

## **NATIONAL MINING MANAGEMENT PLAN – PNOM (for its Spanish acronym)**

### **Principles, Guidelines and Strategic Actions**

#### **Introduction: challenges and principles for mining management**

This chapter presents the proposed guidelines and actions for the mining management system, required to achieve a responsible activity, understanding that which is technically feasible, executed legally and formally, minimizing negative external factors for the environment and society and promoting long-term economic and social development of the land where the activity is carried out.

Despite Government and industry efforts to have a technically organized sector, that is economically, socially and environmentally viable, the following challenges still remain: (i) public policy: there is not a shared vision of medium and long-term relationship between the mining sector and related land use sectors; (ii) institutional: there are conflicting agendas in the public sector, weak state and the rule of law in many areas of mining production, and complexity of information gathering and the relationship with communities; (iii) technical regulations: lack of regulations for specific aspects, such as mining closure and abandonment, minimum technical content tailored to mining requirements and realities (terms of reference, mining and environmental guides); (iv) environmental impact and social dialogue: environmental and social impact has not been properly identified, prevented, mitigated or compensated; at times mine titles have been granted in excluded areas and those of special ecological importance; (v) illegality and informality: different types of mining activities take place in Colombia, legal, informal (including traditional and family-run<sup>1</sup>) and illegal extraction of minerals; lastly (vi) lack of information: there is not enough information to structure consistent projects with proper monitoring, decision making and implementation as well as technical content for the formulation and evaluation of mining project instruments (Construction and Work Plans – PTO for its Spanish acronym).

These problems hinder the arrival of qualified operators, encourage informality and criminality, illegal predatory extraction, and do not facilitate a greater impact on development financing and poverty reduction. All this leads to a poor perception of the industry.

The PNOM seeks to resolve formulated conflicts and problems, considering the ongoing actions by industry and Government, as well as the institutional reforms undertaken. Thus, it surpasses beyond the purely geographical dimension, but it should be integrated with these planning efforts. Therefore, the purpose of this Plan is to achieve an orderly and responsible utilization of mineral resources, promoting the conversion of mining capital into other forms of capital that will lead to greater prosperity and development for the productive regions and for the country at large. The National Mining Management Plan – PNOM (for its Spanish acronym) is medium-term and indicative in nature. This Plan identifies lines of work that will create a road map for a comprehensive management of the sector and for other institutions for its implementation. There are proposals for urgent measures, others that reinforce the work that has been carried out and others that require adjustments to the legislation and regulations currently in place.

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<sup>1</sup> This type of mining receives a special treatment in the National Mining Development Plan and is supported with further derivatives of Mining Formalization Policy and the Mining Code (Article 31, Special Reserves).

The four fundamental management principles of this PNOM (for its Spanish acronym) are:

1. **Value Generation:** A mining project should be developed with high quality standards and when for the country (including the productive regions), its benefits outweigh its socio-economic and environmental costs. This is of vital importance since it is about public resources being used.
2. **Risk Assessment and Risk Management:** For the execution of a mining project, risks should be assessed; evaluate the benefits and socio-economic costs and related impacts. It should be noted that technologies change and that one learns by doing, not by prohibiting, learning through controlled pilots based on rigorous monitoring and follow-up (principle of proactiveness<sup>2</sup>).
3. **Efficiency:** it is necessary to prevent, mitigate, remediate and efficiently compensate the costs of a mining project in order to minimize impact and address any external impacts.
4. **Consistency:** the public sector should have a single agenda (a mining, environmental and social policy) for mining projects. This plan must be consistent with the National Mining Development Plan, PNDM (for its Spanish acronym), the CONPES (National Economic and Social Council) document on mining (being drafted) and the policies led by the Ministry of Mines and Energy, MME.

In this context, it is proposed to systematically use assessment tools for mining projects, such as risk assessment, social and economic project factors and impacts. The proposal is based on the premise that what is not measured cannot be managed or is usually mismanaged. The alternative of not measuring assigns risks, costs or even benefits but without transparency, is subject to influence, is based on perceptions and is full of unanticipated negative surprises.

The proposed assessments are: (I) Risk analysis, as a structuring supervision element to identify at an early stage threats, recommend alternatives for prevention and mitigation, foresee contingencies and arrange supervision of the operation, mine reclamation and management of environmental liabilities. Risk management should allow for experimentation and learning, rather than be based on prohibition as the only alternative in dealing with uncertainty. (ii) Project evaluation to improve regulations and support value generation. Cost-benefit analysis and its extensions (valuation of environmental services) can provide early warnings to the competent environmental authority and the National Mining Agency on whether a project is a disaster waiting to happen, and it can identify alternative technologies for extraction and remediation of damage, with its results becoming a scientifically based dimension source for compensations. Robust evaluation models in conditions of extreme ignorance of benefits and costs have been tested that can be adapted to the so-called limited information circumstances of Colombian Mining. Incidentally, these techniques can support the improvement of environmental regulation, avoiding the universal use of "command and control" mechanisms. (iii) The regular assessment of impacts to review the criteria of risk assessment and socio-economic evaluation of projects, while verifying offsets actually carried out and their impact. It should be performed periodically during the execution of the project and in the final stage of mine reclamation activities.

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<sup>2</sup>According to the principle of pro-action (and the cost-benefit analysis), the cost of restricting or prohibiting an activity must be balanced against the potential costs of allowing for a new technology. The new technology is validated by carrying out careful experimentation.

The PNOM aims to strengthen both sectoral and cross-sectoral institutionalization, facilitating the alignment between the different branches of Government, to improve industry architecture and regulation of mining activities and to acquire information and support from human resources as well as innovation required to reduce transaction costs faced by operators and mining projects. This effectively contributes to the generation of wealth and prosperity for the producing regions and society, with minimal environmental and social impact. In this sense, the PNOM can be organized into three main groups:

1. The first for solving coordination (or alignment) problems at territorial level and land use<sup>3</sup>, as well as between the mining sector and the National Environmental System (and its implications on public health); and mining activities with communities. This involves fostering the relationship between mining and territories and strengthening their capacity to participate in decisions that concern them.
2. The second to optimize industry structure in line with the restructuring efforts that the government has been implementing and make a comprehensive and consistent regulation of project life cycle in order to ensure the transformation of mining capital into other forms of capital.
3. Lastly, to provide information for decision-making on mining developments and transparency in monitoring industry work, as well as technical and professional capabilities for executing mining activities and regional innovation systems.

As may be seen, the actions of this Plan go beyond the purely territorial and touch on essential aspects to have a systematic and responsible activity. It is proposed, to further improve the perception of the industry, that the in the document of the basis of the next Government National Development Plan – PND (for its Spanish acronym) responsible mining - under any denomination- is declared as one of its strategic objectives during the quadrennium.

