RESILIENT SANTIAGO DE LOS CABALLEROS

RESILIENCE STRATEGY
SANTIAGO DE LOS CABALLEROS
RESILIENT SANTIAGO DE LOS CABALLEROS

Monument to the Heroes of the Restoration
Photo: Robert Perez
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SANTIAGO DE LOS CABALLEROS

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Yeque del Norte River
Photo: Jose Bencosme
STRATEGY
VISION

SANTIAGO DE LOS CABALLEROS builds its resilience by recapturing the Santiagueros’ sense of belonging to their territory, their culture and history, laying the foundation for an integrated municipality that uses resilience as its overarching principle.

A CITY THAT LEARNS FROM ITS HISTORY, faces the present and the future, reflects on disaster management, grows and recovers by taking pride in its traditions and provides opportunities to its citizens within a diverse and sustainable economy.

SANTIAGO DE LOS CABALLEROS, a city that is inclusive, safe and participative, that lives in harmony with El Yaque River, and that makes the most of its natural resources.
LETTER FROM
MICHAEL BERKOWITZ
from 100 Resilient Cities

On behalf of 100 Resilient Cities staff, I want to congratulate Mayor Abel Martínez Durán, Chief Resilience Officer Maria Isabel Serrano Dina, and the City of Santiago de los Caballeros for the launching of their Resilience Strategy, which is an important milestone both for the city and our collaboration.

Santiago de los Caballeros, one of the oldest cities in the Americas, is a prosperous metropolis that keeps playing an underlying role in the economy and culture of the Dominican Republic and the rest of the Caribbean. As the city continues growing at a rapid pace, the Resilience Strategy is embarked on a preliminary project to shape its expansion in such a manner that the city can become stronger and more resilient.

While city growth is increasingly important for the future of the region, stresses have also been created, and must be confronted if Santiago de los Caballeros is to be resilient in the 21st century. Given that urban planning has kept pace with rapid urbanization, informal settlement has become an outstanding part of the landscape, often in areas that are more vulnerable from the environmental point of view. Communities in these areas suffer from poor public utilities and infrastructure that has not been established anywhere outside the official city limits.

These stresses further expose these communities and the rest of the city to acute, unavoidable impacts, such as occurred last fall, when Hurricanes Irma and Maria hit the island, leaving more than 80,000 people displaced, 350,000 with no water, and almost 1.8 million without potable water.

This Resilience Strategy provides a perspective and 45 concrete actions that address the shocks and stresses facing the city, including investment in infrastructure to improve disaster response and mitigation, as well as the creation of mechanisms to regulate land use so that the city may extend and develop in a sustainable, flexible manner. The strategy also focuses on fostering a prosperous, innovative, and culturally vibrant city through offering municipal grant programs, promoting the city as a tourist destination, and investing in technological innovations and employment creation opportunities.

The strategy acknowledges the key role of El Yaque river as an urban asset with the potential to transform the city. “Viva el Yaque” is a project aimed at developing a sustainable waste management process, increasing the areas devoted to public green spaces, increasing connectivity, revitalizing the city’s downtown, creating an ecological corridor, and developing a comprehensive cycling plan. These goals will contribute to the city’s resilience.

Through the commitment and hard work of Chief Resilience Officer Maria Isabel Serrano Dina and the leadership of Mayor Abel Martinez Duran, this Resilience Strategy is a true reflection of the needs and priorities of the city.

While launching this initiative is an important achievement, the job is far from completed. The success of this strategy is contingent on its implementation and potential to make the city institutionalize resilience in its planning processes and investments. The whole city as an integrated ecosystem capitalizing on its strong private sector must undertake the task of becoming more efficient in improving the lives of those who live in Santiago de los Caballeros and helping them to become more prosperous, particularly those who are the most vulnerable.

We look forward to continuing our collaboration with the city as well as to observing and taking part in this work as it develops and unfolds.
Santiago de los Caballeros has endured social and natural disasters that have made it rebuild the city again and again. The strength of this municipality of great men and women throughout its history lies in their perseverance and willingness to keep moving the region forward during difficult times. Our society is one that has responded creatively to various challenges, improvising strategies to adapt and survive in the very short term.

The Resilience Strategy for Santiago de los Caballeros, without a doubt, aims for comprehensive planning and robust action in the face of challenges from the accelerated, unplanned regional growth that has taken place in with no vision for the long term. This Resilience Strategy is a specific proposal arising from work undertaken in various sectors. The proposal is based on the capacities of the territory, which are aligned with the municipal land use legal framework, my administration’s agenda, and the municipal development plan. The goal is to strengthen all our efforts to achieve the 2030 vision in a thoughtful, resourceful, and robust manner.

We are working towards renewing pride in Santiago de los Caballeros, pride in the heart of each inhabitant and in every corner of the city. We dream of a peaceful society that is clean, orderly, and safe for every citizen. We dream of a vibrant and cohesive city that thrives again in its green areas as well as its cultural and historic spaces. We aim for a sound, diverse economy and projects that are sustainable over time.

The agreement executed with Rockefeller Foundation to include Santiago de los Caballeros in the 100 Resilient Cities program reinforces cross-functional regional planning that will include a resilience lens in the decisions and actions that will lead to building a Santiago de los Caballeros prepared to face the future with security and confidence.

This Resilience Strategy is not only important now and for the future of the city, it signifies the approach we must follow both domestically and regionally if we want to responsibly face an uncertain future in a world that has an unstable climate. We are committed to developing and institutionalizing this Resilience Strategy, which will ensure and make concrete a rigorous technical process tailored for Santiago de los Caballeros and the challenges it faces.
This Resilience Strategy proposes to build resilience and foster a sense of belonging to the territory by encouraging citizen involvement and the active, inclusive participation of communities in municipal planning and multi-sector actions. The strategy is based on the city’s demonstrated capacity to face and recover from the acute shocks and chronic stresses of the past, but it also prepares us for unexpected events by restructuring our approach to achieving a Santiago de los Caballeros that is a safe, well-designed, and cohesive city.

Empowering citizens and the various sectors of the municipality is key to achieving each pillar and to ensuring that resilience is considered in all planning decisions for the region, in environmental conservation and management of ecosystem services, and in public and private actions. Embedding resilience qualities in the plans, policies, programs and projects of Santiago de los Caballeros in the short, medium and long term is vitally important.

The critical challenges ahead include air pollution, final waste disposal, water provisions, floods, lack of employment opportunities, limited spaces for social cohesion, mobility focused on motor vehicles, poor public lighting, public safety, and gender-based violence. These challenges are interdependent and must be jointly addressed by City Hall in collaboration with all sectors of the city to build the resilient city we advocate.

The new Regional Zoning Municipality Plan (PMOT), which represents significant progress in the building of resilience, starts by regulating land use and defining the growth criteria the municipality must embrace to reduce natural and man-made vulnerability. Another PMOT contribution is that it considers risk in its planning and offers a sustainable vision for land use regulation.

In other matters, the declaration by law of Santiago as an ecotourism destination, the recovery of the public areas of Santiago de los Caballeros through art, culture, gastronomy, and the revitalization of urban green spaces reflect a society that has so much to offer; we now have a unique opportunity to develop the city as a tourist destination by diversifying the economy, creating new employment opportunities and strengthening economic growth.

The greatest challenge we face is, without doubt, recovery of Yaque del Norte river and its close environment. The will of each citizen, the academy, the business community, industries, non-governmental organizations, local institutions, the City Hall and the National Government shall be the key joint effort to recover this very significant and iconic space that, beyond being a source of water, is the little-remembered soul and beat awaiting to be admired again by those who used to take pleasure on its beauty and splendor.

Maria Isabel Serrano Dina
Chief Resilience Officer
LIST OF ABBREVIATIONS
AND ACRONYMS

100RC
100 Resilient Cities.

ACIB
Santiago Merchants and Industrialists Association.

Asecensa
Association of Merchants of Historical Downtown.

BID
Inter-American Development Bank.

BM
World Bank

CDES
Santiago Strategic Development Board.

CME
Municipal Emergency Commission.

CNE
National Emergency Commission.

CNTT
National Central Institution of Transportation Workers.

Corasaan
Santiago Aqueduct and Sewage Council.

CRF
City Resilience Framework.

Fedomu
Dominican Municipalities Federation.

Fomin
Multilateral Investment Funds of IDB.

GEI
Greenhouse gases.

GIRS
Solid Waste Comprehensive Management.

ICES
Emerging and Sustainable Cities Initiative.

Inespre
Price Stabilization Institute.

Infotep
Professional Technical Training Institute.

OAT
Opportunity Assessment Toolkit.

ODS
Sustainable Development Objectives.

OMPU
Urban Planning Municipality Department.

OMS
World Health Organization (WHO).

ONE
National Statistics Department.

ONG
Non-governmental Organization (NGO).

PES
Santiago’s Strategic Plan.

PIB
Gross domestic product (GDP).

PMOT
Regional Zoning Municipality Plan.

PNUD
United Nations Development Program (UNDP).

PUCMM
Pontifical Catholic University Mother and Teacher.

MAG
Gender Audit Municipality Program.

MEPyD
Ministry of Economy, Planning and Development.

Mitur
Ministry of Tourism.

Mipymes
Micro, Small and Medium Business.

Mimarena
Ministry of the Environment and Natural Resources.

MOPC
Ministry of Public Works and Communications.

UGAM
Environmental Management Unit.
The Resilience Strategy for Santiago de los Caballeros describes the need to assess, define, and implement mechanisms to strategically respond to acute shocks, such as earthquakes and floods, and to chronic stresses the city endures daily, such as unorganized and unplanned growth, urban sprawl, lack of social cohesion, and poor urban facilities. Such challenges are barriers to achieving a resilient city and dramatically affect its citizens’ quality of life. The Santiago de los Caballeros Resilience Strategy is therefore intended as a resource for building robust response and management systems to address disasters, to strengthen the city’s cultural resources and vitality, and to strengthen its natural, economic, and social structure.

In 2015 Santiago de los Caballeros was selected to be in the second group of cities that became part of the 100 Resilient Cities initiative (100RC) sponsored by the Rockefeller Foundation. The initiative’s purpose is to support 100 cities around the world in resilience building on an urban scale. Being selected as one of the program’s second set of 100 cities has helped Santiago de los Caballeros understand the vulnerabilities and challenges faced by the city, assess its capacity to respond to them and apply a comprehensive, holistic planning methodology with a resilience lens to them, starting with the local government’s implementation plan and the proposals emerging from the region’s various sectors and institutions.

As part of the first phase of the process, a workshop was held to study perceptions and factors that have an influence on the resilience of Santiago de los Caballeros. Then, several studies and plans were reviewed, including the Inter-American Development Bank under its Emerging and Sustainable Cities Program, the strategic plan of the Santiago Strategic Development Board, and the action plan of Santiago municipality Mayor’s Office were reviewed. During the review, the sustainability status of the city as well as, its vulnerability to climate change, among other topics, were analyzed. Next, the Resilience Strategy work plan was introduced. The plan was validated in workshops involving the various sectors of the city society, with the members of the Resilience Committee assembled by the mayor, and in 145 surveys on perceptions of natural and man-made shocks and stresses.

As the new mayor took office, the data revalidation work resumed. Documents processed at the time were reviewed and a series of consulting processes took place with key city stakeholders to update the action previously identified. At this point the Basin Plan, among other documents, was created and the vision of the current Municipality Management Plan was developed. At this stage, the action validation and prioritization process was started, first with an opportunity assessment toolkit designed by the 100RC program. The goal of the process was to highlight the resilience value of proposed actions and to ensure that they did indeed respond to the shocks and stresses on the city. In addition, four workshops were organized with three multi-sector focus groups and one focus group consisting of City Hall managers. The workshops were intended to foster a sense of social responsibility. They were also to provide feedback on the work conducted, provide an opportunity to develop alliances, and prioritize the most resilient and feasible actions to be included in this document.

The last step of the validation process was the final review of the city Resilience Committee composed of various key stakeholders of the municipality and headed by the mayor. When this process concluded, the preparation and writing of the Santiago de los Caballeros Resilience Strategy was resumed and it was launched in May 2018 so that implementation could begin forthwith.

The multiple threats and high level of exposure due to the city’s physical and socioeconomic vulnerability results in risk that is distributed throughout the region. The pillars and their proposed concrete actions have targets, as shown below.
Scattered, uncontrolled growth of urban sprawl is a challenging trend that significantly increases the natural vulnerabilities and exposure to risk of some communities. This first pillar proposes actions to control the expansion of urban sprawl, reduce natural vulnerabilities, and improve the capacity for prevention, response, and mitigation of acute shocks.

This pillar is intended to strengthen human capacities, expand employment choices, and support the construction of a resilient economy based on a Santiago de los Caballeros that promotes the city, its culture and history, as a tourist product. The aim is to create an economic environment with a strong labor force and healthy supply and demand, one in which a prosperous workforce and an innovative economy can develop and thrive.

This pillar responds to the need for participatory processes that are fundamental to a democracy and that foster a sense of belonging in all citizens to their region and its common assets. This pillar seeks to strengthen institutional and community capacities, so that everyone can work together for a safer city where human dignity is respected.

This pillar proposes the development of environmentally effective mechanisms for creating a holistic environment for the city and its green areas, an environment that is connected to and supportive of human needs. This involves citizens at the outset in all aspects of strategic planning and recognizes the role nature can play in helping to resolve urban challenges. The goal is effective management and conservation of the natural infrastructure of the city.
CONTEXT OF THE CITY

SANTIAGO DE LOS CABALLEROS

RESILIENT

Santiago de los Caballeros City
Photo: Waldir Gomes

01

CONTEXT OF THE CITY
Urban reality

Santiago municipality, with the city of Santiago de los Caballeros as the municipal seat, is one of the municipalities that are part of Santiago Province. The Resilience Strategy framework addresses the territory from three approaches: Santiago de los Caballeros city, which is the city center; Santiago municipality, which is composed of various municipal districts; and the city and metropolitan area. The latter represents the conurbation of Santiago de los Caballeros city Pontifical with neighboring municipalities, such as Villa González, Tamboril, Puñal, and Licey al Medio, as well as the municipal districts of San Francisco de Jacagua, Hato del Yaque, La Canela, and Pedro García.

The topography of Santiago de los Caballeros is mainly a valley. The city sits between the Cordillera Septentrional and the Cordillera Central where the Yaque del Norte River crosses the valley. It has humid warm weather; annual average rainfall between 1,500 and 2,000 mm and average temperature between 25°C and 28°C (CDES, 2002).
HEALTH AND WELL-BEING

A→Z

Santiago Province has a rate of illiteracy of:

94.5%

which is greater than the country’s:

91.8%³

31.4% of the population is below the poverty line, and there are more than

33K dwellings in informal settlements, mainly located in vulnerable areas⁴.

AVERAGE distance in Santiago Province from housing areas to the closest hospital is

4.3 Kilometers⁵

The probability of domestic violence during a person’s life is

69.4%

The level of trust in the police department is low, with only

26% of citizens reporting that they feel safe⁸.

142 vulnerable communities live near 3 rivers, 6 streams and 14 gullies. Out of those 142, 11 are at the Yaque del Norte River⁹.

In 2007 after Hurricanes Noel and Olga, 2,355 cases of leptospirosis, registered, with a mortality rate of

24.8% per one hundred inhabitants, the highest in the last 5 years⁷.

12 The homicide rate is moderate per 100,000 residents.

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26% of citizens reporting that they feel safe⁸.

Vulnerable communities live near 3 rivers, 6 streams and 14 gullies. Out of those 142, 11 are at the Yaque del Norte River⁹.

The industrial sector’s role in the economy of the city, the municipality, and the province is critical to generating 48,000 direct jobs and the movement of about 30 million RD$ per week.

Santiago de los Caballeros metropolitan area has a population of 852,361 residents, corresponding to 37% of the province’s companies, employing 16% of all workers. Santiago provides between 15% and 18% of the GDP of the Dominican Republic.

12. CDES (2010).
INFRASTRUCTURE AND THE ENVIRONMENT

At the sub-basin area about 29.4/tons/day of solid waste from Santiago urban area are deposited, estimated over a total of 58,000 residents located at the gullies surroundings.

It is expected that 200 tons of organic waste are used to produce fertilizer.

The city collects 850 tons of waste daily.

The recycling plant has the capacity to process 600 tons of waste daily.

The Yaque del Norte River is 308 km long, 11 km pass through Santiago, with an average volume of 19.5 m³/sec.

Within the river’s basin there are 40 Municipalities and the river are a primary source of water for the agricultural sector and for livestock, industrial, and domestic uses.

The level of the city carbon dioxide emissions is 3.32 tons CO₂e per capita (2013), slightly above the national level of 3,133 ton. CO₂e / hab. per capita in year 2000 is also a little higher than Latin America’s and low when compared to developed countries.

