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MESSAGE OF THE MAYOR

eneral Santos City is considered the business and trade hub of the SOCCSKSARGEN region. Therefore, careful planning is crucial in protecting, preserving, and developing our natural resources as we continue to progress. The Green City Action Plan will guide the city in pursuing development strategies and actions that will address its environmental challenges and to invest in more sustainable, climate change-resilient, and resource-efficient infrastructure in line with its vision of becoming the "Green City of the South."

The local government unit of General Santos City acknowledges its role in the global response to climate change and in the country's commitment to achieving the United Nations Sustainable Development Goals. We continue to explore creative ways of adopting local policies and programs that reduce the city's vulnerability to disasters, protect and better manage our physical resources, reduce pollution, and build a greener, more beautiful and comfortable living environment for our people. Thus, we deeply appreciate the support of our various development partners such as the Asian Development Bank in strategically planning and prioritizing actions and investments that will strengthen this role.

May I extend my warmest congratulations to the City Green Team in crafting the Green City Action Plan for General Santos City, with the support of former Mayor Ronnel C. Rivera and with the technical assistance of the Asian Development Bank -

TA 9572-REG: Enhancing Effectiveness of Subregional

Programs to Advance Regional Cooperation and

Integration in Southeast Asia.

General Santos City reaffirms its responsibility to work together with all our stakeholders in the public and private sectors and with the local communities toward achieving a healthy and safe environment that will meet the current needs of our people as well as those of the next generations.









ACKNOWLEDGMENTS

The Green City Action Plan (GCAP) for General Santos City (GSC) was developed by the City Green Team under the guidance of the City Mayor's Office and with the technical assistance (TA) of the Asian Development Bank (ADB) through TA 9572-REG: Enhancing Effectiveness of Subregional Programs to Advance Regional Cooperation and Integration in Southeast Asia. The GCAP preparation was facilitated by Ronald G. Sison, ADB resource person, with policy and technical guidance from ADB's Southeast Asia Department (SERD) staff including Alfredo Perdiguero (director of the Regional Cooperation and Operations Coordination Division), Kelly Bird (country director of the Philippines Country Office), Jason Rush (principal operations communications specialist), Allison Woodruff (senior urban development specialist), Maria Theresa Abaquita-Bugayong (senior operations officer), Oscar Amiel Badiola (senior programs officer), and Pamela Asis-Layugan (consultant).

The City Green Team was led by Shandee Theresa O. Llido-Pestaño (chairperson of the *Sangguniang Panlungsod* Committee on Climate Change Adaptation and Environment), Allan D. Marcilla (city environment and natural resources officer), Nael Joseph D. Cruspero (city planning and development coordinator), and Leonard V. Flores (city economic management and cooperative development officer). In addition, valuable inputs were provided by the representatives of other local government offices; national government agencies; the private sector; and nongovernment organizations, which comprises the City Green Team; as well as by the city's development partners.

The City Green Team appreciates the support of the Brunei Darussalam–Indonesia–Malaysia–Philippines East ASEAN Growth Area (BIMP-EAGA) Environment Cluster in submitting the GSC GCAP to the BIMP-EAGA Senior Officials Meeting and Ministerial Meeting as one of the deliverables under the BIMP-EAGA Vision 2025.

Moreover, the Green City Team thanks the following individuals for their technical assistance and overall support for the production process. Pamela Asis-Layugan and Hammed Bolotaolo gave instrumental editorial advice. Mike Cortes designed the cover artwork and Judy Yñiguez handled typesetting and graphics generation. Maria Theresa Mercado and Jess Alfonso Macasaet proofed the draft layout. Alona Mae Agustin and Camille Genevieve Salvador managed the production process.



