



Cement Sustainability Initiative

CSI Quarry Rehabilitation Guidelines – Case Study

Quarry Rehabilitation: a CEMEX experience

Species restoration in a tropical dry forest

Location and situation

Opened in 1980 and used by CEMEX since 1999, the Colorado site is located in the province of Guanacaste, in the Nicoya Gulf in northwestern Costa Rica.

With a total surface of 290ha, the site includes a limestone quarry (20ha), a clay quarry (70 ha) and a cement plant. It is surrounded by a tropical dry forest highly fragmented by human activities, especially cattle-raising and exploitation of high value wood.



Known biodiversity

The local ecosystem is tropical dry forest. The site is located in an area of high biodiversity value which includes a number of protected areas and species listed on the IUCN Red List of Threatened Species. The site is also on an important corridor for migratory birds, between North and South America. It is less than 10km from the Palo Verde protected area, listed as a Wetland of International Importance according to the Ramsar Convention, and within 20km from 13 different national protected areas. The area concentrates a high number of endemic species, especially birds.

Great Green Macaw



Some of the species listed on the IUCN Red List of Threatened Species and that can be found on the site are: birds – Great Green Macaw (*Ara Ambiguus*), Jaribu storks (*Jaribu Mycteria*); mammals – Mantled Hawler (*Alouatta Palliata*), White-throated Capucin (*Cebus Capucinus*), White-tailed deer (*Odocoileus virginianus*), plants – Guaiacum Sanctum.

Targets and aims

- To ensure site restoration and recovery of the initial ecosystem

This case study is part of the CSI Quarry Rehabilitation Guidelines published in 2011.

- To contribute to the conservation and restoration of the local biodiversity and ecosystem services
- To raise the communities' awareness of the importance of biodiversity and the necessity of a sustainable use of natural resources

Restoration activities

Between 1999 and 2005, 6,000 trees were planted to reforest 12ha of the clay quarry, and 50ha were rehabilitated through natural regeneration.

In 2008, a Biodiversity Action Plan was designed for the Colorado site, following the three objectives already defined. It sets the main actions for the first three years:

- To strengthen the White-tailed deer population, declared Costa Rica's national symbol in 1995. Its population is reducing due to illegal hunting and the development of urban areas. The objective is to introduce deer in a 40ha reserve inside the Colorado site, to supply them with food and to monitor their reproduction before releasing them in the whole site. *White tailed deer*
- To exclude cattle from the rehabilitated areas to prevent severe damage to the vegetation. A consultation with the farmers will be organized to reach agreement with them, and fences will be installed.
- To create a seedbed and implement environmental awareness-raising activities: the seedbed will provide native plants for the quarry rehabilitation. Information panels will be designed for a pedagogical walkway, and guided tours and birdwatching activities will be organized for local communities.
- To create a plantation of high value wood and ensure its sustainable management: in the region, trees with a high commercial value have been overexploited. The establishment of plantations inside the site will strengthen the tree density, and the plantations will be managed to balances production and ecosystem conservation.
- To maintain ground vegetation in the rehabilitated areas: opening of the tree canopy where it has closed over time, and eradication of exotic and invasive species.



Partners

To design and implement the site's Biodiversity Action Plan, CEMEX signed a partnering agreement with the FUNDACA (Fundación para el Desarrollo del Área de Conservación Arenal), a local conservation organization. The company also works with the Ministry of Environment and the National Biodiversity Institute.



Results

In January 2009, the FUNDACA started a fauna and flora inventory in a 50ha section of the site that has never been exploited. The aim is to develop a biodiversity database for the Colorado site. The database will include taxonomic descriptions, species prioritization in order of conservation importance, photographs, and sound records. More than 800 species of plants, birds, mammals, reptiles and insects should be registered. The database will be used to establish an ecosystem of reference for the site rehabilitation. It will also allow designing a “biodiversity monitoring tool” to assess the results of the rehabilitation actions. Finally, the data will support the development of learning materials for environmental awareness-raising activities.

Lessons learnt

During the early rehabilitation works, it was common to privilege plant and tree species with a high growth rate, some of which appeared to be invasive. Today, the plantations are made up of native species only, which better fit in the local environment.

Further information

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