Industry is the main pollutant, 41%, The second is mobility, 21%.

Santiago de los Caballeros has green areas, with an average of 20 hectares for every 100,000 residents (73.2 ha / 100,000 inhabitants), if the land of the old airport is considered, there are only 6.2 hectares of recreational areas for every 100,000 residents (8.6 ha/100k inhabitants).

7 to 12% of waste processed at the plant is fully exploited.

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LEADERSHIP AND STRATEGY

The lack of long-term planning has resulted in the fact that 13% of the dwellings in the city are not in compliance with the habitability standards defined by the country. Of this percentage, the majority are dwellings in at-risk areas.

Santiago de los Caballeros urban sprawl grew at an alarming rate of 7.6% from 1999 to 2004, 2.17% from 2004 to 2010, and 3.13% from 2010 to 2014.

The election participation rate as of 2010 in Santiago Province is 52.3% compared to 57.2% at the national level.

During the year 2010, took place 64 social demonstrations in Santiago Province, according to Observatory for Dominican Politics.

22. CDES (2010).
23. Regional Zoning Plan of Santiago.
26. SANTIAGO SOLIDARIO
27. The Socioeconomic Group (GSE) of homes is built from a series of variables such as standard items present in the home (TV set, stove, telephone, washing machine, refrigerator and automobile), degree of sanitation in the dwelling (presence of WC and water from a water line), and the head of household’s level of schooling.
28. Includes high-risk areas due to social or natural events.
02
100 RESILIENT CITIES INITIATIVE

Boulevard of the artists
Photo: José Bencosme
URBAN RESILIENCE

100RC has defined urban resilience as “the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kind of shocks and stresses they experience.”

The 100 Resilient Cities (100RC) initiative, funded by the Rockefeller Foundation, was created in 2013 on the 100th anniversary of the Rockefeller Foundation and in response to three trends of the 21st century: urbanization, globalization, and climate change. 100RC is devoted to helping cities in all parts of the world to become more resilient to the physical, social, and economic challenges that have an increasing importance.

This initiative supports the adoption and incorporation of a resilience view that includes not only acute shocks, such as earthquakes, floods, and disease outbreaks, but also chronic stresses that weaken the structure of a city on a daily basis or in a cyclical manner. Examples of such stresses are high unemployment rates, an overloaded or poor public transportation system, endemic violence or chronic shortages of food and water. By addressing both shocks and stresses, a city can better respond to adverse events, adapt, and have a greater capacity to offer basic functions to its residents in good and bad times.

RESOURCES AND BENEFITS

1. Chief Resilience Officer
2. Technical Assistance
3. Access to tools and services
4. Membership to 100RC network

Member cities of the 100RC initiative have the following resources and benefits that will aid each in creating a resilience roadmap:

1. Financial and logistic support to establish a new and innovative position in the Municipal Government: A Chief Resilience Officer (CRO), who will lead the resilience efforts of the city.
2. Technical assistance from strategic partners so that the Resilience Department can lead stakeholders in developing a strategy that will serve as a resilience guide for the city.
3. Access to toolkits, service providers, and collaborators from the private, public and non-profit sectors able to aid cities in developing and implementing their resilience strategies. Some of the current “platform partners” include data analysis companies, insurers, architects, and energy experts. Cities also have access to a service catalogue available through an online platform.
4. Membership in the 100RC Network, a global network of cities where Chief Resilience Officers are able to share best practices, solve issues jointly, and learn from each other and other resilience experts.

100RC not only intends to help individual cities to become more resilient, but also to facilitate the creation of a resilience development global practice.

The 100RC Resilience Strategy Process is a 6- to 9-month effort led by the CRO to develop a resilience road map for the city and create a set of potential initiatives.
THE MEANING OF SANTIAGO DE LOS CABALLEROS RESILIENT

The Santiago de los Caballeros Resilience Strategy is grounded on a study of natural and man-made vulnerabilities as well as, on the opportunities arising from development needs, the capacity to adapt, and the potential for reinvention at a local government level. The resulting product of this process is the ability to respond to major acute shocks and chronic stresses in a multidisciplinary, interinstitutional manner that spans across all sectors of the city. The work methodology incorporates a resilience lens for the effective planning and building of the territory.

Santiago de los Caballeros, the main city of Cibao region and the second largest city of the Dominican Republic, has a strategic location 30 kilometers away from one of the largest trade ports, Puerto Plata. For years, it has been the city that receives people from the country. It is also characterized as an important industrial development area, not only for the country but for the region. The Yaque del Norte River, which crosses the city, is an urban asset with the potential to transform the city of Santiago de los Caballeros must respond.

The city is located at the Hispaniola fault of the Cordillera Septentrional, translating into an unpredictable risk of earthquakes. Moreover, for years the Yaque del Norte River has been neglected, becoming a dumping ground for solid and liquid waste that is undermining the health and potential of this natural water body.

Santiago de los Caballeros Resilient means that the city is prepared to go forward after natural disasters such as earthquakes and floods. It must also create a dynamic economic environment that is inclusive, in which opportunities exist for everyone. The creativity and cultural pride of its people are of paramount importance, and the city must capitalize on the economic benefits that are possible for all from the environment, tourism, and river transportation.

Making resilience the overarching principle of city planning will enable integrated, sustainable, and beneficial development for all citizens in the short, medium, and long term. The payoff, under this resilience lens, will be a deeper sense of belonging and commitment to a Santiago de los Caballeros that is facing the future in a safe, robust, reflexive, integrated, inclusive, redundant, and resourceful manner.
CITIES IN THE NETWORK AND REFERENCES FOR SANTIAGO DE LOS CABALLEROS

1. Atlanta, USA

2. Miami, USA

3. Quito, Ecuador

4. Santiago de Chile, Chile

5. Santa Fe, Argentina

6. Paris, France

CITIES that have referenced THE STRATEGY

1. Accra
2. Amman
3. Athens
4. Barcelona
5. Belgrade
6. Bengaluru
7. Boston
8. Cali
9. Chennai
10. Chicago
11. Dallas
12. Dayang
13. Huangshi
14. Juzan
15. Kigali
16. Lisbon
17. London
18. Milan
19. Montreal
20. Paris
21. Portoviejo
22. Quito
23. Ramallah
24. Río de Janeiro
25. Santiago de los Caballeros
26. Santiago Metropolitan Region
27. Singapore
28. Si Ratanakiri
29. Tamsui
30. Taipei
31. Tokyo
32. Toronto
33. Vancouver
34. Washington DC
35. Yiwu

Rounds

1st
2nd
3rd
TOOLS AND METHODOLOGY

For a consistent exploration of the meaning of resilience by cities around the world, 100RC promotes a framework that enables each city to analyze its own data and articulate its challenges and opportunities from a resilience perspective.

The City Resilience Framework, or CRF, prepared by the Rockefeller Foundation and Arup29 provides a common language that enables cities to share knowledge and experiences. This CRF articulates the concept of urban resilience in an accessible manner and enables reporting on urban planning projects and city investments based on measurable evidence.

The CRF is composed of 4 dimensions, 12 factors, and 52 indicators that help articulate the processes and capacity the city has for resilience building. The CRF represents the resilience of a city and its capacity to face a wide range of shocks and stresses. This framework provides a lens through which the complexity of a city may be understood and is an aid in assessing its recovery capacity. The CRF helps cities identify critical areas and design initiatives and programs to improve their resilience capacity.

The City Resilience Framework is composed of:

- 4 dimensions
- 12 factors
- 52 indicators

29. Arup is a multinational professional services firm headquartered in London that provides engineering, design, planning, project management, and consulting services for all aspects of the built environment.
In the extensive research conducted by the Rockefeller Foundation and Arup to develop the resilience framework, a set of qualities were identified that describe the behavior or performance of resilient systems that enable them to withstand, respond, and adapt more readily to shocks and stresses. The following qualities determine the manner in which the systems proposed in the actions introduced in the Resilience Strategy address potential acute shocks and chronic stresses, including how these systems contribute to creating a resilience framework.

### Quality: Reflective
- It uses past experiences to make informed decisions about the future and to modify its standards and behaviors.

### Quality: Resourceful
- It is able to find different ways to use resources during a crisis in order to meet its needs or to achieve its goals.

### Quality: Robust
- It has well-conceived, well-built and well-managed physical assets that anticipate potential failures in their systems.

### Quality: Redundant
- It identifies capacities for reserves or replacements created specifically to adapt to interruptions of, extreme pressures on, or increases in demands on its systems.

### Quality: Flexible
- It has the capacity to adopt alternate strategies in response to changes in circumstances or a sudden crisis.

### Quality: Inclusive
- It stresses the need for wide consultation with various stakeholders on the city’s decisions to ensure collaboration and support.

### Quality: Integrated
- It fosters alignment of all city systems with decisions and ensures that investments support common objectives.
The development and implementation of the Santiago de los Caballeros Resilience Strategy is a unique opportunity to design innovative, collective and creative solutions that will enable the city and its communities to be better prepared to respond to acute shocks, overcome stresses, address current issues, and face future challenges. The 100RC proposal helped develop the city’s Resilience Strategy with a holistic and integrated approach that encouraged the participation of key actors in Santiago de los Caballeros, a broad range of regional institutions and provincial departments of the Central Government, the private sector, the academic sector, and civil society.

The first phase of the strategy development process began with the creation of an inventory of actions that could potentially build resilience and a review of the city’s physical assets. Using the 100RC assets and risk tool, an analysis was made of how shocks and stresses on Santiago de los Caballeros could affect the city. In addition, as part of the validation process, 250 Santiago citizens were surveyed and their perceptions of the current status of the Santiago urban zone was compiled. A perception workshop was also conducted in which more than 60 people studied factors that influence the city’s resilience. The results were reported and summarized in the Preliminary Resilience Assessment (PRA), which was subsequently validated by the Resilience Committee. The Resilience Committee then determined a resilience baseline for Santiago de los Caballeros, which includes the threats the city faces and its strength and capacity for building resilience.

The consensus and information consolidation that took place in the first phase made it easier to start the second phase with a unified view of a resilience approach that would foster innovation. Starting with the Municipal Development Plan developed by Santiago City Hall to respond to the short-term needs of the city, some of the other plans and projects consulted were the National Development Strategy, Santiago’s Strategy Plan, Santiago Sustainable City ICESBID, APEDI development projects, Santiago Solidario projects, CARITAS projects, VOICES initiatives projects, and the Santiago de los Caballeros Basin Plan.

The CRO conducted interviews with officials, technical staff, and key stakeholders in the metropolitan region, and she organized 6 participatory workshops in which 59 representatives from all sectors of the city were invited to prioritize cross-functional and feasible actions.
For the development of the Resilience Strategy, the best practices of other cities in the 100RC network were analyzed. In addition, international exchanges, such as the 100RC network exchange at Santiago de Chile for cities with urban rivers, and focus groups to validate actions also played a role. As a result, the Strategy Santiago de los Caballeros Resilient, and its goals and the actions presented in this document, are the result of contributions by all the stakeholders in the community who engaged in this work. Six participatory workshops on the pillar topics were conducted in January 2018 at Santiago de los Caballeros. They brought key stakeholders together to assess and prioritize, through a resilience lens, those actions with the greatest feasibility and the most potential for contributing to resilience.
One of the offerings of the 100RC initiative is an international gathering led by Chief Resilience Officers that focuses on addressing common challenges. This exchange offers the CROs and their teams an opportunity to develop relationships among themselves and to share the ideas and experience gained from using their cities as living laboratories for resilience strategies and their implementation. These international meetings serve as a learning and solutions distribution channel that allows CROs to share and communicate the needs of their cities to the public and private sectors and then return home with new knowledge and ideas upon which they can act. Meanwhile, 100RC works to publicly share their knowledge and experience, so that cities in and out the 100RC network can learn best practices for building resilience.
This inclusive process made the most of the existing knowledge and projects within the community. It acknowledged the strengths and capacities of the city and accessed new information sources to enrich the analysis and identify new stakeholders, potential partners, and projects. And while this participatory process provided a strong foundation for the Santiago de los Caballeros Resilient Strategy, it also offered an opportunity to establish new and closer relationships among the various departments of Santiago City Hall. The process spanned institutions and disciplines, and resulted in everyone becoming focused on a common target—urban resilience.

Santiago de los Caballeros has incorporated the Resilience Office into the City Hall organizational chart, made the concept of resilience part of the Municipal Regional Zoning Plan, and created a Resilience Committee to consult and advise the city.

The committee is composed of key representatives from various agencies of the Municipality, city officials, and members from the private and public sectors and civil society.
Monument to the Heroes of the Restoration
Photo: José Bencosme

HISTORY OF RESILIENCE

03

RESILIENT SANTIAGO DE LOS CABALLEROS
Santiago de los Caballeros has survived acute shocks throughout its history.

1495
A FORTRESS WITH THE NAME OF SANTIAGO
(currently San Luis fortress) erected by Christopher Columbus at the Yaque del Norte riverfront.

1562
A STRONG EARTHQUAKE DESTROYS VILLA DE SANTIAGO and its inhabitants are trapped under the rubble.

1775
STRENGTHENING CHARLES III’s attempts to establish a fortress at Yaque del Norte.

1783
THE CITY IS DESTROYED AGAIN BY STRONG EARTHQUAKES and it resettles at the Yaque riverfront.

1805
HAITIAN TROOPS PLUNDER AND DESTROY THE CITY and displace the inhabitants.

1842
PART OF POPULATION DIES IN A STRONG EARTHQUAKE, and colonial architecture buildings are lost.

1844
Independence is consolidated during the BATTLE OF 30 MARCH.

1863
SANTIAGO IS BURNED AND DESTROYED ALMOST COMPLETELY to expel the Spaniards.

1946
ANOTHER EARTHQUAKE OF 8.1 DEGREE MAGNITUDE affects the main church and the city.

1961
INTENSE MIGRATION FROM THE COUNTRYSIDE TO URBAN CENTERS causes critical in population and sudden extension of urban sprawl.

1979
HURRICANE DAVID, CATEGORY FIVE causes 2,000 deaths, and there was river overflow all over the country.

1998
HURRICANE GEORGE CATEGORY THREE, HTS ISLAND, and 1,000 people die; rainfall occurs at Cordillera Central.

2003
EARTHQUAKE OF 6.4 MAGNITUDE has its epicenter in Cordillera Septentrional.

2007
HURRICANES NOEL AND OLGA LEFT
- 87 dead
- 64,096 evacuated
- 34,480 disaster victims
- 43 disappeared
- 1,526 rescued
- 6,896 homes damaged

2017
HURRICANES IRMA AND MARÍA LEFT
- 80,000 displaced people
- 1,752,415 with no drinking water
- 128 aqueducts out of service
- 350,000 clients without electricity
- RD$3,000 million in damages

From its founding in 1495 by Admiral Christopher Columbus, Santiago de los Caballeros has a history of events that have tested its capacity for resilience. The city has faced acute natural shocks and resurfaced again and again due to the strength of its people. It has even changed its geographic location to face and respond to adverse events. The timeline shows the most powerful events that have made Santiago de los Caballeros and its residents resilient.
Santiago de los Caballeros has experienced acute shocks and chronic stresses throughout its history resulting in a city plagued with social inequity, scattered services, growing natural and man-made challenges.

During the first phase of the Resilience Strategy process, the main shocks and stresses that have affected and continue to affect the city were identified through perception surveys and the 100RC Assets and Risk Tool. In the perception study conducted in 2015 as part of the Preliminary Resilience Assessment of Santiago de los Caballeros, 145 people were interviewed, and they identified the shocks and stresses of greatest concern for various sectors of Santiago de los Caballeros.

The results of the surveys conducted in the first phase identified the hydrometeorological risks aggravated by climate change, such as acute floods and extreme droughts, as the main shocks. Infrastructure failures, earthquakes, and disease outbreaks were also identified.

**Santiago de los Caballeros h a s experienced acute shocks and chronic stresses throughout its history resulting in a city plagued with social inequity, scattered services, growing natural and man-made challenges.**

A huge threat to sprawling and vulnerable Santiago de los Caballeros lies in its economic growth model. The economy of the city greatly depends on industry and trade as the basis for its economic development. However, these sectors directly or indirectly contribute to the degradation of the city’s urban green infrastructure, whether due to proximity, production methods, improper handling of raw materials, or waste dumping. In addition, the demand from these sectors for cheap labor provided by people emigrating from rural areas and relocating in zones with greater natural risks further impacts the green infrastructure.

The accelerated population growth and unregulated expansion of the territory unleashed a false perception of opportunities and opened the door to unemployment, marginality, violence, citizen insecurity, and the inability of municipal authorities to provide basic services to the people. From its inception, Santiago de los Caballeros has been forced to adapt and respond to a host of unexpected events and to reinvent itself each time.

