/report2007-2011\\_eng.pdf](http://www.mnp.am/images/files/nyuter/2012/report2007-2011_eng.pdf).
- Munasinghe, Mohan. 1993. *Environmental Economics and Sustainable Development*. Report. Washington, DC: World Bank.
- National Oceanic & Atmospheric Administration National Marine Fisheries Service. 2012. *Guidance on Cumulative Effects Analysis in Environmental Assessments and Environmental Impact Statements*, by Larry W. Canter. Report. Gloucester, MA.

---

National Statistical Service of the Republic of Armenia. 2012. “Armenia in Figures.”  
<http://www.armstat.am/en>.

OECD. 2006. *Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation*. Report. <http://www.oecd.org/dac/environment-development/37353858.pdf>.

Protocol Resolution of RA Government Session N25, June 30, 2011.

PWC (PricewaterhouseCoopers). 2012. *Corporate Income Taxes, Mining Royalties and Other Mining Taxes*. Report. London. [http://www.pwc.com/en\\_GX/gx/energy-utilities-mining/publications/pdf/pwc-gx-mining-taxes-and-royalties.pdf](http://www.pwc.com/en_GX/gx/energy-utilities-mining/publications/pdf/pwc-gx-mining-taxes-and-royalties.pdf).

RA (Republic of Armenia). 2008. *Second National Environmental Action Program*. Report. Yerevan.

RA. 2008. *Sustainable Development Program*. Report. Yerevan.

RA Government Decree N 91 “Order of assessment of the environmental impact of economic activity on the air,” issued January 25, 2005.

RA Government Decree N 92 “Order of assessment of the environmental impact of economic activity on the land resources,” issued January 25, 2005.

RA Government Decree N 653-N “On the new responsibilities delegated to the ministry of energy and natural resources,” issued May 15, 2008.

RA Ministry of Territorial Administration. 2013. “Community Budgets.”  
<http://www.mta.gov.am/hy/budgetary-performance>.

Rec Caucasus. 2011. “Support Development of Biodiversity Conservation Policies and Practices in Mountain Regions of the South Caucasus.” <http://www.rec-caucasus.org/profile.php?id=1323939165&lang=en>.

Sadler, B., and R. Verheem. 1996. “Strategic Environmental Assessment: Status, Challenges and Future Directions.” Publication 53. Ministry of Housing, Spatial Planning and the Environment, The Hague.

Strategic Plan for RA Long-Term Development for 2012–2025. 4 Economic Development Strategy, 4.2: Sector Development Direct Policies.

UNDP (United Nations Development Programme). 2012. *Armenia Development Strategy for 2012–2025*. Report. Yerevan.

United Nations Conference on Sustainable Development, Rio+20. 2011. “Armenia.”  
<http://www.uncsd2012.org/index.php?page=view&type=510&nr=187&menu=115>.

US Geological Survey. 2011 Minerals Yearbook: Armenia (Advance Release). Washington, DC: US Geological Survey.

Vardgesyan, Edita. 2010. *Economic Evaluation of the Ecological Damage Caused by Teghut Copper Molybdenum Mining Exploitation*. Report. Armenian State University of Economics. Yerevan.

Wall, Elizabeth, and Remi Pelon. 2011. “Sharing Mining Benefits in Developing Countries: The Experience with Foundations, Trusts, and Funds.” Extractive Industries for Development Series #21, World Bank, Washington, DC.

World Bank. 1993. *Argentina Mining Sector Review*. Report. Washington, DC.

World Bank. 1998. *Environmental Sourcebook Update 22*. Environmental Department, Washington, DC.

