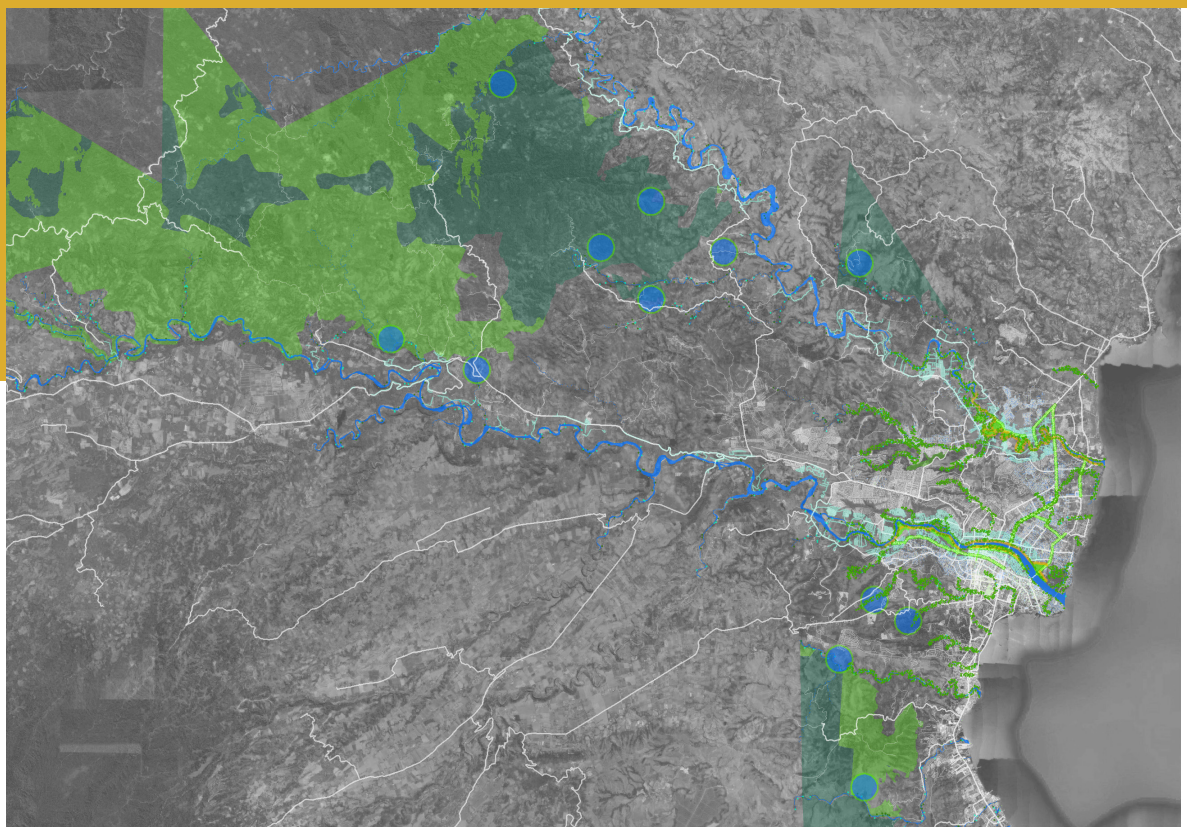
CAGAYAN DE ORO CITY

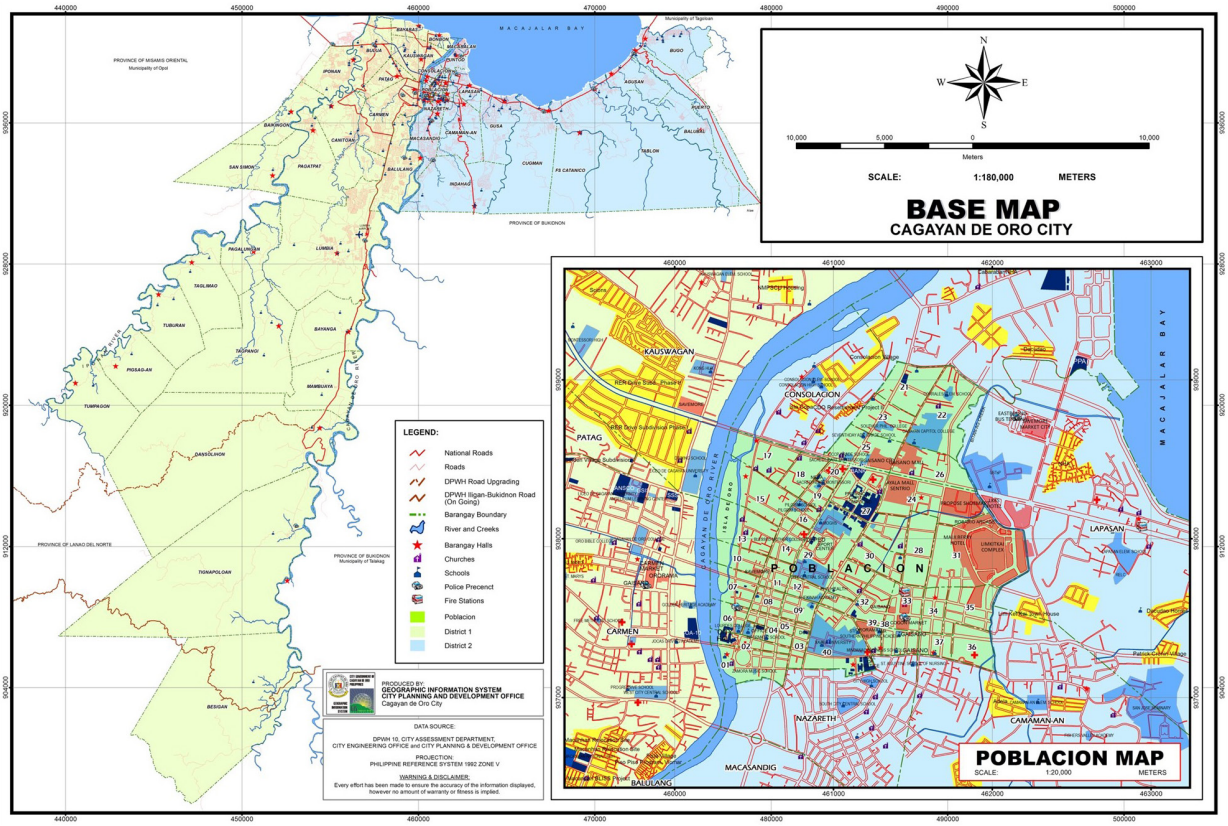
CASE STUDY ON THE PATH TO CLIMATE RESILIENCY



ABOUT OUR CITY

Cagayan de Oro City is a first class, highly urbanized city located at the center of Northern Mindanao (Region X). Its total land area of 57,851 hectares (578.51 sq km) spreads across 80 *barangays* (villages), 14 of which are located along Macajalar Bay and facing the Mindanao Sea. Its upland *barangays* in the south share borders with Bukidnon province's watershed areas that drain into either the Cagayan de Oro River or the Iponan River, both located in the city.