**SHOCKS and Stresses**

**The city developed with no urban planning or land regulation, which has triggered a series of sudden, powerful events that have weakened the capacity of the territory to protect the quality of life for its citizens.**

**SHOCKS** are sudden events.

They may be **NATURAL** (fires, earthquakes, floods) or **SOCIAL** (civil unrest, economic crisis, among others).

**Acute Shocks Revealed**

**From the 100RC Assets and Risk Tool**

- **Floods**
- **Infrastructure Failures**
- **Earthquakes**
- **Disease Outbreaks**
- **Tropical Storms/Hurricanes**
- **Extreme Drought**

**From Perception Surveys**

- **Earthquakes**
- **Disease Outbreaks**
- **Tropical Storms/Hurricanes**
- **Extreme Drought**
- **Floods**
The team assessed the risk level posed by shocks to the city using the 100 Resilient Cities Assets and Risk Tool, which was also used as part of the Preliminary Resilience Assessment of Santiago de los Caballeros. The risk level was measured relative to the probability of an event occurring in the future and its maximum consequence.

As the two risk assessment activities revealed, for Santiago de los Caballeros the shocks presenting the highest risk are severe storms, disease outbreaks, earthquakes, floods and chronic diseases.
In addition, the surveys identified violence, social inequality, unemployment, informal urban settlements at water risk areas, and noise contamination as main chronic stresses.

Interviewees also identified physical stresses related to lack of access to infrastructure and services in the most vulnerable neighborhoods of the city as well as the obsolescence and inadequate redundancy of such infrastructure. Mobility was another issue identified by interviewees.

Lack of space for pedestrians and non-motor mobility are a permanent pressure that limits a large percentage of the population from walking in the city and from using bicycles as a means of transportation and recreation. Adding to this stress is the poor lighting of public spaces, streets, and avenues, which is a challenge that considerably increases people’s perception of insecurity.

**Stresses**

are factors that add periodic pressure to a city such as a drought, water shortages, gender violence, high unemployment rate, and poor public transportation.

**Chronic Stresses Revealed**

**From the 100RC Assets and Risk Tool**

- Urban development and informal dwellings out of control
- Violence and social inequity
- Unemployment and lack of economic development
- Lack of spaces for social cohesion
- Water supply shortages
- Insecurity
- Management of liquid and solid waste

**From Perception Surveys**

- Crime
- Management of liquid and solid waste
- Traffic jams
- Unemployment
- Noise contamination
04
CONSTRUCTION OF RESILIENCE

Los Pepinos, City Mural Art
Photo: María Isabel Serrano
ACTION PRIORITIZATION PROCESS

The work process to build this strategy took as its starting point a review of 13 documents. Seven of them are studies and action plans for the city, from which 500 actions were identified; the other six documents relate to public policy and the laws governing the territory. A series of filters were used to prioritize the actions from these documents. The filters are tools designed to identify the actions that contribute the most to building resilience based on their resilience qualities, the availability of funds for their implementation, the will of the actors in charge to execute them, and the resilience dividends they provide.

The first filter consisted of an exploration of actions responding to challenges identified in the surveys and perception workshops of the first phase, in which shocks and stresses of the city were detailed. Out of the 500 actions from the seven documents, 220 were selected and then grouped per the challenges to which they responded with the aim to create potential goals for each group. This process concluded with a hierarchy matrix in which actions were grouped by tentative pillars according to the challenges they would address. Lastly, the actions were inserted in the ideas bank of the Opportunity Assessment Toolkit (OAT Opportunity Assessment Tool). This tool responds to questions such as these: How many challenges does this initiative solve? What resilience qualities does it present? Who is in charge? Does it have a budget? An important result of this last filter is that 90% of the actions have a budget that can be implemented.

The second filter enabled a reduction of the hierarchy matrix to 120 actions that build resilience after aligning the hierarchy matrix with the City Hall Municipal Development Plan, strengthening the capacity to implement the strategic actions. An interesting finding resulted from this: A great portion of the Municipal Development Plan matches the resilience goals identified during the process.

For the fourth filter, the three multi-sector focus groups validated the 79 actions. The groups were composed of key stakeholders: representatives from the academic world, governmental institutions, organized civil society, non-profit organizations, and the entrepreneurial sector. The stakeholders were divided into groups based on their expertise. Thus, there was a group for pillar A, a second group for pillars B and C, and a third multi-sector group for pillar D. The fourth focus group was organized with all the directors and managers of the City Departments. Five actions were the result of the prioritization exercises during these four workshops.

The fifth filter, consisted in the validation of the resulting 51 actions from the fourth filter and their socialization with the City Resilience Committee, which defined 45 strategic actions that can build resilience for Santiago.

As part of the socialization and empowerment work of the various stakeholders, the Chief Resilience Officer held 18 individual meetings with directors from City Hall as well as 26 meetings with stakeholders from civil society, such as Santiago Solidario, Sociedad Ecológica del Cibao, Santigang Somos Todos, Tú eres el País, Santiago Aqueduct and Sewage Council, Provincial Department of the Environment and Natural Resources, Provincial Department of the Ministry of Women, Santiago Strategic Development Board, Núcleo de Apoyo a la Mujer, Civil Defence, Dominican Foundation for Risk Management, and the Tax Protection Office.

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32. Excel-designed tool to filter actions that build resilience in a four-stage process: ideas bank, resilience filter, resilience detail, and short list of resilience actions.
## Construction of Resilience

### Resilient Santiago de los Caballeros

#### Actions

<table>
<thead>
<tr>
<th>500 Actions</th>
<th>220 Actions</th>
<th>120 Actions that build resilience</th>
<th>79 Actions aligned with territory policies</th>
<th>51 Potential Actions</th>
<th>45 Strategic Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Documents</td>
<td>Hierarchy Matrix</td>
<td>Align with territory policy</td>
<td>Cross-mapped with municipal action plan</td>
<td>Finding</td>
<td>Resulting from the final validation by the resilience committee</td>
</tr>
</tbody>
</table>

### 1st Filter

- Review of literature that responds to the challenges identified as priorities.

### 2nd Filter

- OAT - Ideas Bank
  - How many challenges does this initiative solve?
  - What are the resilience qualities it presents?
  - Who is in charge?
  - Does it have a budget?

- 90% of the actions have a budget.

### 3rd Filter

- Reviewed:
  - Strategic Plan Santiago 2020
  - ICES-BID Action Plan
  - Basins Plan
  - Municipal Development Plan
  - National Development Strategy
  - Yaque del Norte River Flood Map

- Documents:
  - OAT - Ideas Bank
  - Hierarchy Matrix
  - 6 Documents

### 4th Filter


### 5th Filter

- Validation by four multi-sector focus groups and a focus group with municipal officials.
- Validation by the Resilience Committee.
- Validation of the Municipal Action Plan matches the resilience goals identified during the process.

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**Diagram of the Selection Process for the Final 45 Strategic Actions**
Adaptable and Robust Santiago in the Face of Disasters

**GOAL A1.** Invest in infrastructure to improve the response to disasters.
- A1.1 Improve coverage of the stormwater and sewage infrastructure.
- A1.2 Enhance and improve the collection and distribution system for potable water.
- A1.3 Enhance and improve the waste water treatment system.
- **GOAL A2.** Improve the capacity for adaptation and mitigation in the face of disasters.
  - A2.1 Broadcast and promote the micro-zoning study and seismic threat maps.
  - A2.2 Institutionalize education on risk management in the face of disasters.
  - A2.3 Reorganize and modernize Santiago’s Fire Department.
  - A2.4 Organize and train communities on natural and man-made threats.
  - A2.5 Develop plans for flood mitigation and relocation of vulnerable settlements.
  - A2.6 Improve the city’s infrastructure to support emergency response.
  - A2.7 Train groups that will specialize in earthquake response.
- A2.8 Design an immediate action program for emergency control and mitigation of natural disasters.
- **GOAL A3.** Strengthen the land use regulation and taxying mechanisms with a sustainability and resilience approach.
  - A3.1 Implement a Municipal Regional Zoning Plan with a lens of risk management and resilience.
  - A3.2 Regulate the use of land for and the building of industrial waste water treatment plants (PTAR).

The result of the filters and the validation process is the organization of strategic actions prioritized in 4 pillars, with a total of 10 goals that correspond to them and their actions.

**GOAL B1.** Invest in human capital.
- B1.1 Support the literacy plan “Quisqueya Aprende Contigo”
- B1.2 Forge an alliance with Infotep to develop training centers.
- B1.3 Create a municipal scholarships program.
- B1.4 Promote city laboratories, technological innovation, and jobs in R&D.
- B1.5 Develop strategic alliances in science and technology with universities and companies to create a job bank.
- B1.6 Invest in creation of the Trust Fund of Santiago.
- **GOAL B2.** Develop tourism in Santiago to foster its history, culture and a sense of belonging.
  - B2.1 Rehabilitate the Historic Downtown of Santiago de los Caballeros.
  - B2.2 Develop a Municipal Cultural Agenda.
  - B2.3 Promote Santiago as a tourist destination.
  - B2.4 Refurbish the municipal markets.
  - B2.5 Comprehensively transform Yaque Lodge.
  - B2.6 Develop a Special Plan for Peri-Urban Agriculture and Family Orchards.

**GOAL C1.** Strengthen citizen security by improving security infrastructure and services, and by involving citizens in security processes.
- C1.1 Design and implement the municipal lighting project.
- C1.2 Implement the Citizen Observatory Project.
- C1.3 Strengthen the Municipal Police Department.
- C1.4 Creation of committees for Neighborhood Protection.
- **GOAL C2.** Articulate actions to foster investment in health, education, and gender policies.
  - C2.1 Establish a gender policy at City Hall.
  - C2.2 Articulate how municipal investments in health, education, and gender are to be managed.
  - C2.3 Validate and assess the annual investment plan in health, education, and gender.
  - C2.4 Develop an educational campaign for control and reduction of noise contamination at the local level.

**GOAL D1.** Implement the sustainable, comprehensive management of solid waste.
- D1.1 Develop a comprehensive waste management plan.
- D1.2 Enact legislation to execute Decree 126-09 as it relates to management and collection of biomedical waste.
- D1.3 Strengthen the technical abilities of Rafey Landfill Personnel.
- **GOAL D2.** Implement the “Vive el Yaque” Master Plan.
  - D2.1 Prepare and launch a strategy for bicycle.
  - D2.2 Build the Yaque lookout.
  - D2.3 Build the ecological corridor of Yaque del Norte.
  - D2.4 Build Parque Norte and the Nicolas Vargas Reserve.
- **GOAL D3.** Increase land for green zones and public spaces as well as to improve the existing ones.
  - D3.1 Design a master plan for the environmental restoration of the Gurabo River.
  - D3.2 Develop a management plan for parks and public spaces.
  - D3.3 Promote use of Santiago de los Caballeros Central Park.
  - D3.4 Implement the metropolitan green infrastructure master plan.
  - D3.5 Implement the reforestation and conservation program for existing carbon sinks.
CHALLENGES ADDRESSED through the pillars

ADAPTABLE AND ROBUST SANTIAGO IN THE FACE OF DISASTERS

PROSPEROUS, INNOVATIVE, AND CULTURALLY VIBRANT SANTIAGO

SAFE, EMPOWERED AND INCLUSIVE SANTIAGO

HEALTHY, ECO-EFFECTIVE AND ECOLOGICALLY SENSITIVE SANTIAGO TO THE YAQUE RIVER

Earthquakes
Floods
Unplanned growth
Lack of regulation regarding land use
Water shortages
Informal settlements
Poor infrastructure
Quality of critical services
Unemployment
Lack of economic diversification
Social integration
Abandonment of historic districts
Loss of cultural identity
Noise contamination
No sense of belonging
Gender violence
Crime and criminality
Insecurity of citizens
Liquid contamination
Solid waste contamination
Social cohesion

PILLAR

CHALLENGES
The Resilience Strategy consists of 4 pillars, 10 goals, and 45 actions defined during the strategy development process. They are based on the discovery areas identified during the Preliminary Resilience Assessment and its analysis of plans, projects, and programs, and on multi-sector consultation with key stakeholders in Santiago de los Caballeros.

Each pillar describes the challenges and the context in which the work of the Resilience Strategy is to be undertaken. Next, the pillars and the goals for each are defined, and the actions are organized under these. In addition, a description and a resilience benefit for each action are presented. Also stated are the action type, status, implementation time, individual in charge, and other actors involved. The Resilience Strategy importantly also proposes monitoring metrics for each action, which is a first step in monitoring the implementation process for these actions.

RESILIENT SANTIAGO DE LOS CABALLEROS

4 pillars
Action lines that group actions according to which they respond

+ 10 goals
Measurable objectives that are used to track progress in achieving these goals

+ 45 actions
Actions that the city and its partners will implement to achieve these goals

33. The Preliminary Resilience Assessment (PRA) is the resulting summary of the work conducted in workshops, prior studies and surveys reviewed by the Resilience Committee during Phase I. The PRA includes threats to the city, its strengths, and its capacity for building resilience.
Adaptable and Robust Santiago in the Face of Disasters
The first pillar of the Resilience Strategy is the need to strengthen infrastructure, tools, and mechanisms to build a city that is able to respond, adapt, and grow in a resilient manner in the face of natural disasters.

Santiago de los Caballeros has a well-documented seismic history of several earthquakes of great magnitude that have caused the city to be rebuilt many times and even to move its location due to geological faults. To the northeast of the city, crossing through Gurabo and Jacagua and next to the Cordillera Septentrional, is the currently active Northern Fault (Septentrional). To the Southwest is the Hispa-niola Fault, which is potentially active. This natural element is part of a fault system that historically has created telluric movement along the island of around 7.2 degrees' magnitude on the Richter scale (Franco y Peña, 2003b). Thus, per the Sustainable City Santiago de los Caballeros Plan (ICES, 2015), records of the last 500 years show that about 10 events have caused considerable damage on the island. Santiago de los Caballeros has grown towards the geohazard zone there is the high probability fault areas, and in the largest vulnerability zone there is the high probability of floods and collapses (Septentrional). To the Southwest is the Hispaniola Fault, which is potentially active. 13% of homes fail to comply with the habitability standards defined by government most of these homes are dwellings located in risk zones. Santiago de los Caballeros has grown towards the geological fault areas, and in the largest vulnerability zone there is the high probability of floods and collapses. The lack of regional planning, the accelerated growth caused by urban development, and the lack of a regulatory framework for land use significantly increase the risk of natural disasters. 13% of homes fail to comply with the habitability standards defined by government most of these homes are dwellings located in risk zones.

Another major challenge is the lack of capacity and resources to respond to emergencies. Notwithstanding the availability of institutions and entities that can provide aid, the lack of coordination and team work both for prevention and response is a vulnerability that must be addressed for emergency situations arising from natural disasters. At present, the one fire department station in Santiago de los Caballeros not only lacks the infrastructure to respond adequately to the city’s fire and rescue emergencies, but also suffers from the poor quality of its physical infrastructure.

34. The building of housing developments and housing areas near the Septentrional fault, together with the poor quality of the buildings, many of which (schools, hospitals and clinics, institutional buildings) were built before the first Seismic Code of 1979, increases the vulnerability of those who live there. The risks involved are high, especially when the buildings are built over clay or fill dirt soils. The study performed by Fundoger regarding the quality of Santiago buildings shows that about 80% of the schools in Santiago de los Caballeros are below the acceptable level and as such, may not properly withstand an earthquake.

35. By 1995 about 2.6 miles of pollutants (domestic and industrial) entered the Yaque River untreated through eight water sources and their tributaries (streams and gullies). By 2010 this was reduced to 1.46 miles. The numeri suggest that the volume of untreated wastewater was reduced by 27% (PES, 2010).
ADAPTABLE AND ROBUST
SANTIAGO IN THE FACE OF DISASTERS

GOAL
INVEST IN INFRASTRUCTURE TO IMPROVE THE RESPONSE TO DISASTERS.

A1.1
Improve Coverage of the Stormwater and Sewage Infrastructure.

A1.2
Enhance and improve the collection and distribution system for potable water.

A1.3
Enhance and improve the waste water treatment system.

GOAL
IMPROVE THE CAPACITY FOR ADAPTATION AND MITIGATION IN THE FACE OF DISASTERS

A2.1
Broadcast and promote the micro-zoning study and seismic threat maps.

A2.2
Institutionalize education on risk management in the face of disasters.

A2.3
Reorganize and modernize Santiago’s Fire Department.

A2.4
Organize and train communities on natural and man-made threats.

A2.5
Develop plans for flood mitigation and relocation of vulnerable settlements.

A2.6
Improve the city’s infrastructure to support emergency response.

A2.7
Train groups that will specialize in earthquake response.

A2.8
Design an immediate action program for emergency control and mitigation of natural disasters.

GOAL
STRENGTHEN LAND USE REGULATION AND TAXING MECHANISMS WITH A SUSTAINABILITY AND RESILIENCE APPROACH

A3.1
Implement a Municipal Regional Zoning Plan with a lens of risk management and resilience.

