



1. Contestant profile

| - Contestant name: | Belén Acosta Gallo |
|--------------------------------|-----------------------------------|
| Contestant occupation: | Doctor Associate Professor |
| University / Organisation | Universidad Complutense de Madrid |
| Number of people in your team: | 5 |

2. Project overview

| Title: | Social perception and environmental awareness. The case of Valdilecha |
|----------------------------------|---|
| Contest: (Research/Community) | Community |
| Quarry name: | Valdilecha |



Abstract (max 0.5 page)

The proposal developed has had a strong social commitment, aimed at developing actions that increase environmental and social commitment within priority lines that promote the company's linkage with municipalities adjacent to the quarry. The project has been carried out in the quarry of Valdilecha and its surroundings, an agricultural vocation area with crops and scraps of holm oaks located in the southeast of the metropolitan area of Madrid. The main objectives achieved have been i) to identify the social perception of the inhabitants of the localities near the quarry about the extractive activity and ii) to promote actions for habitat improvement and biodiversity conservation in the territory. In order to identify the social perception of extractive activity, we have designed surveys and carried out street interviews. With almost a hundred interviewees, the preliminary analyses allow us to affirm that the quarry is perceived as a boosting agent of the socioeconomic of the municipality, although its environmental impact on the territory is of great concern. The proposal have had a clear educational and environmental awareness intention, so the participation of the inhabitants of municipalities close to the quarry has been essential. The actions developed have been considered as priority actions for most people interviewed. Active learning of simple restoration with almonds and aromatic plants and habitat improvement techniques to increase biodiversity have been proposed as recognition of the goods and services provided by the territory (water regulation, erosion control, biodiversity and pollination, among others). All the proposed actions have been carried out with the children of the municipalities. The incredibly curious kids have come every time to enjoy and learn and they have let us know every time we offered a new workshop. They have always expressed their desire to continue participating in new workshops, and all this enthusiasm for learning and enjoying is reflected brilliantly in all the videos we have edited in this project.



Final report

1. Introduction

Considering the need to take into account social reality, previous experiences and the evaluations of the local population on any economic activity that involves the extraction of natural resources, a pilot experience is proposed with a strong environmental and social commitment. It aims developing actions that promote the company's linkage with nearby municipalities, as well as raising awareness in the integration of socioeconomic development and environmental quality.

The objectives of the proposal are:

- 1) to identify the social perception of the extractive activity of the company among the inhabitants of the surrounding municipalities;
- 2) to establish the necessary awareness-raising actions for the exploited lands landscape recovery
- 3) to incorporate citizen participation in the design and implementation processes of the actions for the restoration of mining areas
- 4) to make the activity of the quarry visible, explaining limestone extraction and the activity of the landfill as a complementary activity

The project is proposed as a case study in the Valdilecha quarry and its surroundings. The quarry is located in the municipality of Valdilecha belonging to the Las Vegas Region, and located in the southeast of the metropolitan area of Madrid, Spain (Fig.1). The activity of the quarry is focused on the limestone extraction, so abundant in this basophil region. The surroundings are characterized by their lowlands landscapes, such as hills and ravines that always have presented an antrophogenic pressure, since this region has a great agriculture heritage. The whole region has a typical Mediterranean climate, mainly characterized by its strong temperature contrast between summer and winter. The summers are very warm, and the winters are long and cold, more or less humid. This continental Mediterranean climate is also characterized by suffering a strong drought summer period. The native flora and fauna are adapted to this long hydric stress period, having developed different survival strategies.

The project team is scientifically and technically qualified for all the activities considered. We are consolidated professionals in the field of ecology, ecological restoration and environmental education. Collaboration has been required from the schools and public centres, as the City Council, in the municipality of Valdilecha and its surroundings. The inhabitants of the municipalities voluntarily participated in the surveys and interviews. The workshops have been held with schoolchildren from the municipality of Valdilecha. The participation of Hanson/Heidelberg Cement Group and its employees has also been essential for the development of all actions.





Fig. 1. Map of location. The project has been developed in the province of Madrid (central Spain), in the municipalities of Valdilecha and surroundings, where the HeidelbergCement quarry is located.