This work is supported by an initial consultancy conducted to determine the scope of a national mining management plan, which is worth noting was unprecedented internationally, and on 20 articles written independently by experts on topics related to conflict or difficulties in planning, managing and operating mining activity.<sup>4</sup> From there, the Interdisciplinary Center for Development Studies - CIDER (for its Spanish acronym), from Los Andes University developed inputs for this proposal whose deliverables are appended to the extended version of the Plan, which also contains chapters related to mining potential, restrictions on territorial law for the exercise of mining as well as enabling conditions for the responsible development of mining. Finally, we received comments from the National Mining Agency – ANM (for its Spanish acronym), the Colombian Geological Services - SGC (for its Spanish acronym), the Ministry of Mines and Energy - MME, Ministry of the Environment and Sustainable Development – MADS (for its Spanish acronym), Ministry of Interior, of the Rural Agricultural Planning Unit – UPRA (for its Spanish acronym), the Colombian Association for Mining – ACM (for its Spanish acronym) and independent consultants,<sup>5</sup> as well as from some of the authors of the articles above mentioned.

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<sup>3</sup>An effort has been made to work together with the Territorial Zoning Committee, TZC and Interagency Task Committee, CEI (for its Spanish acronym), to join the regional planning work being done in Colombia, led by the DNP. The Ministry of Mines and Energy is now a permanent guest of the TZC and delegated upon UPME its sector participation.

<sup>4</sup> See UPME website: <http://www1.upme.gov.co/content/elementos-para-la-elaboracion-del-plan-nacional-de-ordenamiento-minero-pnom>.

<sup>5</sup> UPME acknowledges comments and contributions of Javier García, Guillermo Rudas and Adriana Martínez.

Following are the action lines identified, which involve several institutions with which it will be necessary to agree on concrete actions and timelines as well as budgets for the coordinated action by Government and the private sector.

## **Guidelines and actions for mining management**

### **1. Problems of interagency coordination and licensing**

There are problems of coordination between the Nation and territorial entities, between the mining sector with the environmental system (coordination problems have also been identified within the environmental system itself) and with social management. Likewise, coordination problems have been identified within the mining sector, especially in terms of responsibility struggles between institutions, given the recent institutional reshaping. Proposals for institutional improvement require more political will and budget than anything else. General and specific strategies are proposed to solve the problems of coordination.

The creation of an Inter-Sectoral Commission is proposed, an instance of coordination required to have a unique public agenda on mining, with decision-making functions to generate a clear signal for operators and for other actors. This Commission shall coordinate its actions with the CEO of Projects of National and Strategic Interests, PINES (for its Spanish acronym), in the case of these projects and also for medium and large-scale production projects. In addition, it would be required that the Committee established by Law 1450/11<sup>6</sup> be put in place as soon as possible.

Similarly, we propose signing Contract Plans or adding to the existing agreements as an alternative to negotiating conditions that meet a minimum of territorial aspirations so that social dialogue is facilitated<sup>7</sup>.

Finally, at the beginning of the next Government period, it is proposed to organize a mission to trace guidelines for the development of mining projects, adopting as a rule the legal principle of Prevention – environmental licensing and control, pointing to the other principle, that of Precaution, applies when there is a threat of serious and irreversible damage, as indicated by Law 99 of 1993<sup>8</sup>.

General alignment proposals are presented below followed by specific actions.

AG1. INTERSECTORAL COMMISSION OF MINING, ENVIRONMENTAL & SOCIAL ISSUES. This is one of the coordination mechanisms needed to have a unique public agenda on mining. It must have decision-making functions that generate a clear signal to operators and the rest of the actors (Law 489/98). It would be made up by the Ministers of the Environment and Sustainable Development, Interior, Mines and Energy, the Director of the National Department of Planning – DNP (for its Spanish acronym) and the Presidential Advisor for Competitiveness and Strategic Projects. When the issue to be decided warrants, that committee may be attended by invited members of other ministries such as the Ministry of

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<sup>6</sup> Paragraph of Article 224 of Law 1450 of 2011.

<sup>7</sup>Salazar (2013) notes that it is necessary for the legitimacy and effectiveness of the State to strengthen the mining regions, "so as to improve the perception of effectiveness in the work of supervision of the authorities and trust in the functions that Government should move forward with in the provision of public goods and services for the welfare of the miners and their communities".

<sup>8</sup> The precautionary principle: pursuant to which there is threat of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures effective measures to prevent environmental degradation.

Agriculture and Rural Development, Ministry of Commerce, Industry and Tourism, Ministry of Housing, City and Territory, Ministry of Infrastructure and Transport, among others. The economic and social assessment of the project and the Social Management Plan (of the National Mining Agency) are basic inputs for making decisions about the feasibility of the project. Its operational decisions for monitoring and comprehensive regulation of mining projects would be implemented by the National Mining Agency and the competent environmental authority. This Commission shall set guidelines for joint management of the institutions involved with the CEO of Projects of National and Strategic Interests, PINES and the Presidential Council for Competitiveness and Strategic Projects and will be responsible for ensuring that the appropriate processes move ahead effectively and within reasonable time.

AG2. ACADEMIC REFERENCE COMMITTEE. It is necessary to increase the level of scientific knowledge regarding mining with support from the academia and the private sector to perform useful high-level studies and propose solutions. This Committee shall function as an advisory body to the Intersectoral Mining, Environmental and Social Commission. This technical committee would support better decision making by Government to attract solid, economically and technically committed investors, complying with all obligations imposed by the Colombian government. This Committee shall appoint the representative of the academia in the Mining Policy Advisory Council. In turn, the SGC will delegate one or more highly qualified representatives to participate in said committee.

AG3. CONTRACT PLANS. Following the statement by the Constitutional Court,<sup>9</sup> negotiations would be made with local authorities among different levels of government. One possibility for this purpose would be the formalization of these agreements by the Contract Plans (Law 1454/11 and Law 489/98). These would establish fiscal coordination between sectoral national and territorial authorities for comprehensive Government action in mining projects. It includes the provision of public goods, possible new transfers and eventual delegation of certain mining functions to the territorial authorities, which should be gradual and consistent with local capabilities. Depending on each situation, it is possible to agree on national budgetary contributions or the use of additional compensations to royalties paid by bidders selected by auction, in the case of projects located in Strategic Mining Areas<sup>10</sup>.

AG4. DIFFERENTIATED MANAGEMENT BY MINERAL. Separate plans are required for precious metals (especially gold), coal, iron, nickel-iron and building materials, considering their different types of mining and their impacts. Likewise, taking into account when possible and when they exist, territorial or producer types, with proposals specialized in formalizing, supervision, monitoring and marketing schemes as well as in market information. Strategic Environmental Assessments in areas with mining potential, would help to identify best management options for indirect, cumulative and synergistic effects in mining projects (Jiliberto, 2013).