A3.2
Regulate the use of land for and the building of industrial waste water treatment plants (PTAR).
**A1 ACTION A1.1**

**IMPROVE COVERAGE OF THE STORMWATER AND SEWAGE INFRASTRUCTURE**

**DESCRIPTION:**
City Hall will achieve greater stormwater and sewage coverage infrastructure in Santiago by 2020. Beginning with establishing sewage service in areas that are not currently served. At least 100 kilometers of built or refurbished lines are planned for this system, and will be mainly distributed at the northern, western, and northeast zones of the city. The goal is to improve the sewage system in the city to avoid floods during the rainy season, thus enabling the city to continue to function normally.

**RESILIENCE DIVIDEND:**
- It will resolve the city’s serious deficiencies with respect to rainwater management.
- It will ensure an efficient and effective management of rainwater from building runoff and runoff from the city’s road system, which is collected in the rainwater collection system.
- It will increase the permeability levels of Santiago soil, given that the rainwater sewage system will contribute to a more efficient rainfall water collection system.

**MONITORING METRICS:**
1. Percentage increase of stormwater drainage coverage.
2. Percentage increase of stormwater and captured by the sewage system.
3. Percentage of stormwater and sewage system that gets preventative maintenance.

**LEAD**
City Hall

**STAKEHOLDERS:**
Neighborhood boards, Municipal Public Works Direction.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

---

**100RC NETWORK RESILIENCE STRATEGY NEW YORK**

**EXPANSION OF GREEN INFRASTRUCTURE AND SMART DESIGN TO MANAGE STORMWATER**

The Environmental Protection Department will work with other agencies to institutionalize the management of rainwater when designing public properties, including streets, parks, school yards and public housing. The city will continue with the NYC Green Infrastructure Programme, including installation of landscaping with a bio filtration system to manage one inch or rainfall over 10% of weatherproof surfaces served by the combined sewage system. It will also study incentive programmes with owners to upgrade the rainfall water control.

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**A1 ACTION A1.2**

**ENHANCE AND IMPROVE THE COLLECTION AND DISTRIBUTION SYSTEM FOR POTABLE WATER**

**DESCRIPTION:**
Corasan will enhance the potable water collection and distribution system by the year 2020 resolving the marked deficit trend that endangers Santiago’s future supply of potable water, per studies on Yaque del Norte basin which have shown present and future hydrological challenges. In addition, Corasan has explored underground water availability deficits in order to ensure a strategic intervention on potable water. The Aqueduct and Sewage Board of Santiago (Corasan) will operate the financing for the construction of treatment plants and potable water infrastructure in Santiago Province with a loan guaranteed by Denmark through the Export Kredit Fond (EKF). To increase potable water distribution capacity, in a first phase the Cienfuegos water distribution system was built, and in the upcoming second phase, the system for Guarabo will be built.

**RESILIENCE DIVIDEND:**
- It will increase the supply of potable water for the population about 1.5 m3/s.
- It will reduce losses due to distribution.
- It will improve the quality of potable water by reducing contamination due to poor connections with the waste water infrastructure.
- It will improve the quality of life by giving people greater access to potable water.
- There will be a reduction of the diseases caused by polluted water.

**MONITORING METRICS:**
1. Number of sectors supplied with the enhanced and improved treatment plants and a potable water distribution system in Cienfuegos.
2. Percentage of the population included in the potable water system per year.

**LEAD**
Corasan

**TYPE:**

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

---

**Construction of Cienfuegos Aqueduct**

*Photo: Diario Libre*
**A1 ACTION A1.3**

**ENHANCE AND IMPROVE THE WASTE WATER TREATMENT SYSTEM**

**DESCRIPTION:**
Coraasan will enhance the waste water treatment system, such that, by 2020, Santiago de los Caballeros will have sanitary sewage and waste water treatment systems in the northern part of the municipality and in La Herradura. Residential, commercial, industrial activities and their supportive services produce significant amounts of waste water. This action will reduce the contamination levels created in gullies, rivers, and streams due to the direct discharge of waste water from these activities.

**RESILIENCE DIVIDEND:**
- It will increase the Coraasan waste water treatment capacity that currently is about 40% to above 80%.
- It will reduce the pollution of rivers, gullies, and streams.
- It will improve the quality of water from collection sources.
- It will improve the quality of green areas that are used for social cohesion.

**MONITORING METRICS:**
1. Construction of the waste water treatment plant in the Southern zone.
2. Construction of the waste water treatment plant at Los Salados.
3. Refurbishment of the existing facilities at the waste water treatment plant in El Embrujo.
4. Construction of sanitary sewage and collection systems in Rafey, the Southern Zone, Cienfuegos, Los Salados, and El Embrujo.

**LEAD**
Coraasan

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Central Government, BM, IBD, Japanese Cooperation Agency, Basins Council, CDES.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

---

**A2 ACTION A2.1**

**BROADCAST AND PROMOTE THE MICRO-ZONING STUDY AND SEISMIC THREAT MAPS**

**DESCRIPTION:**
Santiago City Hall will implement a public information campaign on the risks, causes, and potential consequences of a seismic shocks or earthquakes. This campaign will be shared with the city’s inhabitants and developers along with Santiago’s Land Use Plan to inform them and help reduce risk in the city. The campaign will also develop educational materials and training programs that will increase awareness of natural and man-made threats.

**RESILIENCE DIVIDEND:**
- It will prepare all members of the population to face seismic risks.
- It will empower people by spreading risk and resource information from the micro-zoning study.
- It will improve the city’s response capacity.

**MONITORING METRICS:**
1. Number of public educational centers that have received information and training regarding the seismic micro-zoning study.
2. Number of private educational centers that have received information and training regarding the seismic micro-zoning study.
3. Number of neighborhood boards that have received information and training regarding the seismic micro-zoning study.

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Santiago Solidario, CDES, General Education Department, CODIA.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**INSTITUTIONALIZE EDUCATION ON RISK MANAGEMENT IN THE FACE OF DISASTERS**

**DESCRIPTION:**
City Hall will seek to institutionalize education on risk management in the face of disasters at schools, universities, hospitals, and public centers through a collaboration agreement with universities, the Regional Education Department, and neighborhood board federations. This action aims to create among professors and community leaders more experts in disaster management. Santiago will have several experts trained and involved in educational programs regarding disaster management for prevention, mitigation, and response. By 2030, these trained experts will be designing informative materials on disaster management and disaster mitigation and response.

**RESILIENCE DIVIDEND:**
- It will accelerate disaster preparations to face the potential risks from natural disasters and multiply the number of disaster experts throughout the city.
- It will improve the city’s response capacity.
- It will empower Santiago’s citizens.

**MONITORING METRICS:**
1. Number of trained experts who educate on risk management every year.
2. Number of risk management training workshops against disasters per year.
3. Number of people who have taken the workshops annually.
4. Number of public centers involved.

**STAKEHOLDERS:**
- Santiago Solidario,
- CDES, Regional Education Department,
- CODIA,
- Neighbour boards,
- Universities.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**REORGANIZE AND MODERNIZE SANTIAGO’S FIRE DEPARTMENT**

**DESCRIPTION:**
City Hall will refurbish existing fire department infrastructure and facilities identified in the seismic behavior study as one of the weakest elements in the city’s physical infrastructure. In addition, the municipality will train firefighters through seminars, conferences, discussions, and meetings between fire department staff and specialists. This action will include procedures for prevention and arrangements to emergency response as well as the equipment needed to provide a proper response to emergency situations. City Hall will develop an ordinance to implement inspections and certification of building safety. The goal of this action is to ensure a better response in the city in the face of natural disasters.

**RESILIENCE DIVIDEND:**
- It will provide an infrastructure capable to respond in a robust manner before potential earthquakes.
- It will increase the response capacity by population coverage.
- It will ensure efficient work by firefighters facing shocks and stresses, both expected and unexpected of the city.

**MONITORING METRICS:**
1. Number of refurbished existing fire department infrastructure and facilities.
2. Number of seminars, conferences, discussions and gatherings of the fire department members with specialists on procedures for prevention and response to emergencies.
3. Percentage coverage of furniture, computing equipment, machinery and tools needed to provide a proper response to emergency situations per year.
4. Number of municipal ambulances refurbished and under maintenance.
5. Percentage of wage adjustments for fire department members.
**A2 **

**ACTION A2.4**

**ORGANIZE AND TRAIN COMMUNITIES ON NATURAL AND MAN-MADE THREATS**

**DESCRIPTION:**
Santiago has a Municipal Emergency Committee (CME) organized, working and certified before the National Emergency Commission (CNE) towards the end of year 2018 at each community identified as highly vulnerable in the face of natural and man-made disasters. To this end, a risk committee will be created at each community of the municipality deemed as highly vulnerable. The location of shelters and urban evacuation routes will be signaled; training workshops will be developed intended to prepare emergency plans at the municipality communities deemed as highly vulnerable and risk maps will be prepared for each community.

This action seeks to strengthen the most vulnerable communities empowering them on self-management of natural and human threats, to provide effective response enabling to reduce human and resource losses.

**RESILIENCE DIVIDEND:**
- It will empower the most vulnerable communities as preparation and response units at their area.
- It will prepare the population individually in the face of a seismic risk.
- It will improve the city’s response capacity.
- It will reduce municipal expenditure due to avoided economic losses

**MONITORING METRICS:**
1. Municipal Plan for Risk Management targeting the most vulnerable sectors per type of incident.
2. Formalization of CME to comply with Decree 147-02 regarding risk management.
3. Number of risk committees created in the city’s most vulnerable communities.
4. Number of risk committees certified before the National Emergency Commission.
5. Number of signposted shelters and evacuation routes.
6. Number of training workshops offered to the city’s most vulnerable communities.
7. Number of risk maps developed for highly vulnerable communities.

**STAKEHOLDERS:**
Santiago Solidario, Civil Defense, Red Cross, Government Office, Universities, Regional Education Department, Neighbour boards.

**LEAD:** City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**A2 **

**ACTION A2.5**

**DEVELOP PLANS FOR FLOOD MITIGATION AND RELOCATION OF VULNERABLE SETTLEMENTS**

**DESCRIPTION:**
City Hall will control human activities that may affect the water functioning, water quality, and clogging of the Yaque and Gurabo riverbanks to mitigate floods and relocate vulnerable settlements from hazardous areas. To achieve this, two breakwater walls will be built in two critical areas of Yaque del Norte River. City Hall will coordinate and execute the relocation of vulnerable settlements established near the Gurabo River, and develop and implement a clean-up plan for the riverbanks of both rivers to restore vegetation, and make improvements at the affected areas.

**RESILIENCE DIVIDEND:**
- It will improve the physical state of the dwellings of people living in vulnerable conditions.
- It will restore the basins of Yaque del Norte and Gurabo Rivers.
- It will improve the response capacity of the rivers in the face of floods.
- It will reduce human and economic losses when the rivers overflow.
- It will improve the environmental quality of the surrounding areas of both rivers.

**MONITORING METRICS:**
1. Number of tributaries treated annually.
2. Percentage of the annual reduction of vulnerability to floods in the city’s critical areas from installation of retaining and mitigation infrastructure.
3. Percentage of population relocated out of the areas along the Gurabo and Yaque Rivers.

**STAKEHOLDERS:**
Mimarena, MOPC, Neighborhood boards, CME.

**LEAD:** City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**A2.6 IMPROVE THE CITY’S INFRASTRUCTURE TO SUPPORT EMERGENCY RESPONSE**

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
MOPC, Central Government, CME, Dir. Municipal Public Works Direction, Civil Defense, Regional Education Department.

**AVAILABILITY OF FUNDS:**
Not required

**DESCRIPTION:**
City Hall will improve its infrastructure and expand the availability of resources to support emergency response. This action will ensure that strategic buildings, such as hospitals and schools that can serve as shelters and post-disaster strategic coordination and Civil Defense centers can continue to operate after an earthquake and can fulfill their functions.

**RESILIENCE DIVIDEND:**

- It will provide an infrastructure with the capacity to respond in a robust manner in the face of potential shocks and stresses.
- It will increase the response capacity throughout the population.
- It will ensure that the work of firemen facing shocks and stresses on the city, both expected and unexpected, is effective.

**MONITORING METRICS:**
1. Number of improvement projects to the physical structure of Children’s Hospital Arturo Grullón and Regional Hospital Cabral y Baez.
2. Number of improvement projects to the infrastructure of Santiago City Hall.
3. Number of schools with reinforced buildings per sector per year.

**STAKEHOLDERS:**
MOPC, Central Government, CODIA, Civil Defense, Santiago Solidario, Government Office, Fire Department, CNE, CME.

**AVAILABILITY OF FUNDS:**
Not required

**RESILIENCE QUALITIES:**

**A2.7 TRAIN GROUPS THAT WILL SPECIALIZE IN EARTHQUAKE RESPONSE**

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
MOPC, Central Government, CODIA, Civil Defense, Santiago Solidario, Government Office, Fire Department, CNE, CME.

**AVAILABILITY OF FUNDS:**
Not required

**DESCRIPTION:**
City Hall will recruit and train groups of professionals, technical experts, and volunteers to improve their disaster management efforts, and conduct an assessment of weakened or collapsed buildings. With this action, the city will empower rescue groups to act in a timely manner and will improve response capacity in areas with immediate needs.

**RESILIENCE DIVIDEND:**

- It will empower the population to respond effectively after an earthquake.
- It will increase citizen’s participation on risk management teams.
- It will improve local knowledge of disaster risk management.

**MONITORING METRICS:**
1. Number of trained professionals, technical experts, and volunteers per year.
2. Number of training workshops taught per year.

**STAKEHOLDERS:**
MOPC, Central Government, CODIA, Civil Defense, Santiago Solidario, Government Office, Fire Department, CNE, CME.

**AVAILABILITY OF FUNDS:**
Not required

**RESILIENCE QUALITIES:**

**100RC NETWORK RESILIENCE STRATEGY BANGKOK**

**TRAINING CENTER FOR DISASTERS**

The Training Center for Disasters will increase Bangkok’s emergency services capacities. It will create groups of technical experts on disaster management; in addition, it will have state-of-the-art equipment and support systems to offer practical training and knowledge to interested people and local and international agencies.
**ACTION A2.8**

**DESIGN AN IMMEDIATE ACTION PROGRAM FOR EMERGENCY CONTROL AND MITIGATION OF NATURAL DISASTERS**

**DESCRIPTION:**

Under this action, City Hall will appoint a Municipal Emergency Committee (CME) that will be organized, and certified before the National Emergency Commission (CNE) at the end of 2018 in each community identified as "highly vulnerable" to natural and man-made disasters. The city will also design a response program to ensure the safety of vulnerable populations to disasters and to reduce potential damages from disasters and to diminish potential losses from shocks and stresses. This program in highly vulnerable communities will also reduce the potential spread of diseases caused by natural and man-made disasters.

**RESILIENCE DIVIDEND:**

- It will improve the response capacity through risk planning and prevention.
- It will reduce the potential for the spread of diseases caused by natural and man-made disasters.
- It will increase the effectiveness of risk management by making the necessary resources, tools, and skills available.

**MONITORING METRICS:**

1. Number of communities receiving the benefits of the CME.
2. Number of communities implementing the disaster response program.
3. Percentage reduction of harmful effects on health due to natural disasters upon implementation of the program.

**LEAD**

City Hall

**TYPE:**

[ ] [ ] [ ] [ ] [ ]

**STATUS:**

[ ] [ ] [ ] [ ]

**PERIOD:**

A2

**STAKEHOLDERS:**

Civil Defense, Red Cross, Fire Department, Municipal Public Works Direction, UGAM, Community Affairs Direction, Sanitation Direction.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

Cruz Roja Dominicana

Photo: Marí Isabel Serrano

Yaque del Norte River

Photo: Luis Infante
**IMPLEMENT A MUNICIPAL REGIONAL ZONING PLAN WITH A LENS OF RISK MANAGEMENT AND RESILIENCE**

**DESCRIPTION:**
City Hall will develop a regional zoning legal framework by the end of 2018 with a risk management approach, product of the consensus between the City of Santiago and all the socioeconomic and academic sectors based on the proposal articulated by the City’s Land Use Plan (POT). The regulatory framework for land use for the municipality integrates the resilience lens with a guiding approach in planning, incorporating the Resilience office into the advisory team of the Land Use Plan. With this ordinance, the planning processes will be regulated, fostering a sustainable and resilient development of the territory.

**RESILIENCE DIVIDEND:**
- It will improve the quality of life of the population.
- It will control land growth in vulnerable areas and ecosystem protection zones.
- It will make the territory more robust.
- It will improve the quality of life of the inhabitants.

**MONITORING METRICS:**
1. Resilience Office appointed as part of the advisory team for the POT.
2. Resilience Lens incorporated in the POT ordinance.
3. POT is part of the Municipal Urban Planning Office.

