

CENTER FOR SOLID WASTE TREATMENT, SEROPÉDICA (CTR RIO) - BRAZIL



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EXECUTIVE SUMMARY

The Santa Rosa Center for Solid Waste Treatment, known as CTR Rio, is waste management center mainly consisting of a sanitary landfill located in Seropédica municipality, close to the city of Rio de Janeiro in Brazil. CTR Rio operates one of the largest landfills in Brazil, covering 2.2 square kilometers, and has operated since April 2011. About 10,000 tons of waste from Seropédica, Itaguaí, and Rio de Janeiro city are received per day to be treated in CTR Rio. When dump trucks arrive they are weighed and the waste is identified by categories, then the waste is deposited into the landfill to be covered with clay, avoiding the spread of odors. The leachate generated from the decay of organic matter is treated and transformed into recycled water. Also, the biogas produced by the breakdown of organic matter is led off to be flared. At present, CTR Rio is considered the most secure, modern, and efficient solution for treating solid waste in Brazil. The project has showed deep concern for the environment that surrounds the site as well as for the community. The project cooperates with society by implementing social projects and generating jobs, and benefits the environment by launching plans to monitor surface and groundwater, soil, and degraded areas. The project conforms to the National Solid Waste Policy in Brazil, which determines an appropriate allocation and treatment to waste without harming the environment. CTR Rio enabled the closure of the open-air dump areas of Gramacho, Seropédica, Itaguaí, which have polluted heavily the environment and natural habitat.

Ciclus, the enterprise that operates CTR Rio, has emphasized sustainability as a core value in its work. The project team established a sustainability management system through the Environmental Social Management Plan that adopts principles of sustainable development with stakeholder and community participation, environmental control, and programs for improving social problems. This plan is part of sustainable guidelines imposed by the Brazilian bank Caixa Econômica Federal, which lent US \$160 million to fund the project. Ciclus was founded in 2010 and is a partnership between Júlio Simões Transport Services Ltd and Haztec Technology and Environmental Planning. Ciclus has worked with a wide variety of stakeholders and specialized companies to carry out specific analytical procedures and to train professionals involved in the project. In order to build a relationship with the community and improve management, CTR Rio counts on a social communication plan, responsible for engaging the community and stakeholders of the project. The project has a department called CTR Rio Open Doors where communities and stakeholders can present their opinions, complaints, and desires. The project improved infrastructure integration by integrating the existing urban infrastructure into the project design and improving roads and streets of nearby communities. Nevertheless, in spite of working with several stakeholders to broaden the involvement and the understanding of the project, CTR Rio still needs to engage better in teamwork. Several companies (private and

municipal) have worked on the project from its implementation until it coming into operation. CTR Rio did not present reports or documents that monitor whether its teamwork has been working efficiently. An environmental and social management plan was imposed by the Brazilian bank Caixa Economica Federal in partnership with the World Bank, to create the Center for Environmental Education in July 2010.¹ This center, located in CTR Rio, serves for interacting with, informing, and educating local communities about environmental issues and recycling procedures. It also provides workshops to CTR Rio employees to develop skills and capacities. Besides the Center for Environmental Education, the project has undertaken several initiatives to engage and benefit the community. Among them are: a Social Inclusion Plan; a Plan for Environmental Education; and a Social Inclusion Plan for Waste Pickers.

CTR Rio has demonstrated a great interest in improving the quality of life of communities that have might be affected by the project. Several social programs have been implemented to engage society in the project, ensuring a positive impact on the functional aspects of the community. The project cared about the waste pickers who were affected by the closure of former open-dump areas (Seropédica and Itaguaí). Waste pickers are people whose income depended on picking recyclable waste from the open-air dump to sell to recycling companies. When these dumps were closed, many waste pickers did not have any support to restructure their lives. CTR Rio implemented the Social Inclusion Plan for Waste Pickers to compensate them for their loss of income, offering alternatives to reinsert them into the formal labor market or through the revitalization of the recycled waste cooperative and other inclusive businesses. In this center, area residents can learn more about the CTR Rio project, suitable practices, environmental concerns, and recycling procedures. All guidelines were developed through the environmental education plan. The center also provided annual workshops to update employees on waste management technologies and improve their skills. Beyond concern for social improvement, CTR Rio has helped to improve the urban landscape of Seropédica. The project has invested in and recovered public spaces through the reform and adaptation of 20 public squares in the municipality of Seropédica, and has performed drainage and pavement work in several parts of the districts of Jardim Maracanã, Santa Sofia, and Piranema in Seropédica. Therefore, the project has had positive effects on sustainable growth and development. To avoid disturbing the closest community – Vila do Chaperó, located 2 km from the site – CTR Rio has implemented a green belt around the site that works as a natural barrier to hold dust, odor, and noise. Still, there are some issues CTR Rio needs to perform better, such as encouraging alternatives modes of transportation to get to the site, improve community mobility and access, and minimize light pollution. Also, no concerns were showed to implement programs aimed at women, improving their skills and helping them move into the

¹ Caixa Econômica Federal, “Marco socioambiental: aplicável a projetos de gestão integrada de resíduos sólidos e mecanismo de desenvolvimento limpo no Brasil” (Brasília, 2012).

job market.