- 
- World Bank. 2002. *Implementation Completion Report. Argentina—Second Mining Development Technical Assistance*. Report. Washington, DC.
- World Bank, 2008. *Implementing the Extractive Industries Transparency Initiative: Applying Early Lessons from the Field*. Report. Washington, DC.
- World Bank. 2008. *A Strategic Assessment of Spatial Planning Option for Papua Province*. Report. Washington, DC.
- World Bank. 2009. *Armenia Country Environmental Analysis: Institutional Capacity, Incentives and Constraints*. Report. Washington, DC (unpublished).
- World Bank. 2010. *Armenia—Second Development Policy Operation Program*. Report. Washington, DC.
- World Bank. 2010. *Mining Sector Strategic Environmental and Social Assessment (SESA)*. Report. Washington, DC.
- World Bank. 2010. *West Africa Mineral Sector Strategic Assessment (WAMSSA)*. Report. Washington, DC.
- World Bank. 2011. *Strategic Environmental Assessment in Policy and Sector Reform Conceptual Model and Operational Guidance*. Report. Washington, DC.
- World Bank. 2012. *Sample Guidelines: Cumulative Environmental Impact Assessment for Hydropower Projects in Turkey*. Report. Washington, DC.
- World Bank. 2012. *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Report. Washington, DC.
- World Bank. 2013. *Armenia—First, Second, and Third Development Policy Operations Project*. Report. Washington, DC.
- World Bank and IFC (International Finance Corporation). 2002. *Large Mines and Local Communities: Forging Partnerships, Building Sustainability*. Report. Washington, DC.
- World Business Council for Sustainable Development. 2011. “Guide to Corporate Ecosystem Valuation.”  
<http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=104&NoSearchContextKey=true>.

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## Annex 1: SEAs in World Bank Projects in the Mining Sector<sup>68</sup>

Mining Sector—Sustainable Development of Natural Resources Project (Policy SEA)	Afghanistan
Sectoral Impact Assessment of Mining Activities	Argentina
Energy and Mining Technical Assistance	Brazil
Cameroon Mining Sector Technical Assistance Project	Cameroon
Towards Sustainable Mineral-Intensive Growth in Orissa	India
Strategic Assessment for Spatial Planning in Papua Province	Indonesia
Mining Governance and Growth Support Technical Assistance Project	Malawi
Mining Sector Capacity Building Project	Mauritania
Southern Gobi Regional Environmental Assessment	Mongolia
Mozambique Mining Technical Assistance	Mozambique
Mining SEA	Peru
Sierra Leone Mining Sector Reform	Sierra Leone

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<sup>68</sup> World Bank. 2012. *Strategic Environmental Assessment in the World Bank: Learning from Recent Experience and Challenges*. Report. Washington, DC.

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## Annex 2: Tools Applied in SEA

### 2.1. Examples for analytical and decision-making tools for strategic environmental assessment<sup>69</sup>

#### Tools for predicting environmental and socioeconomic effects

Modeling or forecasting of direct environmental effects  
Situational analysis (*see application within the WAMSSA*)  
Participatory techniques for assessment  
Causal chain analysis

#### Tools for ensuring full stakeholder engagement

Stakeholder analysis  
Consultation surveys  
Consensus building processes

#### Tools for analyzing and comparing options

Scenario analysis and multicriteria analysis  
Cost-benefit analysis  
Risk analysis and vulnerability analysis  
Opinion surveys to identify priorities

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### 2.2. Situational Analysis of the Mining Sector, WAMSSA<sup>70</sup>

The West Africa Minerals Sector Strategic Assessment (WAMSSA) was a regional SESA carried out between 2008 and 2010 to help countries in the Mano River Union (Guinea, Liberia, Sierra Leone, and Cote d'Ivoire) use their large, untapped mineral wealth for promoting sustainable development. A **“mining-infrastructure cluster” approach** was used to assess the common environmental, social, economic, and governance issues in the mining sector. The methodology used to identify the clusters followed these steps:

1. Mapping:
  - a. Base map (layer 1) with information on geological provinces, operating mines, major mineral occurrences, and potential new mining projects
  - b. Geopolitical, infrastructure, environmental, and community features (layer 2)
  - c. Proposed road, rail, and electrical projects under investigation or implementation by the African Union and other multilateral agencies (layer 3).
2. Cross-examination of layers 1–3 pointed at potential clusters where new projects would create sustainable opportunities in the region.
3. Economic analysis focused on the differential costs of developing regional facilities versus taking a project-by-project-based infrastructure development approach. The scope and depth of this analysis was constrained by insufficient information available on planned projects.

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<sup>69</sup> OECD. 2006. *Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation*. Report. <http://www.oecd.org/dac/environment-development/37353858.pdf>.

<sup>70</sup> World Bank. 2010. *Mining Sector Strategic Environmental and Social Assessment (SESA)*. Report. Washington, DC.