**STATUS:**

**RESILIENCE QUALITIES:**

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**STATUS:**

**RESILIENCE QUALITIES:**

**AVAILABILITY OF FUNDS:** Not required
Prosperous,
Innovative
and
Culturally
Vibrant
Santiago

Title of mural: "Viva el Merengue" (Corner store Chala).
Artist: Omar Hernández
Photo: Robert Pérez
Ongoing migration from rural areas of people seeking a better quality of life requires an investment in eradicating illiteracy so that these demographic groups may fully participate in the economic growth of the city and not become a burden on the region. In contrast, Santiago de los Caballeros is host to substantially young, educated residents, and the home of many famous universities, and yet job training must be expanded in the municipality as must job availability. The existing job market does not meet the demand created by students who are graduating from the metropolitan universities and technical training centers. Much of the problem lies in the lack of permanent jobs and economic incentives for entrepreneurs to transform their ideas into concrete projects and there is not a centralized or formal job database to post job offerings for job seekers.

Economically speaking, Santiago de los Caballeros is the axis of progress for the northern and central regions of the country, and has a special influence on the national economy. The economy of the city of Santiago is mainly based on the production and sale of agricultural and livestock products, trade, banking, call centers, health services, and education. The industrial free zone of the city of Santiago hosts 23% of the country’s companies and produces 24% of its exports, and a total of 155 companies are headquartered in 15 industrial parks, that is, 30% of the country’s companies are located in the municipality. The primary direct employment driver is the trade and hotel sector, followed by the industrial sector, representing 29.2% and 18.3% of the employed population, respectively. However, for 2010 the percentage of employed people in the city was estimated to be 41.4% of the total population of Santiago municipality (ONE, 2010a), while employment by 2015 was about 54.6% of the employed population, per data from an ICES study (2015).

Santiago de los Caballeros has six important markets: the area of Hospedaje Yaque, La Placita, Mercado Central, El Modelo, Pekín, and Matadero Municipal. Not including Inespre Markets and the markets of Cienfuegos and Yagüita del Pastor, the remaining are operated by City Hall. Despite the poor quality of their infrastructure, these markets have a history of customs and traditions, and serve as distribution and purchasing centers for the whole region. This is a sector that continues to grow due to the boom in markets as tourist spots and the gastronomic tours in cities that depend on tourism. However, the physical condition of these markets is an environmental problem for the city, given their continuous generation of organic waste, which aggravates the markets’ already poor sanitary conditions.

The limited number of jobs available, in addition to low diversification in the economic sectors on which the municipality depends, creates pressure that must be addressed to open up new opportunities. The historical, cultural and environmental potential of Santiago de los Caballeros should be capitalized on to create a new sector, one that promotes Santiago de los Caballeros as a cultural tourism destination.
PROSPEROUS, INNOVATIVE, AND CULTURALLY VIBRANT SANTIAGO

**GOAL**

**B1** INVEST IN HUMAN CAPITAL

B1.1 Support the literacy plan “Quisqueya Aprende Contigo”

B1.2 Forge an alliance with Infotep to develop training centers.

B1.3 Create a municipal scholarships program.

B1.4 Promote city laboratories, technological innovation, and jobs in R&D.

B1.5 Develop strategic alliances in science and technology with universities and companies to create a job bank.

B1.6 Invest in the creation of the Trust Fund of Santiago.

**GOAL**

**B2** DEVELOP TOURISM IN SANTIAGO TO FOSTER ITS HISTORY, CULTURE AND A SENSE OF BELONGING

B2.1 Rehabilitate the Historic Downtown of Santiago de los Caballeros.

B2.2 Develop a Municipal Cultural Agenda.

B2.3 Promote Santiago as a tourist destination.

B2.4 Refurbish the municipal markets.

B2.5 Comprehensively transform Yaque Lodge.

B2.6 Develop a Special Plan for Peri-Urban Agriculture and Family Orchards.
**PILLAR B**

**RESILIENT**

**SANTIAGO DE LOS CABALLEROS**

**ACTION B1.1**

**SUPPORT THE LITERACY PLAN “QUISQUEYA APRENDE CONTIGO”**

**DESCRIPTION:**
Under this action, the National Government will conduct an assessment of the municipality’s illiteracy status in collaboration with the National Statistics Department (ONE), to coordinate the organizational structure of the municipal board with the municipal districts of Santiago. The aim will be to develop a literacy campaign together with community organizations, universities, churches, schools and other entities across civil society. Since Santiago is a growing city, where migrants arrive every day from rural zones, the city must have an ongoing program to eradicate illiteracy and must offer better access to education and employment opportunities.

**RESILIENCE QUALITIES:**
- It will improve the quality of life of the population reached by the program.
- It will reduce poverty.
- It will provide new opportunities to access jobs and schools.

**MONITORING METRICS:**
1. Percentage of municipal population that can read and write, measured annually.

**LEAD**
National Government

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
City Hall, Neighbor boards, Regional Education Direction, ONE, Churches, Universities.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**ACTION B1.2**

**FORGE AN ALLIANCE WITH INFOTEP TO DEVELOP TRAINING CENTERS**

**DESCRIPTION:**
Santiago City Hall will create six technical training centers in the communities of Buenos Aires, Hoya del Caimito, Cerro de la Tuna en La Herradura, Reparto Peralta, and Rafey with the goal of improving the opportunities of these populations to access training that allow them to improve their living conditions through decent jobs. With these centers new employment opportunities will be opened in labor areas with demand for specific services that have not been covered in the municipality, improving the coverage of services and increasing the population with access to employment.

**RESILIENCE QUALITIES:**
- It will diversify the labor market.
- It will open new employment opportunities.
- It will diversify the economy.
- It will improve the quality of life of the population served by these centers.
- It will reduce unemployment rates.

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Infotep, Entrepreneurial Sector.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**100RC NETWORK RESILIENCE STRATEGY ATHENS**

**EMPLOYMENT ACTION STRUCTURE**
While the city has no authority over employment and the creation of jobs, Athens is using partnerships, innovative thinking, and legislation to increase the number of jobs available and the development of small- and medium-sized businesses. To do this, Athens is building a platform that will connect people with job opportunities. In addition, it is acting as a liaison between those receiving social assistance and companies, facilitating work permits for refugees and immigrants, expanding job opportunities for unemployed women, and promoting an entrepreneurial spirit and civic pride in elementary schools.
**PILLAR B**

**RESILIENT SANTIAGO DE LOS CABALLEROS**

**STAKEHOLDERS:** Infotep, Sector empresarial.

### CREATE A MUNICIPAL SCHOLARSHIP PROGRAM

**DESCRIPTION:**
Santiago City Hall will enroll low-income young people with the desire and academic potential to continue their education in the Municipal Scholarship Program. This program will better position these young people in the labor market in areas where they can contribute to the city’s economic growth while improving their quality of life and that of their families.

**RESILIENCE DIVIDEND:**
- It will provide access to students with merit but no resources to complete their education or advance in their academic and technical programs.
- It will increase the number of young people joining the labor force in needed areas.
- It will foster social equity.

**MONITORING METRICS:**
1. Agreements created with the city’s educational institutions.
2. Scholarship committee in place by 2019.
3. Assessment mechanisms in place for the screening of students to be benefited.
4. Number of students benefited by the municipal scholarship program annually.

### PROMOTE CITY LABORATORIES, TECHNOLOGICAL INNOVATION AND JOBS IN R&D

**DESCRIPTION:**
Organizations such as CDES, Intec, and Fomin will sign an agreement to develop a project to prepare young talent in the city in technology areas and open new possibilities for employment in local industries and the R&D sector with funds from IDB. With this program, professionals with expertise in these areas may access jobs in the city’s R&D sector, improve their quality of life, and contribute to the economic development of the territory in sustainable, diverse ways.

**RESILIENCE DIVIDEND:**
- It will increase the number of young people positioned in the labor sector of R&D.
- It will provide access to students with talent but no resources to complete their education or advance in their academic training.
- It will foster social equity.
- It will reduce municipal unemployment rates.
- It will diversify the economy by integrating a new production sector.

**MONITORING METRICS:**
1. Percentage of R&D projects in progress in the city annually.
2. Number of young people with access to jobs thanks to this program annually.
ACTION B1.5

DEVELOP STRATEGIC ALLIANCES IN SCIENCE AND TECHNOLOGY WITH UNIVERSITIES AND COMPANIES TO CREATE A JOB BANK

DESCRIPTION:
City Hall will help spur a permanent strategic alliance between the Higher Education, Science and Technology Ministry of the Dominican Republic, the universities of Santiago, and businesses to strengthen access to information about job opportunities through an open database of available jobs in the city. In addition, this action will encourage academic institutions to consider the human resources needs of companies in the careers and curricula they offer, so that competencies and skills can be developed to meet those entrepreneurial needs.

RESILIENCE DIVIDEND:
• It will increase the access of recently graduated professionals to their first job in the labor system.
• It will increase the number of young people positioned in high-demand areas of the labor market.
• It will foster social equity.
• It will reduce unemployment rates.
• It will improve the quality of life of the population reached by the program.
• It will foster permanent updating of job opportunities to respond to the labor needs of the city.

MONITORING METRICS:
1. Number of young professionals employed in their first job annually.
2. Percentage reduction in the unemployment rate annually.

LEAD
City Hall

TYPE:

STATUS:

PERIOD:

STAKEHOLDERS:
Ministry of Education, Ministry of Labour Local Universities, Entrepreneurial Sector

AVAILABILITY OF FUNDS:
Not required

RESILIENCE QUALITIES:

ACTION B1.6

INVEST IN CREATION OF THE TRUST FUND OF SANTIAGO

DESCRIPTION:
The Trust Fund of Santiago (Fonfides), created and approved by the City Council, incorporated and operating towards the end of 2018, seeks to take advantage of the benefits of Law 189-11 on fiduciary development to promote projects that add liquid resources from the private sector to the comparative advantages of the City Council in the real estate issue. Through this action, agreements between the City Council and the private sector to promote private investments in the city will be formalized. With the creation of the Trust Fund, at least five projects aimed at the development of the territory, based on public-private investments, will be developed by the year 2022.

RESILIENCE DIVIDEND:
• It will foster investment by the private sector in city projects.
• It will improve the confidence of the private sector in investing in the city.
• It will make public-private relationships more robust.
• It will increase the city’s portfolio of executable projects.

MONITORING METRICS:
1. Number of projects developed from Fonfides annually.

LEAD
City Hall

TYPE:

STATUS:

PERIOD:

STAKEHOLDERS:
Entrepreneurial sector, Banking institutions

AVAILABILITY OF FUNDS:

RESILIENCE QUALITIES:

100RC NETWORK RESILIENCE STRATEGY BRISTOL

FIDUCIARY STRUCTURE OF A RESILIENT CITY

Bristol will explore options to create a fiduciary structure for a resilient city by developing large and small projects with a lens on local resilience (for example, flood protection, green infrastructure, new housing, and community facilities). The structure will combine public and private funds and will have a long horizon (25 years or more) to meet the social goals as well as financial benefits.
**ACTION B2.1**

**REHABILITATE THE HISTORIC DOWNTOWN OF SANTIAGO DE LOS CABALLEROS**

**DESCRIPTION:**
This action articulates and establishes the Historic District Territorial Zoning Plan, creating a collaboration agreement between the Ministry of Culture, the Historic District Board, and the real estate entities of the city. In addition, there is a goal to start a permanent investment fund for protection-recovery and to articulate a strategy for revitalizing cultural activities in coordination with cultural entities in the Historic District. To this end, a plan to refurbish the city’s colonial buildings will be defined. With this action, the Historic District of Santiago de los Caballeros will recover its commercial and residential vitality, and visits by locals and tourists will increase, thus boosting the economy.

**RESILIENCE DIVIDEND:**
- It will diversify the economy.
- It will foster inclusion and social cohesion.
- It will recover a sense of belonging to the territory and its traditional customs.
- It will provide young people with healthy entertainment spaces with a local cultural identity.
- It will reduce criminality due to the recovery of critical areas through strategic programs.
- It will attract tourism.

**LEAD**
City Hall

**TYPE:**

**AVAILABILITY OF FUNDS:**
Not required

**PERIOD:**

**STATUS:**

**STAKEHOLDERS:**
CDES, Asecensa, Regional Culture Direction, Historic District Board.

**RESILIENCE QUALITIES:**

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**ACTION B2.2**

**DEVELOP A MUNICIPAL CULTURAL AGENDA**

**DESCRIPTION:**
Santiago will design and implement a Cultural Agenda based on a consensus between the Ministry of Culture, Santiago City Hall, and the various entities and cultural officers with responsibilities in the metropolitan area by the end of 2018. Through this cultural program, Santiago will foster cultural expression by starting an institution devoted to teaching the city’s history and culture that is incorporated and functioning in the municipality. In addition, activities in the public spaces of the Historical District will bring life back to these places, which will boost the economy by using art and culture as drivers.

**RESILIENCE DIVIDEND:**
- It will reduce rates of violence by recovering spots that were previously used for criminal activities and turning them into areas for artistic and cultural exchange.
- It will position the city as a tourist destination due to its unique art and culture.
- It will foster social cohesion and inclusion.
- It will foster recovery of the city’s environmental and architectural heritage.
- It will develop the citizens’ sense of belonging to their public spaces, art, and culture.
- It will bring the Historic District back to life.

**LEAD**
City Hall

**TYPE:**

**AVAILABILITY OF FUNDS:**
Not required

**PERIOD:**

**STATUS:**

**STAKEHOLDERS:**
Asecensa, Historic District Board, Municipal Culture Direction, Regional Culture Direction, CDES.

**RESILIENCE QUALITIES:**

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**MONITORING METRICS:**
1. Percentage of population involved in art and cultural activities annually.
2. Percentage increase in visitors to the city due to its art and cultural activities annually.
3. Percentage of spaces recovered under the Municipal Cultural Agenda annually.

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**100RC NETWORK RESILIENCE STRATEGY BYBLOS**

**STRUCTURE TO REVITALIZE THE OLD CITY**
The city will establish a structure with the local community, experts on city history, and National Government Institutions to develop economic restoration techniques for building owners. The objective is to offer incentives for training and implementation of loans and tax deductions.

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**Photo:** José Manuel Antuñano
**PILLAR B**

**RESILIENT SANTIAGO DE LOS CABALLEROS**

### PROMOTE SANTIAGO AS A TOURIST DESTINATION

**ACTION B2.3**

**DESCRIPTION:**
Santiago municipality has been operating a tourist center since 2017. The tourist center has developed a strategy to increase tourism by the end of 2018. With this action Santiago City Hall plans to retrofit 100% of the physical infrastructure of its municipal buildings and spaces to improve their tourist appeal by the 2019.

**RESILIENCE DIVIDEND:**
- Visitors to the city will increase, enhancing and energizing the local economy.
- It will create new sources of employment.
- It will bring value to the Historic District.
- It will foster inclusion and social cohesion.
- It will instill again a sense of belonging to the territory and pride in its traditional customs.
- It will bring the Historic District and the iconic spots of the city back to life.

**LEAD**
City Hall

**TYPE:**
- [ ]
- [ ]
- [ ]
- [ ]

**STATUS:**
- [ ]
- [ ]
- [ ]
- [ ]

**PERIOD:**

**STAKEHOLDERS:**
- Culture Municipal Direction, Regional Culture Direction, CDES Tourist Cluster.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**
- [ ]
- [ ]
- [ ]

### REFURBISH THE MUNICIPAL MARKETS

**ACTION B2.4**

**DESCRIPTION:**
Santiago City Hall has pre-feasibility and viability studies to remodel three municipal markets (La Placita, Central, and Hospedaje Yaque) by the end of year 2018. In a second stage, City Hall will refurbish the Modelo, Pekín and Matadero Municipal markets by 2019. Through this action, City Hall aims to improve the safety and hygiene levels of products sold in these municipal markets from public and private investments by 2022.

**RESILIENCE DIVIDEND:**
- It will regulate the sale and quality of agricultural and livestock products.
- It will foster tourist activities involving markets and local gastronomy.
- It will create new employment sources.
- It will improve the sanitation conditions in these spaces and surrounding areas.
- It will reduce contamination produced by haphazard disposal of organic waste.
- It will diversify the economy.
- It will foster gastronomic tourism in the city.