Figure 1: Base Map of Cagayan de Oro City



Dubbed as the "Gateway to Northern Mindanao" and the logistics hub of the region, the city has a deep water seaport serving both passenger and cargo ships; and bus terminals with transportation services to nearly all areas in Mindanao, as far as Surigao City to the east, Zamboanga City to the west and General Santos City to the south, and connecting to the rest of the country.

The airport, which was transferred from Lumbia, Cagayan de Oro to Laguindingan, Misamis Oriental in 2013, caters to passenger and cargo planes from the Northern Mindanao area, most of which travel from and to Cagayan de Oro. The Laguindingan Airport connects the city to Metro Manila by an hour and half and to Cebu City by 50 minutes. There are also daily flights going to the cities of Iloilo, Dumaguete, and Davao.

The city has an estimated population of 746,000[1] with a population density of 1,289 persons per sq km. The city's annual average population growth rate of 2.69% is higher than the national average. The city's highly urban and relatively young[2] population is estimated to grow even further and could double in year 2047.

Such a high growth rate is attributed not only to increase in birth rate but also to migration, as the city is a magnet for employment and education in the region. In 2019, Cagayan de Oro registered over 26,000 businesses, resulting to Php 112 Billion gross sales. Agriculture, fishery, and forestry represent the biggest share in businesses at 53.93%, with manufacturing and quarrying close second and third places at 14.37% and 14.28%, respectively. Other sectors contributing to the income of the city are: construction, wholesale and retail, transport/ storage/communications, business services, and community services. The city also serves as a home to several business process outsourcing offices, one of the sectors that contribute to the region's economic development, particularly to Region X's Gross Domestic Product.

Cagayan de Oro is also the center of education in the region, with four universities and several other higher education institutions and technical-vocation institutions. Education is a priority of the city government: the collected real property taxes are heavily invested in improving and constructing school buildings. Since 2013, over 600 school buildings and 20 new campuses have been built and has produced over 28,000 graduates. The city also introduced the IskolarsaDakbayan (IsDa) Program, which offers fully subsidized tertiary education for qualified students at a university of their choice. The inclusive education-targeted programmes have earned the city awards and recognition, such as the Seal of Good Education Governance by the Synergeia Foundation for 2017, 2018 and 2019 and the Galing Pook Award for 2017 and 2018.

Recognizing that Northern Mindanao is the center for trade, logistics, ICT, and education, the national government has initiated efforts to establish the Metro Cagayan de Oro with the city as the center, as indicated in the Philippine Development Plan 2017-2022. This effort is backed by approved investments for the region totaling Php 228.8 billion in 2018[3], the biggest in the country.

An enabling and resilient natural and built environment is necessary for the city to realize and sustain the projected growth. Just as the city has played an important role in the growth and development of the region, it continues to do so as it moves closer to achieving climate change resilience. This path, however, has been fraught with challenges.

For a city that used to be hit by typhooons only 11 times during a 20-year period, Typhoon Sendong (international name: Washi) in December 2011 proved to be devastating. While it barely rained in the city proper, the heavy downpour dumped a month's worth of rain in nine hours in some areas in Bukidnon province, which was eventually drained into the Cagayan de Oro River. From two meters, water level rose to as much as 9.86 meters at the Cabula river area. This unprecedented event resulted in 674 lives lost, decimated riverside communities, and irreparable damage to critical habitats.

This disaster forced the city to acknowledge that it experienced the effects of climate change, and pushed it to take necessary steps in implementing adaptation and mitigation measures and mainstreaming these in planning and development.

This is the story of Cagayan de Oro, and its people's journey towards climate resiliency—the city that has endured tortuous challenges, but also one of hope rising from the aftermath of Typhoon Sendong.

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[1] As of 2020.

[2] About 30.81% of the total population belongs to the age group 0-14 years old. Productive population (ages 15-64 years old) comprises 66.86%, while 3.33% of the household population are elders (above 65 years old). The bigger portion of its workforce is composed of a relatively young population, with 16% coming from age range 20-24 years old, with both sexes equally represented.

[3] Board of Investments, 2018. (https://boi.gov.ph/setting-another-record-breaking-performance-boi-investment-approvals-breach-php907b-level-in-2018/)

OUR PEOPLE IN THE FACE OF CLIMATE CHANGE

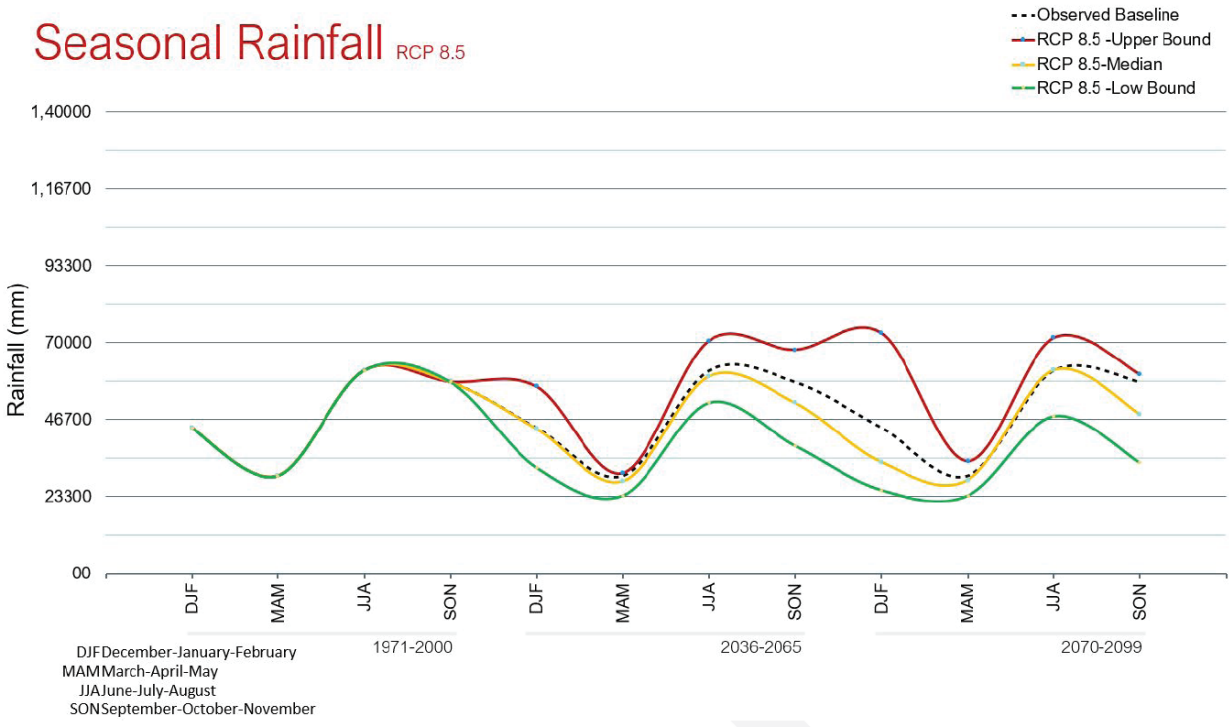
The city's experience with Typhoon Sendong was a clear indication of changes in climate, with potentially devastating effects on the city unless transformed into positive action.

