

Case 4: Mining-environmental planning in the West Ribera del Ebro



This good practice case responds to the integration of minerals and land use planning policy.

MinLand Good Practice Stream Topics:

- A) Data assessment and use in policy formulation and land use planning**
- B) Identification of actual and potential land uses**
- C) Assessment of whether minerals and other land uses have been introduced on equal footing**
- D) Assessment and extent of integration between minerals and land use policies**
- H) Assessment of strategic consideration of safeguarding Permitting**

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Part 1: Case Overview

1.1 Executive summary

This case is mainly addressed to the following MinLand Good Practices Topics (defined in deliverable 6.1):

A. Data assessment and use in policy formulation and land use planning; B. Identification of actual and potential land uses; D. Assessment and extent of integration between minerals and land-uses policies; H. Assessment of strategic aspect consideration (protecting mineral resources/safeguarding).

The case study is located in the area of Ribera del Ebro (Navarra, North-East Spain), being one of the European regions which have highest aggregates consumption (it is the only Spanish region with an aggregate consumption above the European average). Thus, pressures on the environment due to aggregates exploitation are high as well as the occurrence of conflicts with agriculture and transport infrastructures.



The **mapping of potentially exploitable mineral resources** is the starting point for the integration of mineral resources in Land-Use Planning. Its main objective consists in the establishment of a balance between the environmental sensitivity to mining, and the potential for the development of this activity. The result of this assessment is the **Mining-Environmental Planning Maps**, which show categorized areas of exploitable resources (with different levels of priority) as well as environmental protection areas.

1.2 Overview of Key Good Practice Aspects and suggestions

Good Practice Aspect 1:

- **Enhancing mineral resources knowledge for land use planning and use in policy formulation.**
Main key elements for transferability: impress on mining authorities the importance of developing their own mining strategies. Availability of professionals with appropriate training and experience.

Good Practice Aspect 2:

- **Development of tools and procedures for the assessment of actual and potential land uses in order to reduce conflicts within extractives industries.** Development of the **Mining-environmental planning** map which includes a territorial zoning proposal (based on the aptitude for aggregate extraction and the carrying capacity of the territory). Key elements for transferability: enhancement of the involvement of responsible institutions and other stakeholders (environmental authorities and land-use planning authorities); Inclusion of regional and local associations in this process as consulting entities.

Good Practice Aspect 3:

- **Integration of mineral resources into land-use planning for mineral resources safeguarding.**
The development of the Mining-environmental Planning Map, with the definition of a territorial zoning proposal (consistent with the mineral resources, environmental and land-use planning regulations and policies), would improve the decision making process related to the integration of mining activity and other land uses. Key elements for transferability: enhancement of the coordination among responsible institutions and other stakeholders; Inclusion of mining authorities in the development of regional and Local Land Use Plans (similarly to what happens with other sectors).

1.3 Mineral resource groups



Aggregates

Part 2: Case description

2.1 Case description

The case study is located in the area of Ribera del Ebro (Navarra, North-East Spain). Navarra is one of the European regions which have the highest aggregates consumption in Spain. This Spanish autonomous region is a net importer of aggregates; currently, it is the only Spanish region with an aggregate consumption above the European average (despite the crisis in the construction sector). Thus, pressures on the environment due to aggregates exploitation are high. Due to the proximity of the exploitation areas to the rivers (a common concern in many parts of the world), the occurrence of land-use conflicts with agriculture and transport-infrastructure is very likely. In addition, in Navarra, the agri-food sector is one of the most important engines of the economic development of the region, both in terms of agricultural production (origin-protected vegetables), as in weight of the industrial sector oriented to the packaging and transformation of agricultural production, and the wine industry.

