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Sustainable Development

Non-Metallic Mining

Building the case for specific legal frameworks

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Non-Metallic Minerals: Building the case for specific legal frameworks
Draft for Consultation – Not for Distribution

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Written by IGF Secretariat

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EXECUTIVE SUMMARY

Non-metallic materials are essential for the modern development of countries. They make up some of the basic materials used in constructing roads, housing, and rail infrastructure, and their supply is crucial for local industries.

Non-metallic mining is present in all IGF member countries. In some of these countries, it is the only type of mining to be done. A 2024 IGF survey of more than 30 member countries revealed that more than 50% of their mining activity is related to non-metallic minerals, with approximately 45% of that corresponding to construction materials.

Figure ES1. City of Tegucigalpa, Honduras

However, up until now, mining governance best practices that have been shared internationally have mainly focused on the metallic sector. To help countries manage the unique challenges of non-metallic mining, the IGF has launched research on best practices in the sector and global efforts to build capacity.

Drawing on the guidance of IGF member countries, this policy paper outlines best practices and examples of provisions for non-metallic mining legislation, taking account of the nuances of the sector and how it differs from metallic mining. These examples are intended to support governments in managing the specific characteristics of the non-metallic mining sector.

Considering the importance of non-metallic minerals in the mining sectors of the member countries, legal frameworks can be tailored to optimize the contribution of these minerals to sustainable development.

Although many countries lack a legal framework for non-metallic mining, some do incorporate specific provisions for this sector. IGF's research shows that most countries have introduced specific provisions for (among other things) the following aspects of non-metallic mining:

- the classification of minerals,
- permit-granting processes,
- royalties and taxes,
- use of construction materials for public infrastructure, and
- exploration and extraction phases.

This policy paper addresses those matters specific to non-metallic mining that require different treatment in the law. In general, national mining legal frameworks will apply to non-metallic mining. However, it is helpful for governments to set out their differences in the law by including certain aspects that are specific to non-metallic mining.

Classifying non-metallic minerals in mining laws can facilitate definition of the mining authority's responsibilities and specific provisions regarding each mineral. Classifying minerals is also effective for determining exploration and extraction phases, royalties, environmental and social impact assessments, and waste management provisions that are consistent with non-metallic mining. A clear classification will ultimately give certainty to permit holders about their rights and responsibilities.

In addition to classifying minerals, it is crucial to categorize mining activities by scale. Criteria for determining the scale of the operation could include production volumes, extraction and processing techniques, or the size of the mining area and the number of employees. Distinct rules and regulations should be established for artisanal, small, medium, and large-scale non-metallic mining activities to address the unique characteristics and potential impacts of each scale. Government agencies should consistently consider these scales when formulating policies and regulatory frameworks, ensuring that the guidelines are tailored to the specific challenges and requirements of each category.

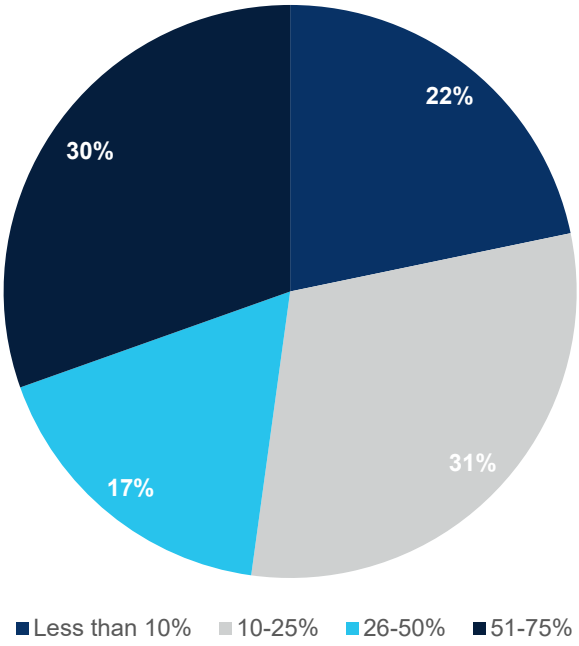
This approach will allow for implementing customized licensing procedures that are better suited to the diverse needs and capabilities of permit holders operating at various scales. It will also play a key role in shaping strategies for formalization among non-metallic minerals miners. This is especially important considering that almost 50% of IGF members surveyed indicated that more than 25% of their non-metallic mining activity is informal (Figure ES2).

Other matters that should be considered when regulating non-metallic mining include the specific environmental impact assessments that should be undertaken depending on the

type of mineral and the impacts it generates. Attention should also be paid to sand restrictions, bans, or quotas from lakes, rivers, and coastal areas.

There are no universal approaches to the taxation of non-metallic mining. However, in general, countries have chosen either unit-based or value-based royalties, depending on the type of mineral and its market value.

Figure ES2. Informal non-metallic mining as a proportion of all mining activity (in surveyed countries)



The current trend and focus in the mining sector on designing or implementing critical minerals strategies and regulations is overshadowing the need to review outdated non-metallic mining provisions. These provisions should be examined to introduce sustainability standards and incentives to decarbonize such operations. This can be promoted through, among other things, mandatory greenhouse gas emissions mitigation plans, tax incentives, or access to low-interest credit lines financed by the government.

In addition, it is important to consider that some non-metallic minerals may be deemed critical or of strategic interest to the country in question and included in a specific critical minerals list derived from the national critical minerals strategy. In these cases, the legal provisions of the critical minerals regulations (such as the application requirements, the permit-granting process, the fiscal regime, and the potential trade considerations) should apply to the non-metallic minerals included.

Finally, an independent mining authority that oversees both non-metallic and metallic mining—including mineral extraction, processing, and utilization—is found in most countries. This proves to be more effective than delegating non-metallic governance to environmental authorities, which do not necessarily have technical knowledge related to mining.

This policy paper outlines best practices in, and examples of provisions for, non-metallic mining legislation. Each provision template is accompanied by an explanation and a set of alternatives that countries intending to adopt the provision can consider. The provisions presented in this policy paper are intended as a resource for legislators and governments to use in drafting mining laws for non-metallic mining.

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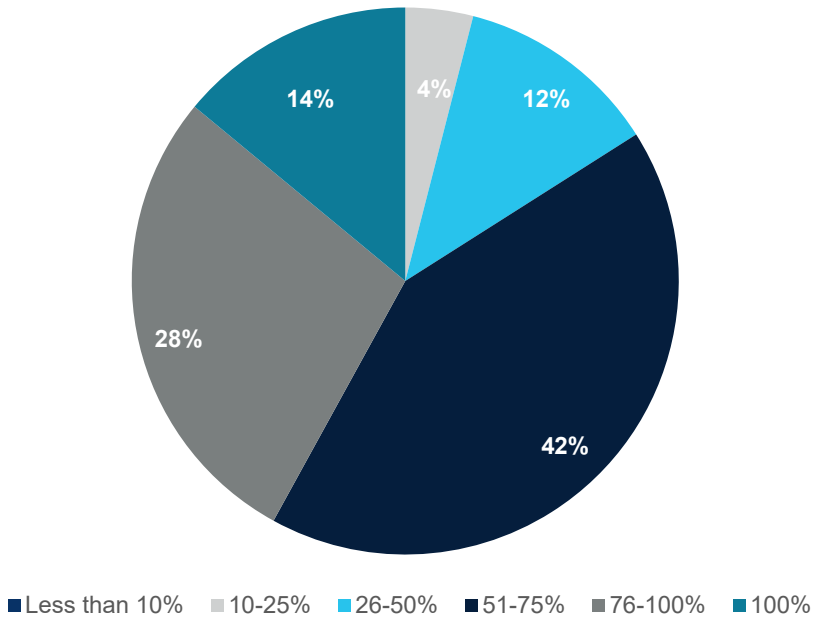
1.0 INTRODUCTION TO NON-METALLIC MINING

Non-metallic mining produces minerals that are neither metals nor fuels. These minerals are present in every country and are essential for people's daily lives. They include sand, gravel, limestone, sandstone, marble, and clay, which are crucial for building homes, roads, and other infrastructure. They also include barite, salts (except lithium salt brines), phosphate, and graphite, which have different industrial applications and play key roles in the agricultural, chemical, and energy industries. Non-metallic materials represent the largest share of global materials usage, and their consumption is projected to rise from 44 gigatons in 2017 to 86 gigatons by 2060 (Organisation for Economic Cooperation and Development [OECD], 2019).