Under the Coronas Climate Classification System of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Cagayan de Oro's Climate falls under Type III and IV. The western portion of Cagayan de Oro is classified under Type III, which is characterized by a short dry season, usually from February to April. Type IV climate in the eastern part of the city, meanwhile, is characterized by an almost evenly distributed rainfall during the whole year.

Projections using Representative Concentration Pathway (RCP) 8.5[4], often regarded as the "worst case" climate change scenario based on the business-as-usual path of increasing GHG emissions, show a wide range of changes in rainfall volume for both mid-century and late-century periods. It could increase by as much as 28.1% from December to February, the highest increase for mid-century forecasts, but could also decrease by as much as 27.2% for the same period. The dry period from March to May would be even drier, as rainfall volume is estimated to decrease by 20% by mid-century. Meanwhile, late-century projections foresee a 64.8% increase in rainfall volume in the wet season of December to February, and a dry season with a plausible 236.7 millimeter (mm) of rainfall, compared to the current baseline of 296 mm.

[4] Representative Concentration Pathways (RCPs) are "scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases (GHGs) and aerosols and chemically active gases, as well as land use/land cover".

Figure 2: Representative Concentration Pathway (RCP) 8.5 Seasonal Rainfall Projections



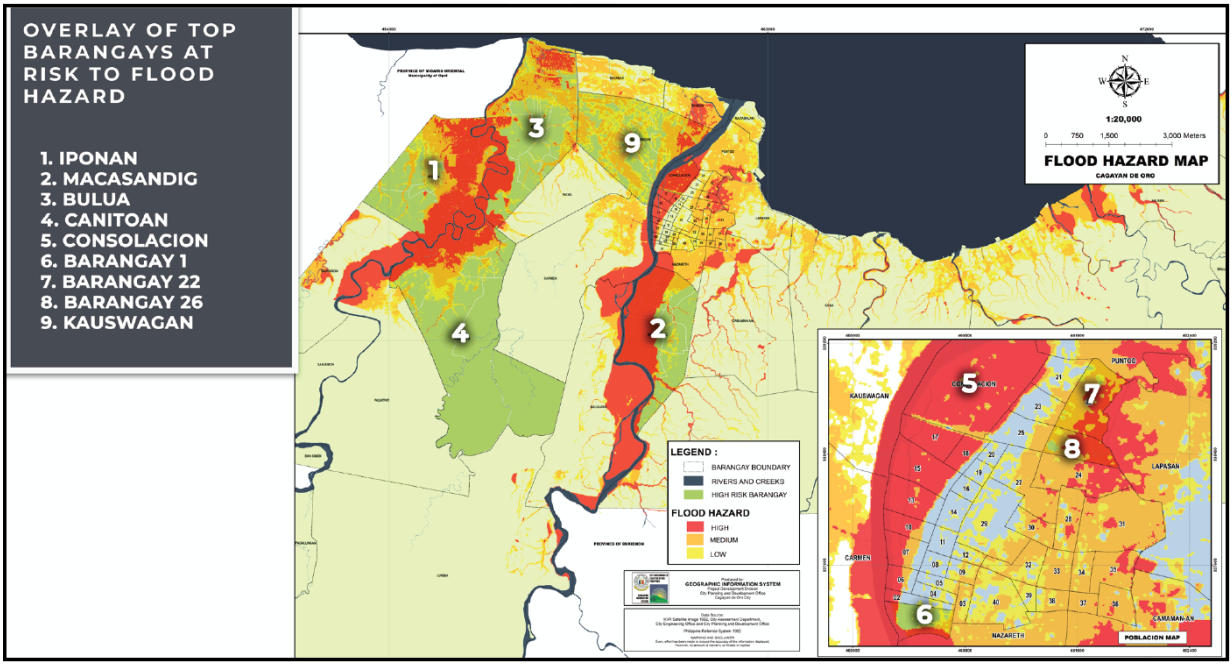
Note: For the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, four scenarios were selected as basis for climate change projections.3 On the other hand, the Special Report on Emissions Scenarios (SRES) projection for extreme rainfall events, reveal that more than 150mm will fall on around 13 days in 2020 and 9 days in 2050.

Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration.

This wide range of scenarios compels the city to address and manage critical factors that contribute to the effects of climate change.

Externally, heavy rainfall at the watershed areas would result in runoff that drains into the Cagayan de Oro and Iponan rivers. This can be aggravated by a decrease in forest cover, caused by deforestation and the conversion of agricultural areas into banana and pineapple plantations, which do not absorb enough water. Excessive runoff will adversely affect flood-prone and low-lying *barangays* located along Cagayan de Oro River, Iponan River, and the coast. 74,399 people are currently exposed to 1.5 meter (m) flood depth, with 59 out of 80 *barangays* at high risk. At most risk are residential areas in Barangays 18, 17, Consolacion, 2 and 15, all of which have the highest risk scores for population based on their vulnerability to previous flooding incidents. Climate and Disaster Risk Assessment (CDRA) results show that while Barangay 18 has a high risk score, Barangay 22 has the highest vulnerability score.