In the early phase of the environmental mining land use assessment in Ribera del Ebro, a territorial analysis was performed, including an environmental inventory (geology, geomorphology, physiography, hydrology, hydrogeology, climate, soils, vegetation, fauna, land uses), an inventory of the exploitable resources, an analysis of the visual incidence and the impacts on landscape, and a socio-economic and cultural heritage studies. Mining activity was also assessed by means of a technical and environmental characterization, including an inventory of the mining operations. A territorial diagnosis was also carried out. The final results included: a territorial zoning proposal, a mining and environmental planning map, and the definition of exploitation and restoration criteria and models.

The mapping of potentially exploitable mineral resources can be a valuable tool as a starting point for the integration of mineral resources in the Land-Use Planning process. However, there are other important variables that should be considered, in order to select an appropriate location for mining. The principal work consisted of: the establishment of a balance between the environmental sensitivity to mining, and the potential for the development of this activity. The main objective was to perform Mining-Environmental Planning Maps. The aforementioned maps show areas with

different categories of exploitable resources and environmental protection zones in which mining is not recommended and exploitable areas with different levels of priority. For the realization of the Mining-Environmental Planning Map the following activities were required:

- An environmental inventory: study of the physical and socioeconomic environment.
- An analysis of the mining activity: collection of data from active and abandoned quarries in field templates.
- A geological-mining research and a Territorial diagnosis

The information and thematic cartographies generated constituted the so-called “environmental inventory”. Also geological and mining characterization of the potentially exploitable resources, together with their geographical delimitation in a “resources map”, is obviously important. A technical and environmental characterization of the mining operations (active, inactive and abandoned), called “analysis of the mining activity” was also carried out in order to identify the environmental problems that these activities induced.

Finally, a model of Mining-Environmental Planning of the territory was developed. This model includes the mapping of zones and the definition of suitability categories for mining. These zones were defined on the basis of criteria such as the capability of the territory to accept the mining activity, and other considerations such as the legal status of the land, applicable sectorial regulation, protection of the population and the norms that protect exceptional environmental and cultural elements, as well as the possibilities for the recovery of the foreseeable degradations. All of them were grouped into “exclusion criteria” and “conditions for extractive activity”, respectively. This was done using Geographical Information System (GIS), having a systematic and easily reproducible character.

Environmental inventory

The first step of the work consisted of the collection of environmental information in order to configure the environmental inventory.

The abundant graphic information (orthoimages), cartographic and written information available was compiled and analysed, selecting the most interesting and useful criteria for the environmental inventory. The collaboration between the Geology and Geotechnical Service of the General Directorate of Public Works of the Government of Navarra, the Soils and Climatology Section of the Agricultural Structures Service of the Department of Agrarian Resources of the Government of Navarra, as well as the Hydrographic Confederation of the Ebro was an important factor in enabling a successful process of establishing the environmental inventory. The collaboration of the Prince of Viana Institution, attached to the Department of Culture and Tourism of the Government of Navarra, was also of great value for the process.

From the cartographic information, a series of maps created ad hoc for the assessment and diagnosis, were performed: Map of Potentially Exploitable Mineral Resources, Hydrogeological Map, Map of Floodplains, Map of Soils, Map of Land Uses and Map of Territorial Affections.

Analysis of the mining activity

Additionally, an analysis of the mining activities was developed in pursuit of characterise specific intrinsic features of the mining sector in the target area.

All the quarries recognized in the area, with one exception, were located on the fluvial terraces of the Ebro and Ega rivers, except one. From the lithological point of view, were located over heterometric gravels of well-rolled limestone and, to a lesser extent, quartzite, sandstone and microconglomerate, with variable contents in sandy and sandy-silty matrix. The thickness of the terrace levels was of the order of metric to decametric and the gravel pits had exploitation fronts with heights between 2 and 30 meters.

As the materials are generally poorly consolidated and lightly or not cemented, the extraction is done by a front loader or backhoe loader. The use of the extracted materials as aggregates usually required only a sieving at the quarry, with washing being carried out on rare occasions to raise the appropriate quality and value of the materials.