The significance of these minerals should not be underestimated. A recent survey conducted by the IGF with participants from over 30 countries[1] revealed that in most countries, more than 50% of mining activity is related to non-metallic mining (see Figure 1).

Figure 1. Non-metallic mining as a proportion of all mining activity (in more than 30 surveyed countries)

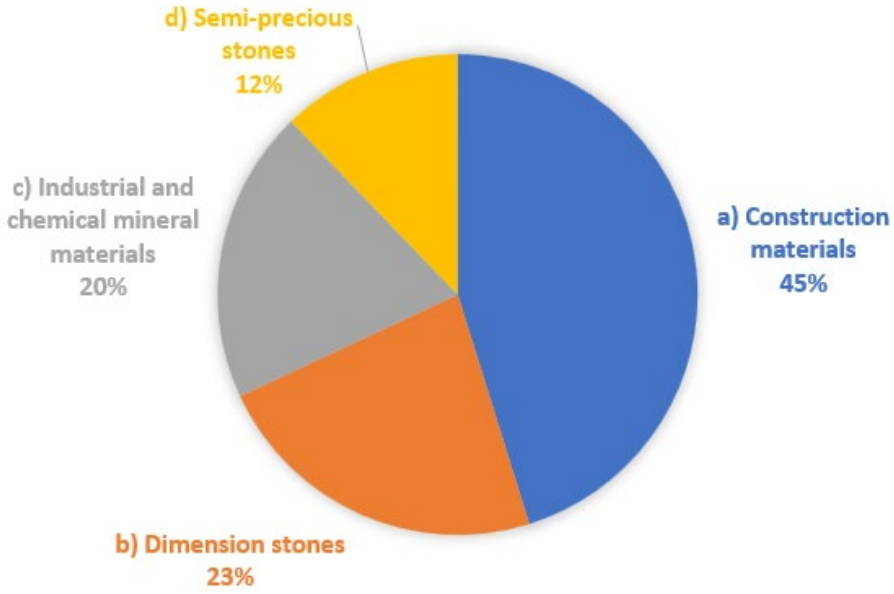


Source: Authors' calculations.

[1] Argentina, Armenia, Brazil, Burundi, Cambodia, Cameroon, Chad, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Ethiopia, France, Georgia, Germany, Guinea, Honduras, Jamaica, Lesotho, Mexico, Peru, Philippines, Senegal, Sudan, Suriname, Sweden, Thailand, Timor Leste, Togo, United Kingdom, and United States.

As shown in Figure 2, our survey results also revealed that approximately 45% of the non-metallic minerals mined corresponds to construction materials; another 43% corresponds to an almost equal split between dimension stone and industrial and chemical mineral materials; and a smaller proportion corresponds to semi-precious stones.

Figure 2. Proportion of non-metallic minerals by category (in surveyed countries)



Source: Authors' calculations.

Non-metallic mining operations typically occur in quarrying and can be conducted on various scales—from small to large-scale quarries—and production volumes. Apart from semi-precious stones, these materials, typically of lower value than metallic ore deposits, are often extracted in large quantities. They are primarily used locally because of their bulk and the associated high cost of transporting them. However, potash salts and phosphates, for example, which are used in agricultural and chemical industries, are sometimes exported outside production countries. Because of their wide-ranging uses, non-metallic materials are indispensable for economic growth, technological advancement, and improving people's quality of life.

To align with the established literature, the term non-metallic minerals is used throughout this policy paper to describe materials that are neither metals nor fuels and that are extracted through non-metallic mining. This includes minerals (like quartz and graphite) and rocks (such as granite and limestone). Semi-precious stones are also included in this term, because they are not metallic materials and because they share certain characteristics with non-metallic minerals. However, exceptions are made throughout this

policy paper on the treatment that semi-precious stones should receive in relation to certain matters.[2]

The African Mining Atlas (AMLA) Guiding Template uses the term "development minerals" to refer to non-metallic minerals as "a subset of minerals mined, beneficiated and consumed principally in domestic and regional markets as identified in the [Directive of the African Union Commission]" (World Bank, 2017). For the purpose of this guidance document, we use the term "non-metallic minerals."

[2] Although geologically precious stones are non-metallic materials, they do not share other characteristics of non-metallic materials and should be treated differently in regulations. As mentioned above, in certain cases the legal frameworks for semi-precious stones should be similar to precious stones, considering the similar value of the two categories of stones.

2.0 LEGAL AND INSTITUTIONAL FRAMEWORKS FOR NON-METALLIC MINING

Legal frameworks for non-metallic mining can be tailored to optimize the sector's contribution to the sustainable development of countries.

Although many countries lack a legal framework for non-metallic mining, some do incorporate specific provisions for this sector. Our survey shows that most countries have specific provisions for, among other aspects of non-metallic mining:

- the classification of minerals,
- permit-granting processes,
- royalties and taxes,
- use of construction materials for public infrastructure, and
- exploration and extraction phases.

Given that many general mining provisions will also apply to non-metallic mining, this policy paper addresses the matters relating to non-metallic mining that require different treatment in the law.

The next sections will outline best practices and examples of provisions for non-metallic mining legislation. Each provision template has an accompanying explanation and a set of alternatives that countries intending to adopt the provision can consider. These provisions serve as a resource to aid legislators and governments in drafting laws for non-metallic mining.

The suggested provisions, although considered to be best practices, should be adjusted to suit the specific circumstances and institutional framework of each country's mining sector. Certain measures may need further refinement, in particular when outlining the process for granting mining permits and when setting out the rights and responsibilities of permit holders. Before implementing any of these measures, a legal assessment should be conducted to avoid creating an inconsistent or conflicting regulatory framework.

2.1 Classification of Minerals

Non-metallic minerals can be defined in the mining law. The law can also incorporate a non-exhaustive list of these minerals, which the mining authority can update when needed. This enables metallic mining and non-metallic mining to be treated differently in the law based on their characteristics.

In the classification of minerals, the law can reflect the idea that non-metallic mining encompasses the extraction of materials and minerals that are not metals or fuels. The classification exercise recognizes rocks and minerals like sand, gravel, granite, limestone, marble, sandstone, clay, salt (except lithium salt brines), barite, and phosphate. With the exception of semi-precious stones, these materials are typically considered by the legislator to be of lower value than metallic ore deposits, are recognized as often being

extracted in large quantities and are primarily used locally. This is because of their bulk and the associated high transportation costs. However, potash salts and phosphates, for example, which are used in the agricultural and chemical industries, may be exported—even outside the production countries.