Figure 3: Flood Hazard Map of Cagayan de Oro



Source: City Engineering Office and City Planning and Development Office, CDO

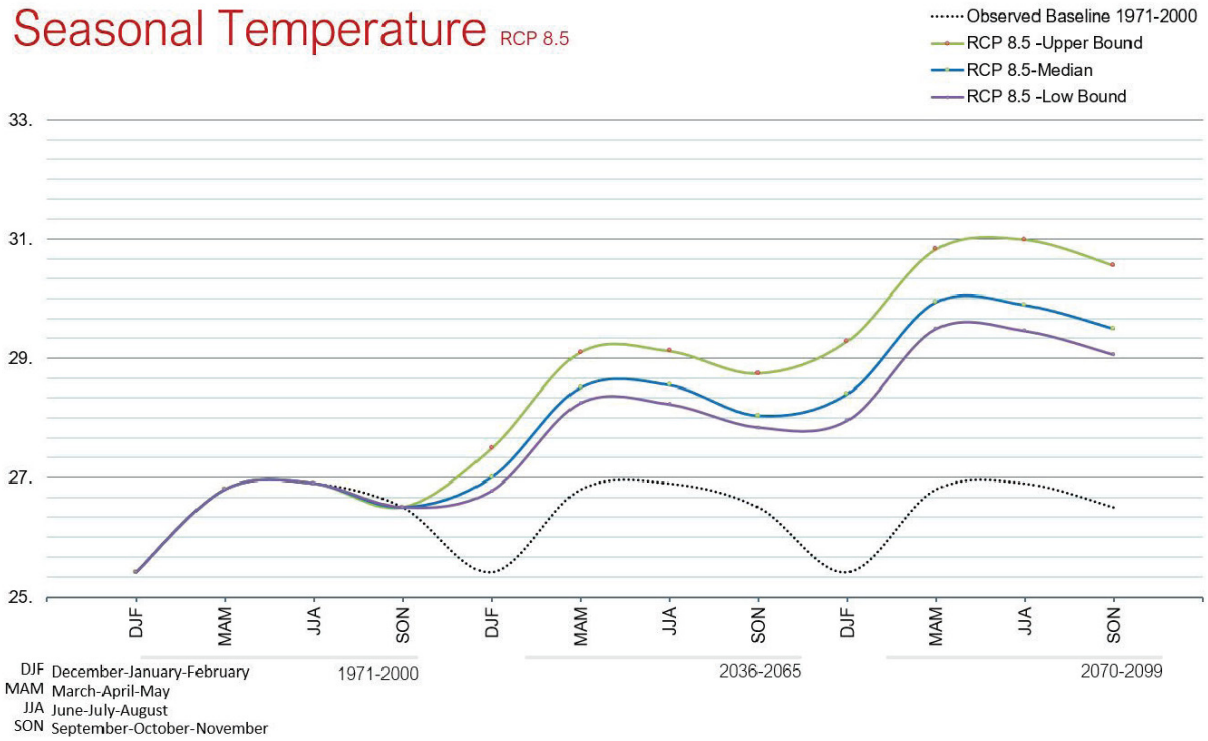
There is also a high number of households in these areas that live below the poverty threshold and in houses made of light materials, which further increase their risk to climate change-driven flooding. As of this writing, around 208 informal settler families (ISFs) living in these *barangays* have been profiled and included in the City Housing and Urban Development Department's list of ISFs to be considered for provision of adequate housing.

All in all, nine *barangays* are critically vulnerable and majority of the city's 80 *barangays* are highly vulnerable to flooding.

The city's critical facilities are likewise at risk, especially Barangay Carmen where a higher education institution is at high risk of flooding. Meanwhile, Cagayan de Oro Water District's production wells, which are some of the city's lifeline faclities located in Barangay Camaman-an, are also highly at risk, with potentially high cost of replacement in case of damage from flooding.

Aside from drastic changes in rainfall patterns, Cagayan de Oro also faces increased temperature. Projected mean temperature under RCP 8.5 scenario for mid-century could increase by as much as 2.3 °C. At the end of the century it could increase by 4.1 °C from June to August.

Figure 4: Representative Concentration Pathway (RCP) 8.5 Seasonal Temperature Projections



Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration.

Such changes amid increasing commercial activitiy, especially in Poblacion (downtown area), result in heat stress. In fact, the city's heat stress map shows high to very high heat index in areas where there are more concrete buildings and less urban green cover. Particularly, heat stress affects 42 out of 80 *barangays*, including almost all of the 40 urban *barangays*. Most of these urban *barangays* comprise the business district with relatively high transport concentration and energy consumption. Increased temperature will thus further exacerbate heat island effect, or the significant warm temperature in built-up areas[5] that is evident in the city.

Increased temperature may not only cause discomfort to the residents but may also lead to illnesses. For instance, the city has an unprecedented record of over 1,500 cases of dengue in 2019[6], which resulted in eight deaths. Various studies have pointed to the strong influence of temperature on dengue transmission and the Aedes mosquito population.[7]

The CDRA conducted by the city in 2018 identified two other climate-related hazards: storm surge in the 14 coastal *barangays* and rain-induced landslides in the southern part of the city.

All 14 coastal *barangays* are highly susceptible to storm surge. Natural barriers such as mangroves are not dense except in areas where mangrove planting activities were regularly undertaken. Compounding this are several

[5] As defined by the United States Environmental Protection Agency (US-EPA).
[6] See https://pia.gov.ph/news/articles/1025613.
[7] See https://www.who.int/heli/risks/vectors/denguecontrol/en/.

big-ticket infrastructure, including bridges and a diversion road, that threaten critical habitats along coastal areas. These projects also forced the relocation of informal settler families, increasing their vulnerability. Around 200 families are affected by the ongoing flood risk project along Cagayan de Oro River. The City Housing and Urban Development Department is conducting profiling to obtain data for the housing database and planning purposes.

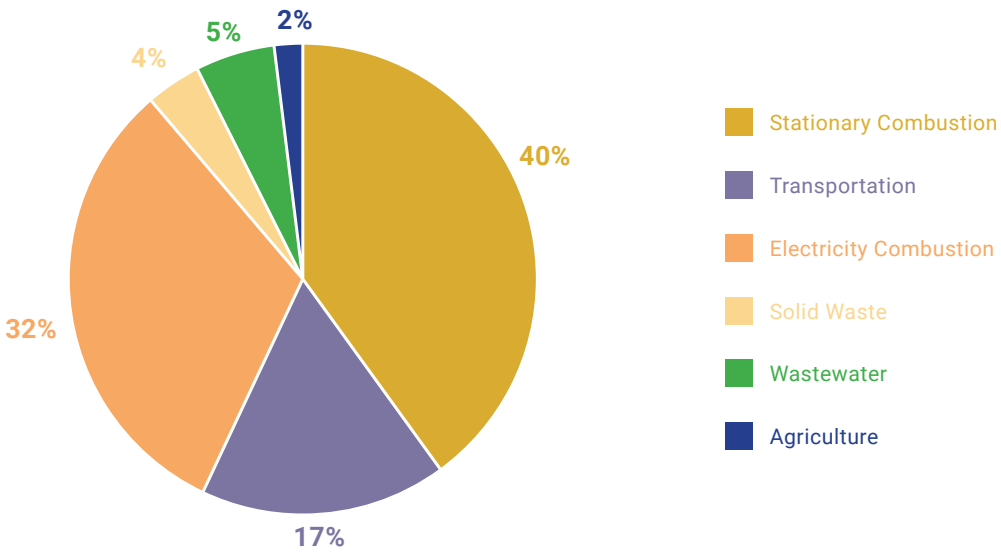
Most of the *barangays* at the southern part of the city have low to moderate vulnerability to rain-induced landslides. The exposure of these areas is not high, which is an advantage for production areas in the southern section. There are also opportunities to harness water for communities with limited supply.