Most of the active quarries in the exploitation areas did not have aggregate treatment facilities beyond screens. The extracted aggregate was taken to facilities that companies had in a nearby place, often occupying old exploitation pits.

A map of surfaces affected by aggregate exploitations was made. This map showed zones of different status of the land affected, depending on whether the exploited area was simply abandoned or was rehabilitated and a new use of the land after abandonment was implemented.

Geological-mining research

The main objective of the Geological-Mining research was to perform the geological characterization and to assess the exploitability of the resources, defining different types or varieties of potentially exploitable resources, as well as their geographical delimitation. The cartographic result of this research was the Map of Potentially Exploitable Resources. In this territory a high quality geological and geomorphological cartography existed on a very detailed scale (1:25,000). This map was obtained in a simple way, by means of the simple selection of suitable geological formations.

It is common to consider that the mining potential of a deposit of natural aggregates depends on the following factors: thickness and variability of the overburden; thickness and extension of the resources; physical, chemical and mineralogical properties of the resources; accessibility of the deposit; availability of sufficient quantity of water, and depth of the water table. The factors referring

to the physical, chemical and mineralogical properties of the resource and to the availability of water cannot be considered with the information available at the scale 1:25,000.

The aggregate extraction sites were almost always separated from the places where the treatment facilities were located, which eliminated the problem of water availability at the points where the gravel pits were located, while centralizing in more favourable points, the water supply. Finally, the accessibility was not an element that allowed discerning different classes in the work area. In addition, the concentration of aggregate treatment facilities at generally very accessible points minimizes the importance of this factor in the work area. In addition, the concentration of aggregate treatment facilities at, generally, very accessible points minimized the importance of this factor in the work area.

It was judged that the most determining factors from the point of view of the analysis of the potential or aptitude of the territory for the production of natural aggregates in the work zone were:

- A. Quality or parameters of the material (size, degree of cementing and content of fines).
- B. Thickness and extension, which defined the form and the volume of the resource.
- C. Water table position. In addition to the constraints for the exploitation, an environmental imperative stipulates that the exploitation is only feasible up to one meter above the water table. Thus, where the position was higher, the exploitable power decreases in practice.

These parameters were deduced from the geological and hydrogeological cartographies, the existing geophysical data, observations made in the field and from the data collected in the visits to the active and inactive quarries.

Through the joint consideration of all the elements mentioned above, and their geographical distribution, four categories of aptitude for the extraction of aggregates were established and mapped: low aptitude, medium aptitude, high aptitude and very high aptitude.

Territorial diagnosis and mining-environmental planning map

Once the abovementioned information had been compiled, the territorial diagnosis conducted as a starting point for establishing mining-environmental planning map. The ultimate purpose of the territorial diagnosis was to determine the capacity of the territory to support the exploitation of aggregates (carrying capacity for aggregates mining). For this purpose, an analytical type assessment was carried out, consisting of an individualized evaluation of the most relevant elements of the environment: mining geology, fluvial systems (including river beds and banks), flood areas, groundwater, soils, current vegetation, wetlands, fauna, land uses, settlements and infrastructures, archaeological sites and other territorial factors. Regarding the visual impact, given the soft relief

of the area especially in the areas of greatest interest, the scale of work was insufficiently detailed to highlight the unevenness of the terrain with clear effects on the visuals that could be established between points with high visualization potential and areas of interest for the exploitation. Therefore, it was not possible to incorporate more criteria for zoning, on the basis of visual incidence.

One of the main objectives of the territorial diagnosis was the identification of the most valuable or vulnerable environmental elements, in order to guarantee their preservation or to minimize a foreseeable impact. Within the study area, the following elements were analysed, in risk terms, due to their high conservation value or to their high vulnerability in the face of a future mining exploitation: Points of Geological Interest, Groundwater, Channels and banks of the rivers, wet areas, Flooding areas, Best soils, Vegetation and fauna, Cultural heritage, Urban areas and road and agricultural infrastructures.