AG5. MISSION ON INFRASTRUCTURE (MINING IN THIS CASE) ENVIRONMENT AND COMMUNITIES. It is proposed that once the Government takes office for its next period, a document should be drafted setting down the general guidelines for the sectors of

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<sup>9</sup>Press release ruling C-123 of 2014. Lawsuit against Article 37 of Law 685 of 2001. The Constitutional Court stated that the process by which the conduct of exploration and mining, the competent national authorities shall agree with the concerned local authorities, the necessary measures for the protection of a healthy environment be warranted, and especially protecting watersheds, economic, social, cultural development of the communities and the health of the population by applying the principles of coordination, competition and subsidiarity under Article 288 of the Constitution.

<sup>10</sup> PND 2010-2014, Article 108. By order of the MME 180102/12 and Resolution 202 ANM 045/12 blocks were created in the departments of Amazonas, Chocó, Guainía, Guaviare, Vaupés and Vichada. Through Resolution 180241 of 2012 from the MME, 313 new blocks were established.

infrastructure related to the mining industry, about how to align national programs and projects to those in the territories; regarding mining area allocation and issue of environmental licenses, based on the main criterion of cost/benefit analysis for each project on its own merits; providing guidelines to regulate previous consultation with ethnic minorities and in general the relationship with communities and society as well as guidelines on the relationship with the nation's cultural heritage; eliminating sequencing decisions between different authorities, in this case, between mining and environmental authorities; and addressing the issue of funding for the implementation of actions required and established to finally achieve responsible mining. Currently work is being done on an Economic and Social National Council document which provides the guidelines for a responsible mining development.

These five general coordination measures are complemented by the following groups of more specific coordination measures with territorial, environmental and social issues.

- **Propose setting arrangements and negotiation of mining in the territories**

Establishing conditions conducive to the development of responsible mining in the country requires the work to be ordered, taking into account structuring elements concerning desirable development goals for the country, for the territory and its population; with management instruments provided by legislation (financial, administrative and control); and institutional structure envisaged for implementation. It is necessary to consider specific and controllable conditions for mining in areas where it is restricted, and the identification of constraints and opportunities to generate conditions of compatibility and complementarity between mining and other ways of occupation and rural use in general, in the context of environmental sustainability and social licensing (Marino, 2014). Furthermore, the simultaneity of mining and environmental permits is essential.

Several problems related to the coordination of mining and territorial planning have been identified: (i) The lack of coordination between sectors and different levels of government generates institutional weakness, (ii) illegal extraction and informality are closely related to institutional weakness, (iii) municipal and department governments perceive costs are far greater than benefits for mining operations, (iv) the land use planning is still in the process of being structured and consolidated and only recently has it been linked to the mining and energy sector; lastly, (v) conflicts arise with other productive sectors regarding the use and occupation of the land.

To solve these problems, the following actions have been proposed:

AT1. PROGRESSIVE (AND INITIALLY SELECTIVE) DECENTRALIZATION OF SPECIFIC FUNCTIONS. According to the type of mineral, exploitation size, land types and/or production, and social, environmental and institutional risks, certain sectoral functions may be delegated to local authorities (Act 489 of 1998), gradually and consistently with their capabilities. This delegation is subject to close supervision for its continuity.<sup>11</sup> Antioquia's delegation is a good pilot to use. It is necessary to strengthen institutional capacities, despite changes in the different levels of public administration, promote results-based management and cooperation among different levels of government. It is worth noting that through the regulation of the Mining Code, Government could issue harmonized and coordinated decrees with regulations

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<sup>11</sup>Previous difficulty delegating roles is recognized but it is expected that the more capacity in the regions, the more they can participate actively in decisions that concern their territory with due monitoring and supervision from mining authorities.

related to environmental licensing, regarding how to classify projects in order to grant such licenses. As authorized by the Land Zoning Organic Law - LOOT (according to its Spanish acronym), classification also opens ways to delegate the granting of mining rights to certain departments and capital municipalities, which in the Government's opinion, have the ability for appropriate management; these delegations, on a case by case level, would be time-based to measure how successful they have been, and if so, to extend them with appropriate adjustments.

AT2. SUPERVISION AND LAW ENFORCEMENT. It is necessary to strengthen the mining supervision and monitoring system (also the environmental and social systems) by generating specialized technical capacity and by allocating adequate resources to strengthen their regional reach. In this regard, it is necessary to carry out required adjustments to the control process regarding the consolidation of teams of skilled professionals, adjustment of mechanisms and tools used for monitoring and tracking, reviewing visit frequency by title, and structuring of information systems<sup>12</sup> that allow for a timely and effective enforcement and monitoring of mining standards and commitments. Likewise, it is necessary to strengthen the monitoring of compliance with industrial safety protocols and working conditions of workers linked to the mining sector. As for informality and criminality, the national level (elite police group) in coordination with mining authorities, possibly through a regionalized structure, must assume complex judicial decisions where municipal authorities do not have the power to do so. It is also necessary to design an assessment of institutional capacities in each territory, where the gap is measured against a standard on supervision. Those local authorities that meet this standard can then be delegated to take the competence but maintaining communication ties for information exchange with the National Mining Authority. For local authorities (governors' and mayors' offices) not yet mature, it is necessary to define a category and implement a plan of action to bring them up to par.

AT3. GREATER BENEFITS FOR MUNICIPAL PRODUCERS. There have to be alternatives so that mining municipalities and their communities perceive greater benefits, prerequisite for national and regional benefits to materialize<sup>13</sup>. In the short term, compensations which have been proposed by the Government with contributions from the national budget and in the medium term with an amendment to the Law of Royalties, depending on related difficulties and risks. As mentioned, local authorities and communities perceive that the costs of a mining project outweigh the benefits, thereby generating a misrule in the control schemes of informality and increased lawlessness (especially gold, construction materials and coal), since the current distribution of royalties discourages proper management from non-renewable mineral resources producing regions.

AT4. INTEGRATION TO LAND USE MANAGEMENT PROCESSES. There is a need to promote integrated territorial development processes in municipalities of interest for mining. In these processes it is necessary to consider the effects of the production of the mineral resources

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<sup>12</sup>The audit process must generate information systems to fill existing gaps; without focusing solely on the findings of each case, but generating a statistically reliable public information system. There can be two important aspects identified from the initial analysis of the audit process executed by the Agency: *"On the one hand, a high percentage of the total number of findings of titles visited that should lead to government action to declare the expiration of such titles, is a situation that indicates deficiencies in the observation of existing regulations. On the other hand, information on reserves, again leaving aside the case of coal, is mediocre. This combination of low compliance with the provisions of current regulations, as well as ignorance of the true mineral potential of the country, makes it difficult to build adequate public policy."* (Escobar, 2014).