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## Annex 4: Studies and Projects Dealing with Economic Valorization of Natural Resources in Armenia

In addition to the research on the Teghut mine, a number of other projects and initiatives have looked into specific ecosystem valorization in Armenia. These include:

- *Introduction of Payment for Ecosystem Services Schemes in Upper Hrazdan Pilot River Basin of Armenia, Geoinfo LTD, October 2011.* The objective of this assignment is to improve the policy and legislation of water resources management in Armenia through the development of the package of suggestions to introduce financial mechanisms of payments for economic and ecological services (PES) provided by water ecosystem based on their valuation. The project piloted a program for the upper basin of the Hrazdan River—with a total area of 780 square kilometers and a population of some 99,400 people. The report *Introduction of Payment for Ecosystem Services Schemes in Upper Hrazdan Pilot River Basin of Armenia* includes three significant items. First is the proposed approach, which is the calculation of damage caused to the water resources by the water use and wastewater discharges. The example calculation is done for the economic damage caused to the Tsaghkadzor River by the biological oxygen demand in wastewater discharges. Second is a case study of the PES rates for the sample resort house based on investments required for the construction of the wastewater treatment facility on the one hand, and the characteristics of the wastewater and biological oxygen demand on the other hand. Third is a suggestion to improve the legislation through the adoption of the RA Law “On Payments for Ecosystem Services.”
- *Estimating Willingness to Pay (WTP) with Random Valuation Models: An Application to Lake Sevan, Armenia, Hua Wang, Benoit Laplante, Xun Wu.* A contingent valuation survey was conducted in Yerevan, Armenia, to estimate people’s WTP for the protection of Lake Sevan. Lake Sevan has played a decisive role in Armenia’s history. As such, the lake has a very significant cultural and historical importance to the Armenian people. Furthermore, Lake Sevan has contributed and continues to contribute to Armenia’s economy by providing water resources for agricultural, industrial, and energy production needs. A summary of the WTP models and the estimation methods associated with the three contingent valuation approaches employed in the study are provided. The results are presented through a number of variables describing the sample set separately for open-ended, closed-ended, and the stochastic payment card approach with final comparison of the results of all three approaches.
- *Support Development of Biodiversity Conservation Policies and Practices in Mountain Regions of the South Caucasus, REC Caucasus.* Within the scope of the Sustainable Management of Natural Resources Programme,<sup>72</sup> the project focuses on three mountain regions of the South Caucasus: the Racha region in Georgia, the Yenyol and Shehriyar regions in Azerbaijan, and the Koghb and Jujevan regions in Armenia. The project includes evaluation of ecosystem services and biodiversity (including forest ecosystems) in surrounding areas of selected communities; gap analysis of existing regional/local policy, strategies, and programs in light of reflection issues related to biodiversity conservation; sustainable use and community forest management and recommendations to mainstream biodiversity and community forest management issues into policy/regulatory documents; and capacities need assessment at the local level to mainstream biodiversity conservation, sustainable use, and community forest issues into local development policies and develop recommendations to enhance respective capacities and improvement of the environmental liability regime, including introduction of methodology for valuation of environmental damage.
- *REC Caucasus in the scope of Environmental Policy and Integration Program<sup>73</sup> launched in March 2012.* The overall objective of the project is to improve the environmental management

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<sup>72</sup> Rec Caucasus. 2011. “Support Development of Biodiversity Conservation Policies and Practices in Mountain Regions of the South Caucasus.” <http://www.rec-caucasus.org/profile.php?id=1323939165&lang=en>.

<sup>73</sup> Rec Caucasus. 2011. “Support Development of Biodiversity Conservation Policies and Practices in Mountain Regions of the South Caucasus.” <http://www.rec-caucasus.org/profile.php?id=1323939165&lang=en>.

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system in Armenia and Georgia through the enhancement of the environmental liability regimes. The objectives of the project include development of modern methodology for estimation of the monetary value of damage caused as a result of environmental pollution and exploitation of natural resources at the national level, including designing of pilots to demonstrate such methodologies.