Given climate change projections and technical findings of the CDRA, the city realized the need to address four climate change impacts: flooding, heat stress, storm surge, and rain-induced landslide.

The city government, together with the Climate Change Commission, implemented the Twin Phoenix Project in 2012 aimed at addressing the impact of climate change in the city. Mainly a response to Typhoon Sendong, the project focused on flood mapping and projection, new warning systems, and stream gauges. The project was also an opportunity to provide a new perspective on disaster risk management and dispel the notion of the city as being "typhoon-free".

In addition, the city also supported by an official development assistance on strengthening urban development, conducted its greenhouse gas (GHG) inventory. Done in 2016, this initiative aimed to shed light on sources of GHG emissions, and hopefully guide the city in implementing appropriate measures to reduce them.

Figure 5. Sources of Greenhouse Gas Emissions, Cagayan de Oro



Source: Cagayan de Oro's Greenhouse Gas Inventory 2016.

Community-level inventory revealed that stationary combustion[8] was the city's highest source of GHG at 441,251 tonnes of carbon dioxide (tCO2e) or 40.06% of the total emissions. The residential sector accounts for 88% of the total stationary combustion emissions, while the use of wood and biomass by both the residential and commercial/industrial sectors accounts for 98% of the stationary combustion emissions. Electricity consumption came in second at 348,460 tCO2e or 31.64%, while various transportation sources were the third largest contributor, adding 185,739 tCO2e or 16.86%.

The results of the inventory was an active prompt for the local government to arrest the increase of GHG emissions, by targeting its sources and prioritizing actions that can lead to emission reduction.

These past initiatives would fuel the city's continuing effort, and inform current plans and programs towards climate change resilience.

[8] Stationary combustion sources are energy systems that are fixed in place and GHG emissions are caused by the combustion of fossil fuels or biomass. They can be deployed in residential households (e.g., gas stoves) and commercial establishments (e.g., small-scale diesel generators), manufacturing/commercial industries (e.g., fuel-powered boilers) or power plants (e.g., gas-powered turbines).

OUR PURSUIT TO BUILD RESILIENCE THROUGH URBAN PLANS AND DESIGNS

The effect of climate change on the formation of typhoons became part of post-Sendong conversation as the city formulated its Vulnerability and Adaptation Assessment (VAA) in 2013, and consequently in the crafting of its Local Climate Change Action Plan (LCCAP), which was completed in 2017. The United Nations Human Settlements Programme (UN-Habitat) Philippines assisted in facilitating the city's teams through the processes in order to produce both outputs.

Another partnership was forged in 2017 as the city was chosen to be one of five partner cities of the Building Climate Resilience through Urban Plans and Designs (BCRUPD) Project.

Increased Capacity through the BCRUPD Project

One of the main objectives of the BCRUPD Project was to develop local government capacity. The project started by conducting a Capacity Needs Assessment (CNA) of the relevant local government staff. Through surveys, focus group discussions, and key informant interviews, the CNA identified existing knowledge and skills, and capacity gaps. It revealed that the local government did not have its own capacity development program on climate change, particularly on urban plans and designs. Majority of the respondents also acknowledged the importance of the building the capacity of the local government unit (LGU) since only 45% said they have a basic understanding of the concepts related to climate change. The survey also revealed a low level of knowledge on urban design, with few having relevant work experience and 22% needing advanced knowledge on the subject.

Across all the departments that participated, these were the identified priority learning areas: Multi-hazard Vulnerability and Risk Assessment,

Environmental Planning, Urban Planning and Design for CCA, Advanced Climate Change Adaptation, and Geographic Information System and Database Management.

Aside from completing the CNA, the city started updating the LCCAP. Attention was drawn to the Risk and Vulnerability Assessment. The updating process revealed a glaring gap that the multi-sectoral team composed of the local government, academe, professionals, and utility providers had to face: the city had incomplete or outdated data sets. This made data and technical analysis challenging because the Technical Working Group (TWG) members had to gather information first, mostly from primary sources. It took about four months to finish, with some data obtained after more than six months due to changes in the data requirements. On the upside, the TWG were able to gather the latest data for the CDRA. The project trailblazed what was to become a critical part of urban planning–conducting the enhanced CDRA, which became the basis for the LCCAP now being used by the city. The CDRA will also figure in the review and updating of the city's Comprehensive Land Use Plan (CLUP).

The city is now pushing to utilize the Community-Based Management System (CBMS), a household-level data gathering tool for evidence-based program implementation and impact monitoring, to gather the needed information for planning purposes. Enumeration is ongoing and once complete, the CDRA and LCCAP will again undergo updating using CBMS data.

The BCRUPD project has helped the city recognize the significance of data gathering in technical analysis. Moving forward, it will continue place paramount value on correct climate and disaster risk data as a takeoff point for climate-resilent urban plans and designs.

Another challenge in appreciating the LCCAP as an integral part of LGU-level planning was the difference in terminologies, specifically the definition of mitigation in the context of disaster risk reduction and in climate change. But through a series of capacity building activities, members of the TWG and other participants deepened their understanding of climate change, including nuances in climate change and disaster risk approaches, and used this knowlede to identify and take the next urgent steps that needed to be taken.

New Learnings

Urban design, particularly that which is geared towards climate change adaptation and mitigation, is important. Its integration into building guidelines helps in the development and management of a rapidly urbanizing city. It provides guidance in decision-making and prioritization, which is especially useful in LGU-funded projects. The adoption, localization, and customization of the Green Building Code through a local ordinance is an opportunity for sustained action towards climate resilience, This entails a lot of work, since adjustments in design need to be done down to the streetscape level.

Another significant learning for the TWG was using Excel pivot tables introduced by the project to help in the analysis and formulation of technical findings. The TWG used to work with innumerable sheets of data, making the process tedious and the analysis challenging. Since the old process was not efficient, the TWG even missed to include the scenarios and intersections of exposure units with the hazard or vulnerability on the first draft of their findings. The enhanced pivot tables enabled the TWG to shift to a more efficient process of analyzing and presenting data.

Aside from the CDRA, the LCCAP process also helped the LGU understand urban heat island effect, inspiring nature-based solutions such as urban forestry, urban container gardening, tree planting using endemic tree species, and development of policies and guidelines for heat-sensitive building construction.