<sup>13</sup>Ibáñez (2013) notes that the indicators of per capita income in the mining municipalities are not higher than any other comparable municipalities, possibly as a result that *"in extraction areas there is denser population, perhaps as a result of mining itself"*.

from the soil and subsoil with regard to territorial socio-ecological relations,<sup>14</sup> both for environmental licensing of mining and land use zoning by municipalities. In the short term, the idea is to forge intersectoral arrangements related with functions and responsibilities of the Land Zoning Commission – COT (for its acronym in Spanish) and the Regional Zoning Commissions - CROT (for their acronym in Spanish - department, municipal and district), making them operational, as well as interactive between themselves, for which the National Department of Planning - DNP shall provide the guidelines using the National Development Plan (2014-2018). For intersectoral instances, it is proposed: a. To identify and move ahead with supra-municipal pilot processes with joint participation from the National Environmental System, the mining sector, the DNP and department, municipal and district authorities, aimed at identifying gaps in the standards, guidelines and management tools of the territory for the harmonization between the mining activity and other land use activities. b. Systematize and institutionalize the results of that experience using protocols, policy proposals, training and institutional capacity, with emphasis on environmental key aspects (MADS and CARs) and socio-economic guidelines (departments) for the formulation of Regional Environmental Management Plans - PGAR (for its acronym in Spanish), the River Basin Management Plan - POMCA (for its acronym in Spanish) and the local land zoning plan - POT (for its acronym in Spanish) in mining regions of interest. c. In order to agree on a strategy and timetable for joint action to define areas with mining potential with different environmental sensitivities, enabling conditions and instruments required for the responsible use of minerals, such as the schedule of delimitation of the most sensitive ecosystems and scales of delimitation, the MADS and DNP shall include articles in the PND (2014-2018) in accordance with Articles 202, 203, 204, 206, 207 of Act 1450 of 2011.

AT5. MONITORING AND CONTROL FOR CONFLICT RESOLUTION IN LAND USE. Regional Zoning Commissions - CROT (departmental, municipal and district) must employ observatories to identify conflicts in land use and its resolution, specifically with regard to the exploitation of minerals in the soil and subsoil - in rural or urban areas - with other activities such as agriculture, tourism, manufacturing, housing, among others. The CROT would take cases to the COT (through the Interagency Special Task Committee, CEI), in order to analyze and identify preventive measures for conflicts or for their resolution.

- **Solving coordination problems between the mining sector and the National Environmental System**

From an environmental perspective, Miranda (2013) and Ponce (2013) make evident the lack of coordination between Mining and Environmental Authorities in the regulations they issue. Blanco (2013) identifies five major problems associated with environmental institutions with regard to mining activities: (i) Lack of formal internal coordination between the Ministry of the Environment and Sustainable Development and the regional environmental authorities, (ii) inequality in the distribution of CARs resources for the fulfillment of their duties which affects the control and monitoring of mining activities, (iii) ambiguity in establishing environmental key aspects for land planning and mining that generate (sic) conflicts in land use; (iv) inapplicability of environmental licensing instrument and similar instruments such as Environmental Management Plans, permits, authorizations and concessions for the use of

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<sup>14</sup> For example, assessing the existing or projected rural reserves, irrigation or drainage districts or soil in agrologic classes 1, 2, 3 and 4.



natural renewable resources for artisanal and small-scale mining; and (v) absence of an effective strategy to control environmental impacts of informal mining.

To ensure that mining is done within the constraints and environmental conditions, the PNOM proposes:

AA1. ENVIRONMENTAL LICENSE ADAPTED TO VARYING CONTEXTS AND BY STAGES. The idea is to enhance the implementation of environmental licensing so that procedures are consistent with the characteristics of the operation and the mining process. Although the Code does not differentiate by either scale of production or ore for classification purposes, decrees may be issued to indicate how to classify projects for environmental licensing. The terms of reference for environmental studies should also consider these specificities. There is an initial proposal for the classification of mines into six types according to eight criteria of environmental impacts (Lavelle, 2013). This must be supplemented with other technical criteria, a topic on which the Ministry of Mines and Energy has been working. The idea is to reduce the costs of permit processing for small exploitations or those of moderate impact. In addition, the idea is to consider a single environmental permit for the exploration phase, to collect lesser permits nowadays required independently for the exploration phase, such as temporary subtraction, granting water discharge permit, logging permit and the requirement of an environmental license for the exploitation phase, taking into account the type of mineral and mining technology.

AA2. EARLY PARTICIPATION FROM THE NATIONAL ENVIRONMENTAL SYSTEM. The National Environmental System, supported by the mining institution, must create a menu of alternatives of environmental engineering for the stages of mining projects and discuss it with potential operators before issuing an environmental license<sup>15</sup>. Likewise, it is also necessary to implement and coordinate early warning systems with<sup>16</sup> key information for the comprehensive management of renewable natural resources<sup>17</sup>. Currently, there are applicable environmental guidelines for mining exploration and it is necessary to work on monitoring mechanisms to verify their effectiveness on the exercise of authority.

AA3. MONITORING AND CONTROL TO ENSURE MINIMAL ENVIRONMENTAL IMPACT ON SOCIO - ECOSYSTEMS UNDER THE INFLUENCE OF MINING. Carry out joint actions between the mining and environmental sectors<sup>18</sup> to minimize and monitor environmental impacts on renewable natural resources, with a focus on water resources<sup>19</sup> and risk factors associated with climate change. This will require improved tools for planning, monitoring, evaluation and follow-up of projects (mining and environmental) as well as the skills and qualities of the professionals involved in both the formulation, evaluation and monitoring. It is convenient to separate the functions of planning from those of monitoring, evaluation and follow-up.

AA4. MONITORING AND CONTROL TO PREVENT FACTORS THAT MAY IMPACT WORKERS' HEALTH AND THOSE EXPOSED TO MINING AREAS OF INFLUENCE. Define coordination

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<sup>15</sup> For example, in cases involving rural reserves, irrigation districts or drainage (existing or planned) or agrologic soil classes 1, 2, 3 and 4, it is recommended that the competent environmental authorities consider this information for the respective assessment.

<sup>16</sup> Such actions will prevent titles from being allocated in areas excluded from mining, as it happened in the past.

<sup>17</sup> The Colombian Environmental Information System, SIAC (for its Spanish acronym), administered by IDEAM, is a platform that enables interoperability between different information systems of public entities; this information system serves the mining system to integrate information with the SIAC.

<sup>18</sup> In cases where there are areas involved as mentioned in footnote 15 or areas with agricultural potential, it is recommended that the competent environmental authorities consider information that may be supplied by the UPRA, MADR or other information sources in the agricultural sector.