The aptitude was rated as “Very high” in certain places in the work area. Formally, and to handle homogeneous scales, it was considered that the aptitude was “Very low” in all those geological formations that were not considered as possessing potentially exploitable resources, as well as in all those elements of the natural and cultural heritage of unquestionable value, often already protected.

Finally, the capacity of the territory to receive the mining activity was determined by applying an impact/aptitude model, that is, a balance between the vulnerability or the fragility of the environment before the extraction of natural aggregates and the aptitude or potential of the territory to support this activity.

The criterion adopted by consensus among the members of the drafting team was to exclude for the exploitation of natural aggregates those surfaces in which the carrying capacity was qualified as “Very low”. Also, many of the areas to which this carrying capacity was assigned were already protected by legislation or planning normative. These surfaces were designated as “Non-Exploitable Zones” in the Mining-Environmental Planning Map, and were detailed in the Map of Excluded Surfaces for the Exploitation of Natural Aggregates.

Among the excluded areas were those that represented infrastructures or surfaces in which the current use of the land is basic for the normal development of the activities of the population, that is to say, housing zones and productive areas (roads, industrial areas, towns and irrigation infrastructures). In addition, the zones for the protection of the cultural or natural heritage were also determined as not exploitable. The areas referred to the protection of riverbeds and riverside vegetation were also excluded. All the surfaces excluded with cartographic representation were grouped in Environmental Protection Areas (areas where the capacity for the extraction of aggregates was considered very low). Low and medium aptitude surfaces with strong environmental limitations were also added.

In addition to the areas excluded for exploitation described above, the following land use planning categories were defined:

- Priority 1 Areas: surfaces with high or very high aptitude for the extraction of aggregates, in which no valuable or protected environmental elements were detected, nor basic elements for the normal development of the activities of the general population, nor located in flood zones for a return period of 50 years. These areas had a “High” or “Very high” reception capacity.
- Priority 2 Areas: surfaces with a “medium” aptitude for the extraction of aggregates, in which no valuable or protected environmental elements were detected, nor basic elements for the normal development of the activities of the general population, nor located in flood zones for a return period of 50 years. These were surfaces with high or very high aptitude, fulfilling all the previous constrains except that they held soils with high agrological value. These areas were determined to have an “Average” reception capacity. The extractive use could be considered compatible with conditions.
- Priority 3 Areas: surfaces with low aptitude for the extraction of aggregates, in which no valuable or protected environmental elements have been detected, nor basic elements for the normal development of the activities of the general population, nor located in flood zones for a return period of 50 years; surfaces with medium, high or very high aptitude, fulfilling all the previous constrains except that they were located in flood zones for a return period of 50 years, and might affect soils with high agrological capacity; surfaces with high or very high aptitude located within the delimitation of habitats of Community Interest. These areas were determined to have a “Low” reception capacity. The extractive use could be considered compatible with strong environmental constrains.

At the date on which the case study was being performed, the Regional Land-Use Planning of the Ribera del Ebro Zone (POT5) was being changing and developed. It was a great opportunity to include the results achieved in the case study in the Land-Use Planning and this was the final objective of the case study. The results of the project and the zoning proposal were directly applicable to the Regional Land-Use Planning as all the land-use categories and protection figures were consistent. Nevertheless, unfortunately, this did not occur, due to a lack of coordination between the institution that commissioned the case study to the IGME and the Regional Land-Use Planning authority. The real impact achieved was limited due to the lack of consideration of the results of the case study on the part of the Land-Use Planning authority and, finally the results were not included in the Land-Use Planning of the Ribera del Ebro Zone. Nevertheless, the results of the case study are a useful tool for the Mining Services in the permitting process of new mining projects in the study area.