Through improved assessment, the TWG ultimately gained a better understanding of the actual problems on the ground. The team used to prepare project briefs that only contained a simple list of projects on climate change adaptation and mitigation. After looking into the technical findings of the CDRA, the team began to see *barangays* as a bigger exposure unit, and customized the proposed climate change resilience initiatives based on local conditions and impacts.

Towards a City Adaptation Strategy

These proposed initiatives formed part of a larger city-wide strategy for climate change

adaptation. After a series of consultations with concerned stakeholders, the city government came up with Project Lunhaw.

"Lunhaw" is the Visayan vernacular for "verdant" or "lush". The word encapsulates the vision articulated by the TWG for Cagayan de Oro: a city filled with lush and green open spaces, which are accessible and convenient especially for senior citizens, pregnant women, children, and persons with disabilities. Lunhaw signifies a holistic approach to address the need for climate change adaptation and mitigation towards a more resilient population and city.

Lunhaw was initially planned as a project for the Poblacion area only, particularly Barangay 2, Divisoria Park, and the riverside portion of Barangays 2, 6, 7 and 13. However, after revisiting the CDRA and re-examining the technical findings, the LCCAP was adjusted, revealing additional priority areas areas: Barangays 22, 26, Bulua, Kauswagan, Iponan, and Macasandig.

The City-wide Lunhaw Strategy

With the LCCAP as basis and providing clearer direction, the city government realized that Lunhaw was not just a mere site-level project, but a broader climate change adaptation strategy that will help restore and protect critical areas in Cagayan de Oro.

The city-wide Lunhaw Strategy aims to achieve the following results:

- Improved watershed management for the area to benefit 2000 people living in and producing crops/livestock in the *barangay*: 10% by 2020; 20% by 2023; and 30% by 2025;
- Reduced GHG emissions of 10% by 2022 and 30% by 2030;
- Lowered ambient temperature by 1 degree by 2030;
- Improved resilience of all residential and commercial areas to flood impacts: 20% by 2020, 30% by 2022, and 40% by 2024 from the risk score baseline of CDRA;
- Lower number of populations living in critical flood prone areas by 80% in 2025;
- Improved *barangay* capacity to capture rainwater to avoid flood and introduce redundancy in water use covering 30% of the *barangay* area exposed;
- Increased property insurance coverage for residential, commercial, and institutional by 50% in 2025;
- Strengthened functionality of all reservoir/ pipes during and after flooding events where disruption will be 6 hours.

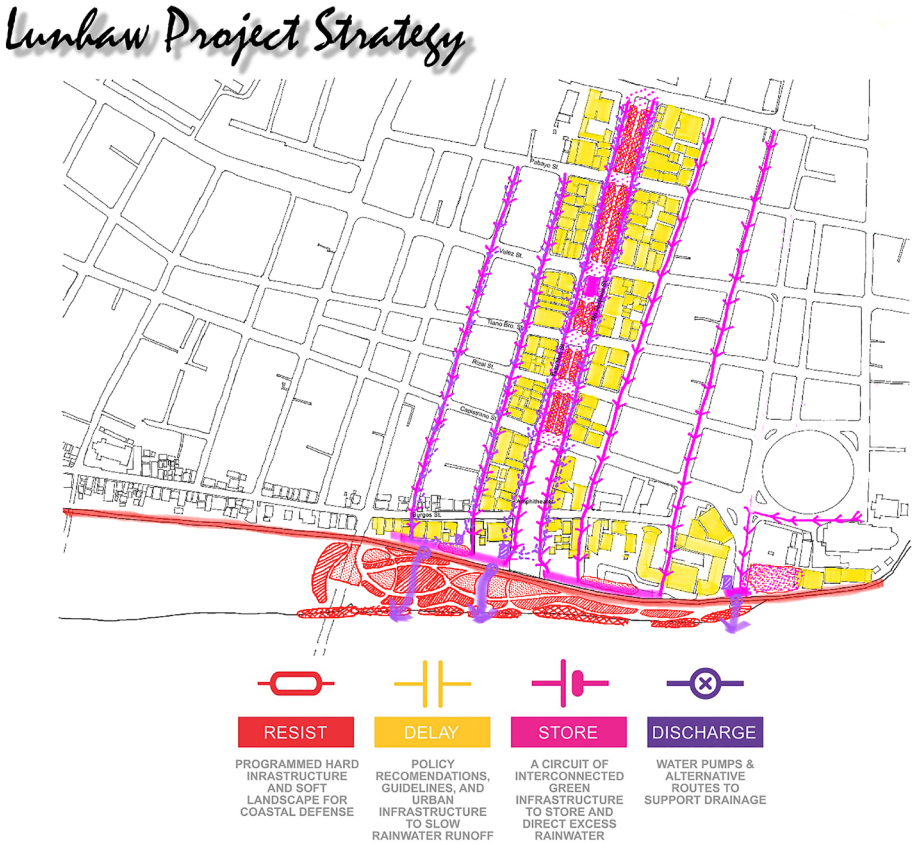
The Lunhaw Strategy focuses on utilizing urban elements to address the impacts of increasing temperature and to increase the volume of ground water recharge as a response to urban flooding. It emphasizes the ridge-river-reef approach in managing natural resources while facilitating urban development and delivery of urban services.

The strategy is conceptualized as three segments: Lunhaw Central (Poblacion area); Lunhaw West for Barangays Bulua, Kauswagan and Iponan; and Lunhaw East for Barangays 22, 26, Lapasan, and Puerto. Lunhaw Central will be designated as the entry point for the implementation of the all-inclusive Lunhaw Strategy.

Exsting multi-sectoral and spatial development strategies were considered in the identification of projects and activities under Lunhaw Strategy. As a result, the city's Urban Development Growth Areas correspond with Lunhaw, as within each growth area are high risk *barangays* that the project likewise seeks to provide interventions for. This way, climate action and urban development go hand-in-hand.

The Lunhaw Strategy incorporates the strategies of Resist, Delay, Store, and Discharge. Resist applies to the defense of coastal lines through a combination of hard and soft, nature-based infrastructure solutions. Delay refers to actions to slow down the run-off from accumulating in one area and thus causing flooding. It also pertains to the policies and guidelines that can be incorporated in building design and area development that will ensure more deliberate water flow. Store is the innovation in infrastructure that will direct the flow of water to a storage area, and allow the recycling or the repurposing of the stored water. Lastly, Discharge denotes the construction of drainage systems that will enable the flow of water away from areas prone to pluvial flooding by utilizing water pumps and drainage systems.