<sup>19</sup> Including groundwater.

schemes between the mining authority and competent institutions in labor and health issues to establish, enforce and monitor high standards for mining, labor, environmental and public health, to minimize the factors of physical, occupational and epidemiological risk for workers and locals in the mining zone of influence. This will require improved tools for planning, control and occupational and epidemiological monitoring by public health agencies and Labor Risk Administrators – ARL (for its Spanish acronym), in mining regions, as well as the skills and qualities of responsible professionals in charge of these issues, both in their formulation and their evaluation and monitoring. This item includes risk assessment on food security for the local population and the identification of opportunities that may arise to develop new niches for local agricultural production during incremental demands for food supply of the regional mining projects.

- **Moving toward a process of social licensing and monitoring of the mining activity**

Social license understood as the degree of confidence and mutual trust, continuously achieved between mine operators, institutions, authorities and communities in the territory is one of the issues that is increasingly taking a larger dimension for mining ventures. The reasons why it is so important are diverse, but among them is, on the one hand, the need for businesses to set up social programs and stable coordination channels with municipal authorities and to a lesser extent departmental measures. On the other hand, the Government's interest to harmonize social programs and promote good policy practices, ensuring corporate investment in social responsibility issues, according to the investment in each of the stages of the project and determine the scope of their social impacts. It is also considered that this may be a very good way to formalize and legalize much of the mining activity, as it happens with some companies that have pilot projects related with small miners and informal and illegal miners who have become formalized (legalized) during the incorporation of these ventures.

In like manner, a review of international experience made it clear that the process of negotiating a mining project, with all stakeholders, should be carried out from the initial stages of the project and not only when it is already in operation. It seems that this is the best way for negotiation and discussion of projects, taking into consideration the growing distrust and tension that mining projects have triggered in certain regions of Colombia. The more transparency there is regarding the rules of project development, the better the chances of success. The Government should foster a social license or support social dialogue in large and medium projects throughout their life. This social license must be the result of a discussion among local stakeholders, regional and national governments with the mining company. The best option is that the company itself proposes a social entrepreneurship program (mining), which would then become the basis for discussion of that social license. The proposed actions are:

AS1. SOCIAL LICENSE (OR DIALOGUE) FOR MEDIUM AND LARGE MINING PROJECTS. This instrument is the space to unlock the potential of Corporate Social Responsibility – RSE (for its Spanish acronym), beyond poverty reduction<sup>20</sup>. This leverages the creation of trust,

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<sup>20</sup>Pinilla (2013) argues that in Colombia there is a strategy for Corporate Social Responsibility -CSR- linked to local development processes, that (sic) systematically interpret local and community issues. The Social License already exists in countries such as Australia, Canada and Peru. In Canada it is known as Social License to Operate (SLO) and has the following features: (i) it is not a formal document or an enforceable tripartite contract (government, communities and mining company) that can hold up in court; (ii) it was invented by the mining industry to reduce risks of misalignment of interests and expectations between a mining company and its *stakeholders*; (iii) it reflects the level of acceptance or approval that is given continuously by a local community project and a mining company. After an SLO is obtained, it must be maintained proactively; (iv) it is a strategy of linking *stakeholders* to manage

coordination of public-private actions and improves the feasibility of projects approval. It is not a formal document that will be requested, but it provides enforceable agreements with the community to be maintained and fulfilled. In this sense, the consensus reached must be consistent with the provisions of the social management plan proposed below. The recommendation is to draft a sectoral best practices guide for business and community relations and the implementation of certification systems in good mining practices, that take into account the issue of corporate social responsibility<sup>21</sup>. Similarly, one can think of the creation of regional mining advisory committees and regional points of service that promote social dialogue, a task that is already being done by the ANM. One suggestion is to perform an evaluation of incentive schemes allowing the allocation of comparative advantage proposals that include compliance with standards of community relations.

AS2 . SOCIAL MANAGEMENT PLANS. The implementation of Social Management Plans is recommended, as proposed by the ANM, institution that defines them as *a systematic, continuous, organized and comprehensive tool for management of impact and risks generated by the mining operation to the community, as well as opportunities to create tangible and sustainable benefits in the area of direct and indirect influence, with a long-term vision that can be derived from a social, economic and environmental aspect of the mining operation*. Such a Plan should ensure the reduction or mitigation of negative social impacts and generate initiatives that improve the quality of life for communities, as well as the analysis and implementation of productive projects<sup>22</sup>.

AS3. EARLY CONSULTING AND COMMUNITY PARTICIPATION WITH ETHNIC MINORITIES, VULNERABLE GROUPS AND LOCAL AUTHORITIES IN THE MINING PROJECT: Government must recognize the cultural values of each territory and, among other things, assess the possible effects of mining on issues associated with the agricultural sector infrastructure (eg.: land improvement districts). Government should conduct early relationships tasks with groups identified as vulnerable; meanwhile the mine operator must prepare early actions closer to the community and local authorities, as well as begin early law consultation with ethnic minorities as the case may be<sup>23</sup>. On the other hand, the Government should generate tools to shield these processes from malpractice handling of communities. An early strategy approach would create spaces for the mining institution to participate and permeate the process of drafting territorial planning instruments (POT's, POMCAS and municipal development plans).

## 2. Organizational problems of the industry and their regulation

### ● Optimizing the organization and structure of the industry

The presence of different types of mining in Colombia, legal, informal (including traditional and artisanal), and illegal mining, is, for the State and Society, a problem of high complexity,

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complex, challenging environments and social variables. It requires management negotiation skills, conflict resolution, trust building and value creation (Benavides, 2014).

<sup>21</sup> The ANM supports the creation of a system of standardization, certification and accreditation of socially responsible mine management (ANM 2014).

<sup>22</sup> Ibáñez (2014) shows that *"Municipalities with mining exploitation are different from non-mining municipalities. They are municipalities more isolated from the production centers with less institutional presence and lower socioeconomic status. This is particularly true for municipalities with gold and silver exploitation"*.

<sup>23</sup> Vargas (2014) from a study of the relationship between companies and communities in two mining 'districts' despite their similarities show different levels of social conflict around mining, thus he concludes that: *"It is crucial for companies to maintain relations of coordination and cooperation among them and with local governments because this way it facilitates dialogue with local actors"*.

since it is essential that a given time all mining activities are feasible (technically, economically, environmentally and socially) and illegal mining must be effectively eradicated. Mining activities must meet minimum standards, and comply with current regulations; offering commit with the conservation of the environment; and contribute to the development of the nation and the regions by generating decent and formal employment, paying taxes, royalties and corporate social responsibility initiatives. In short, mining should all be legal.

Three major problems related to the structure of the mining industry in Colombia have been identified: (i) Existing mechanisms under the law, and the requirements and criteria for the award of mining rights are not sufficiently rigorous and do not allow the State as resource owner, to decide with whom to partner for their utilization; (ii) informal mining does not have the technical capabilities to exploit resources, it pollutes the environment, employees work in hazardous conditions, they have no social security and pay no royalties; (iii) in the case of illegal extraction, in addition to all the negative aspects of informal mining, the profits of the enterprise may be in the hands of armed groups outside of the law.