2. Actions and activities:

To achieve the proposed objectives, different actions have been planned and carried out. These actions are divided into two lines: (A) the study of the social perception in first place, and (B) environmental recovery and awareness in second place. Even though the actions have been planned in two separate aspects, they are strongly related in a feedback that we have to consider, creating a circle in which social perception conditions the actions that have to be done related to awareness and the awareness will modify the future perception¹. Taking this into account, different actions have been developed with an important divulgation work.

2.1. Study of social perception

The study of the social perception took place mainly in Valdilecha and surrounding villages as Tielmes, Campo Real and Carabaña. In view of the need to take into account social reality, the project addressed the social perception of quarry mining activity in the municipalities of Valdilecha and surrounding areas. We have designed street interviews and social perception surveys to identify the social perception of the inhabitants of the localities near the quarry about the extractive activity. A short questionnaire was distributed in public centres and social spaces such as the schools and senior centres. This questionnaire was also filled up directly by street level surveys.

A preliminary scoping analyses has been made with the data collected from almost a hundred people interviewed² (first exploratory analyses with the data collected from almost a hundred people interviewed, n=96). After the exploration of the matrix, we were left with 80 valid interviews that allow us to characterize and approach the social perception about the quarrying activity. It should be mentioned that women were more receptive to answer interviews.

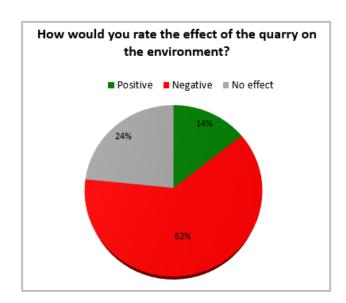


Fig. 2. Social perception about the environmental effect on the quarry (n=96)

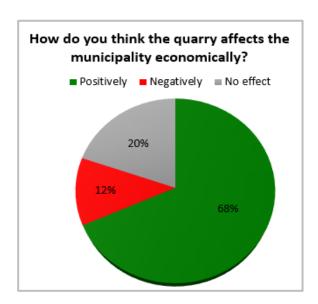


Fig. 3. Social perception about the economic effects of the quarry (n=96)

¹ Watch Social perception and environmental awareness: Valdilecha. https://www.youtube.com/watch?v=YTAq8nisB-4

² adults: always over 18 years old



After analyzing the perception data matrix, we highlight the following relevant results:

- The mining activity is considered worrying for the environment, for most people (Fig.2).
- But nevertheless, it is mostly perceived as a source of economic wealth capable of boosting the employment of the surrounding municipalities (Fig.3.).
- Mostly, they have knowledge of the quarry but have not had the opportunity to visit it³. Despite being less than 15 km from the town of Valdilecha, nearly 25% of those interviewed are unaware of the existence of the quarry. 85% of the interviewees have never got the opportunity to visit the quarry, and only 15% of the inhabitants have visited the quarry at some time.
- Almost 40% of the people do not know what type of materials are extracted from the quarry.

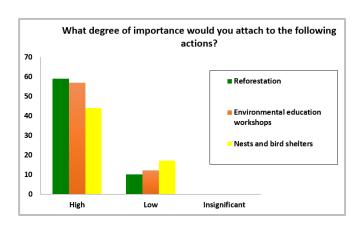


Fig. 4. Social perception about the environmental effect on the quarry (n=96)

- The actions we proposed at the beginning of the project, and without even knowing the opinion of local people, have been chosen by more than 80% of the population as priority actions for socio-economic and environmental development of the municipality of Valdilecha and surrounding areas: i) Planting in bare soil, in our case with almond seedlings and aromatic plants, has been considered by more than 90% of those interviewed as a priority action. As well as ii) the need to carry environmental education workshops among the population. iii) The placement of nests and shelters is also considered vital to increase the biological richness of the environment of the municipality (Fig.4).
- At a local level, the people interviewed have an average perception of socioeconomic change and almost all of them have detected a population and in the immigrant population increase. They are also aware of broader scale phenomena such as climate change, carbon emissions, and scientific and technological advances.