In order to protect freshwater availability, CTR Rio characterized all basins and analyzed the quality of water before implementing the project. Also CTR Rio includes a comprehensive drainage system and incorporates design features to minimize negative impacts on surface and groundwater. The drainage system leads stormwater to two swales channelized on site, from which the rainwater is properly led to its natural watershed. In this manner, the project has created essential measures to address the runoff and successfully maintains wetland and surface water functions. Also, the waterproofing system ensures that the leachate generated by the accumulation of rubbish deposited does not reach and pollute any groundwater or surface water. Network sensors were spread in the area where the rubbish is dumped and covered with clay, in order to detect any trace of pollution in the soil. Thus the project has taken many measures to mitigate any pollutants generated by the leachate. Furthermore, the leachate produced by the decomposing organic matter is treated and transformed into renewable water to be used in the site. CTR Rio counts on some plans and programs to mitigate any negative impact on the hydrologic environment: the Program for Monitoring the Quality of Surface and Groundwater executed by National Institute for the Environment (INEA), which is responsible for collecting and analyzing the quality of water from the aquifer every three months; the Geotechnical Program, responsible for monitoring erosion, landslides, and any issues related to soil; and the Plan for Degraded Areas that has helped to restore any degraded area inside CTR Rio. Although CTR Rio has showed concern for its water functions, there are measures that still need to be taken to improve the system. Some of these include storage and reuse of rainwater, checking and management of potable water, and monitoring of the water system inside the project.

The project has not directly affected fauna and flora in the surrounding area. CTR Rio was implemented in area that had already suffered from human action and heavy grazing. The sanitary landfill is located in a rural area away from any environmental protected area. Nevertheless, in the environmental study assessment, the project team evaluated all animals and plants in the surrounding area as well as the features of the land. The project was implemented in agricultural/pasture flat land with clay soil. Both characteristics are good for installing a sanitary landfill. A good approach has been taken toward reducing excavated materials taken off site. All soil excavated is used to cover the rubbish. The clay used is also found in the site, reducing transport costs. There is a plan to periodically control pests. In terms of the material used to build the project, the project team should have given more attention to the resources (physical material, energy, and water use). The project did not present documentation that the construction materials were recycled or reused, or that they could be recycled/reused at the end of the project's life. At present, CTR Rio has not demonstrated that

it reduces overall energy use of the plant or any use of renewable energy sources.

To contribute to climate adaptation, CTR has launched the Plan for Mitigating Greenhouse Gas Emissions, based on the Kyoto Protocol. It aims to reduce greenhouse gas emissions by 40% between 2015 and 2018 and methane emissions by 50%. It is certified under the Clean Development Mechanism (CDM), offering carbon credits to other countries. CTR Rio has installed a pipe system to capture the biogas produced by the decay of organic matter. The biogas is led to the flares where the methane is transformed into CO₂, which is less polluting. CTR Rio plans to use the biogas as a renewable energy source in the future. In terms of becoming a resilient project, CTR Rio has some gaps to improve on. The project has a plan to address short-term risk which mentions the measures that need to be taken in case of any damage to the system, though it does not explain how in detail. No plans were provided to reduce air pollution, monitor air quality, prepare for long-term climate change, or assess climate threat. If CTR Rio aims to be a resilient project, these issues should be addressed more carefully, since the infrastructure project is a landfill. If any natural or human disaster should happen to the project, CTR Rio needs to be prepared with resilience solutions to meet natural and social environmental needs.