In order to solve the problema, (i) it is necessary to guide title awarding toward bidding through auctions. For this to happen there must be a system with adequate information about restrictions and environmental conditions, social problems and the geological structure of the entire national territory. While it is not possible to stop mining while compiling the basic information, it is necessary to encourage the arrival of companies of recognized ability, as these companies most easily meet requirements of the law.

The impacts of the problem (ii) are reduced by promoting strategic partnerships between small and medium miners and between large miners and the government (at various levels, national, regional and territorial). This provides informal miners the incentives to formalize and legalize their activity, since associations make them more productive<sup>24</sup>.

To solve the problem of illegal extraction (iii) it is necessary that the Government contemplates the inclusion of the provisions of Article 106 of Law 1450/11 with legislative counter initiatives to explicitly postpone the effectiveness of what is mentioned there, and further, that national and regional mechanisms for monitoring and supervision of mining as well as the implementation of registration and monitoring mechanisms and the marketing and circulation control processes of heavy machinery before they go into operation.

OI1. PUBLIC AUCTION OF MINE TITLES. Exploration (and thus exploitation) should preferably take place by supply rather than by demand, when possible, through contests between specialized firms to subsequently attract operators with high technological and financial qualities. To achieve good results in these processes of blocks auctions, they should have a detailed characterization of the subsoil and soil<sup>25</sup>, the supply of ecosystem goods and services and social structure within the country. The ANM initiated objective selection activities for granting mining concession contracts in strategic areas, in accordance with the provisions of Article 108 of Law 1450 of 2011. It is recognized that there is a trade-off between the quality of information and the intensity of competition.

OI2. MANDATORY REQUIREMENTS FOR ACCESSING A MINING TITLE. When permits are granted by demand, it is necessary to impose technical, financial and managerial capacity

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<sup>24</sup> Strategic alliances are functional to the extent that informal miners operate in areas legally constituted, in the case of informal mining in free areas, the procedure must be different.

<sup>25</sup> Such as categories as mentioned in footnote 15.

conditions<sup>26</sup> to receive a title (and to keep it) in order to segment the risks of exploration and exploitation, and preferably to attract firms operating in international markets. These requirements, to the extent authorized by LOOT. In addition to a Mining Code classification by decrees, as stated, would open roads to delegate the processing of applications for mining titles when in the judgment of the national government, local authorities have appropriate management capacity, without incurring in the waiver by the State to exclusive ownership of mineral resources.

OI3. EMERGENCY PLAN FOR FORMALIZATION. We must eliminate the varying degrees of non-legal mining, and determine what type of breaches can be remedied so as to allow financially, socially and environmentally sustainable projects. It is recommended that the Ministry of Mines and Energy harmonizes with MADS the concept of mining formalization. The proposed formalization from MME provides the following definition for the formal mining: Activity whose productive units perform mine labor with a valid mining title or under its coverage and meeting the technical<sup>27</sup>, environmental, economic, labor and social parameters, as defined by the law in each of these aspects. Once informality has been defined, there is a need to establish a quick plan that drastically reduces it, with a decisive intervention, in unison with territorial authorities in technical, safety, environmental and economic aspects. The proposed formalization from the MME includes the following path to its achievement:

Traducción textos imagen

1st Goal, 2nd Goal, 3rd, Goal, 4th Goal, 5th Goal, 6th Goal

JOIN FORCES & BECOME STRONGER, TRAIN, BE  
PRODUCTIVE, INNOVATE

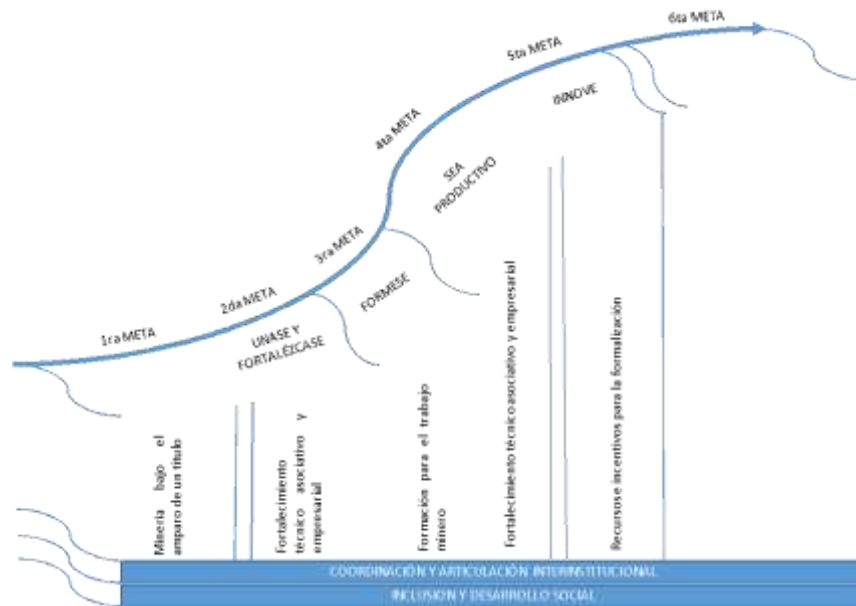
Mining protected by a mine title, Technical corporate &  
business strengthening, Training for mining tasks, Technical  
corporate & business strengthening, Resources & incentives  
to achieve formalization

INTERINSTITUTIONAL COORDINATION & ARTICULATION

INCLUSION & SOCIAL DEVELOPMENT

<sup>26</sup> Including environmental and social issues.

<sup>27</sup>There is a need to set these parameters. Martínez (2014) notes that "*The regulation of mine safety dates back to 1993. The terms of reference are from 2003. The guides have more environmental content than technical and mining content. There is an urgent need to update these parameters*".



Taken from: Ministry of Mines and Energy, Department of Mining Formalization

Continuity and sustainability of this initiative should be a clear concern for MME<sup>28</sup>. It is suggested that the Environmental Management Plan, PMA, in its first stage be included.

O14. INCENTIVES FOR LARGE MINERS TO FORMALIZE INFORMAL MINING. In the short term, we must continue to facilitate risk-sharing arrangements between large mining companies and small informal miners or legal miners, based on business sustainability and other arrangements. This has already been done by mining companies with very good results. MILPA and Gran Colombia Gold are successful examples of these initiatives. In the medium term, similar to what was done in Chile, it is worth thinking about an Enami type entity (of mixed nature or international cooperation), which is responsible for organizing, training, access to credit, marketing and purchasing old ore informal miners who were included in the formalization processes (selecting mineral interest).