2.2. Environmental awareness

The activities related to environmental recovery and awareness have taken place with inhabitants of Valdilecha and the surroundings, most them children belonging to the public school of Valdilecha (CEIP Miguel de Cervantes). The collaboration of the school's parents association (AMPA), the proper school and the Hanson/Heidelberg Cement Group has been required with very satisfying results. To promote these activities, informative posters were designed and distributed, as well as different videos and infographics were created to divulge what has been learned and done during the workshops. During both workshops the activity of the quarry has been explained.

³ It must be taken into account that the interviewees were all adults; they mentioned that many children do visit the quarry with the school).



Forestry workshop

The objective of the workshop was to take advantage of the reforestation of a certain area of the quarry to create an open-air classroom where the importance of biodiversity could be transmitted. The design and elaboration of this action has taken three steps:

- I. Floristic characterization of the study area. In order to select suitable species for the reforestation of the quarry area, a floristic data analysis of the area was carried out with a GIS program. For the characterization the floristic data from the Geoportal of the Spatial Data Infrastructure of the Community of Madrid (IDEM) was overlapped with the data of the municipality of Valdilecha and surroundings (Perales, Tielmes, Carabaña, Orusco, Villar del Olmo, Pozuelo del Rey and Campo Real). The adjacent municipalities have been taken into account in order to increase the representativeness of the area avoiding as much as possible the pressures that the municipality of Valdilecha may have suffered in the past. Once the data was processed, a list with the most representative species was generated.
- II. Plant species selections. For the workshop, three species were chosen: *Prunus dulcis* (almond tree), *Rosmarinus officinalis* and *Thymus vulgaris*. The almond tree was selected for several reasons. In first place, it is a tree with an important traditional use in terms of crop separation, in fact it is frequent to find this type of trees on the edges of the plots. This has not only been useful for farmers, but also for different species of this agro-ecological ecosystem as they may work as small ecological corridors. In second place, the almond tree has been selected for its culinary interest, providing the community a natural alimentary resource. As for the aromatic species, both rosemary and thyme have been selected for their interest in the traditional Spanish cuisine and for their important role in attracting pollinators. All the seedlings were bought at local nurseries.
- III. The workshop. The workshop took place the 5th of May in the Hanson/Heidelberg Cement Group's quarry plot. The participants where mainly children from Miguel de Cervantes public school, some of their parents, members of the parent's association and members of the team project. The activity began with the departure from the school by private bus to the quarry, taking advantage of the trip to explain the development of the activity. Both the seedlings and the materials for the activity were provided to the stakeholders. The members of the project have participated in other activities with children involved. This has given them the necessary experience to identify those rest and creative concern needs that characterize children. In order to cover those needs, seasonal fruit, water and sun hats were provided. These caps were used as a canvas for children to illustrate their experiences of the day, as can be seen in the video⁴.

During the workshop, two main activities were done. The main activity **(A)** was the **plantation of almond trees and aromatic species** by the children and the other participants. At the beginning they were explained how to do the plantation and then they were accompanied and helped during the whole day. During this process a lot of concepts were explained and related, as the role of pollinators as an ecosystem regulatory service, the importance of the conservation of native species and the concepts related to biodiversity, and a lot of questions were resolved. There was conscious intention to explain all these concepts while the activity was taking place in order to settle knowledge in a context, instead of isolating theoretical knowledge.

⁴ See divulgation section (2.3) or Forestry workshop - Quarry Life Award https://www.youtube.com/watch?v=dEnuAZMkVHE&t=



The second activity (B) that was carried out during the day was a little field experiment to illustrate the importance of the vegetation cover as a protector layer against erosion and a natural water filter (Fig. 5.). For this experiment three bottles were cut and prepared to simulate different environmental situation: i) a vegetation covered soil, ii) a litter covered soil and iii) a bare soil. The children had to water each bottle simulating the rain and then collect the water filtered through the soil. The final result were then observed and commented, in order to show how a vegetal cover prevents erosion and filters better the water. The children also created a poster to illustrate all the acquired concepts to, once again, try to internalize and settle what has been learned⁵.



Fig. 5. Children during the field experiment showing the three environmental situations.