Different studies that describe development minerals, which are mostly non-metallic minerals, group them into four "branches" (Hilson, 2016):

- The first branch, **construction materials**, is defined by the British Geological Survey as minerals "used by the construction industry, for example in road making, in concrete, in house construction and as railway ballast" (British Geological Survey, n.d.). The largest component of these is "aggregates," which are used on their own or in concrete, mortar, roadstone, or asphalt.
- The second branch is **dimension stone**, or "natural rock quarried for the purpose of cutting and(or) shaping to a specific size" (Sutphin & Orris, 2007, p. 677). The main rock types used to fabricate dimension stone are granite, limestone, and marble.
- The third branch is **industrial minerals**, which are (single or group) commodities whose "physical or chemical properties, and not their metallic, energetic or gem properties are the main basis for industrial purposes" (Karlsen & Sturt, 2000, p. 8). Examples include calcium, carbonate, dolomite, feldspar, graphite, mica, potash, pumice, quartz/quartzite, and talc.
- The final branch is **semi-precious stones**, which are crystals or rocks that range in value and do not include diamonds, emeralds, rubies, or sapphires—the so-called precious stones. Both types of stones tend to be cut and polished to make jewellery. Examples of semi-precious stones include amethyst, aquamarine, garnet, opal, pearl, and quartz.

Table 1 presents a classification of non-metallic minerals as broken down in different mining laws:

Table 1. Classification of non-metallic minerals

Construction materials	Dimension stones	Industrial minerals	Semi-precious stones
• Gravel • Sand • Crushed rock • Clay • Shale • Asbestos	• Marble • Granite • Travertine • Sandstone • Limestone	• Salts • Kaolin • Calcium • Graphite • Phosphate • Potash • Sulphur	• Amethyst • Jade • Opal • Quartz • Turquoise • Zircon

Source: Authors.

The classification proposal in the AMLA Guiding Template suggests using a list to clearly distinguish the minerals:

> For the purpose of this [section], "development mineral" refers to a non-metallic or non-fuel mineral that may be mined, beneficiated and utilized or consumed [principally] in [Country] and includes [list particular minerals] or such other minerals as the [Regulating Authority] may from time to time declare by notice in the [Gazette] to be a development mineral. (World Bank, 2017)

The emphasis of the guidance goes beyond the geological definition to highlight the importance that the minerals are mined, beneficiated, and consumed locally, or that they are relevant to the development of the country.

In classifying minerals in legislation, some countries differentiate only construction materials. It is common to find definitions and specific provisions for construction materials and quarries in legislation worldwide. Some countries go beyond this and classify all minerals, but their classifications do not always correspond with a geological classification.

Box 1. Examples of classifications of minerals in law

In the Democratic Republic of Congo, Article 4 of the Mining Code (2005) classifies minerals into seven categories: (a) fossil energetic substances; (b) radioactive energetic substances; (c) ferrous and non-ferrous metallic substances; (d) non-metallic substances; (e) precious substances; (f) thermal and mineral waters; and (g) construction and ceramics materials. For the purposes of the legislation, "non-metallic substances" are potassium, sodium and magnesium salts, phosphates, bismuth, sulfur, nitrogen fertilizers, and graphite.

Similarly, in Angola the classification goes beyond metallic and non-metallic minerals. Annex II of Angola's Law no. 31/11 (2011) defines 10 categories: (a) ferrous metals; (b) non-ferrous metals; (c) rare earth elements; (d) radioactive minerals; (e) noble metals; (f) non-metallic mineral resources; (g) construction materials; (h) ornamental rocks; (i) precious and semi-precious stones; and (j) solid fossil fuels.

Honduras has a shorter classification system. Article 8 of the Mining Law (2020) limits this to concessions for metallic mining, non-metallic mining, precious stones, and aggregates.

These classifications are useful when they mention the minerals that they refer to and grant different treatment to these minerals. However, the wider the categorization, the more difficult it is to have a consistent and differentiated legal framework for distinct types of minerals.

Different categories are established even within non-metallic mining. Laws can introduce exceptions or exclude certain minerals in order to determine the rights and obligations of the permit holders. For example, while geologically precious stones fall within the category of non-metallic minerals, they could be treated differently than other non-metallic minerals. This distinction reflects the differing dynamics, including their value (mostly higher), their uses (such as jewellery), and the quantity of materials (generally lower) that can be exploited and transported.

Legal provision language template: Classification of non-metallic minerals

Article [*]. *Classification of non-metallic minerals*. Non-metallic minerals are geological materials that are not metals or fuels and that normally require minimal processing. Although they may contain a metal component, they do not have metallic properties and are extracted for neither their metal nor their energy potential content.

The main categories of non-metallic minerals are: (a) construction materials, including sand, gravel, aggregates, shale, and limestone; (b) dimension stone, which includes marble, sandstone, and granite; (c) industrial and chemical mineral materials, including salts, kaolin, calcium, graphite, phosphate, and potash; and (d) semi-precious stones, which include amethyst, opal, turquoise, and quartz; or such other categories of non-metallic minerals as the [mining authority] may from time to time declare by publishing a notice in the [Official Gazette]. When applicable, national and local authorities may treat metallic mining differently and establish specific regulations for non-metallic mining.

2.2 The Mining Authority

In some countries, non-metallic mining activities fall under the responsibility of different government agencies. These include the national mining authority, the environmental authority, and local governments.

It is important to establish the technical mining authority as responsible for administering all mineral resources. Although this distinction of responsibility may seem evident, in some countries the environmental authority oversees the administration of non-metallic minerals. The environmental authority is usually responsible for issuing environmental permits and licences and for overseeing compliance with environmental laws. However, in some jurisdictions, it is also responsible for some mining activities. In practice, problems have been created by the environmental authority's lack of expertise or by providing different treatment to parts of the mining sector. In general, it is the mining authority that has the technical knowledge needed to manage the non-metallic mining sector.

In addition, mining authorities might operate at a central level or a local level. Among the countries we surveyed, existing practices in governing non-metallic mining vary, as shown in Figure 3.

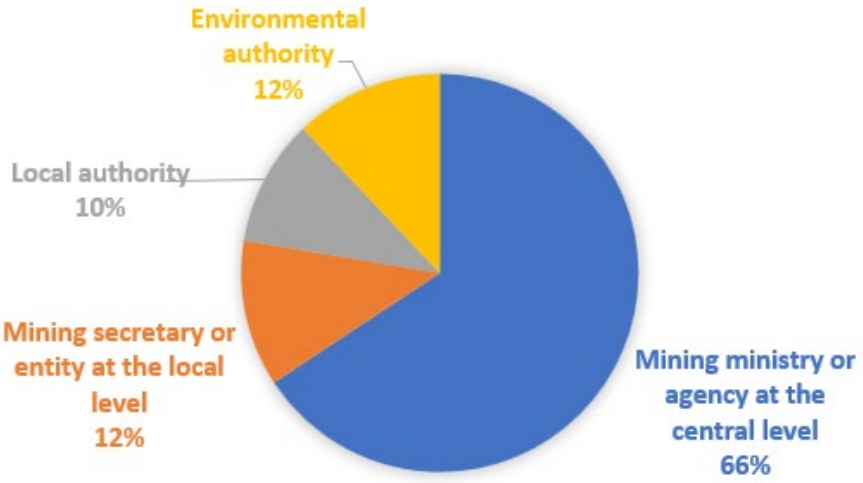
Some central governments delegate a broader power to, or even vest ownership in, local authorities. These local authorities are closer to the permit holders:

> […] since most development minerals are most optimally utilized within a limited radius of their production, it is recommended that regulation of such minerals is devolved to the locality where the minerals are produced. Federal governments may also consider vesting the ownership of development minerals in states to facilitate their optimization. (World Bank, 2017)

Oversight of mining operations is also key to enforcing the law, and central government may find this difficult to do when mining is in remote areas.

