ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE
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PUERTO BAHÍA MULTIPURPOSE PORT
COLOMBIA

Figure 1: General picture of the project
Sources: Sociedad Portuaria Puerto Bahía, "Informe de Progreso" (presented to the United Nations Global Compact 2014), 5.

Manuela Guzmán Ramírez prepared this case study under the supervision of Cristina Contreras ENV-SP and Judith Rodriguez ENV-SP as part of the Harvard-Zofnass program directed by Dr. Andreas Georgoulias by initiative of IDB for the purposes of research and education.
Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective project design or implementation.

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EXECUTIVE SUMMARY

Puerto Bahía is a large-scale multifunctional port with capacity to handle dry and liquid products in bulk. Located at the southern part of Mamonal in Cartagena Bay, between the Dique Canal and Bahía Honda swamp on the island of Barú, the port is the most advanced in Colombia and the region for handling, storing, and exporting oil. In its current operation phase the project has the capacity to store 3 million barrels of oil and to handle an export flow of 6.8 million metric tons per year. US $585 million was invested in the construction of the port, which is allowed to operate for 25 years under the administration of Sociedad Portuaria Puerto Bahía (SPPB), part of the holding company Pacific Infrastructure.

Puerto Bahía has been committed to sustainability during its construction and operation periods. Specifically, it has made several efforts to improve the quality of life of the surrounding community and the natural world. The project performed a broad set of actions including infrastructure development, technical training, and support of cultural and entrepreneurial programs. It also made several efforts to conserve and restore the surrounding water bodies of the Dique Canal and Bahía Honda swamp by creating sound reforestation programs and monitoring quality of both vegetation and animal habitats. Impacts on Quality of Life and Natural World were the project's highest achievements, followed by Leadership, Resource Allocation, and finally Climate and Risk.

Efforts to improve quality of life in the surrounding communities resulted in the construction of a cultural center and a new day care center, and the renovation of El Pelao aqueduct and the soccer field. The community's economic improvement was also seen after the implementation of training workshops in technical skills associated with port operation and a policy of employing local population first. 60% of the unskilled labor came from the direct area of influence, and at least 200 workers were employed during the construction period. Additionally, a group of the most disadvantaged women was selected to receive entrepreneurial support for starting a new manufacturing company. Two companies resulted from these programs, the cleaning products company Productos Barú and the clothing manufacturing company Confeccionando Futuro. Moreover, surrounding communities were involved in activities to monitor and restore natural conditions. For example, 107.5 ha of mangrove areas and 65 ha of wooded areas on land were replanted by Pasacaballos Mangrove Growers Association, a worker-owned company from the project's area of influence.

Water systems conservation and restoration stand out in the project's impacts on the natural world. Since the area is not connected to Cartagena's aqueduct network, water supply and consumption were addressed with special care. Freshwater scarcity is handled by collecting and

treating rainwater as well as wastewater, using portable toilets, reusing industrial water, and performing monthly surface and groundwater quality monitoring. Moreover, the project manages flooding dynamics, water infiltration, and water quality by implementing mangrove and dry forest reforestation programs in addition to planting an ecological corridor around Bahía Honda swamp. These restorative actions improve the existing hydrological systems in addition to providing new habitats for animals. As a side effect of the water system restoration, the project team was able to preserve the biodiversity conditions found before the construction of the project started.

These natural world achievements are supported by the leadership of the Puerto Bahía team. The project follows the United Nations Global Compact, is part of local associations, and demonstrated strong collaboration with both public and private agencies dealing with sustainability issues. For example, it identified Coreca, a local company that buys recycled material derived from the port's operation. This company is part of APELL, a cooperative group of the largest industrial companies of Mamonal and Cartagena as well as community leaders, created to promote joint efforts in case of an emergency. Additionally, the project supports sustainable practices by requiring its contractors and suppliers to meet the ISO 14001 quality standard as part of its sustainability management plan.

In its resource allocation practices for construction materials, Puerto Bahía considered both the sources and disposal of used material as well as internal practices for reducing waste and promoting recycling. For example, 100% of construction materials such as concrete, gravel, and sand were acquired from local companies. All the ornamental and reforestation vegetation came from the area of influence. Separate containers and designated places for dangerous waste treatment and disposal were provided for recycling and waste reduction. Additionally, the amount of excavated materials taken off site was reduced by creating topographic reconfigurations inside the project. The efforts to acquire materials from local companies and reuse excavated materials reduce each material's embodied energy. This will represent a reduction of CO_2 emissions and fossil fuel use among other benefits related to transportation.

Finally, some consideration was given to climate and risk. Puerto Bahía performs well in its measurement of emitted gases and air pollutants in the project area. The port is also very well prepared for short-term hazards both natural and manmade such as earthquakes, fires, or flooding. Puerto Bahía's employees and the affected community were informed about possible risks and receive periodic communications regarding emergency responses. However, the project's resilience could be improved by creating a long-term plan for threats such as global warming and sea level rise.

Although Puerto Bahía is considered a sustainable infrastructure project, there is still room to improve several aspects of its operation and planning, such as: reduction of energy and water consumption, increased reuse of recycled materials inside the project, creating an adaptability plan for sea level rise and global warming or addressing the heat island effect. Some other measures to consider are planning for possible deconstruction and recycling of the project's facilities, improvement or support for community mobility and access beyond roads for vehicles, and encouragement of alternative modes of transportation for the affected communities as well as employees.

Due to the project is located in such a strategic ecological region between the Dique Canal and the Bahía Honda swamp, it was imperative to address the ecological dynamics of the existing habitats in order to improve not only the project's site but the surrounding communities and the region. Commitment to the communities started through the conservation and improvement of the natural habitat, and went on to provide better living conditions that will foster economic development. Puerto Bahía's performed actions toward sustainability in addition to its role as a sustainability leader in the cooperative sector may help disperse negative impacts of the project at a regional and maybe a global scale.

Figure 2: People and Leadership award Summary of results

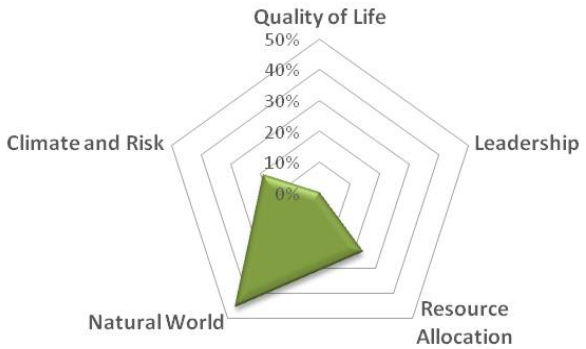

Figure 3: Climate & Environment award Summary of results

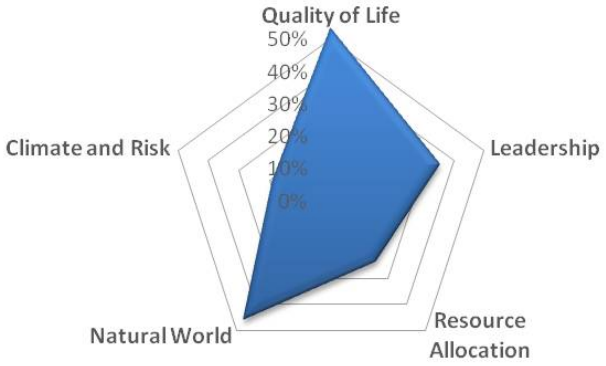

Figure 4: Infrastructure 360 award Summary of results