Figure 7: Four Major Strategies under the Lunhaw Project



Source: Cagayan de Oro Technical Working Group

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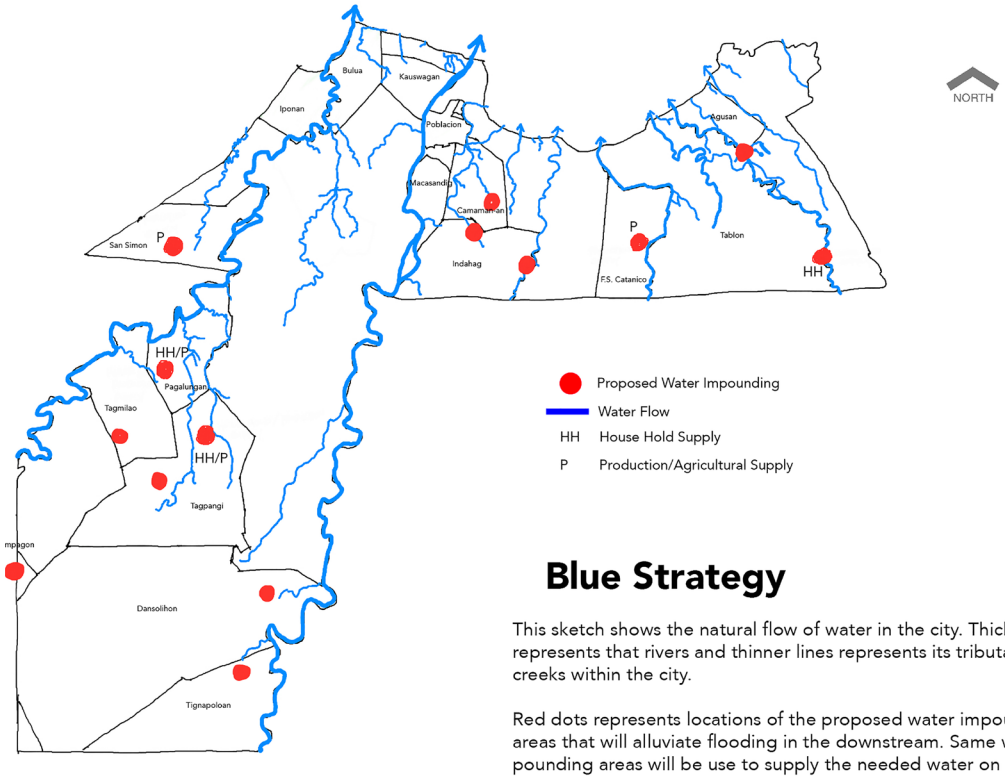
Lunhaw also follows the Blue-Green Framework. Besides managing water flow, it aims to improve the city's green spaces through watershed management, riparian reforestation, increasing green cover in urban areas, and promoting walkability. Doing so will develop and promote the city's "breathing

spaces" and address urban heat stress. Figure 8 below shows the natural flow of water in the city, along with the proposed water impounding area that can help alleviate flooding in the downstream.

Figure 9, meanwhile, shows a visual representation of Lunhaw's Green Strategy with the main objectives of reducing GHG level and improving water permeability and water recharge. The Green Strategy will also focus on preserving biodiversity, protecting forest reserves, and promoting walkability. Once implemented, this will help reduce the city's heat stress.

All these techniques will be applied to Lunhaw Strategy, particularly at the Lunhaw Central segment.

Figure 8: Natural Flow of Water in the City (Blue Strategy)



Blue Strategy

This sketch shows the natural flow of water in the city. Thicker lines represents that rivers and thinner lines represents its tributaries or creeks within the city.

Red dots represents locations of the proposed water impounding areas that will alluviate flooding in the downstream. Same water impounding areas will be use to supply the needed water on the hinter-

Figure 9: Lunhaw's Green Strategy

Green Strategy

Protecting forest reserves, Improving watershed management and reparian reforestation to improve temperature, increase carbon sequestration there by improving GHG level, improve water permeability and ground water recharge. By doing so, it encourage biodiversity to flourish and thrive. Where man and nature will live harmoniuosly.

Brown shading on the drawing indicates Highest heat stress in the city exacerbated by heat island effect. The city's plan climate change adapation is to introduce urban forest and increase green cover to all open areas. Promoting walkability along tree lined paths.

Lunhaw also closely aligns with the design elements provided by CLUP Guidebooks[9]. The urban design elements used to guide the conceptualization particularly of Lunhaw Central are the following:

Density + Mix

The Lunhaw Central segment along the city's Poblacion area will utilize density and mix, enhancing and maximizing the commercial, residential, recreational, and institutional uses of the area. Lunhaw Central will demonstrate the efficient mix of different uses of space, and will complement this combination with rainwater harvesting and impounding. It will also provide for the renovation and installation of infrastructure to ensure effective management of water run-off; the conversion of existing roads to pedestrian, non-motorized, and energy-efficient public transportation. More trees will be planted and water features will be included, both intended to give a cooling effect and counter the heat island effect from the surrounding built environment.