However, local authorities may lack the capacity to handle mineral rights issues (World Bank, 2017). When responsibility falls under the central government, this ensures consistent policies and standards in the mining sector as a whole. It is also consistent with those national constitutions that establish that the ownership of mineral resources is vested to the state, republic, or government on behalf of the people. Thus, the decision will depend on the size of the country, the extent and location of the mining industry, and the capacity of local authorities to monitor mining operations, among other factors.

Figure 3. Government agency responsible for non-metallic mining (in surveyed countries)



Source: Authors' calculations.

Box 2. Colombian mining authorities

In some countries, multiple entities in the mining administration sector are in charge of mining.

In Colombia, the Ministry of Mines and Energy is responsible for public policy on mining, the National Mining Agency oversees the administration of the mineral resources and the concession contracts, the Planning Unit for Mines and Energy is responsible for planning in the mining sector, and the Colombian Geological Service oversees scientific knowledge relating to the mineral resources.

The National Mining Agency may delegate some of its responsibilities to mining secretaries in a department of the country that has a large mining industry. On the other hand, environmental matters are assigned to the National Authority of Environmental Licences and regional environmental corporations, depending on the scale of the project.

It might not be necessary to have as many agencies overseeing the sector, but most countries have found that separating the mining and environmental aspects of non-metallic mining governance and management provides a good balance of allocated responsibilities.

Legal provision language template: The mining authority's role

Article [*]. *Mining authority*. [*The particular entity in charge of mining matters*] will be the mining authority responsible for the administration of all mineral resources. It will award mining titles, grant and supervise mining permits, and promote and plan mining activities in the territory.

The mining authority may delegate its power to local authorities to ensure effective and efficient mining procedures, including for formalization processes and oversight. Whenever the mining authority delegates power to local authorities, it shall maintain a guiding and supervisory role.

2.3 Scales of Non-Metallic Mining

Best practice in mining law provides for different scales of mining. In countries with metallic and non-metallic minerals there may be different classifications of scale for each type, given the larger production volumes for non-metallic minerals. However, because the production and extraction volumes for semi-precious stones are generally smaller, an exception should be made by establishing specific criteria for the semi-precious stones present in the country.

Many laws differentiate scales of mining by referring to artisanal, small, medium, and large scales. Criteria used to differentiate scale include production volumes, number of employees, type of machinery employed, and number of hectares to be granted in the concession or licence. For some countries, it may be enough to have artisanal, small-scale and large-scale mining categories, depending on the characteristics of the sector. However, other countries may include medium-scale mining or semi-mechanized mining to encourage the growth of mining operations.

Legal provision language template: Scales of non-metallic mining

Article [*]. *Scales of non-metallic mining*. Non-metallic mining will be classified as artisanal, small-scale, medium-scale, and large-scale mining depending on the following criteria:

1. Artisanal: between [*] and [*] tons per day through non-mechanized equipment operations [*or a maximum of [*] employees and/or [*] hectares*].

2. Small-scale: between [*] and [*] tons per day [*or a maximum of [*] employees and/or [*] hectares*].

3. Medium-scale: between [*] and [*] tons per day [*or a maximum of [*] employees and/or [*] hectares*].

4. Large-scale: between [*] and [*] tons per day [*or a maximum of [*] employees and/or [*] hectares*].

The criteria for and number of scales will vary in each country depending on the size and characteristics of the mining industry. This approach can help to effectively address the needs of permit holders at different mining scales through specific policies (for example, policies relating to taxation, occupational health and safety, labour, and environmental

planning). It can also be useful for formalizing and supporting artisanal and small-scale mining. Legislation can then use this classification to establish the various rights and obligations of the permit holders throughout the mining cycle.

2.4 Uses of Non-Metallic Mining

The use of non-metallic materials can stand out in legislation as a differential characteristic. For example, construction materials are essential inputs for public works and infrastructure projects, and these materials are usually sourced locally. Many countries have devoted special mining permits to construction materials, many of them with provisions allowing for the "free" use of construction materials. Such authorization can speed up the construction process and lower project costs.

Box 3. Honduran provisions for construction materials

Articles 21–26 of the Honduran Special Law to Simplify Investment Procedures for Public Infrastructure (2011) simplify the procedures related to building public infrastructure by stating that non-metallic minerals required for public infrastructure projects may be used rationally by the state with the prior authorization of the secretary of public works, transport, and housing.

The extraction of minerals for public infrastructure can be exempted from royalty payments as long as the contractor does not include its total costs in the project expenses. In Georgia, Article 7 of the Law on Fees for the Use of Natural Resources (2011) exempts companies from paying mineral-related fees when the minerals are extracted "in the course of the construction of metro, water supply and sewage systems, and underground structures for domestic and infrastructural purposes." Some countries allow the unrestricted use of construction materials in areas that have been awarded to third parties. However, this may create problems (Mining Law, 2009, Art. 45) by leading to litigation against the mining authority for violation of acquired rights.

Likewise, in countries with remote or disaster-affected regions where obtaining construction materials is too difficult or costly, the use of construction materials for community infrastructure can be authorized under special mining permits granted by local authorities.

When the permit holder is different from the builder of the infrastructure, the local authority or the contractor could set a preference for procuring construction materials from those miners. Buying construction materials (directly or through public tender processes) from artisanal and small-scale miners can contribute to their formalization and, in doing so, improve business practices. In Ethiopia, municipal authorities are responsible for public procurement of construction materials for maintenance or building of local roads. Public tendering processes for construction materials gave preference to the participation of local small and medium-scale mining operations (Riedel et al., 2022). Over the years, tendering processes have included stricter rules and become more competitive, which has encouraged the local operators to better organize themselves (Riedel et al., 2022).

Legal provision language template: Construction materials for public works

Article [*]. *Use of construction materials for public works*. The mining authority may grant government agencies or its contractors special mining permits for the use of construction materials for public works and infrastructure projects. For this purpose, the mining authority will grant a special mining permit subject to the following rules:

1. The permit will be issued only for areas that have not yet been awarded to another applicant and that are within the project's boundaries as defined by the mining authority.

2. The permit will be valid during the construction period only, and it may only be used for the public works or the infrastructure project. Any other use may be considered illegal.

3. The permit holder must comply with environmental regulations.

4. The permit holder shall not pay royalties for the extracted construction materials.

5. The permit holder must report the quantities of extracted construction materials to the mining authority.

6. The permit holder shall not include the construction materials in its costs but may include the cost of labour and use of machinery.

The mining authority shall regulate this matter and may delegate the issuance of special permits to local authorities.

Article [*]. *Use of construction materials for infrastructure in remote and disaster-affected areas*. Communities, directly or through their contractors, in remote or disaster-affected regions may use up to [*] tons of construction materials for the construction, repair, or reconstruction of community infrastructure, such as roads, schools, and hospitals.

The municipal authority shall grant a special mining permit and register the permit holders in a registry previously created by the mining authority.

The special mining permit may be granted subject to the following rules any additional regulations established by the mining authority and in accordance with the following rules:

1. A permit must not have already been awarded for the area.

2. The permit will be valid during the construction period only, and it may only be used for community infrastructure. Any other use may be considered illegal.

3. The permit holder must comply with environmental regulations.

4. If the permit holder is different from the person or entity building the infrastructure, it may receive payment for the minerals extracted.

2.5 Process of Granting Mining Permits

Mining titles may be awarded through different processes (such as the first-come, first-served licensing principle) or through competitive processes (such as auctions). Irrespective of the mineral allocation process, an applicant must comply with all the requirements and obligations set out in the country's mining, social, and environmental

regulations to acquire a mining permit. The decision to choose one process over another should be based on:

- a cost-benefit analysis for the country,
- knowledge of the mining area and potential,
- the country's definition of strategic and critical minerals, and
- the regular need for certain materials, such as construction materials.