**LEAD**
City Hall

**TYPE:**
- [ ]
- [ ]
- [ ]
- [ ]

**STATUS:**
- [ ]
- [ ]
- [ ]
- [ ]

**PERIOD:**

**STAKEHOLDERS:**
- Agriculture Regional Direction, Regional Health Direction.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**
- [ ]
- [ ]
- [ ]

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**100RC NETWORK RESILIENCE STRATEGY EL PASO**

**USE THE HISTORIC AND NATURAL RESOURCES TO DEVELOP A HERITAGE TOURISM PLAN.**

El Paso will develop a strategy to preserve critical natural and historic assets and use them to transform the city into an international destination that shares the vibrant culture of the community. In addition, the city will foster planning of open spaces, reduce its carbon footprint and preserve important historic buildings to prove the importance of natural and historic preservation.
**ACTION B2.5**

**COMPREHENSIVELY TRANSFORM YAQUE LODGE**

**DESCRIPTION:**
City Hall will transform Hospedaje Yaque's physical structure and its administration and operation through public and private investments supported by the business sector and the Central Government by 2022. Hospedaje Yaque is the most important market in the city based on its history and relationship with Santiago's customs and traditions. The impairment, disorganization, and lack of sanitation make it a compelling site for renovation and renewal. With the rehabilitation of the physical infrastructure and the reorganization of this important supply center of the region, the environmental quality and image of the Historic Downtown will improve, and contribute to the revitalization of the city’s economy.

**RESILIENCE DIVIDEND:**
- It will improve the sanitation conditions of this space and surrounding areas.
- It will foster social inclusion through the market transformation.
- It will attract the local and regional population as well as tourists.
- It will boost the economy.
- It will increase the profits of the market’s merchants.

**MONITORING METRICS:**
1. Number of improvements to Hospedaje Yaque market infrastructure per year.
2. Number of reorganized and regulated merchants per year.
3. Percentage increase in satisfaction levels of market visitors and merchants due to the transformation.

**LEAD**
City Hall

**TYPE:**
- ++ +

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Central Government, Regional Agriculture Direction, Regional Health Direction.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**
- - -

**ACTION B2.6**

**DEVELOP A SPECIAL PLAN FOR PERI-URBAN AGRICULTURE AND FAMILY ORCHARDS**

**DESCRIPTION:**
The City Council of Santiago defined, through the Metropolitan Land Use Plan (POT) normative standards for agricultural efforts at peripheral areas of the municipality by 2018. As a result, the communities of Santiago de los Caballeros established in peripheral zones will be able to undertake agricultural activity, diversifying the economy of small producers and encouraging entrepreneurship in areas of lower purchasing power.

**RESILIENCE DIVIDEND:**
- It will diversify the economy.
- It will reduce dependency on product imports.
- It will create a new business opportunity.
- It will open new employment opportunities.
- It will promote sustainable agriculture.
- It will heighten environmental awareness in children.
- It will empower communities to produce their own food.

**MONITORING METRICS:**
1. Number of peri-urban communities that implement peri-urban agriculture by year 2019.
2. Number of City Hall training workshops about peri-urban agricultural production.
3. Percentage that peri-urban agriculture contributes to the local economy every year.

**LEAD**
City Hall

**TYPE:**
- + + +

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Regional Agriculture Direction, Regional Education Department.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**
- - -
Title of mural: “Brave Woman”
Artist: Anilcia de Luna, Katheryn Santana, Manaury Calzada
Photo: Walder Gomez

Safe, Empowered and Inclusive Santiago
One of Santiago de los Caballeros’ challenges is the lack of social cohesion. The factors leading to this lack of social cohesion, addressed through the third pillar, include high levels of violence (including domestic violence), noise pollution, poor quality nighttime public lighting, high crime levels, and a lack of a sense of belonging and identification with the city (ICES 2015). In addition, there is an inadequate number of policies in place to address the needs of the most vulnerable sectors of society.

A top trigger of family violence and criminality is noise (Voses, 2012). In Santiago de los Caballeros, noise pollution is considered to be high or very high (ICES 2015). Noise contamination directly affects the emotional and psychological health of residents creating a violent society that negatively impacts families and the rest of the community” (Voses, 2012).

Crime levels and general feelings of insecurity are directly related to the lack of sufficient public lighting and of effective planning and administration in the territory. Rapid economic development caused accelerated industrialization of the municipality without properly implemented public policies for land use management. Therefore, zones of marginalized communities were created and expanded while spaces for social cohesion, e.g., community parks, were reduced. The city grew in such an accelerated fashion that the territory’s capacity to adapt to new and increasing population needs resulted in inequality and a host of unmet needs. Nearly 96% of the population reports that it would not dare to walk alone at night (ICES 2015).

One result of these factors is little access to the goods and services that are indispensable for living with dignity. Moreover, unemployment and the lack of regulations in these areas have opened the doors to illegal activities, a situation that fosters the criminality that shapes the population’s perception of security and increases the levels of family violence.

Every 48 hours a woman is murdered by her partner or former partner in the Dominican Republic (Municipal Program of Gender Audit, 2011); 69.4% percent of the women in Santiago de los Caballeros have experienced violence at some time in their lives (ICES, 2015). These data support the urgent need to invest in programs that improve citizen security, equity and gender equality in the municipality. Such programs require political will for their development and must have leadership that insists on gender equality, respect for human rights, support for democratic institutions, and a violence-free society.

One of the main challenges is the need to change the traditionally chauvinistic culture of Santiago society and to improve the quality of life of the most disadvantaged sectors of the population by providing jobs, housing opportunities, and access to basic services. This requires a new link between civil society and City Hall, which is stated by the Dominican Republic, under Decree 176-07, regarding participatory budgets. It also requires investing in educational programs, in social services for those who live in marginalized and violent conditions, and in a citizen surveillance system that empowers the city’s inhabitants.
PILLAR C
RESILIENT
SANTIAGO DE LOS CABALLEROS

SAFE, EMPOWERED, AND INCLUSIVE SANTIAGO

GOAL

STRENGTHEN CITIZEN SECURITY BY IMPROVING SECURITY INFRASTRUCTURE AND SERVICES, AND BY INVOLVING CITIZENS IN SECURITY PROCESSES.

C1.1 Design and implement the municipal lighting project.
C1.2 Implement the Citizen Observatory Project.
C1.3 Strengthen the Municipal Police Department.
C1.4 Creation of committees for Neighborhood Protection.

GOAL

DEVELOP ACTIONS TO FOSTER INVESTMENT IN HEALTH, EDUCATION AND GENDER ISSUES

C2.1 Establish a gender policy at City Hall.
C2.2 Articulate how municipal investment in health, education and gender are to be managed.
C2.3 Validate and assess the annual investment plan in health, education and gender.
C2.4 Develop an educational campaign for control and reduction of noise contamination at the local level.
**C1 | DESIGN AND IMPLEMENT THE MUNICIPAL LIGHTING PROJECT**

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Municipal power department, Edenorte.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

**DESCRIPTION:**
Santiago de los Caballeros City Hall will have more public lighting as a result of the replacement of 100% of the lamps it currently has with LED technology and enhancement of the existing network. Santiago City Hall will receive additional annual revenue of 36 million pesos from the savings obtained by changing the deficient public lighting lamps and their high-power consumption, mainly in the central and northern areas of the city by year 2018.

**RESILIENCE DIVIDEND:**
- It will reduce areas for criminal activity thanks to more effective lighting.
- It will improve the perception of security.
- It will foster social cohesion in night-time hours.
- It will reduce power consumption by the municipality, and therefore the public expense on power service.
- It will contribute to making the city and its public spaces more attractive.
- It will encourage walking in the city in the evening with greater confidence.

**MONITORING METRICS:**
1. Number of lamps replaced annually.
2. Percentage of annual income from the savings resulting from replacing the public lamps.
3. Number of public sociocultural or recreational activities occurring during night-time hours.
4. Number of demands or requests to City Hall related to lighting issues.

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**C1 | IMPLEMENT THE CITIZEN OBSERVATORY PROJECT**

**LEAD**
CDES

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Civil Society organizations, Neighbours boards, Citizens in general interested on participating.

**AVAILABILITY OF FUNDS:**
Not required

**RESILIENCE QUALITIES:**

**DESCRIPTION:**
CDES will coordinate the development of the Citizen Observatory Project, a monitoring and analysis system that will oversee the Strategic Plan “Santiago 2020” progress and the city’s development. It will be a municipal reference that will inform, analyze, and foster debate among strategic actors at various levels. This project will contribute to building citizenship and to strengthening local democratic institutions, social involvement, and public participation. It will start with the building of a multi-dimensional space for monitoring and supervising the actions implemented under this Resilience Strategy to build Santiago’s resilience.

**RESILIENCE DIVIDEND:**
- It will empower citizens in the surveillance, monitoring and assessment process for implementing the actions under this Resilience Strategy.
- It will develop the sense of belonging among citizens.
- It will involve citizens in the City’s decisions.
- It will improve the performance of public officials because it will monitor the implementation of the Resilience Strategy.

**MONITORING METRICS:**
1. Number of multisector Citizen Observatory meetings per year.
2. Number of sectors regularly attending meetings.
3. Number of local events to report Citizen Observatory results.
4. Number of Citizen Observatory results publications.
Strengthen the Municipal Police Department

**Description:**
Through a diagnosis of the socioeconomic, educational, social and environmental challenges of areas with increased criminality, City Hall will organize gatherings to inform social groups of the municipality about action lines, by articulating and implementing a training plan for members of the Municipal Police Department regarding surveillance tactics, conflict management, professional ethics and community management. An inter-institutional commission will be created to coordinate actions to reduce insecurity levels. This initiative should be coordinated with the Ministry of the Interior and the National Police.

**Stakeholders:**
Municipal Police Department, National Police Department, Ministry of the Interior and Police

**Resilience Dividend:**
- It will foster safer and more cohesive public spaces.
- It will reduce crime hubs.
- It will increase tourism visits to the city due to the high perception of security.
- It will motivate greater investment in the city due to the security guarantee.
- It will help improve the walkability of the city.

**Monitoring Metrics:**
1. Annual number of Municipal Police members trained in surveillance tactics, citizen protection and community management.
2. Establishment and functioning of an inter-institutional coordination mechanism for improved security in infrastructures and community equipment by 2018.
3. Percentage reduction expenses related to vandalism-related repair or replacement of municipal property (real or personal).
4. Number of police officers reported due to misbehavior.

**Lead:**
City Hall

**Type:**

**Status:**

**Period:**

**Availability of Funds:**

**Resilience Qualities:**

---

Creation of Committees for Neighbourhood Protection

**Description:**
City Hall will conduct a regional assessment of citizen insecurity, with the intent of organizing the operational structure and appointment of neighborhood protection committees. Inclusion of these committees in the City Hall organic structure must be duly formalized by a resolution so that communities are involved in their own processes as key actors in social change to reduce criminal and violence activities.

In addition, neighborhood protection committees will be formed at locations identified as high insecurity zones per the assessment so that each of these can focus their efforts with each community. These neighborhood protection committees will help build more peaceful and secure communities with mechanisms tailored to their own needs and demands.

**Stakeholders:**
Municipal Police Direction, National Police Department, Ministry of the Interior and Police, Neighbour boards.

**Resilience Dividend:**
- It will empower and involve communities in the protection of their social and human capital.
- It will foster social cohesion and a sense of belonging within the community.
- It will improve quality of life in the communities.

**Monitoring Metrics:**
1. Number of neighborhood protection committees functioning annually.
2. Percentage reduction of crime at the neighborhoods that have a committee per year.

**Lead:**
City Hall

**Type:**

**Status:**

**Period:**

**Stakeholders:**
Municipal Police Direction, National Police Department, Ministry of the Interior and Police, Neighbour boards.

**Availability of Funds:**

**Resilience Qualities:**

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**100RC Network Resilience Strategy Santiago de Chile**

**Security Community Councils**
The Community Plans on Public Security (PCSP) seek to relieve the role and leadership of municipalities to summon and articulate local actors with competences in prevention of crimes and insecurity. Starting with a diagnosis, the Community Councils on Public Security define their priorities and validate strategies, programmes and projects, both from a community and an investment with the purpose to solve the violence, criminality, coexistence and insecurity challenges.
**PILLAR C**

**RESILIENT SANTIAGO DE LOS CABALLEROS**

**C2 ACTION C2.1**

**ESTABLISH A GENDER POLICY AT CITY HALL**

**DESCRIPTION:**
City Hall must implement educational, health, and gender programs in accordance with the legal provisions of Law 176-07, Article 21d for districts and municipalities. As per this standard, 4% of the municipal budget must be allocated to education, health, and gender programs. In addition, in accordance with that law, the gender program must be managed through the Vice-Mayor’s Office and led by a woman (this would be the first step to implement this type of program).

**RESILIENCE DIVIDEND:**
- It will foster gender equality.
- It will reduce rates of violence.
- It will build a safer, more empowered, and cohesive society.

**MONITORING METRICS:**
1. Number of women in the city benefited by the gender program.

**LEAD:** City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Vice-Mayor Office, Municipal Unit for Women Ministry of Women, Santiago Prosecutor’s Office, Movida, Other organizations that might take part.

**AVAILABILITY OF FUNDS:** Not required

**RESILIENCE QUALITIES:**

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**C2 ACTION C2.2**

**ARTICULATE HOW MUNICIPAL INVESTMENTS IN HEALTH, EDUCATION AND GENDER ARE TO BE MANAGED**

**DESCRIPTION:**
By the end of 2018, City Hall will have an investment plan in health, education and gender, as a result of coordination between it and the various communities of the territory that have a poor record on these issues. Communities with the highest levels of gender violence will be able to reduce them through investments in education and victim support (this action will supplement the prior action).

**RESILIENCE DIVIDEND:**
- It will foster gender equality.
- It will reduce rates of violence.
- It will build a more robust, safer, and more cohesive society.
- It will position municipal management to promote a culture of no violence.

**MONITORING METRICS:**
1. Annual number of communities benefited by coordination with City Hall on violence reduction.

**LEAD:** City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
Vice-Mayor Office, Municipal Unit for Women Ministry of Women, Santiago Prosecutor’s Office, Movida, Other organizations that might take part.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**100RC NETWORK RESILIENCE STRATEGY SANTA FE**

**PROGRAM AGAINST GENDER VIOLENCE**
This initiative aims to strengthen the prevention of and comprehensive attention to acts of violence in a collaborative and multi-disciplinary manner. Among its projects are: networks to prevent and address gender violence; Comprehensive Protection Home for Women in violent situations; a gender perspective for the sanitary system; detection and comprehensive guidance for gender violence situations in Santa Fe municipality.

The goal is that by 2019 Santa Fe will have a system of information to enable measurement of the impact of the existing projects and to assess the results of prevention policies for family and gender violence.

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**100RC NETWORK RESILIENCE STRATEGY MEDELLÍN**

**SAFE CITIES FOR WOMEN**

A: With Safe Cities for Women, tools, policies and comprehensive approaches for prevention and response to sexual harassment and other forms of sexual violence against women and girls in various environments are developed, implemented and assessed. Medellin, since June 2015, is part of the 22 cities in the Global Program Safe Cities of UN Women, an initiative arising in 2010 and the first global program to prevent and respond to the sexual attacks in public spaces that women constantly endure in urban centers around the world.

**WOMEN FOR PEACE AGENDA**

B: The Women for Peace Agenda consists of conversations, panels, and key note conferences open to all in the city, which include projects and educational strategies for the transformation of war-like language into peaceful coexistence narratives leading to a reduction in the use of violence to solve conflicts. The forum is coordinated effort among various entities with the approach of ethics of care for the feminization of peace and dialogue about the efforts of Colombian women to build peace in the country.
ACTION C2.3
VALIDATE AND ASSESS THE ANNUAL INVESTMENT PLAN IN HEALTH, EDUCATION AND GENDER

DESCRIPTION:
Given the high rate of gender violence and the high rate of feminicides in Santiago, this action will try to identify and select urban areas where municipal investments should be made in health, education, and gender programs. This will enable, on one hand, the design of the multiannual plan for municipal investment follow-up, and on the other, a reduction in gender violence. It will also provide protection and assistance to women abused by their partners (this action will supplement the two prior actions).

RESILIENCE DIVIDEND:
• It will foster gender equality.
• It will reduce rates of violence.
• It will build a safer and more cohesive society.
• It will improve the population’s quality of life.

MONITORING METRICS:
1. Number of communities receiving the benefits of the investment plan.
2. Percentage reduction in gender violence and deaths due to feminicide annually.
3. Percentage of budget devoted to investments in health, education, and gender programs annually.

ACTION C2.4
DEVELOP AN EDUCATIONAL CAMPAIGN FOR CONTROL AND REDUCTION OF NOISE CONTAMINATION AT THE LOCAL LEVEL

DESCRIPTION:
City Hall will create a Noise Contamination Reduction Plan that will start, in the first phase, with education on the use of horns, announcements on buses, and noise management in public areas. This action seeks to reduce noise contamination caused mainly by city traffic, to keep the noise volume down to legal levels, and to educate drivers on the use of the horn.

RESILIENCE DIVIDEND:
• It will foster social cohesion through multi-sector education.
• It will reduce rates of violence.
• It will foster a culture of peace.
• It will improve coexistence in shared spaces and public areas.
• It will improve the population’s health.