2.2 Responsible institutions

- Department of Innovation, Enterprise and Employment of the Government of Navarra (the Mining Service specifically). It is the regional mining authority. It is the responsible for granting mining permits in its territory (except for mining projects located in two or more Autonomous Communities. The Regional mining authority has competence in the development of legislation and enforcement of the mining regime and the power for establishing mining policies and performing regional mining strategies (that is not the case of Navarra, which does not have adopted a Regional Mining Strategy). This institution ordered the elaboration of the Mining-environmental planning in the West Ribera del Ebro to the Spanish Geological Survey. Furthermore, this Mining Service helped in the elaboration of the environmental inventory providing valuable information as well as requesting the involvement of stakeholders in this regard. It shall also be responsible for applying and/or disseminate the results obtained.
- Spanish Geological Survey (IGME SP). National Public Research Institution. In the project, it was responsible for performing the assessment of potentially exploitable mineral resources, the mining-environmental planning and the zoning proposal with different levels of priority for the mining activity. The main objective for institution was the elaboration of the Mining-Environmental Planning Maps, being in charge of the execution of the mining land use planning tasks related.

2.3 Case stakeholders

In addition to the above institutions:

- Regional Land-Use Planning authorities. It is the responsible authority in land-use planning. On the regional level, Regional Plans and Guidelines are developed and implemented. Those plans are mostly strategic policies and guidelines that are coordinating the spatial development and land-use system on regional scale. Land-use planning also establishes land-use categories. For example, in the Autonomous Region of Navarra regional planning includes: the Territorial Strategy, Regional Land-use Plans and Territorial Action Master Plans. Theoretically this organism coordinates the land use planning policies at regional level, therefore must be the final recipient of the whole work.
- Regional Environmental Authority. It is responsible for granting environmental permits and establishes the Regulations of Natural Resources Plans. Its competences were focused in validating the final product regarding the environmental aspects.

- Local Land-Use Planning authorities. On municipal level, Municipal Urban Master Plans are guiding the spatial development. They are comprehensive plans that are regulating the land-use and setting the permitted land-use for the municipal territory that are legally binding for land-owners. Development Plans are detailed land-use plans. At the final stage (after mining and environmental permits are granted by the regional authorities), the mining operators must to obtain an Activity permit that is granted by the local Land-Use Planning authority. Since a legal land-use figure for mining activity does not exist, the local Land-Use Planning authority has got the final decision about changing (or not) the previous land-use category for allowing mineral extraction in areas which it was not possible previously. Their role must be theoretically limited as consultative body but, due to the acquired competences, became the second main receiving agent of the final results.
- Mining companies. Considering the conflictive situation regarding mining activities they should be the main group of beneficiaries for the application of the Mining-environmental planning process. Additionally, they intensively collaborated providing information useful for the environmental inventory and for the analysis of the mining activities in the area.
- Regional and local associations (mainly environmental NGOs and agricultural associations). They should be the second group of beneficiaries assuming that, despite they were in an advantageous position, their interest would be even more protected after the application of the Mining-environmental planning process.

2.4 Context

As mentioned above, the high aggregates consumption resulted in pressures on the environment and the occurrence of conflicts with agriculture and transport infrastructures. Conflicts with the agri-food sector were extremely important for authorities due to its great importance as one of the most important engines of the economic development of the region.

The mining activity, and the mining operators, faces with a decentralised system, both in mining and land-use permitting processes. At the end, the permits are granted (or not) in a case-by-case basis.

The final decision about land-use falls on the municipalities. In general, safeguarding mechanisms for the protection of mineral deposits for the future do not exist and only few municipalities in Spain contemplate the mining use in their land-use planning. At the final stage of the permitting process (after mining and environmental permits are granted by the regional authorities), the mining operators must to obtain an Activity permit that is granted by the local Land-Use Planning authority. Since a legal safeguarding protection figure for the mining activity does not exist, the

local Land-Use Planning authority has got the final decision about changing (or not) the previous land-use category for allowing mineral extraction in areas which it was not possible previously. This situation is aggravated by the lack of any Mineral and Mining Strategies. National and Regional Mineral Strategies become essential tools that establish the needs for mineral resources. Within the framework of Mineral Strategies, the integration of mining use in land-use planning makes sense.