- *Project Implementation Presence (PIP)*. The OSCE Office in Yerevan has helped Syunik marz administration diversify the local economy and help mitigate the economic security risks of mining since August 2012. Mining remains the dominant industry in the Syunik region, representing some 90 percent of industrial output and 60 percent of total production and services. While the mining industry has a strong positive economic impact for the region and the country, it also carries economic and environmental risks because it creates dependence on a single industry and limits opportunities for agriculture and tourism. It has become crucial for the region to plan for jobs in other sectors after mineral resources run out. The OSCE provides advice and consultation to the regional administration of the marz for the preparation of the region's economic diversification plan. The new plan proposes developing industries other than extraction and processing of minerals. The approach is based on an analysis of competitive resources and capitalization opportunities to help the government and donors prioritize investment initiatives and make development efforts more effective.

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## Annex 5: List of Background Documents and Legal Documents

This draft framework document was prepared using the following background material:

1. Report on the development of the RA mining sector strategy concept, “Geo ekonomika,” LLC, MENR, 2007 (service contract ԲՆ-ՄՁԲ-07/28).
2. Report on General Program for Extractive Industries Development, Japan International Cooperation Agency, 2003 (Japanese Government financing on RA Government request).
3. National Policy and Development Strategy in Mining Sector of RA, draft of the RA Government Resolution, 2007–2008.
4. Conceptual trends of RA industry sector, approved by RA Government Session on June 14, 2010.
5. Concept of development of nonmetallic minerals processing industries, approved by the operative group session on support for programs promoting economic development, RA Prime Minister, December 23, 2009. Session Protocol N 02/02.3/[28573]-10, par 5 (1).
6. *On the Way from the Crisis Towards the New Development Trends*. Economic Report of Armenia, RA Ministry of Economy. Yerevan, 2009.
7. Findings of the investigations carried out based on the approval of the working program of the RA President’s Control Service for 2009. RA Presidential Order ՆԿ-9-Ս, dated January 21, 2009.
8. Draft of the RA Government Resolution on approval of development concept of mining sector, in pursuance of the RA Prime Minister Resolution N 627-Ս, dated July 28, 2009.

### RA Government Decrees

A number of government decrees have been issued since the adoption of the new Mining Code in force since January 1, 2012, to enforce and ensure the operation of the law (together with previously issued ones, there are more than 60 government decrees related to mining):

1. RA Government Decree N 569-Ն “On procedures of handing of geological information,” issued May 23, 2013.
2. RA Government Decree N 439-Ն “On procedures of special permits for the exploration of radioactive minerals,” issued April 25, 2013.
3. RA Government Decree N 368-Ն “On procedures of assessment of qualitative criteria to the financial and technical capacities and means of companies applying for the earth use licenses,” issued March 28, 2013.
4. RA Government Decree N 367-Ն “On determination of the content and requirements imposed on the information about the financial and technical capacities and means of companies applying for the earth use licenses,” issued March 28, 2013.
5. RA Government Decree N 319-Ն “On procedures of coagulation of the mining structures related to mineral extraction,” issued April 4, 2013.
6. RA Government Decree N 243-Ն “On procedures of geological economic evaluation of the mineral mines,” issued March 21, 2013.
7. RA Government Decree N 274-Ն “On approval of classification of actual and predictable earth reserves of solid minerals,” issued March 14, 2013.
8. RA Government Decree N 203-Ն “On procedures of preservation of the newly discovered non-minable minerals,” issued March 7, 2013.
9. RA Government Decree N 1414-Ն “On procedures of preservation of the geological earth information in Armenia,” issued November 8, 2012.
10. RA Government Decree N 1680-Ն “On approval of check list of risk based inspections conducted by the mining state inspectorate of the MENR,” issued December 20, 2012.
11. RA Government Decree N 1480-Ն “On approval of classification of industrial and predicted reserves of underground waters,” issued November 22, 2012.

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12. RA Government Decree N 1571-Ն “On approval of procedures on state cadastre of mineral deposits and occurrences,” issued November 22, 2012.
  13. RA Government Decree N 1511-Ն “On approval of the general description of the criteria for determination of the riskiness and methodology of inspections based on risks conducted by the mining state inspectorate of the MENR,” issued November 8, 2012.
  14. RA Government Decree N 1348-Ն “On approval of quarterly and annual reporting forms on the flow of mineral reserves,” issued October 25, 2012.
  15. RA Government Decree N 1170-Ն “On approval of procedures of conducting the state balance for mineral resources,” issued September 13, 2012.
  16. RA Government Decree N 1147-Ն “On approval of procedures for disclosure of information on mining licenses contained in the centralized register-book,” issued September 6, 2012.
  17. RA Government Decree N 1148-Ն “On approval of procedures for independent expertise of geological information,” issued September 6, 2012.
  18. RA Government Decree N 911-Ն “On approval of register-book forms for the daily flow of reserves of mineral resources,” issued July 19, 2012.
  19. RA Government Decree N 363-Ն “On approval of forms for mining licenses and licenses for geological exploration for mining purposes, as well as permits for geological explorations,” issued March 22, 2012.
  20. RA Government Decree N 437-Ն “On approval of templates for mining contracts,” issued March 22, 2012.
  21. RA Government Decree N 1901-Ն “On approval of procedures for calculation of revenues from sales as basis for the calculation of royalties,” issued December 29, 2011.