MONITORING METRICS:
1. Number of drivers included in the first educational stage for control and reduction of noise contamination.
2. Annual percentage of noise contamination from the reduction of speakers annually.

LEAD
City Hall

TYPE:

STATUS:

PERIOD:

STAKEHOLDERS:
Civil society organizations, COBA, 911, AMET, Transit department.

AVAILABILITY OF FUNDS:
Not required

RESILIENCE QUALITIES:

100RC NETWORK RESILIENCE STRATEGY THESSALONIKI
REDUCTION OF NOISE POLLUTION

30% of the Thessaloniki population is exposed to noise level exceeding the EU limits. Given the lack of comprehensive data and observance measures to address this type of contamination, the city will develop an intensive campaign to identify noise pollution hotspots.
Healthy, Eco-Effective and Ecologically Sensitive Santiago to the Yaque River
CHALLENGES

This last pillar is a collection of actions to address the deterioration of public spaces that should provide areas for leisure and relaxation to the city’s inhabitants and help reduce social alienation and crime.

Rapid, unplanned development, is the result of the migration of people from rural areas to the city. Illegal settlements in the most vulnerable areas of the city, along the gullies, rivers, and streams, have impaired the quality of these water bodies and the general population’s quality of life. Especially affected are the people who live in overcrowded conditions in these critical areas. These realities are impairing the city’s green infrastructure and public spaces.

The expansion of urban sprawl has led to uncontrolled settlement of areas adjacent to the city. This urban expansion has occurred at the same time as public spaces have been reduced, and the result has been a serious impact on the public’s ability to access green areas. Green areas are also affected by the production of solid and liquid waste, which ends up obstructing the natural drainage in the city. The significant increase in the urban footprint was not offset by an increase in public green and recreational areas. This means that the city lacks enough public spaces to foster social cohesion.

When contamination due to the discharge of solid waste occurs there is a direct co-mitigation with the amount of solid waste produced, collected, and disposed of. In 37 years Santiago de los Caballeros increased the production of solid waste tons and the municipal government kept the city clean by removing costs to around 24 million pesos per month. This cost is just for the amount of waste produced in the city in the short term. It does not address the fact one section of the population (generally the poorest and most vulnerable) throw away their solid waste in the city’s streams, rivers and gullies.

Regarding waste water discharges, the city must address the sources and complete construction of waste water treatment plants to keep the levels of contaminants within allowed standards before they reach the region’s water bodies. However, although the reduction of contamination levels has not been fully achieved, some progress has been made.

Management of biomedical waste is another important issue that must be addressed. To do so, while City Hall has been in charge of collecting biomedical waste at medical centers and hospitals, it does not have direct authority to do so. The lack of mechanisms ensuring collection, management, and final disposal of this highly contaminated waste negatively impacts the public’s ability to access green areas.

This last pillar is a collection of actions to address the sources and complete management of waste can unleash diseases provided by POT Santiago.

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This last pillar is a collection of actions to address the sources and complete management of waste can unleash diseases.
GOAL D
IMPLEMENT THE SUSTAINABLE, COMPREHENSIVE MANAGEMENT OF SOLID WASTE

D1.1 Develop a comprehensive waste management plan.
D1.2 Enact legislation to execute Decree 126-09 as it relates to management and collection of biomedical waste.
D1.3 Strengthen the technical abilities of Rafey Landfill Personnel.

GOAL D2
IMPLEMENT THE “VIVE EL YAQUE” MASTER PLAN

D2.1 Prepare and launch a strategy for bicycle.
D2.2 Build the Yaque lookout.
D2.3 Build the ecological corridor of Yaque del Norte River.
D2.4 Build Parque Norte and the Nicolás Vargas Reserve.

GOAL D3
INCREASE LAND FOR GREEN ZONES AND PUBLIC SPACES AS WELL AS TO IMPROVE THE EXISTING ONES.

D3.1 Design a master plan for the environmental restoration of the Gurabo River.
D3.2 Develop a management plan for parks and public spaces.
D3.3 Promote use of Santiago de los Caballeros Central Park.
D3.4 Implement the metropolitan green infrastructure master plan.
D3.5 Implement the reforestation and conservation program for existing carbon sinks.

HEALTHY, ECO-EFFECTIVE AND ECOLOGICALLY SENSITIVE SANTIAGO TO THE YAQUE RIVER
DEVELOP A COMPREHENSIVE WASTE MANAGEMENT PLAN

DESCRIPTION:
Through this action, Santiago City Hall will develop initiatives to increase its service capacity for the collection, disposition, and treatment of solid waste. City Hall will prepare a Comprehensive Waste Management Plan and a package of emergency measures to improve the management of final waste disposal sites. The goal is to develop a sustainable waste management system. The existing final waste processing units will be upgraded and new processing infrastructure will be built to ensure a reliable, continuous system for the comprehensive management of waste collection and treatment.

RESILIENCE DIVIDEND:
- It will reduce the exposure of the population to the biomedical waste currently disposed at inappropriate sites and processed with home waste.
- It will create a new business opportunity.
- It will open new employment opportunities.
- It will increase the potential for using recoverable waste, as it will not be contaminated with biomedical waste.
- It will make the management of solid waste more efficient.
- It will improve the landfill reception and management capacity.

MONITORING METRICS:
1. Percentage improvement in the waste processing capacity of the landfill annually.
2. Percentage reduction in expenses for city cleaning activities annually.
3. Number of final waste processing units out of service due to lack of maintenance annually.
4. Number of communities per year sorting out of service due to lack of maintenance annually.
5. Annual percentage of students, schools, and community organizations that have taken home waste.

ENACT LEGISLATION TO EXECUTE DECREES 126-09 AS IT RELATES TO MANAGEMENT AND COLLECTION OF BIOMEDICAL WASTE

DESCRIPTION:
This action creates legislation to govern the management of biomedical waste as well as a public bid process to receive tenders regarding the construction of a plant for the treatment of hospital waste. Under the decree, legislation must be passed to ensure that private companies with the capacity to offer solid waste collection service in an efficient manner are regulated and taxed by City Hall. Santiago City Hall may then concentrate on investing municipal resources in providing comprehensive services for solid waste management and leave management of biomedical waste to the Regional Health Authority, as stated under the Health Law 42-01 of the Public Health Ministry. This strategy will help the city achieve a better quality of service and make the most of City Hall’s investment.

RESILIENCE DIVIDEND:
- It will reduce exposure of the population to biomedical waste currently disposed at inappropriate sites, and processed with home waste.
- It will create new business opportunities.
- It will foster new employment opportunities.
- It will make the most of recoverable waste, as it will not be contaminated with biomedical waste.

MONITORING METRICS:
1. Implementation of Decree 126-09, approving the regulation regarding waste produced by health centers and related entities.
2. Enforcement of Law 42-01 on public health as it relates to the management and collection of biomedical waste.
3. Number of clinics and hospitals added to the biomedical waste collection route annually.
4. Percentage of collection expense reduction annually.
5. Number of automated processes for the management of hospital waste installed and operating with documented procedures for collection and management annually.

100RC NETWORK RESILIENCE STRATEGY SANTIAGO DE CHILE

“SANTIAGO RECYCLES”
In its waste recovery program, “Santiago Recycles” seeks to:
- Implement a network of clean spots in the metropolitan region
- Overhaul existing recycling facilities
- Conduct an organic waste recovery plan (homes, free fairs, cleaning and decoration).
- Implement a promotion, broadcasting, training, and education program for the population regarding waste recovery and recycling on schools.
- Establish a base recycling formalization plan.
- Use mobile applications for logistic support and promotion of recycling (e.g., RecicleApp, recycling management connecting people with base recyclers; Recycle online, Electronic Recycling, etc.)

In addition, the initiatives set a construction and demolition waste recovery system and an incentive system to reduce the production of waste. The purpose is then, to study the various separation at the origin methods, to perform pilot activities and to propose the best alternative for Santiago city on the matter.

Photo: Alberto Segura
**D1 ACTION D1.3**

**STRENGTHEN THE TECHNICAL ABILITIES OF RAFEY LANDFILL PERSONNEL**

**DESCRIPTION:**
City Hall will improve the technical capacity of the Rafey landfill to receive non-recyclable waste with the closure of the Tamboril landfill and to prevent naturally occurring fires as well as arson, and the proliferation of vectors and disease outbreaks due to improper waste handling. By hiring more technicians, Santiago City Hall could prevent plant pests at the landfill and ensure compliance with public health and environmental laws.

**RESILIENCE DIVIDEND:**
- It will open up new employment opportunities.
- It will make the management of solid waste more efficient.
- It will improve the landfill reception and management capacity of non-recyclable waste.

**MONITORING METRICS:**
1. Number of fires at landfill annually.
2. Percentage improvement in landfill sanitary conditions.
3. Number of waste recyclers with improved capacity.

**STAKEHOLDERS:**
Mimarena, Regional Public Health, GIRS, Municipal Direction of Commercial Cleaning Management, Neighborhood boards, Municipal Department of Environmental Education, UGAM.

**LEAD CITY HALL**

**TYPE:**

**STATUS:**

**PERIOD:**

**AVAIlABILITY OF FUNDS:**
Not required

**RESILIENCE QUALITIES:**

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**D2 ACTION D2.1**

**PREPARE AND LAUNCH A STRATEGY FOR BICYCLE MOBILITY**

**DESCRIPTION:**
City Hall will launch a pilot on non-motorized sustainable mobility in the area around Yaque del Norte River to foster a renewal in this area and to motivate city residents to see this iconic public space as a symbol of Santiago’s recovery. Later, in a second stage, pilot activities will include identifying and prioritizing the metropolitan areas best suited to adopting the bicycle mobility strategy, particularly those areas with a highly mobile school and university population.

In addition, the pilot will also involve the design of a training plan for city residents to explain the advantages of using bicycles for transportation. And lastly, having demonstrated the need for areas where bicycles can be used for transportation and exercise, this action will foster budget planning for the design and construction of a cycling network in metropolitan areas with the greatest population. By 2020, a bicycle mobility strategy must be defined and adopted that includes the introduction of a cycling infrastructure network, a public bicycle system, and spaces for bicycle parking.

**RESILIENCE DIVIDEND:**
- It will improve the population’s health due to exercise.
- It will foster social cohesion.
- It will recover abandoned public spaces.
- It will develop a sense of belonging to these public spaces.
- It will provide an incentive for non-motorized urban mobility.

**MONITORING METRICS:**
1. Construction of a Yaque del Norte cycling road at the southern greenway as a specific urban strategy to recover the river and motivate city inhabitants to enjoy and appreciate their river.
2. Percentage of annual increase in the number of people using the cycling areas.

**STAKEHOLDERS:**
OMPU, Municipal Public Works, Plazas and Parks Direction, Municipal Culture Direction, Cleaning Direction, GIRS Municipal Transit Direction, UGAM, Mimarena, CDES.

**LEAD CITY HALL**

**TYPE:**

**STATUS:**

**PERIOD:**

**AVAIlABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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**100RC NETWORK RESILIENCE STRATEGY SANTIAGO DE CHILE**

**A SANTIAGO THAT USES PEDALS PLAN**

A Santiago that Pedals Plan seeks to promote the use of bicycles as a sustainable and clean means of transport through investments, programs, projects and interdisciplinary work flows executed throughout the metropolitan region. The actions include:
- Implement an inter-community system of public bicycles.
- Develop a 400 km network of multipurpose paths for pedestrians and bicycles in rural areas.
- Implement a network of public parking lots for short- and long-term bicycle parking.
- Restore areas for pedestrians and cyclists through recovery projects that create green roads linked to the recovery of urban waterbodies and their surroundings.
BUILD THE YAQUE LOOKOUT

DESCRIPTION:
The City Hall will implement this project as part of the Yaque del Norte Recovery proposal and it includes the section between the San Luis Fortress and the open plaza next to the Old Tobacco building, and the development of green spaces that promote recreation and tourism. The project also contemplates the construction of a linear park with a Southern Park pedestrian walkway, a green path, the Yaque Overlook, and a protection levee that will be part of the Historic center regeneration. This project will reduce greenhouse gases and environmental pollution due to current high traffic rates at the Historic center and the Southern Ring Road.

RESILIENCE DIVIDEND:
• It will foster social cohesion by providing spaces for recreation and cultural activities.
• It will provide flood buffer zones that will also serve as areas for sports and cultural activities.
• It will increase the amount of quality green space for city inhabitants.
• It will improve security in the area and its surroundings.

MONITORING METRICS:
1. Percentage reduction in greenhouse gases and environmental pollution annually.
2. Increases in the city’s budget from permit application and permit processing fees.
3. Percentage increase in tourists and the average length of their stay.
4. Percentage reduction of informal vendors.

BUILD THE ECOLOGICAL CORRIDOR OF YAQUE DEL NORTE RIVER

DESCRIPTION:
The City Hall seeks to recover the ecological corridor of the Yaque approximately 4 km long by creating a bike path along the entire runway of the bypass that will go from the beginning to the end of the corridor in the mouth of the Gurabo River. This action also includes the construction of sidewalks suitable for walking, recovery of urban greenery and treatment of river pollution by wastewater and solid waste. The project also includes a green path in the section Bicentennial Band, the housing relocation of the Hard Floor and El Cambronal settlements, and the improvement of the public space associated with the Market’s iconic building and The Yaque Lodging. Through this intervention the city will enhance the environmental quality of Yaque del Norte River and its surroundings.

RESILIENCE DIVIDEND:
• It will foster social cohesion through spaces for recreation and cultural activities.
• It will provide buffer zones for floods that will also serve as areas for sports and cultural activities.
• It will increase the amount of quality green space for inhabitants.
• It will improve security of the area and surroundings.
• It will provide an incentive for non-motor urban mobility.

MONITORING METRICS:
1. Percentage reduction of greenhouse gases and environmental pollution annually.
2. Increases in the city’s budget from permit application and permit processing fees.
3. Percentage increase in tourist arrivals and the average length of their stay.
4. Percentage reduction of informal vendors.
5. Percentage increase in number of people using the cycling spaces annually.

100RC NETWORK RESILIENCE STRATEGY BANGKOK

DEVELOP NEW RECREATIONAL PARKS, GREEN SPACE OF CHAO PHRAYA RIVER

Bangkok will increase its green space by 500,000 acres during the next 5 years. The city will design spaces in collaboration with the public consultation, adopting a municipally beneficial approach to such issues as flood prevention and safe community gathering spaces after a disaster. The initiative also aims to create a database of the city’s green spaces.

Development of a 1.2-kilometer walkway along Chao Phraya River that will have green space, a pedestrian walkway and bicycle lanes is one of the critical projects. The walkway will connect central business districts and will be a land and water transportation center.

Photo: Miguel Rojas
**Build Parque Norte and the Nicolas Vargas Reserve**

**Description:**
City Hall will make an intervention at Norte del Yaque Park, its natural reserve areas and Fluvial Park. It will involve the construction of a pedestrian walkway at Norte Park, construction of a green trail, restoration of the Meandro Norte Trail, construction of a protective levee, and treatment of stormwater and sewage.

This action will improve the environmental condition of the Yaque River’s wetlands, thus reducing the river’s potential for flooding the city.

**Resilience Dividend:**
- It will foster social cohesion through spaces for recreation and cultural activities.
- It will provide buffer zones for floods that will also function as areas for sports and cultural activities.
- It will increase the amount of quality green space for the city’s inhabitants.
- It will improve security in the area and its surroundings.

**Monitoring Metrics:**
1. Percentage reduction in greenhouse gases and environmental pollution annually.
2. Increases in the city’s budget from permit application and permit processing fees.
3. Number of tourists arrivals and the average length of their stay.

**Stakeholders:**
City Hall, Corasan, CDES.

**Resilience Qualities:**
- 100RC Network Resilience Strategy
- Santa Fe

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**Design a Master Plan for Environmental Restoration of the Gurabo River**

**Description:**
Mimarena will undertake structural mitigation measures to expand the river’s natural areas that will transform the territory, as well as, non-structural mitigation measures such as the relocation of people away from flood-prone areas. These areas that are subject to floods will be turned into green areas for recreation and leisure activities. This master plan for the Gurabo River must be integrated into the Urban Green Ring Plan.

The City will also rehouse population living in precarious housing, and the neighborhoods will undergo an assessment process in which the installation of basic sanitary infrastructure will be priority to minimize man-made impacts on the water quality of the Gurabo River.

**Resilience Dividend:**
- It will foster community participation in the recovery of the Guarabo River Basin.
- It will provide flood buffer zones that will also function as spaces for sports and cultural activities.

**Monitoring Metrics:**
1. Increase in kilometers of the Guarabo River with better flood control annually.
2. Number of residents of the immediate area of the Gurabo River who benefit from the flood control measures annually.
3. Increase in reforested areas near Gurabo River annually.
4. Number of square meters of restored areas impacted by well-coordinated educational and environmental programs.
5. Percentage reduction of contamination levels in the lower portion of the Gurabo River annually.
6. Percentage of basin recovery annually.