Additionally, the Regional Mining Authority has competence in the development of legislation and enforcement of the mining regime and the power for establishing mining policies and strategies (but in the case of Navarra, a Regional Mining Strategy does not yet exist). Regional mining authority is also responsible for granting mining permits (in coordination with the regional Environmental Authority, responsible for granting the environmental permit).

Regarding land-use planning, the Autonomous Communities perform land-use planning laws and land-use planning policies and tools, establishing a land-use planning system for their territories. These include the implementation of restrictions and requirements on the municipal level (e.g. for implementation of protected areas). Most regions have established hierarchical, cascading planning systems based on compliance with up-streamed planning content. Due to the constitutional law, municipalities are the main actors and stakeholder in the Spanish land-use planning system. They are responsible for the preparation and adoption of local plans and strategies (with varying content and level of detail in different regions). Depending on the size, the municipalities adopt basic Master Plans that include land-use plans; it can happen that very small municipalities do not adopt Master Plans; hence their spatial development is governed by plans made on regional/provincial level (Subsidiary Regulations). Thus, decision making on land-use is mainly located on local and regional level.

In general, safeguarding mechanisms for the protection of mineral deposits for the future do not exist. The Municipal Urban Master Plans regulate the land-use and set the permitted land-use for the municipal territory that are legally binding and only few municipalities in Spain contemplate the mining use in their land-use planning. At the final stage (after mining and environmental permits are granted by the regional authorities), the mining operators must to obtain an Activity permit that is granted by the local Land-Use Planning authority. Since a legal safeguarding protection figure for the mining activity does not exist, the local Land-Use Planning authority has got the final decision about changing (or not) the previous land-use category for allowing mineral extraction in areas which it was not possible previously. In fact, the only link between the policy streams of mineral resources and land-use planning is the obligatory Activity Permit that is necessary to obtain a mining license. Activity Permits are issued on the municipal level and, usually, entails permitting a new land-use that is different to actual one. The Activity Permit is the final stage of the permit procedure, after having obtained the mining and environmental permit. That is the case of Navarra.

All these aspects show a complicate framework for the development of the mining activities. Thereby, mining authority resolved which it will be necessary to find a way to integrate the geological and mining interests in the established land use planning. The Spanish geological survey decided to perform a Mining-environmental planning based on the mapping of potentially exploitable mineral resources as a starting point for the integration of mineral resources in the Land-Use Planning process (developing a line of work itself called Mining-Environmental Planning of mineral resources). The main objective was to perform Mining-Environmental Planning Maps, which must show areas with environmental protection figures (in which mining is not recommended) as well as exploitable areas with different levels of priority.

The case study represents an application of this line of work to the aggregates resources of the Ribera del Ebro in Navarra, as part of other works included in a Master Plan for Mining Activities of the Autonomous Community of Navarra. This kind of approach would enhance the development of mining strategies that integrate socio-environmental and planning aspects and regulations, being completely consistent and easily implemented with the regional land-use planning categories. Furthermore, the option of choosing, at the very beginning, the best location for the mining activity (under this integrated approach) would enhance the environmental permitting process and the decision making process for the integration of mineral resources in land-use planning. Since the governance framework is similar for the rest of autonomous communities, this methodology could be completely extrapolated to any other part of the Spanish territory.

However, the lack of coordination and information exchange between responsible authorities (regional Mining Authority, Regional Land-use Authority and Municipal Land-Use authority) entails a real challenge, and it is the key point (together with and appropriate knowledge about the mineral resources and mining activity) in the way of establishing safeguarding figures for mineral resources.