It is common to use the first-come, first-served licensing principle for non-metallic mining permits. This is because of the low value of the mined materials and the bulk of applications received by mining authorities. When these are not considered strategic for the country, the first-come, first-served licensing principle is faster and less complicated for the mining authority to administer. However, this does not mean that the criteria are more relaxed: These are set in advance, and fulfilling them is a sine qua non condition of being granted the permit.

Box 4. Mining permit-granting processes: Options for non-metallic mining

Competitive process: This process allows applicants to compete and the mining authority to choose the most qualified among them. Criteria set by the mining authority can include technical and financial capacity, proposed work programmes, or the highest bid. Process options can include auctions, open or closed tender processes, or negotiated procedures, among others. Designing the process and evaluating the proposals may be complex and time-consuming, but doing so ensures that the most capable permit holders exploit the mineral resources or that the country is generating a higher revenue. The competitive process is usually chosen when the minerals are of strategic value for the country.

First-come, first-served principle: This principle refers to the process by which the permit is granted to the first applicant to submit a complete application for a mining area. The permit is granted and maintained subject to the applicant's compliance with the various requirements and conditions established in the country's mining, environmental, and social regulations. These may include financial capabilities, technical expertise, mining plans, environmental impact assessments, prior consultation with communities, and other conditions necessary for carrying out mining activities in the specified area. Public disclosure of the application is recommended.

The competitive licensing process is not the default rule for non-metallic materials because it can be time-consuming, complex, and expensive. Having a competitive process for every non-metallic mining permit may prove to be very costly for the government, especially when considering its economic gains and factoring in the delay that can be produced in projects of national interest like those for construction or infrastructure.

Exemptions usually apply to certain non-metallic minerals for which competitive licensing processes could be convenient:

- Some minerals may be deemed critical for the country and included in its list of critical and strategic minerals derived from its national mineral strategy. In this case, the legal provisions of the critical mineral regulations would apply to the

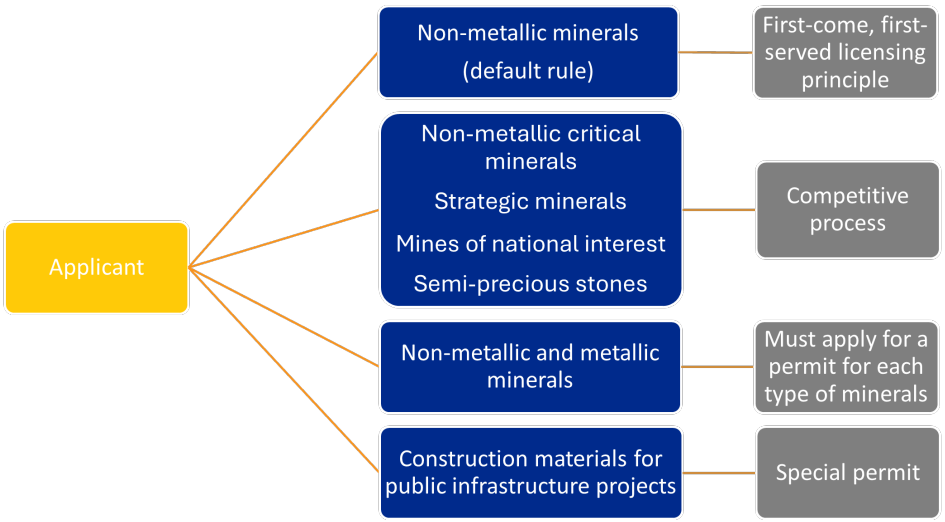
application and permit-granting processes, even if those provisions are more stringent.

- Certain non-metallic minerals (such as semi-precious stones) or mines may be of national interest because of their value or uniqueness.

The government has the power to determine whether large-scale mining projects or certain semi-precious stone mines will be allotted through auctions or other competitive processes. This is especially useful when the government foresees the existence of more than one suitable applicant. For example, it can be beneficial for a country to use a competitive process to award permits for critical non-metallic minerals that are in high demand, such as graphite, which is used for electric car batteries, semiconductors, and nuclear reactors.

Figure 4 summarizes the most effective permit-granting process for each category of non-metallic mining.

Figure 4. Summary of permit-granting processes for non-metallic mining



Source: Authors.

In most cases, a country's mining laws outline the process for appealing a licence refusal, including explicit refusals and refusals by inaction to avoid an arbitrary decision.

Box 5. Non-metallic mining: Examples of permit-granting processes

Various countries have already acknowledged the differences in the minerals and excluded non-metallic mining from their competitive processes.

In India, the Mines and Minerals Act (2016, § 14) excludes the application of auction by competitive bidding and other provisions to quarry leases, mining leases or other mineral concessions in respect of "minor minerals,"[3] and allows state governments to determine the procedure for granting these types of mining concessions.

Kazakhstan introduced the first-come, first-served licensing principle for "solid minerals" in its mining code in 2017 (OECD, 2018).

The Equatorian Mining Code (2009) states that the granting of concessions for non-metallic mining and construction materials is not subject to the public auction processes set out in the relevant law. Article 31 of the code states that the government has to establish the procedure for granting concessions for these minerals and that it must include the following in the process: technical and economic solvency requirements; investment amounts; location; area; deadlines for the development of exploration and exploitation activities; and social responsibility requirements and purposes.

Legal provision language template: Non-metallic mining permit-granting process

Article [*]. *Non-metallic mining permit-granting process*. The mining authority shall grant a non-metallic mining permit after determining that the application complies with the conditions set out under this law. Allotting non-metallic mining blocks will follow a first-come, first-served licensing principle. Where two or more applications are submitted for the same block, unless the mining authority has established a different rule, the applicant who first applies has the right of priority over other applicants.

Notwithstanding the above, the mining authority can establish competitive tenders to grant permits for non-metallic minerals or mines that it legally declares as strategic or of national interest and for semi-precious stones.

When applicable, regulation to this law will determine any additional conditions and requirements that an applicant must comply with to apply for a non-metallic mining permit, and the procedure for obtaining one. It will also determine: (a) the rights and obligations of the permit holders; (b) the investment commitments, mining plans and mining programmes that must be presented and executed by the permit holder depending on the mining scale; and (c) the reporting requirements during the exploration and extraction phases.

[3] [Sections 5 to 13] not to apply to minor minerals. 14. The provisions of sections 5 to 13 (inclusive) shall not apply to quarry leases, mining leases or other mineral concessions in respect of minor minerals" (Mines and Minerals Act 2016, § 14). The Mines and Minerals Act (2016, § 3) in India defines minor minerals as "building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, and any other mineral which the Central Government."

2.6 Exploration and Extraction Phases

Non-metallic mining usually includes two phases: exploration and extraction. The exploration phase is required for geological, geophysical, and geochemical studies; sampling; and analysis of the mineral deposits. It allows the permit holder to determine the quality and quantity of the minerals and the viability of the project. This phase is usually shorter in non-metallic minerals operations than it is in metallic minerals operations, because non-metallic minerals operations are usually superficial. Therefore, exploration permits are also shorter for these operations. In Honduras, for example, the exploration period is a maximum of 2 years for non-metallic minerals and a maximum of 5 years for metallic minerals (Mining Law, 2013, Art. 16). In both cases, the period can be renewed.

In explorations related to precious stones, the activities can yield small volumes of high-value stones. It is good practice to have legal provisions that allow the sale of semi-precious stones during the exploration phase. Having a legal mechanism for selling these stones can help prevent or limit illegal and undeclared mining activities.