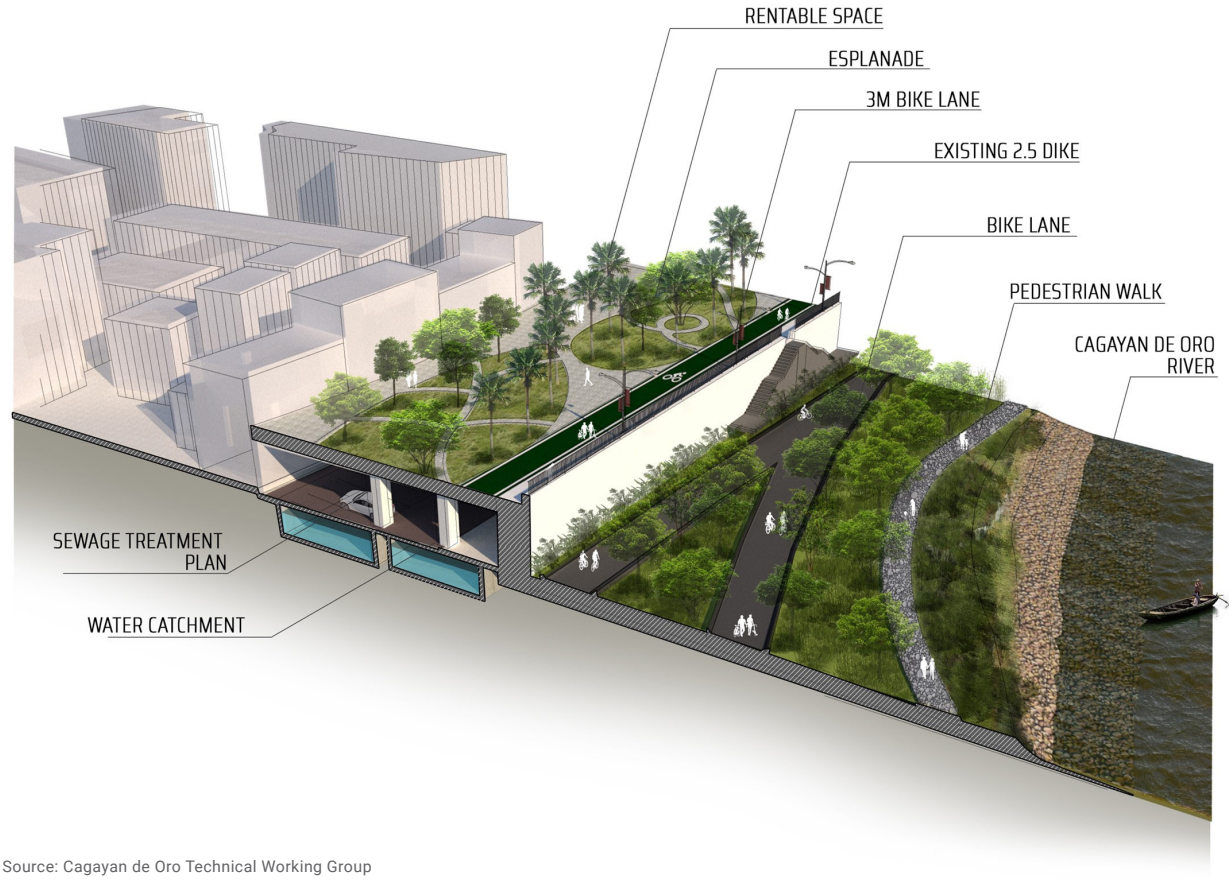
Details + Materials

Lunhaw espouses the use of sustainable and environmental-friendly materials in the design of buildings in the city. These include permeable materials, LED lighting, green roofing and walls, and rainwater catchment facilities. This will be especially useful to public institutions like schools in flood-prone areas.

The use of eco-friendly materials and promotion of greening of the built environment will be done in consideratiion of their impact on existing structures such as historical buildings. A wastewater recycling system will supply water to maintain public green spaces and help address urban flooding.

It is important to note that to operationalize climate-resilient deisgn, including specificities related to building materials, a local Green Building Ordinance must be adopted and institutionalized.

Figure 7: Four Major Strategies under the Lunhaw Project



Source: Cagayan de Oro Technical Working Group

[9] https://hlurb.gov.ph/services/local-government-unit/clup-guidebook/

Streetscape + Landscape

The city has allocated space for the "green loop", which will promote walkability and green spaces, and reduce heat stress. This is especially beneficial for areas that experience both flooding and high temperature, as is the case in the western side of the city. The loop will feature streetscapes with increased greenery, pedestrian zones, and bike lanes.

Again, the Green Building Ordinance is key in the introduction, development, and management of such areas across the city's landscapes.

Other Policy Support to Climate Change Resilience

The city's Comprehensive Development Plan and Comprehensive Land Use Plan have identified the banks of Cagayan de Oro River as a "no build zone". This policy is meant to protect the waterway and prevent risks associated with the build-up of permanent structures. Concurrent to this will be the safe resettlement of informal settlers curently located along the river, to a new site that is considered to be of lower risk. Meanwhile, the riverside will be transformed into an open, publicly accessible area. Septage and sewerage policies were also suggested to improve and prevent further contamination of the riverine ecosystem.

Another potential policy support is an increase in insurance coverage for agriculture, as well as for residential and institutional areas that are at risk of climate change impacts such as flooding.

To encourage effective implementation, the TWG considers creating a policy on providing incentives to stakeholders who will actively participate in project implemenation. It is also important to align the strategy and resulting projects with the city's comprehensive land use and development plans, and ensure consistency between Lunhaw and the city's spatial and sectoral policies.

THRIVING—AND NOT MERELY SURVIVING—IN THE FACE OF CLIMATE CHANGE

The BCRUPD process helped Cagayan de Oro City to focus on climate change in the context of its own urban conditions and growth. This was a critical step in moving towards the right direction. The project also helped the city arrive at strategies, projects, and policies that represent both its climate change adaptation goals and overall development vision.

The benefits gained from the project are not only in relation to climate change, but also to the overall sustainability of Cagayan de Oro. The effect of addressing climate change is not confined to improving environmental quality or lowering risks, but extends to economic development, such as women's groups, micro, small and medium enterprises that will now have opportunities to engage in Lunhaw-identified and designed areas. The Lunhaw design process was also undertaken with greater accessibility and inclusivity in mind; it ensures that persons with disabilities , the elderly, pregnant women, and otherwise marginanlized groups can find individual and community benefit from the project.

These, among other considerations, are aimed at encouraging and empowering local communities to actively play a role in the continuing drive towards climate change adaptation, in the same breath as overall local development.

Lunhaw will not only help resolve local challenges, but will try to contribute in the global efforts on climate change. Improving local legislation and implementing high-impact projects may send a ripple effect to neighboring cities, who can replicate these initial actions and induce wider transformation.

The city government focused on providing enabling infrastructure and policy to adapt to the effects of climate change while achieving the co-benefits of lowering GHG emissions and increasing carbon sink. But beyond this, the project is also designed to increase the resilience of Cagayan de Oro through citizen empowerment. Indeed, the city's track record for remarkable projects and programme implementation have been due largely to the active citizen participation. The LGU acknowledges that stakeholder buy-in and action are essential for any significant project to be sustainable.

Putting people at the heart of the climate-smart city initiatives is key, and Lunhaw can succeed only through the convergence of sustained efforts of the city government, civil society, and the private sector. Lunhaw's vision comes with the hope that the changes and improvements will inspire the people to contribute to the continuing advocacy for climate change resiliency not just as compliance with existing laws and city ordinances, but also in making it part of their norms and local culture.

The road to resiliency can be bumpy, but Cagayan de Oro is dedicated to becoming a city that can withstand shocks brought about by climate change. The city government hopes to set an example that will inspire other LGUs to take bold but calculated steps to address climate change, promote sustainable urban dvelopment, and empower their people.

About the BCRUPD Project

Building Climate Resiliency Through Urban Plans and Designs (BCRUPD) is a three-year German-government-funded project being implemented by the United Nations Human Settlements Program (UN-Habitat) in partnership with the Department of Human Settlements and Urban Development (DHSUD), and other Philippine governmentagencies in five cities.

It aims to support the Philippine government in improving policies, regulations, and capacities to adapt to climate change through the promotion of climate-responsive sustainable urban development plans and designs. In support of existing national climate change frameworks and strategies, it aims to enhance national and subnational government representatives' institutional capacities to guide and manage urban growth towards suitable areas and design the same incorporating resilience principles and practices.

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