Part 3: Case Evaluation

3.1 Impact achieved

- High involvement of the institutions and mining companies implicated (specially providing useful information related to the case study)
- Increased knowledge of the mineral resources of the area as well as better understanding of features of the mining sector and issues related for responsible institutions and stakeholders
- Development of the potentially exploitable mineral resources map as a starting point for the integration of mineral resources in the Land-Use Planning process
- Huge set of complete and valuable environmental information data (including soil quality at a detailed scale) which is available to institutions and to the general public after publishing the results of the mining-environmental land planning works
- Valorisation of cultural and environmental heritage (implied to the mining-environmental land-use planning) which was useful for the mining authority and very instructive for mining companies
- Establishment of safeguarded areas of mineral deposits (consistent with the mineral resources, environmental and land-use planning regulations) through the Mining and environmental Planning Map
- Knowledge about the aptitude for mineral resources extraction and the carrying capacity of the territory as starting point of the definition of Mineral and mining Strategies
- Establishment of a basis for simplification of the mining and environmental permitting processes
- A mining-environmental land use planning methodology directly exportable to the national territory
- Enhancing of decision making process related to the integration of mining activity and other land uses (balance between the environmental sensitivity to mining, and the potential for the development of mining activity). The “Mining and environmental Planning Map” becomes a tool that directly could lead to determining safeguarding categories for mineral resources.

3.2 Good Practice Aspects: Elements and their transferability

GOOD PRACTICE ASPECT 1:	
Enhancing mineral resources knowledge for land use planning and use in policy formulation	
Key elements (of Good Practice Aspects)	Suggestions for Transferability (of Key Elements)
<p>Elaboration of Potentially Exploitable Resources Maps: The first step to involve regional authorities on the idea of integrating geological and mining aspects in the land use planning processes requires that they realize which geological resources are available in their territory. In that vein this element would be helpful in order to impress on mining authorities the importance of developing their own mining strategies. Map of Potentially Exploitable Resources is a helpful tool in order to transmit directly and clearly this point. Geological characterization and assessment of the exploitability of the mineral resources, defining different types or varieties of potentially exploitable resources, as well as their geographical delimitation is required. The cartographic expression of this research is the Map of Potentially Exploitable Resources.</p> <div style="text-align: center;">  <p>SUCCESS FACTOR</p> </div>	<p>The works must be carried about by professionals with appropriate training and experience and based on scientific data. It would be necessary to implicate authorities, stakeholders and especially mining companies which usually have better knowledge regarding mineral resources on the area.</p> <p>The transferability could reach different levels of successful depending mainly on the previous existing geological and mining information and the willingness to cooperate by involved actors sharing information.</p>
<p>Availability of Information: The elaboration of Mining-Environmental Planning Maps (including Maps of Potentially Exploitable Resources) is only feasible when enough information is available or can be acquired at the specific working map scale. The need for information and thematic cartographies of the different elements that make up the natural and socioeconomic environment, in order to acquire a greater knowledge of the characteristics of the territory, was noteworthy.</p> <p style="text-align: center;">CONTEXTUAL FACTOR</p>	<p>Key point for transferability would include: finance a mapping process to collect data (from various ministries and actors) and to group such data according to different land-uses (in order to avoid land-use conflicts).</p>
<p>Willingness to cooperation by involved actors: It is also important to consider the will of the stakeholders (and even the mining companies themselves) for sharing information which even may be sensitive in some cases (nesting areas, economically strategic outcrops, archaeological sites, etc.) which probably will be available to public.</p> <p style="text-align: center;">CONTEXTUAL FACTOR</p>	<p>The proposal for transferability would entail the development of a process of information exchange and collaboration. The working group should be set up by both mining and land-use planning authorities (they would be responsible for calling the stakeholders) which, additionally, should lead and manage the group. The mapping process needs to bring actors together.</p>