The extraction (mining) phase begins upon the termination of the exploration phase, and after the mining authority has verified that the permit holder complied with all obligations during the exploration phase.

It is important to establish the term of the permit by considering the type of mineral and the mining methods. This aims to avoid underuse or speculation, and it takes into account the smaller areas and the faster exploitation rate for non-metallic minerals. It is common to set a maximum term that allows for renewal under specific conditions relating to, for example, performance (World Bank, 2017).

Closure plans and financial guarantees for the mine are also essential requirements of the permits. The permit holder must present these periodically during the operation and before such closure.

Artisanal and small-scale mining may require different terms, requirements, and phases. Some countries ignore the exploration phase and its permit for artisanal mining. In the Democratic Republic of Congo, the Mining Code (2005) grants authorization for artisanal extraction, under certain conditions, for alluvial or eluvial mineral deposits that are extracted by artisanal means. The authorization is valid for 3 years and can be tacitly renewed for the same period.

Legal provision language template: Exploration and extraction phases for non-metallic mining

Article [*]. *Exploration and exploitation phases for non-metallic mining*. The mining permit for non-metallic minerals will be granted in two phases: an exploration phase and an extraction phase.

The exploration permit will be granted for a term not exceeding 2 years for the evaluation of the mineral deposits. This term may be extended for an additional term not exceeding 2 years.

The exploitation phase will begin only upon the termination of the exploration phase, and after the mining authority has verified that the permit holder complied with all its obligations during the exploration phase. The exploitation permit may be granted for a term not exceeding [*] years. The mining authority may renew the exploitation permit for one additional period not exceeding [*] years.

The holder of a mining permit shall comply with the obligations and conditions established in this law and its regulations for each phase, including the terms for the closure of the mine.

The mining authority may establish different permits, terms, and requirements for non-metallic artisanal and small-scale mining, as well as for the special mining permits referred to in articles [*] and [*].

2.7 Royalties and Taxes

In general, taxation for non-metallic mining is either unit-based royalties or value-based royalties, depending on the type of mineral and its market value.

Royalties can take various forms, such as unit-based, value-based (or ad valorem), and profit-based. The type of regime hinges on factors like the mineral's value and volume; price fluctuations; the government's ability and resources to oversee the royalty regime; and global demand.

Profit-based royalties are rare. They are mostly used in advanced mining jurisdictions, such as Canada, Peru, and Chile. They are applied to operating profits, so they are paid only when a mine is profitable. They require the most administrative resources in monitoring, and they are typically enforced by the tax administration.

Value-based royalties are assessed as a fixed or variable rate based on the value of production. Many royalty regimes—especially for metallic mining—are currently value-based to allow governments to capture more royalties from the higher prices of certain minerals. Enforcing value-based royalties requires the government to monitor production volumes, value, and market prices.

Under unit-based royalties, payment begins during the extraction phase with a fixed fee per unit of measurement. Unit-based royalties only require the government to verify the production volumes of the extracted minerals, making it easier to administer the regime. Although the unit of measurement will generally be the metric ton, it is advisable to state this for each mineral in case another unit of measurement is used for certain minerals.

The recommended approach to unit-based royalties for non-metallic mining will vary by substance and depend on two variables: (a) the average market value per unit of production, and (b) the extent to which variations in the quality of the mineral affect its market value. For instance, a unit-based royalty might be more appropriate for certain low-value minerals. A recent study for Georgia that examined royalty systems in 52 countries suggests that unit-based royalties are suitable for low-value, high-volume minerals like construction materials (Readhead & Taquiri, 2021). They might also be better suited to minerals that do not play a significant role in the domestic economy.

The main challenge with unit-based royalties is using them for minerals that have large price variations depending on quality. For instance, marble, after being processed into slabs, is priced according to different grades (A to D), with the prices of the higher-quality grades being up to three times as high as the prices of the lower-quality grades. A uniform unit-based royalty on all marble may be too high for low-quality marble and too low for high-quality marble. In such cases, governments may choose to adopt different rates for different levels of quality (which may be overly complex and limit the simplicity of the unit-based system) or choose to adopt a value-based royalty.

When designing or updating a royalty regime, it is imperative for each country to conduct periodic reviews of international prices and global demand for minerals within its territory. This evaluation will help to determine whether it will be more beneficial to establish a value-based royalty regime for specific minerals in the prevailing market conditions. Hybrid regimes are used in some countries (such as India, Burkina Faso, and Côte d'Ivoire), where value-based royalties apply to only a few high-value minerals (Readhead & Taquiri, 2021). Western Australia also has a hybrid regime with a specific rate per tonne for certain low-value construction and industrial minerals (Government of Western Australia, 2024). Under a unit-based regime, it is imperative to establish a method for automatically adjusting the royalty rates to account for inflation.

Countries that have royalty systems should be cautious when imposing additional taxes on the mining industry, because these will deter investments. Mining should only be subject to general national taxes, such as income tax, value-added tax (VAT), and border taxes. Empowering local authorities to impose additional taxes or fees is not recommended, because potential investors tend to assess the overall fiscal framework and favour countries where taxes are consistent, codified in the law, and shielded from political fluctuations.

The fiscal regime can also include tax incentives to promote the decarbonization of the mining industry. Various incentives, such as VAT exclusion, custom duties exemption, or income tax deductions, can be used to boost the decarbonization of non-metallic mining operations. The incentives should be focused on machinery, supplies, and services that are intended to (a) reduce greenhouse gas emissions; (b) introduce clean energy or carbon capture, utilization and storage technologies into mining operations; or (c) introduce energy-efficiency measures and actions into mining operations. For this purpose, investments should be evaluated and certified as projects for improvements in

one of these areas of focus. The project should be verified by the mining authority or by any other authority determined by the government.

To promote formalization, the taxes, fees, and royalties that are applied to artisanal and small-scale mining should be in line with the production size and income of artisanal and small-scale holders of mining permits. A different royalty rate or an exemption from paying royalties for artisanal and small-scale mining is often recommended, and this rate or exemption can also be applied to other fees, taxes, or rents established by the country. Although the fiscal tools vary from jurisdiction to jurisdiction, some countries, like Ecuador and Sierra Leone, have differentiated royalty rates for artisanal and small-scale mining (Mutemeri et al., 2024).

However, to avoid fragmentation it is important to include a provision stating that for the purpose of royalty payments, mining permits belonging to the same permit holder within an area determined by the government will be treated as a single permit. If the aggregate extracted volumes reach the threshold for medium- or large-scale mining, the permit holder will be subject to the royalty rate that applies to that specific type of mining.

Legal provision language template: Royalties and tax systems for non-metallic mining

Article [*]. *Fees, rents and royalties*. Any applicable fees, rents, and royalties to mining operations shall be expressly stated in law.

Article [*]. *Royalties*. Mining permit holders shall be liable to pay royalties to the government on any mineral extracted during the term of the mining permit at the rates established in this article.

For [*list of higher-value minerals*], mining permit holders will pay an *ad valorem* royalty of [*]% of the domestic market value, if sold domestically, or the equivalent free on board (FOB) market value, if exported, during the extraction phase.

For [*list of low-value minerals*], mining permit holders will pay a fixed royalty per unit during the extraction phase in accordance with the following tables:

1. Artisanal and small-scale mining

Mineral	**Unit of measurement**	**Amount per unit**
Mineral X	Volume, e.g., in cubic metres	a $
Mineral Y	Weight, e.g., in carat	b $
Mineral Z	Value per unit of weight, e.g., in $/carat	c $

For royalty payment purposes, artisanal and small-scale mining permits held by the same permit holder within an area of [*] hectares will be treated as a single permit. If the aggregate extracted volumes reach the threshold for medium- or large-scale mining, the permit holder will be subject to the applicable royalty rate for that specific type of mining.