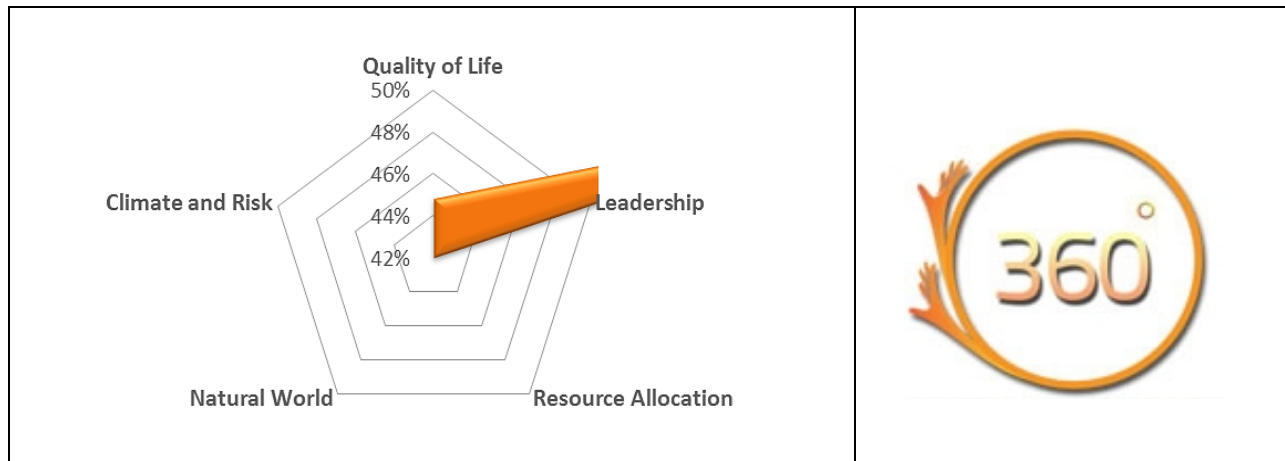


Figure 02: People & Leadership Award Summary of results

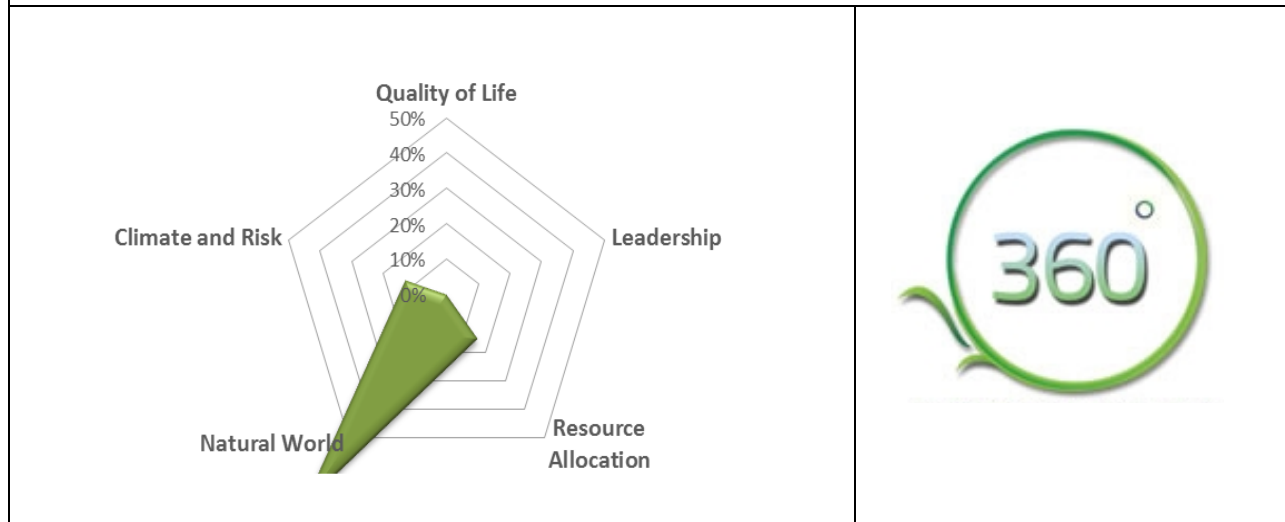


Figure 03: Climate & Environment Award Summary of results

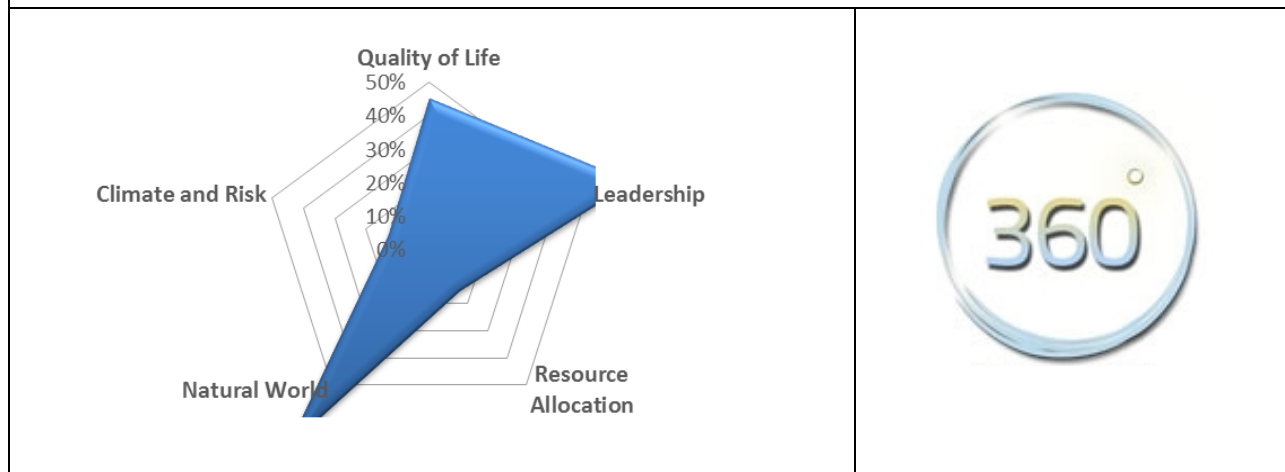


Figure 04: Infrastructure 360 Award Summary of results