At the end of the workshop around 100 almond trees and 50 aromatic seedlings were planted. The almond trees were planted forming a continuum near the edge of the plot, while the aromatic plants were planted in a rocky area where other adult specimen were found (Fig. 6). After this event, an important monitoring work has been carried out to determine the success of the reforestation, with more than 85% of the seedlings surviving. Irrigation has been carried out during the summer months to guarantee a minimum water supply to all individuals.

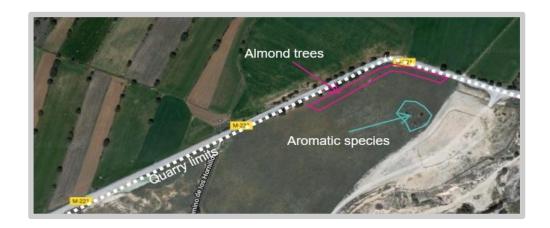


Fig. 6. Picture where the almonds planted area (purple) and the aromatics planted area (blue) is drawn. The white dotted line represents the plot boundaries.

Biodiversity shelters workshop (nest-boxes workshop)

The biodiversity workshop consisted in the assembly and placement of bird nesting boxes as well as bat shelters and insect hotels, highlighting their importance as dispersing agents and pollinators. It took place at a pine forest near the village the 3rd of June. Once again all the materials where provided: recycled wood with the necessary measures, tools, sprays, varnish, and paint brushes.

⁵ See divulgation section (2.3) or Soil erosion experiment <a href="https://www.youtube.com/watch?v=phJflW6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="https://www.youtube.com/watch?v=phJflw6PMKw&t="ht



The activity began with the explanation of how nest boxes are assembled and why it is important to measure the box according to the potential host. The participants could then start working on their boxes (Fig. 7.). During the workshop an environmental training session was integrated, in order to explain i) the role of birds as the essential seed dispersal agent and land re-colonization processes, ii) bats as an alternative in the biological control of insect pests and iii) insects as the most important pollinator agent. After all the nest boxes and shelters were finished, the group hung them in different points of the municipality, as the pine forest, the park and the schoolyard. Apart from making nest boxes, the children were able to develop their creative side as they were provided with paintings and markers. In addition, they could learn a little better different birds that are in their municipality by mounting birds mobiles and thanks to the folders that contained different sheets with birds from the area that were



Fig. 7. Children during the biodiversity shelters workshop assembling a insects hotel.

distributed by the project team. All these activities are collected in the video of the workshop⁶.

2.3. Divulgation:

In order to strengthen the actions of social perception and environmental awareness, special attention has been given to the sharing of everything studied, learned and done during all actions, always with an accessible and non-technical vocabulary. The platforms used to disseminate all this content are: the blog of the QuarryLife Award, the parents association of the school CEIP Miguel de Cervantes's blog and YouTube. The divulgation material has been generated in several formats, such as videos, infographics, posters, handwritten diagrams and several work entries. All the material has been powered by team members with the participation of the children of the workshops.

- Two **informative posters** were made about the workshops intended to the inhabitants of Valdilecha, one per workshop. Information about the day, the theme, the place and contact address was given.
- Videos uploaded through YouTube, available in the QuarryLife Award blog:
 - Social perception and environmental awareness: Valdilecha: a visual thinking made by team members that explains how the project was designed and what we expect from it.
 - Representative plant species: Valdilecha. A view of the process of the floristic characterization with the final results. https://www.youtube.com/watch?v=M1VcHuBp_bM&t=3s
 - Forestry workshop Quarry Life Award. A summary video about the forestry workshop where all the work done and the concepts learned are reflected. <a href="https://www.youtube.com/watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t="https://watch?v=dEnuAZMkVHE&t=

 - Biodiversity shelters workshop. This video narrates the steps followed during the nest-boxes workshop as: 1. Learn, 2. Action, 3. Play. Once again, the team members pursue the conception of a learning attached to the game. https://www.youtube.com/watch?v=soU-hGJE1AA
 - DIY: nesting boxes Quarry Life Award. A Do It Yourself video that describes how a nest box is made and the materials you need. In particular, this video explains how to assemble an insectivore box, a bat box, and a little owl box. https://www.youtube.com/watch?v=H7LW2jVhets&t=14s

⁶ see divulgation section (2.3) and *Biodiversity shelters workshop - Quarry Life Award* https://www.youtube.com/watch?v=soU-hGJE1AA



- Infographics: the project members created two educative infographics related to the workshop issues.
 - Benefits of bats and birds, in relation with the role as pollinators and seed dispersers amount other information (Fig. 8.).
 - Reasons for planting trees, because they provide ecosystem services that include storing and sequestering atmospheric carbon, improving air and water quality, and controlling stormwater, among others (Fig. 8.).