Other legislative acts adopted in previous period:

1. Resolution of the Prime Minister N 396-U “On approval of the measures for operation of the Mining Code,” issued April 4, 2012.
2. RA Government Decree N 719-U “On the allocation of state budget loans to extractive companies,” issued June 26, 2009.
3. RA Government Decree N 1782-Ն “On priority measures for improvement of use and protection of mineral deposits,” September 30, 2004.
4. RA Government Decree N 1782-Ն “On primary measures on improvement of use and protection of earth mineral resources,” issued September 30, 2004.
5. RA Government Decree N 1784-Ն “On procedures of geotechnical expertise approval of explored mineral reserves and other geological information,” issued December 9, 2004.
6. RA Government Decree N 1192-Ն “On procedures of allocation of earth plots for geological exploration purposes,” issued August 19, 2004.
7. RA Government Decree N 1055-Ն “On procedures of record and state registration of geological exploration activities,” issued August 21, 2003.

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## Government decrees and other legislative regulations:

1. Resolution of the RA Prime Minister N 406 “On the areas not re-cultivated after the decommissioning of mineral deposits,” issued Jul 10, 1996.
2. MNP Procedures N 1-3U-427 “On the control of payments for natural reserves use and nature pollution charges,” issued December 9, 1993.
3. RA Government Decree N 864 “On charges for nature use payments,” issued December 30, 1998, after the adoption of the new Mining Code is applicable only to nonmetallic mines.
4. RA Parliament Resolution Ն-293-1 “On the accession to the convention on work safety and hygiene in boreholes,” issued October 12, 1998.
5. RA Government Decree N 986 “On measures ensuring the operation of the RA Law on Nature Protection and Nature Utilization Payments,” issued October 17, 2001.
6. RA Government Decree N 874-Ն “On the listing of hazardous waste in Armenia,” issued May 20, 2004.
7. RA Government Decree N 1089-Ն “On approval of the procedures for conducting the compulsory initial (before hiring to the job) and regular medical check-up of the groups of population impacted by hazardous and harmful production factors, listing of impact factors, types of works, check-up frequency and medical contra-indications, as well as approval of procedures for hygienic characteristics of working conditions,” issued July 15, 2004.
8. RA Government Decree N 1652-Ն “On definition of actual volumes subject of nature use and nature protection payments,” issued October 6, 2005.
9. RA Government Decree N 750-Ն “On technical procedures and requirements to recultivation and classification of damaged lands,” issued May 26, 2006.
8. RA Government Decree N 291-Ն “On approval of general safety rules applicable to the blasting works,” issued March 6, 2008.
9. RA Government Decree N 1083-Ն “On approval of the technological manual for safe operation of underground-pit mines,” issued August 27, 2009.
10. RA Government Decree N 1277-Ն “On approval of the technological manual for safety rules of crushing, sorting and dressing of the ore,” issued October 29, 2009.
11. RA Government Decree N 51-Ն “On approval of the technological manual for safe operation of open-pit mines,” issued January 21, 2010.
10. RA Government Decree N 1484-Ն “On establishment of procedures of regime monitoring necessary by the use of underground mineral water and water resources protective measures from pollution and over-consumption,” issued November 22, 2012.
11. RA Government Decree N 1079-Ն “On procedures of calculation of charges for the establishment and spending of the authorized capital for environmental protection purposes, as well as for the membership of the professional commission,” issued August 23, 2012.
12. RA Government Decree N 22-Ն “On procedures of calculation and payment of fees paid for the monitoring purposes to ensure safety of mining operation areas, tailings, as well as of the health and safety of the population of nearby communities,” issued January 10, 2013.