2. Medium- and large-scale mining

Mineral	**Unit of measurement**	**Amount per unit**
Mineral X	Volume, e.g., in cubic metres	a $
Mineral Y	Weight, e.g., in carat	b $
Mineral Z	Value per unit of weight, e.g., in $/carat	c $

The royalties due for mining extraction will be indexed every January 1 with the annual consumer price index [*or any other index determined by the country to adjust the rates in line with inflation*].

Article [*]. *Taxes*. Unless otherwise provided in another law, mining activities will only be subject to general taxes as stated in the applicable law.

Article [*]. *VAT zero-rating*. To promote the use of clean energy and energy efficiency in non-metallic mining operations, a zero percent rate of VAT will apply to national or imported equipment, elements, machinery, supplies, and services that are intended to (a) reduce greenhouse gas emissions; (b) introduce clean energy or carbon capture, utilization and storage technologies into the mining operations; or (c) introduce energy-efficiency measures and actions into the mining operations.

For this purpose, the investment must be evaluated and certified by the mining authority [*and/or any other authority determined by the government*] as a project that reduces greenhouse gas emissions in the mining operation; as a project that introduces clean energy or carbon capture, utilization and storage technologies in the mining operation ; or as an action or measure relating to energy efficiency in the mining operation.

Article [*]. *Custom duties exemption*. To promote the use of clean energy and energy efficiency in non-metallic mining operations, customs duties will be exempt for imported machinery, equipment, materials, and supplies that are intended exclusively for the mining operations and are intended to (a) reduce greenhouse gas emissions; (b) introduce clean energy or carbon capture, utilization and storage technologies into the mining operations; or (c) introduce energy-efficiency measures and actions into the mining operations.

For this purpose, the investment must be evaluated and certified by the mining authority [*and/or any other authority determined by the government*] as a project that reduces greenhouse gas emissions in the mining operation; as a project that introduces clean energy or carbon capture, utilization and storage technologies into the mining operation; or as an action or measure relating to energy efficiency in the mining operation.

2.8 Environmental Impact Assessments

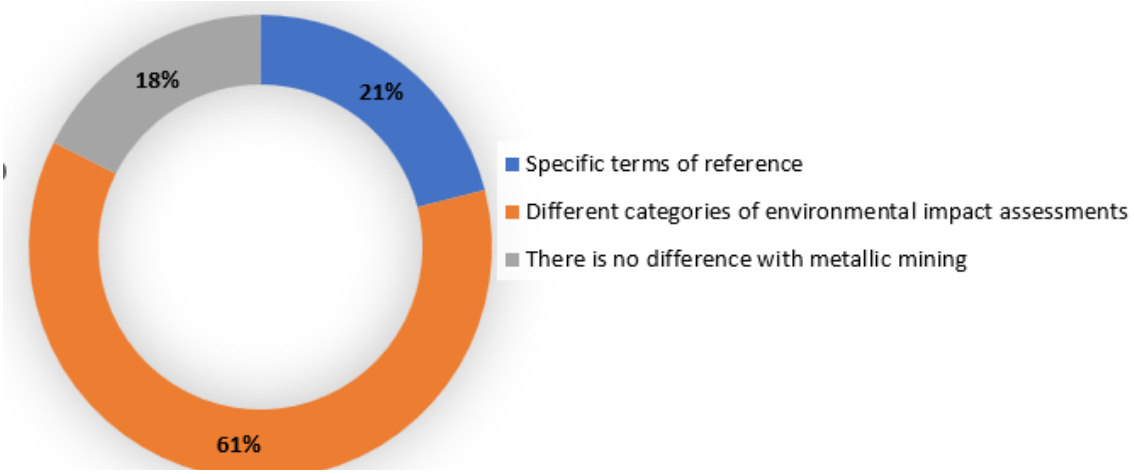
The environmental impacts of non-metallic mining are not the same as those of metallic mining. For example, in general, non-metallic mining involves fewer chemical processes than metallic mining does, which, as a consequence, presents fewer impacts. However, non-metallic mining is mostly open-pit mining. Thus, blasting and excavation can cause the release of suspended materials, dust, noise, and changes in the morphology of the surface area of the mining operations.

Therefore, even though the environmental impacts might be lower than those of metallic mining, environmental impact assessments are still needed to prevent and mitigate the

impacts of non-metallic mining. Prior to beginning any mining operation, environmental baseline assessments should be conducted.

Different laws require environmental studies in different forms. Practices around the world show that environmental authorities issue specific terms of reference for non-metallic mining or put non-metallic mining in a separate category for the purposes of environmental impact assessments—usually with requirements that are adapted to its impacts. As shown in Figure 5, according to our survey, most countries at least have different categories of environmental impact assessments in mining.

Figure 5. Environmental assessments for non-metallic mining (in surveyed countries)



Source: Authors' calculations.

Good practices in environmental licensing also include designing mine rehabilitation plans for non-metallic mining operations during the exploitation and decommissioning phases. In Germany, for a closure plan to be approved it must include restoring the surface area of the mining operations and removing the operational structures and facilities (Federal Mining Act 1980 as amended 2021, no. 53 and 55). Permit holders in Germany are also required to present compensation plans for environmental impacts that occur during the mining operations, and these must include a financial component.

Although any type of mining usually requires conducting an environmental impact assessment and obtaining an environmental licence, differences can be allowed for different scales of mining. To promote formalization, laws can provide for simplified environmental studies and permits for artisanal mining. Practices around the world show that artisanal non-metallic mining can be carried out as a subsistence activity, often informally. Overburdening artisanal miners with legal requirements may deter their formalization.

Another alternative practice is to do a government-led strategic environmental assessment, especially where there are clusters of artisanal or small-scale mining operations. These assessments can be the base for evaluating artisanal and small-scale miners' applications for environmental licences.

Further analysis can be found in the forthcoming publication, *Non-Metallic Mining: Environmental management*.

2.9 Sand Extraction and Related Restrictions

Environmental impacts from extracting mineral sand and aggregates near river basins, lakes, and coastal areas include water contamination; coastal and river erosion; and effects on biodiversity (United Nations Environment Programme [UNEP], 2019). Sand extraction also affects other activities, like tourism and electricity generation. Because it affects different activities, sand extraction should be addressed in an interdisciplinary manner.

In many laws, there are particular provisions for sand extraction. In some countries, sand extraction permits are granted by the mining authorities. However, in others, sand extraction permits are granted by the environmental authorities, especially if the extraction takes place near water resources. The latter approach has been criticized for inconsistency with the approach to granting permits for mining other non-metallic minerals and because the environmental authorities have less technical experience than the mining authorities do.

The mining authority or the environmental authority can establish bans on or determine quotas for extracting sand and construction materials situated near water resources to protect these. Any ban, restriction, or quota should be based on ecosystem and regional studies that include sediment inflows, flooding zones, geological stability, impacts on surrounding communities, and biodiversity, among other aspects. The authority should also consider water management, coastal zone management, and environmentally protected areas in addition to the need for construction materials and new infrastructure in the country.

In establishing bans and restrictions or determining quotas for sand extraction, granting joint power to the mining and environmental authorities might bring better results than enshrining them directly into the law. This ensures that the restrictions are technically determined, and it provides the flexibility to create the necessary limitations and avoid any unnecessary ones.

The authorities should also consider the coexistence of sand extraction with other activities (fishing, tourism, energy generation, etc.) and their impacts on the water resource—or consider the implementation of integrated coastal, watershed, or lake zone management plans—to determine if and how mining can take place in a particular area.