Fig. 8. Infographics Reasons for planting trees and Benefits of birds & bats.

• Blog entries: a total of 24 posts have been done in the QuarryLife Blog in order to inform about the project development as well as to extend the information given during the interaction with the community. This entries not only contain all the resources generated such as videos, infographics, posters but also information about the plantation status, a series of entries titled "Learning from the weather 2018 in Valdilecha" in which it is explained, in detail and with a simple but rigorous vocabulary, why this spring has been more rainy than usual, associated with a displacement of the polar vortex, and posts related to the surveys done.

In addition, to show the interest that HeildelbergCement places on all these actions, the QuarryLife logo has been made visible in different ways. The cars and buses involved in the workshops carried the logo in a visible way and all the nest boxes were marked by spry with it. All these details are visible in the videos and in the blog itself.



3. Discussion:

The final evaluation of the work has been done of both lines of action separately, since each one has required protocols, actions, public and different objectives. Regarding the **Social Perception line**, the final sensation has been very satisfying because the obtained data from the surveys and the interviews are representative of Valdilecha's municipality. The team has done a great effort to obtain and analyse these data, and finally the sample consists of almost one hundred valid fields, out of a total population of 2000 inhabitants. This size gives statistical validity to the data obtained, so the effort has been worthwhile. With the results obtained, it is possible to design priority lines of action with the main environmental and social concerns identified, as well as the local population understanding of any economic activity that involves natural resources extraction. The interviews invite us to rethink and broaden the project perspectives. The team is happy to know that the actions we proposed have been identified by the community as the main priority actions for the socio-economic and environmental improvement of the region. We also would like to emphasize in that the analysis of these data made in this work could be considered as a superficial vision, and that perhaps with more means, especially time, it would be interesting to make a deeper analysis that would draw new sociological conclusions.

Concerning the **Environmental Awareness line**, the team also feels satisfied with the final results. It has been a very hard work due to the scarcity of resources and personnel, since all the workshops have been designed, organized and carried out by team members, but the reception that these workshops have had has been much greater than expected. We have felt strongly supported by the school's parents association (AMPA) and by HeidelbergCement Group, what made the development of the workshops easier. The reception by the children has also been very satisfactory, as we have seen that the assistance was extended from one workshop to another and the children always seemed to want more. On the other side, it would have been interesting to do more workshops with other schools but this was not possible because of the time and the small number of people that integrate the project team. With respect to the plantations made in the forestry workshop, the team is also very satisfied with the efforts done to do a follow-up work in the plantation. This monitoring has allowed a 85% of the seedling survivor this summer, so the team is very optimistic about the future of the plantation. Initially, a technical assistance was budgeted for the audiovisual material, but a subsequent readjustment of the budget meant that all this material should be created by the members of the team itself. This was a challenge that in the end could be solved with a more than satisfactory result.

✓ Added value for the community:

This social research and biodiversity conservation project provided an integrating perspective, encouraging the participation of all social agents involved in the socio-economic development of the territory where aggregate extraction is located. The possibility of actively participating on proposals to improve habitat quality and biodiversity conservation empowered the inhabitants of municipalities, probably stimulating their participation in future territorial planning processes. The Valdilecha environment is the result of historical shaping landing processes - natural and cultural- that has had a predominantly agricultural use. Now a days, the territory is subjected to market forces which lead to the intensification or the abandonment of crops. The mining operations without compromising the environmental sustainability is vital for the well-being of the community. Recognizing the value of the goods and services provided by the territory (water regulation, erosion control, biodiversity, pollination, biological pest control) and the active learning of simple techniques for improving the habitat is important for the schoolchildren, and it also offered leisure alternatives that combine outdoor activities with the enhancement of their territory. In the educational aspect, the students participating in the workshops have not only been able to understand many ecological concepts but also have the opportunity to appreciate a long-term reward of their effort in the present with almond trees planting. This is directly connected to the patrimonialization of the territory, since an action that identifies as yours, in a given moment can add great value to an area.