**Stakeholders:**
Mimarena, Regional Public Health, GIRS, Municipal Direction of Commercial Cleaning Management, Neighborhood boards, Municipal Department of Environmental Education, UGAM.

**Resilience Qualities:**
- Reforestation along the Gurabo River

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**North Park (Green-Blue Infrastructure)**

North Park represents the recovery and restoration of 80 hectares of land now occupied by the old landfill, the Municipal Botanic Garden, and deteriorating green spaces. It aims to be an example of comprehensive management of a public space from both a residential and environmental perspective. Its design brings together an array of green and blue infrastructure projects, which include the construction of walkways and sports facilities, improvements in the sanitary treatment of lakes and rainfall drainage, construction of a technical school, and improvements to the district’s central facilities. In addition, real estate development and large-scale public-private investments are foreseen for the construction of housing and new neighborhoods already identified in the city’s Urban Zoning Regulation. Santa Fe intends to hold community meetings on the park’s design and its features, especially with the people in the adjoining neighborhoods.
DEVELOP A MANAGEMENT PLAN FOR PARKS AND PUBLIC SPACES

**DESCRIPTION:**
Santiago City Hall will strengthen and enhance the environmental quality and infrastructure of the city’s parks and public spaces by making their management and maintenance more robust. In addition, there will be renewed municipal investment in new public spaces for recreation in appropriate areas specified by the provisions of POT. The city will design an official guide to urban tree planting and species that not only enhance environmental quality but that also fit harmoniously into the urban fabric. The guide will provide advice for choosing the best species for a particular environment.

**RESILIENCE DIVIDEND:**
- It will increase the sequestration of carbon dioxide.
- It will protect the river, streams, and riverbeds.
- It will improve the quality of the urban landscape.
- It will improve air quality.
- It will increase the visual appeal of the area.
- It will reduce the effects of urban heat islands.
- It will foster social cohesion.

**MONITORING METRICS:**
1. Design and launch of the urban tree planting guide for Santiago de los Caballeros.
2. Percentage of budget allocated to municipal investment in new public recreational spaces in areas identified for renewal per the provisions of PMOT annually.
3. Increase in reforested kilometers of gullies crossing the city annually.
4. Increase in percentage of green areas per resident annually.

**LEAD**
City Hall

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
UGAM, Municipal de Plazas and Parks Direction, GIRS, OMPU.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**

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PROMOTE USE OF SANTIAGO DE LOS CABALLEROS CENTRAL PARK

**DESCRIPTION:**
The Central Park Corporation has envisioned the construction of a children’s recreational space at the Central Park positioned as an important space for the city of Santiago de los Caballeros where recreational, leisure and sports activities take place promoting the healthy development of childhood through playgrounds in a space of approximately three thousand meters of land. The children’s recreational space will include a gazebo, a bridge house, swings and trapezoids all raised in wood. It will also count with sixty wooden benches and tables for families to go on picnics. Central Park’s new green space will extend for 60 hectares doubling the number of green area square meters per city dweller.

**RESILIENCE DIVIDEND:**
- It fosters social cohesion through its spaces for recreation and cultural activities.
- It will improve the condition of the gullies.
- It will improve quality of life in the surrounding communities.
- It will increase goodwill in the adjoining neighborhoods.

**MONITORING METRICS:**
1. Percentage reduction of air contamination in the immediate surroundings of Parque Central annually.
2. Annual percentage increase in visitors to Central Park for exercise and recreation.

**LEAD**
Parque Central Board

**TYPE:**

**STATUS:**

**PERIOD:**

**STAKEHOLDERS:**
UGAM, Municipal de Plazas and Parks Direction, GIRS, OMPU.

**AVAILABILITY OF FUNDS:**

**RESILIENCE QUALITIES:**
**Implement the Metropolitan Green Infrastructure Master Plan**

**Description:**
City Hall will lead the implementation of a master plan that brings existing spaces and a network of new spaces together as parks lining the main rivers and streams. Santiago has a wide hydraulic network with tributaries of the Yaque del Norte River that virtually embrace the whole city. It is this natural network of rivers and riverfronts that forms a basic framework for reversing the downward trend in the amount of green space per resident in the city. If this green infrastructure is restored, connected, and strengthened to cover the city perimeter as a green belt, the territory will be better able to respond to floods and the effects of climate change, and the environmental quality of the metropolitan area will improve.

**Resilience Dividend:**
- It will increase carbon dioxide capture.
- It will protect the river, streams, and riverbeds.
- It will improve the quality of the urban landscape.
- It will improve air quality.
- It will increase the appeal of the area.
- It will reduce the effect of urban heat islands.

**Monitoring Metrics:**
1. Percentage of air contamination reduction in the immediate area of metropolitan green infrastructure annually.
2. Percentage of green spaces connected within the infrastructure of ecological corridors.

**Stakeholders:**
MOPC, OMPU, PMOT, Mimarena.

**Availabilities of Funds:**

**Resilience Qualities:**

**Type:**

**Status:**

**Lead:**
City Hall

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**Implement the Reforestation and Conservation Program for Existing Carbon Sinks**

**Description:**
The Provincial Environment and Natural Resources Ministry (Mimarena) has an annual reforestation program for Santiago province of about 85,000 trees, with an annual increase of about 5% to restore the 30 meters of waterfront or ecologic corridors of the Yaque, Nibajito, Pontezuela, Gurabo, and Jacagua Rivers, among other tributaries. This program is intended to increase the forest coverage of the province and the environmental quality of urban areas such as Santiago de los Caballeros.

**Resilience Dividend:**
- It increases carbon dioxide capture.
- It protects the rivers, streams and riverbeds.
- It improves the quality of the urban landscape.
- It improves the air quality.
- It increases the visual appeal of the area.
- It reduces the effects of urban heat islands.

**Monitoring Metrics:**
1. Increased percentage of urban tree coverage.
2. Percentage increase in water quality from tributary improvements annually.
3. Percentage decrease in air contamination annually.
4. Percentage increase in the quality of urban and peri-urban green spaces annually.
5. Number of trees planted annually.
6. Number of square kilometers of riverfront recovered annually.

**Stakeholders:**
Municipal Plazas and Parks Direction, Botanical Santiago Soeci, Central Park Board, Neighborhood boards, INVI, Government Office.

**Availabilities of Funds:**

**Resilience Qualities:**

**Type:**

**Status:**

**Lead:**
Mimarena

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As part of the great and ongoing planning history of the city, Boulder manages many aspects of its ecosystem, including management of the interaction between fauna and people, maintenance of the forest canopy, and regular restoration activities along the riverfront. The latter contribute to Boulder’s quality of life and community spirit as well as to the city’s successful green belt planning. Based on these efforts, the city is incorporating various initiatives into a unique management plan to address new opportunities to expand the current green infrastructure planning initiatives for the future.
The Resilience Strategy for Santiago de los Caballeros is the result of consolidating the human and technical capacities of the municipality. Thanks to surveys and studies conducted by the academic sector, NGOs, and the territory’s governing institutions. The city has documents such as the Santiago Strategic Plan, the Basin Plan, and the ICES-BID Action Plan, as well as documents stemming from academic research projects, that reflect a clear desire to transform Santiago de los Caballeros into a national and international example of the proper management of common assets and of sound principles for decision-making.

The Chief Resilience Officer will work hand in hand with the municipal departments and their directors to support the application of a resilience lens in the planning and implementation of the initiatives described in this Resilience Strategy and in other initiatives that contribute to the city. This will promote adoption of the concept of resilience as an overarching and cross-functional principle of municipal management.

All aspects of risk management will be coordinated, including preventative planning and response activities, early warning and development of the response capacities of vulnerable communities, and integration of human resources, as well as, material and economic resources so that they are sustainable over time. To accomplish this, the efforts of multiple stakeholders in the risk management of Santiago de los Caballeros must take place as part of a coordinated work plan. Communication among the various institutions and organizations that are part of the Resilience Committee for the territory’s management will be key.

Internationally, 100RC has partners who offer pro bono services to cities of the network. They can assist the municipality in implementing its resilience initiatives. Santiago de los Caballeros must capitalize on these connections along with the other 99 100RC cities committed to building resilience and exchanging ideas, practices and knowledge.

The project “Vive el Yaque” aims to recover Yaque del Norte River. It is coming at a time when there is a unique opportunity to transform Santiago de los Caballeros and to bring the multiple benefits of resilience to all its citizens. The city’s dynamic environment requires a monitoring system to play a key role in the periodic assessment of data that must take place as the Resilience Strategy is being implemented. The impact of the various actions to build resilience must be measured. For this strategy to be successful, all who work and live in the city must participate and every action must be monitored, so that each is efficiently and effectively executed for the benefit of every inhabitant of Santiago de los Caballeros.

Given that administrative changes are a challenge, it is expected that this Resilience Strategy is just the beginning of the city’s commitment to ensure the continuation of the resilience program into future. Santiago de los Caballeros will survive, adapt, and grow no matter what types of acute shocks and chronic stresses it undergoes, thanks to its commitment to moving forward as a unified city in building a metropolitan territory that is healthy and thriving from following the path of resilience and sustainability. We invite you to walk this path with us.
Glossary

A
Adaptation to Climate Change
The adjustment of natural or human systems in response to climate stimuli or effects, actual or expected, that moderate their damage and exploit beneficial opportunities (UNFCCC).

Biodiversity
Range of life on Earth. It includes all bodies, species and populations, genetic variations among them and their complex sets of communities and ecosystems (UNEP).

B
Biodiversity
Range of life on Earth. It includes all bodies, species and populations, genetic variations among them and their complex sets of communities and ecosystems (UNEP).

C
Climate Change
Change of weather, directly or indirectly attributable to human activity that alters the composition of the world’s atmosphere and that adds to the natural climate variability observed during comparable periods of time (UNFCCC).

Response Capacity
The ability of people, organizations and systems to make use of available resources and technologies to face and manage adverse conditions, emergency situations and disasters (UNFCCC).

Social Capital
Networks with shared standards, values, and knowledge that facilitate cooperation within groups or among groups. According to this definition, networks are understood to be real-world links among groups or between individuals (e.g., networks of friends, family, former colleagues). Social capital provides the means to facilitate collaboration, cooperation, and innovation (OCDE).

Social Cohesion
Tendency of a group to be unified when working toward a goal or when addressing the emotional needs of its members (Caron and Brawley, 2000).

Coliform
The generic denomination coliform refers to a group of bacterial species with certain common biochemical features and a relevant importance as indicators of water and food contamination.

Conurbation
An area that is not administrative nor legal and that does not correspond with political-administrative boundaries. It consists of the adjacent urban areas of the city, contiguous with the Villa Gonzalez, Putil, and Tamboril municipalities, as well as the municipal district of San Francisco de Jacagua.

Resilience Qualities
Qualities that enable cities to withstand, respond, and adapt more readily to acute shocks and chronic stresses (100RC).

D
Environmental Degradation
Reduction of the environment capacity to respond to needs and social and ecological objectives (UNISDR).

Human Development
It has the purpose of enhancing people’s opportunities, paying special attention to the value of human lives and not only to wealth of economies (PNUD).

Sustainable Development
Development that meets the present needs without exposing the capacity of future generations to satisfy their own needs (Brundtland Commission). Sustainable development may not be achieved if there is no assurance that all women and men, and girls and boys, enjoy dignity and human rights and the chance to enhance their abilities, guarantee their reproductive health and their rights, find decent employment and contribute to economic growth (UNFPA).

Disaster
A serious disruption in the function of a community or society that causes a large number of deaths as well as losses and material, economic, and environmental impacts that exceed the capacity of the affected community or society to face the situation using its own resources.

Ecosystem Diversity
Ecosystem variations in a geographic location and their global impact on human life and the environment.

Human Diversity
Variations based on physical characteristics and social context, that is, genes and culture (Durham, 1991)

E
Eco-effective
Emulating nature in the process of directly maintaining the quality of resources through their life cycles instead of disposing of the waste produced. What is produced is not waste, but new resources.

Ecosystem
A community of living organisms together with the non-living components of their environment (e.g., air, water, or mineral soils) that interact as one system. These biotic and abiotic components are considered to be joined together throughout their life cycles and energy flows (Odum, 1971).

Entrepreneurship
Process in which a person takes an idea and creates a concrete business, for a profit or nonprofit, which results in innovation and employment opportunities.

Exposure
Populations, properties, systems or other elements present in areas where there are threats and where, therefore, they may experience losses (UNISDR).

F
Geologic Fault
Discontinuity in a rock formation through which a significant displacement takes place when the rock mass moves. The energy released by the rapid movement in active faults is the cause of a majority of seismic movements (Allaby, 2015).
Greenhouse Gases
Atmospheric gases that are responsible for global warming and climate change. The main greenhouse gases are carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). Greenhouse gases that are less frequent, but very potent, are hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF6) (UNFCCC).

Governability
The capacity of a socio-political system to govern itself, which in turn depends on the quality of the system’s laws and regulations as well as the system’s influence on them. The greater the quality of the governance, the greater the institutional capacity to meet the system’s needs.

Governance
Term used to refer to the efficacy, quality, and good leadership features of the interaction between strategic actors of a territory in responding to its society’s needs.

Governing
The capacity of a socio-political system to govern itself, which in turn depends on the quality of its laws and regulations as well as the system’s influence on them. The greater the quality of the governance, the greater the institutional capacity to meet the system’s needs.

Liquefaction
Liquefaction of soils is a phenomenon in which land, specifically recent sediments, such as sand and gravel, lose their firmness and flow due to water saturation, and as a result of the stress caused upon them by earthquakes. Liquefaction is a major cause of earthquake-related destruction (even more so than the direct action of waves on buildings). That is, liquefaction can displace, sink, or topple infrastructure, including homes and other buildings.

Mitigation for Climate Change
Human interventions to reduce greenhouse gas sources or to increase sumps for greenhouse gases. Interventions to reduce greenhouse gases includes the use of fossil fuels in a more efficient manner and the use of solar power or wind power. “Sumps” are forests or oceans that are healthy enough to absorb and eliminate large amounts of the carbon dioxide in the atmosphere (UNFCCC).

Shock
Sudden natural and social disasters such as fires, earthquakes, floods, and acts of terrorism.

Isocacceleration
A fixed rhythm of acceleration/deceleration from a seismic fault. The amplitude distribution of maximum accelerations in soil is present in curves calculated by interpolation of acceleration/deceleration values.

Citizen Involvement
Individual and collective actions designed to identify and address that relate to the public interest. It is a collective commitment to work on making a difference in the civic life of a community and to develop the knowledge, skills, values and goals to achieve it. It means to foster quality of life through both political and non-political processes (New York Times).

Resilience
The capacity of individuals, communities, businesses and systems within a city to survive, adapt, and grow, no matter what kinds of acute shocks and chronic stresses they experience. (100RC - Rockefeller Foundation).

Risk
The combination of probability that an event will occur and its negative consequences (UNISDR).

Ecosystemic Services
The benefits obtained from ecosystems by people and communities. Among the benefits that ecosystems offer are the so-called “regulating services,” such as regulation of floods, droughts, and soil degradation, and the “provision services,” such as food and water. Also included are “support services,” such as soil formation and nutrient cycles, and “cultural services,” such as recreational, spiritual, religious, and other non-material services (UNISDR).

Early Alert System
The set of capacities needed to produce and broadcast alert information that is critical and timely so that individuals, communities, and organizations endangered by a threat can get ready to act appropriately and with enough lead time to reduce the possibility of losses or damages (UNISDR).

Sustainability
Derived from “sustainment” and “ability,” this concept refers to the property of biological systems to remain diverse and productive over time. In more general terms, sustainability is the permanence of systems and processes. The governing principle of sustainability is sustainable development, which includes four interconnected domains: ecology, economy, politics, and culture (James et al., 2015).

Man-made Vulnerability
The reduced capacity of a person or group of people to anticipate, face, and resist the effects of a natural threat or one caused by human activity, and to recover from those threats. It is a relative and dynamic concept. Vulnerability is almost always associated with poverty. However, people living in isolation and with insecurity and feelings of helplessness in the face of risks, shocks, or chronic stresses are also vulnerable.

Natural Vulnerability
A complex internal factor of risk in a system that corresponds to the degree of exposure to harm when there is a specific threat, natural or man-made, given the system’s intrinsic disposition to be harmed. This type of vulnerability can be expressed through various dimensions: physical, cultural, psychosocial, environmental, economic, political, and institutional.
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ACKNOWLEDGMENTS

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### INSTITUTIONS AND STAKEHOLDERS ATTENDING THE VALIDATION WORKSHOPS

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### KEY STAKEHOLDERS (EXTERNAL TO CITY HALL)

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Yaque del Norte River
Photo: Robert Pérez
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