Despite the options mentioned above, certain countries with particular characteristics and past experiences have considered imposing sand extraction bans in the law for specific areas to guarantee the enforcement of the bans.

Legislation can also support specific sustainability strategies for managing sand resources in a sustainable way, as recommended in a recent report (UNEP, 2019). These strategies include: 1) "Avoiding consumption through reducing over-building and over-design"; 2)

"Using recycled and alternative materials to sand in construction"; and 3) "Reducing impacts with existing standards and best practices" (UNEP, 2019, p. xiv).

Legal provision language template: Sand extraction and related restrictions

Article [*]. *Sand extraction and its restrictions*. Sand extraction activities require a mining permit. The mining authority will determine the minimum conditions for obtaining a sand extraction permit.

The mining authority and the environmental authority may jointly establish bans and restrictions or determine quotas for sand extraction near to and inside river basins, lakes and coastal areas to protect water resources, protect biodiversity, and avoid heavy erosion [*and/or any other impact that justifies a restriction*].

In addition, measures should be taken to avoid and control illegal sand extraction, including regular site monitoring.

2.10 Decarbonization of Non-Metallic Mining

An important aspect of policy and regulatory analysis is the introduction of sustainability standards and incentives to decarbonize non-metallic mining operations. Consumption of non-metallic minerals is projected to rise from 44 gigatons in 2017 to 86 gigatons by 2060, representing the largest share of global materials usage (OECD, 2019). While much of the focus on decarbonizing mining operations is directed toward metallic mining, addressing greenhouse gas emissions from non-metallic mining is also crucial.

Before non-metallic minerals are transformed into cement and other materials, their actual extraction and processing creates far fewer greenhouse gas emissions than are created by other industries. However, energy use and transport that relies on fossil fuels add to the greenhouse gas emissions generated by non-metallic mining operations, especially large-scale operations, and these will continue to grow as the demand for materials increases.

In addition, when considering the whole value chain, the non-metallic materials industry—including cement—generates more than 7% of the world's greenhouse gas emissions (Korczak et al., 2022). Most of these emissions are caused by the highly energy-intensive processes required for clinker production in the cement industry.

Current trends show that greenhouse gas emissions need to be addressed through comprehensive value chain analysis. The Greenhouse Gas Protocol established a framework for companies to understand their greenhouse gas emissions in three different scopes:

> Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. (Greenhouse Gas Protocol, 2022, p. 1)

Despite various transparency initiatives and tools, such as the Greenhouse Gas Protocol (2022), the lack of standardized carbon accounting methods means that companies are left to determine independently how to calculate and report their greenhouse gas emissions. This can lead to inconsistencies and minimal consequences for inaccurate reporting.

After doing studies on greenhouse gas emissions from non-metallic mining operations in their country, analysing the existing carbon accounting methods, and consulting stakeholders, governments can require reporting and set rules for it. Permit holders can monitor and report their greenhouse gas emissions to identify the main emission sources and establish mitigation alternatives. Such legislation should be in accordance with national and international commitments and with national and regional legal frameworks.

Legal provision language template: Sustainability measures for non-metallic mining

Article [*]. *Sustainability measures*. Mining plans for non-metallic large-scale mining projects shall include a plan for reporting, monitoring, and mitigating greenhouse gas emissions. The mining authority shall establish through regulation the carbon accounting methods and requirements of the greenhouse gas emissions plan.

The mining authority may develop mechanisms and create incentives to promote energy efficiency; clean energy; reprocessing of minerals; carbon capture, utilization and storage technologies; and efficient extraction and processing technologies in existing non-metallic mining operations.

The proposed legal provision can require new applicants of large-scale mining operations to monitor and report greenhouse gas emissions and include a greenhouse gas emissions mitigation plan in their mining plans. The government can regulate the specific requirements of such a plan. Large-scale mining operations will produce more greenhouse gas emissions than smaller operations and will likely have the resources and capacities to develop and comply with such a plan. Imposing this requirement on small and artisanal miners may not significantly reduce greenhouse gas emissions, but it could discourage miners from formalizing their operations.

For existing operations, it is difficult to mandate greenhouse gas emissions mitigation plans. However, governments can still promote decarbonization in existing mining operations. Technological upgrading can also be supported through law. This can be promoted through tax incentives, as described in the previous section, or through access to low-interest credit lines financed by the government. Other market mechanisms, such as carbon markets or taxes to cover the costs of environmental damage or pollution, can also provide incentives to reduce emissions. Public tenders for the acquisition of low-carbon materials and end-products from non-metallic minerals can also work as an incentive.

To decarbonize mining operations, several alternatives exist.[4] These include energy-efficiency interventions; autonomous and digital solutions; and renewable energy sources, such as solar and wind. Other crucial steps in this process are switching to sustainable biofuels and clean hydrogen; and adopting electrification and low-carbon transport solutions, such as battery electric vehicles, trolleys, and conveyors. Other, complementary alternatives are reprocessing minerals and carbon capture, utilization and storage. Although these alternatives can be used for both metallic and non-metallic operations, it is important to adapt them to non-metallic mining.

[4] A recent study by Korczak et al. (2022) identified 10 measures that can be used to decarbonize energy-intensive industries: (a) resource efficiency; (b) energy-intensive construction materials replacement; (c) hydrogen (feedstock and fuel) and clean synthetic methane; (d) carbon capture, utilization, and storage (CCUS); (e) electrification of heat; (f) strong energy-efficiency and material-efficiency measures; (g) waste heat utilization; (h) combined heat and power production; (i) energy management (strong energy efficiency); and (j) technology replacement. For non-metallic mining (mainly in the cement industry), the authors found that the most discussed mitigation alternative was CCUS, followed by strong energy-efficiency and material-efficiency measures and waste heat utilization.

3.0 CONCLUSION

Non-metallic materials are essential for daily life and represent the largest share of global material usage, with consumption expected to rise significantly in the next few decades. A survey conducted in 2024 by the IGF with participants from more than 30 countries revealed that more than 50% of mining activities in most countries are related to non-metallic minerals, with approximately 45% of that corresponding to construction materials.

Although non-metallic mining is present in all IGF member countries, international best practices have primarily focused on the metallic mining sector. Considering the unique characteristics of non-metallic mining, this policy paper has presented the aspects that could receive different treatment in the law and has shared best practices from legislation around the world.

Legal frameworks that are tailored to non-metallic mining can optimize the management of these resources. The first step is to classify non-metallic minerals in mining laws to clarify responsibilities and provisions, while ensuring certainty for permit holders. This classification is useful for establishing further differences within the non-metallic minerals industry itself, such as the permit-granting process and the royalties for semi-precious stones and critical or strategic non-metallic minerals. In addition, categorizing mining activities based on scale—artisanal and small-, medium-, and large-scale—allows for tailored regulations that address the unique challenges of each scale.

The terms of exploration and exploitation permits should be adapted to the type of mining operations, in general requiring shorter terms, to avoid speculation about the permits.

Environmental and social impact assessments and sand extraction regulations should also be customized according to the type of mineral and its impacts. Outdated non-metallic mining provisions need to be updated to include new sustainability standards and incentives for decarbonizing these operations.

Finally, it is crucial to emphasize that the recommendations in this policy paper should be taken from the standpoint of each individual country's particularities in order to complement the general mining framework. Each country should analyze its sector and general mining legislation to tailor these best practices to its needs. Legal assessments are essential for preventing the establishment of inconsistent regulatory frameworks and for ensuring that measures are adjusted to meet the specific needs of each country's mining sector.

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