GOOD PRACTICE ASPECT 2:

Development of tools and procedures for the assessment of actual and potential land uses in order to reduce conflicts within extractives industries

Key elements (of Good Practice Aspects)	Suggestions for Transferability (of Key Elements)
<p>Development of the Mining-environmental planning map: The Mining-environmental planning map is a cartographic zoning proposal whose main aim is to select the best location for the mining activity having had previously into account the Potentially Exploitable Resources Maps as well as all the socio-environmental and legal (environmental, mining and land-use planning) constrains.</p> <p>This map includes different categories as “Non-Exploitable Zones” and “Exploitable Zones”. These categories were performed based on prioritisation criteria attending to the aptitude for the extraction of aggregates and the carrying capacity. This categorization must be consistent with the mineral resources, environmental and land-use planning regulations.</p> <p>Thus, this methodology could be the starting point of the definition of Mineral and mining Strategies, and would help to simplify the mining and environmental permitting processes.</p> <div style="text-align: center;">  <p>SUCCESS FACTOR</p> </div>	<p>The zoning works must be performed attending to strictly objective criteria;</p> <p>The results must be necessarily endorsed by authorities. Stakeholder’s perception regarding the results must be considered to the extent possible. It would be also important to consult regional and local associations</p> <p>Due to similarities in the governance framework, this aspect may be directly transferable to any other region of the Spanish territory by adapting specific issues to the socioeconomic, environmental and mineral resources reality.</p>
<p>Issues regarding the zoning criteria employed: Since there are diverse actors involved (with different interests) in the assignment of land uses, pressures regarding the modification of the results may arise.</p> <p style="text-align: center;">CHALLENGE ENCOUNTERED</p>	<p>It is necessary to point out again that zoning works must be performed attending to strictly objective technical criteria commonly-agreed by the actors involved in order to allocate specific weights to the different land uses. These criteria must be as clear as possible for every authority and stakeholder involved. Thus, an intense work of coaching, in this regard, would be likely necessary.</p>

GOOD PRACTICE ASPECT 3: Integration of mineral resources into land-use planning for mineral resources safeguarding	
Key elements (of Good Practice Aspects)	Suggestions for Transferability (of Key Elements)
<p>Integration of mineral resources in land-use planning policies: Results of the Mining-environmental map are based on a balance between the environmental sensitivity to mining and the potential for the development of mining. In addition, the zoning proposal is consistent with the mineral resources, environmental and land-use planning regulations and policies</p> <p>Thus, integration of mining activities in land use planning has been unquestionably improved in a framework of mineral resources safeguarding. The “Mining and environmental Planning Map” becomes a tool that directly could lead to determining safeguarding categories for mineral resources (provided that the generated product is finally used in land use planning proceedings).</p> <div style="text-align: center;">  SUCCESS FACTOR </div>	<p>It would be important to include the mining sector (professionals from the mining authorities) in the development of regional and local Land-Use Plans similarly to what happen with other sectors (e.g. responsible institution for hydrologic planning or civil infrastructures)</p> <p>On the other hand, the perspective of authorities related (mining authorities, environmental authorities and local administration) should be taken into account in the process as well as be fully informed of results through periodically briefing, establishment of follow up commissions, etc.</p>
<p>Effective coordination and information exchange among responsible institutions: key element in this point is the enhancement of the coordination and information exchange among responsible institutions and other stakeholders (environmental authorities and land-use planning authorities), being also important to consult regional and local associations in the decision making process.</p> <div style="text-align: center;">  SUCCESS FACTOR </div>	<p>The results of all the previous work need to be transferred at the governance level. This fact necessarily requires understanding and consensus among all the organisms involved regarding the decision making process. Practically, inter-administrative commissions must be implemented in order to reach this objective</p> <p>Inasmuch the competences of local level in land uses issues it will be necessary have good feedback from local entities concerning the results, in particular from the local administration.</p>