- **Draft coherent and comprehensive regulations of the types of minerals to the life cycle of projects, including monitoring and their evaluation**

Assessing risks, costs and benefits of mining projects is essential to generate organized and responsible mining. The proposal makes the assumption that what is not measured can not be managed or is usually mismanaged. The alternative of not measuring allocates risks, costs and benefits of all forms, but without transparency, it is subject to influence, based on perceptions, and full of unanticipated negative surprises. The idea is to adopt three simple protocols, one for project approval, one for tracking and one for impact assessment linked to the provisions of mine closure. Approval would have two steps: first, to define whether the risk of the initiative makes impossible to mitigate or manage, to prevent any further consideration. If the initiative passes this first filter, it may be delivered via auction rounds designed for this purpose or via demand for individual application.

RS1. COMPREHENSIVE MONITORING OF PROJECT LIFE CYCLES . The risk analysis performed prior to the exploration stage, through the application of an early warning system allows, in addition to the factors of exclusion, to identify major conflicts that may render impractical

<sup>28</sup>Proposal made by the ACM (2014). It is believed that formalization requires a much more ambitious and structural proposal that implements something different from what has been done in Colombia so far and they make said recommendation.

future mining development<sup>29</sup>. This analysis must be refined in the environmental impact study required to grant the environmental license<sup>30</sup> as a prerequisite to start the exploitation stage. This work can be built on the experience of Canada or Australia, where there are manuals for this purpose by each type of mine and mineral. It could be done by UPME under its duties as Sector Information Coordinator<sup>31</sup>.

The cost-benefit analysis (including analysis of external factors and comprehensive assessment of economic and social impacts<sup>32</sup>) is a basic requisite to obtain a Social License to Operate (CIDER, 2014). It must accompany the submission of the Work Plan and Civil Works, PTO, studied together with the documents for the granting of the environmental license enabling the mining exploitation. The ANM must prepare the information resulting from this analysis. For those exceptions of actions not foreseen in the environmental management plan (PMA of EIA) not covering all social externalities (cases in which the socio-economic assessment to obtain a ratio B/C less than one), the Commission proposed in AG1 # will take an appropriate decision to ensure that the project will generate social benefits expected under the Social Management Plan required by the ANM. Impact assessment will be done periodically during project implementation and final mine closure stage. The results of monitoring the life cycle should provide feedback to the Social-Environmental-Mining Intersectoral Commission.

RS2. REGISTRATION AND FOLLOW UP TO MARKETING PROCESSES. It is necessary to strengthen marketing schemes and registration systems that allow tracking the commercialization of mining products (traceability). The Sole Record of Marketing (RUCOM from Spanish acronym) will be a key tool in achieving this goal and contributes to solving the problem of illegal mining. The ANM initiated online applications in early 2014 (ANM 2014). We must review the faults that occur in the transaction of information (CGR, 2014). It is also recommended to analyze the application of green seals and certifications together with environmental responsibility along with ICONTEC (ANM 2014).

RS3. REGULATION OF MINE CLOSURE. There must be special emphasis given to the closure and abandonment of mining activities<sup>33</sup>. They are considered the final stage of the mining cycle plan which should be considered and quantified from the initial stages of the mining project. These rules should be established for all types of mining rights. They will generate additional contractual obligation for a closing instrument, demanding the financial guarantee and creating a post closing rate. The Social Management Plan includes aspects that can be considered in a mine closure bill proposed by UPME to ensure the sustainability of the positive impacts of the mining project. Additionally, regulatory actions should provide for the management of abandoned mines, especially those that create imminent risk to the population as well as financial resources to guarantee its assistance. Recent experiences like Chile may be used as guidelines.

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<sup>29</sup> In the case of a schema offer, this study must be done before opening the auction process for strategic mining areas.

<sup>30</sup> While it is understandable that many times the information available, the expertise of staff and the lack of the tools do not yield a quantitative risk assessment, so rigorous and precise at the onset, one should begin with a qualitative risk assessment of each project and gradually begin progressing towards higher levels of accuracy.

<sup>31</sup> Article 5 of Decree 4130 of 2011.

<sup>32</sup> The UPRA suggests including future costs in agricultural production (agriculture, forestry, livestock, aquaculture and fisheries) in the socio-economic evaluation, from the perspective of food security at the local, regional and national levels.

<sup>33</sup> It is necessary to identify which soils can be restored to or through a model of agricultural production.

RS4. TECHNICAL TOOLS FOR MINING. It will be necessary to develop a battery of programs to ensure technical accuracy of the mining exploration and exploitation (including mine closure), which can be represented by best practices guidelines, technical regulations, protocols, manuals (similar to the existing instruments for the electricity sector), including technical tools to restore and rehabilitate the soil to a productive level. Likewise, work should be done to make more rigorous evaluation of the PTO, which requires the participation of experts and forces the mining company to present the best technical quality PTO. On the other hand, is necessary to develop the technical content necessary for proper implementation of mining legislation.

RS5. GREATER TRANSPARENCY AND ADOPTION OF STANDARDS AND COMPLIANCE. Colombia should strengthen its ties with EITI and other current initiatives (map of royalties), which generate the arrival of operating firms listed in international exchanges and adapt best practices. EITI requires mining companies, government and local authorities to publish accurate information on royalty resources<sup>34</sup> and taxes generated by mining activities and how they are used. Thus civil society can understand and monitor the use of public resources produced by mining and public and private actors are forced to act with greater transparency and efficiency<sup>35</sup>. EITI's credibility depends largely on the credibility enforced for transparency of those who promote it. Additionally, and consistent with the technical-mining mentioned content it is necessary for the country to adopt minimum standards for the development of this activity in technical, environmental and social issues, aimed at achieving high international standards of best practices and corporate responsibility matters.

### **3. Strengthen information systems for decision-making and conflict prevention, which are generated by the absence of public information, training systems and innovation**

The limited availability of information for decision-making has been identified. Ponce (2013) notes that Colombia's geological and mining information does not permit estimating possible changes in mine development and the mining information provided by the Government through SIMCO is generic and incomplete. Thus, it is essential to strengthen information systems for assigning titles, to explain early warnings and in general for making decisions and monitoring of mining activities.

UPME is responsible for the consolidation and management of sector and strategic information to support mining development (and Colombia's energy) and for the provision of products and information services to stakeholders in the sector and the national government within quality frameworks, information security, SLA's (service level agreements) and automation of processes and procedures<sup>36</sup>. The SGC is responsible for essential functions for

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<sup>34</sup> The mining authority reports the distribution of royalties and should move forward with reporting their generation (CGR, 2014).

<sup>35</sup> Rudas (2014) in the work of the Comptroller General of the Republic there has been emphasis made on the need for quality information that is transparent and accessible.