✓ Added value for the site:

Hanson/Heidelberg Cement Group, a company that is committed to policies with a strong environmental and social commitment, will see its Corporate Social Responsibility (CSR) practices reinforced. With the results obtained in the analyses of the surveys, it will be possible to design priority lines of action with the social concerns identified. The proposed actions for restoring the land with aromatic plants, facilitating the nesting of insectivorous birds, or small birds of prey, will **increase the biological richness** of the area, a cornerstone of the proposals financed by Hanson/Heidelberg Cement Group. The bat shelters and the strategically located insect hotels had a clear educational and environmental awareness intention. The participation of schoolchildren and neighbours facilitates future processes of citizen participation, notably improving the company's image. The pilot experience, in some of the techniques proposed here, could be witness to future actions in similar environments at a really low cost. The Hanson/Heidelberg Cement Group logo was printed on the nest boxes, shelters and hotels that were installed, not only in the surroundings of the quarry, but also in the rural areas themselves, identifying the **quarry as an opportunity for unique fauna**, which is also committed to integrate economic development with social welfare and sustainability criteria.

4. Deliverables:

This project has a universal approach, indeed, it is a pilot experience that can be applied and extended to any other place in the world as long as a readjustment of the socioeconomic and environmental context is made to avoid a social or ecological shock. The awareness workshops can be carried out anywhere, whenever the environmental needs of the place are taken into account, for example, in this area the plants planted where native species and the nest boxes were designed for the passerine birds, so frequent in this area. All the divulgation material, as infographics and some videos like the DIY, can be used by the company and anyone who is interested as educational resources.

Another characteristic of the project is that it is based on mid-term follow-up. The almond trees may require some cares during the first years of development to ensure maximum survival. The nest boxes also require a follow-up during their use. It is necessary to do some maintenance and cleaning of the boxes, in order to extend their usability as much as possible. These boxes can be used in future to carry out faunal studies.

The data obtained with the interviews and surveys can undergo a much deeper analysis than the one carried out in this project that may be of interest to the company, since they can extract the perception and opinion that people have about the company's activities. With this type of information the company can develop actions from real and representative data, which may have a bigger social effectiveness.

5. Final conclusions:

- √ The proposed actions (reforestation, biodiversity increasing techniques, and environmental awareness
 workshops) have been identified by the community as the main priority actions for the socio-economic and
 environmental improvement of the region.
- ✓ There has been a high participation in the street interviews, achieving a sample with statistical validity allowing to infer several conclusions from the data.
- ✓ As a priority line, HeidelbergCement can pay attention to the fact that 25% of the population did not know about quarry existence, and that 40% does know about it but does not know what type of material is being extracted. This type of data can be a starting point for scheduling environmental education talks or other workshops in the future.
- ✓ The mining activity is considered worrying for the environment, though it is mostly perceived as a source of economic wealth capable of boosting the employment of the surrounding municipalities
- The kids have comprehend vital ecosystem processes such as pollination and seed dispersal, soil processes (water retention, runoff, infiltration) and landscapes dynamics during the workshops.
- ✓ A lot of informative material has been generated (videos, infographics, blog posts), and has been requested
 by the schools for future use.





✓ To be kept and filled in at the end of your report

| Project tags (select all appropriate): This will be use to classify your project in the project archive (that is also available online) | | |
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| | | |
| Rehabilitation & habitat research Scientific research Soil management Species research Student class project Urban ecology Water management | □ Sandy and rocky habitat □ Screes ☑ Shrub & groves ☑ Soil □ Wander biotopes □ Water bodies (flowing, standing) □ Wetland □ Woodland | |
| Flora: Trees & shrubs Ferns Flowering plants Fungi Mosses and liverworts Fauna: Amphibians Birds Insects Fish Mammals Reptiles Other invertebrates Other species | Stakeholders: Authorities Local community NGOs Schools Universities | |