<sup>36</sup> UPME, in its role as Chief Information Officer, CIO, shall boost initiatives that: (I) develop the Enterprise Architecture within the sector guidelines aligned to Ministry of Information Technologies, (ii) contribute to the sector entities having an exchange of information through integration architectures, (iii) develop data governance and generation of information and knowledge through business analytics (Business Analytics and Optimization), where there is integrated use, especially dashboards, business intelligence, data mining, predictive models and optimization, master data management and content management -ECM (Enterprise Content Management), among others, to strengthen the planning and management of the country's mining and energy, (iv) develop human talent in the mining and energy sector in the development of competencies, skills and abilities to support efficient and



decision-making, among which may be noted the generation and management of Colombia's comprehensive geoscientific knowledge, conducting research of subsoil resources to evaluate their potential, ensuring that this information is available for decision making. Nowadays, mapping information generated by private operators is not integrated into official systems. On the other hand, in Colombia there is no educational provision that meets the needs of developing organized and responsible mining in the territory.

Regional strengthening of institutions such as SENA (Colombian State Run Educational Entity) in those departments with high presence of mines would be essential for improving the incorporation of local and regional population in mining projects, giving way to better employment opportunities in mining or other related directly or indirectly therewith, in turn facilitating the development of forward and backward linkages. Applied research in new technologies for the development of responsible mining and environmental communities would develop a niche in universities housed in producing regions (or in large cities, where those do not exist), organized with mining companies, under the principle of diffusion of knowledge among both parties.

A balance must be achieved between the National Educational Innovation Centres – CIEN (for its Spanish acronym), the Centers for Regional Educational Innovation – CIER (for its Spanish acronym), Institutions of Higher Education and the productive sector in the formulation and adoption of programs that integrate IT into educational content and foster the development of research centers in the mining sector, for which royalty resources could be used. New projects will demand skills different to those traditionally employed. Proactive and comprehensive monitoring of project lifecycles shall be a constant in the future. As a result, the fields where there will be a need for a large range of professionals are social project evaluation, risk assessment and valuation of ecosystem services.

To improve the basis for development of mining activities the following is proposed:

**ID1. INFORMATION SYSTEMS FOR DECISION-MAKING AVAILABLE IN UNIFIED PLATFORMS.** Good geoscience and statistical information is essential for achieving better results in the allocation of mining rights and in general for decision-making related to the mining sector. It is essential that information be available on platforms that consolidate and integrate existing official data on missionary platforms and are easily accessible by public and private entities involved in the sector and by the general public. Likewise, it is fundamental for DANE (Colombian Data & Statistics Entity) to perform a Miner census, with periodic applications, learning difficulties and errors from the so-called "Censo 2010-2011." There is also a need for a complete mining cadastre to generate timely information for evaluation of the proposed concession contracts for the administration of existing contracts and information for decision-making.

**ID2. REGIONAL LAND MANAGEMENT EXERCISES IN MINING AREAS OF INTEREST.** The development of regional land use planning exercises in areas of mining interest will allow gathering, cross-referencing and analyzing information for potential, restrictions and conditions for the development of mining scales with better accuracy, more useful for decision-making. Seeking to develop dynamic and multivariate analytical tools (with the

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effective management data, information and knowledge to the light of the initiatives outlined here, (v) develop the capacity of TIC within UPME to support the above initiatives, (vi) promote scientific research processes, technology and innovation focused TIC to support strategic, mission and operational processes of the sector, (vii) develop the capacity to process management and technology-related projects in the sector, and (viii) lead and articulate the Government TIC within the sector.

ability to model and analyze complex scenarios) for the formulation of socio-ecological analysis as a basis for decision-making. The result of these exercises also allows the user to set guidelines and strategic actions proposed in this PNOM.

ID3. INTEGRATION OF INFORMATION GENERATED BY OFFICIAL MINING EXERCISES CONDUCTED BY IGAC<sup>37</sup> AND OTHERS. It is necessary to reach an agreement between data and information generators with protocols that allows reliable supply information generated by the sector. This product must be useful for feeding the country's official systems. One concrete action proposed is to create mechanisms to ensure that the information reported in geological exploration reports submitted by mining companies complement the geological information of the SGC. It is necessary to harmonize the main instruments of Colombia's territorial system, with emphasis on national and regional areas, so that they constitute an updated framework for municipal plans.

ID4. TRAINING AND PROFESSIONALIZING HUMAN RESOURCES. The idea is to establish an intersectoral committee for human resource management as a coordinating body of national order (amendment to Decree 1953 of 2012). The main objective of the Intersectoral Committee with new features, will be building, harmonizing, coordinating and managing a policy framework in education, applied to different industries, particularly the mining sector, with agency coordination faculties and through different levels of training. This Intersectoral Committee must harmonize sector plans in the short medium and long term in order to improve the relevance of the academic programs offered, strengthen competition of existing programs and create new academic programs to the Colombian mining sector.

The Intersectoral Committee must have sectoral committees whose main objective will be to identify training gaps, the approach that should be driven to the skills training for each sector and private-public coordination mechanisms required for the implementation of specific academic programs. The main reason for suggesting the revision of Decree 1953 of 2012, reallocating objectives and functions of the Intersectoral Committee is to address and overcome the identified institutional miscoordination to implement the plans and strategies derived from the NDP, the 3674 CONPES and education plans sector. Successful examples of such international initiatives are evident in New Zealand, UK and Australia where such committees have their own field of inter-agency coordination in the education sector.

ID5. REGIONAL INNOVATION SYSTEMS AND PRODUCTION CHAINS. It is essential to strengthen regional innovation systems and local capacity to develop production chains, especially for suppliers of goods and services for the mining and energy sector to be consolidated together<sup>38</sup>. In order to achieve this, it is proposed to structure public and private agendas, roadmaps to improve departmental competitiveness and a "differentiated intervention of public policy with a high level of coordination and cooperation between central and local institutions, given the differences in the baseline capabilities and

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<sup>37</sup> The IGAC is responsible for leading, with accompaniment from the National Planning Department, under the parameters of the Colombian Spatial Data Infrastructure - ICDE, the implementation of the National Geographic Portal project and SIG-OT, currently operating without updated certified mining information, to provide a unified platform for managing geographic information in Colombia, so as to allow the generation of comprehensive and formal consultations, addressing the different sectoral and regional themes (CONPES 3762).

<sup>38</sup> Castillo (2013) believes that the development of local industry suppliers linked to the pipeline of mining and energy investment creates an opportunity for backward linkages with potential business enterprises SMEs in the order of USD \$2.6 billion and for larger companies more than USD \$23.0 billion, and even forward linkages, for example, in construction in neighboring thermal plants, which is deficient in Chile, liquefaction or gasification of coal and the development of jewelry with high added value from gold and emeralds.

competence to receive and boost the projected large influx of investment" (Castillo, 2013). The possibilities of achieving new business projects and generating sustainable linkages require that actions should be measured and planned in order to close the competitiveness gap among regions. (see Regional Competitiveness report Private Competitiveness Council).