ABBREVIATIONS

ADB Asian Development Bank
AIP Annual Investment Program

ASEAN Association of Southeast Asian Nations
ASUS ASEAN Sustainable Urbanisation Strategy

BEV 2025 BIMP-EAGA Vision 2025

BIMP-EAGA Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN

Growth Area

CBD central business district
CCA climate change adaptation

CCAM climate change adaptation and mitigation

CDC City Development Council

CDP comprehensive development plan

CDRRMO City Disaster Risk Reduction and Management Office

CEMCDO City Economic Management and Cooperative Development Office

CENRO City Environment and Natural Resources Office

CEO City Engineer's Office

CH₄ methane

CLUP comprehensive land use plan

CO₂ carbon dioxide

COVID-19 coronavirus disease 2019

CPDO City Planning and Development Office

CWMO City Waste Management Office

DENR Department of Environment and Natural Resources

DOE Department of Energy

DPWH Department of Public Works and Highways

DRRM disaster risk reduction management

EO executive order

ESWM ecological solid waste management

EU European Union

GCI Green Cities Initiative

GEF Global Environment Facility

GHG greenhouse gas
GSC General Santos City

GSCWD General Santos City Water District

ICT information and communication technology IEC information, education, and communication

IRA internal revenue allotment
ISF informal settler family
IT information technology

IT-BPM information technology and business process management

LBP Land Bank of the Philippines

LCCAP local climate change adaptation plan

LDIP local development investment program

LDRRMF Local Disaster Risk Reduction and Management Fund

LPTRP local public transport route plan

LGU local government unit

MRF materials recovery facility

N₂O nitrous oxide

NEDA National Economic and Development Authority

NIA National Irrigation Administration

NIPAS National Integrated Protected Areas System

NGO nongovernment organization
PPAs programs, projects, and activities

PPP public-private partnership

PSO Public Safety Office

RA Republic Act

RWSA Rural Waterworks and Sanitation Association

SDG Sustainable Development Goal

SLF sanitary landfill

SOCCSKSARGEN South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General

Santos

SOCOTECO II South Cotabato II Electric Cooperative, Inc.
SP Sangguniang Panlungsod (city council)

SpTP septage treatment plant
STP sewerage treatment plant

SUID MP Sustainable Urban Infrastructure Development Master Plan

SURGE Strengthening Urban Resilience for Growth with Equity

SWM solid waste management

TA technical assistance

UN United Nations

USAID United States Agency for International Development

WTE waste-to-energy

WEIGHTS AND MEASURES

ha hectare kg kilogram km kilometer

km² square kilometer m³ cubic meter

NACNA 111

MCM million cubic meters

mm millimeter

MVA megavolt ampere

MW megawatt t metric ton

tCO₂e ton of carbon dioxide equivalent



mong the long-term strategic development thrusts of the Brunei Darussalam–Indonesia–Malaysia–Philippines East ASEAN Growth Area (BIMP-EAGA) under its BIMP-EAGA Vision (BEV) 2025 is the sustainable management of the subregion's natural resources. As BIMP-EAGA's regional development advisor, the Asian Development Bank (ADB) has been providing the member countries with technical assistance (TA) under its Green Cities Initiative, which encourages cities to embrace green infrastructure as well as climate change resilience, resource efficiency, and participatory planning to help achieve the United Nations Sustainable Development Goals 11 and 13. Part of this assistance is developing Green City Action Plans (GCAPs) for selected cities in BIMP-EAGA under ADB TA 9572-REG: Enhancing Effectiveness of Subregional Programs to Advance Regional Cooperation and Integration in Southeast Asia. One of the pilot cities is General Santos City (GSC) in Mindanao, Philippines.

The GCAP for GSC commenced in June 2021 and was completed in November of the same year. The GSC GCAP is an integrated package of priority green investment projects that will contribute to the city's energy efficiency, reduced reliance on nonrenewable energy sources, climate change resilience, resource efficiency, sustainable and low carbon transportation systems, waste reduction and management, water cycle management, livability, and integrated and inclusive planning and implementation. The GCAP is a key deliverable presented by the Environment Cluster in the 29th BIMP-EAGA Senior Officials Meeting and discussed at the 24th BIMP-EAGA Ministerial Meeting in October 2021.

GCAP preparation was guided by ADB's Green City Development Framework and *Green City Development Tool Kit*. The three-step framework entailed (i) developing a comprehensive profile of the city to identify needs and priority intervention areas; (ii) identifying strategic interventions, implementation mechanisms, and preliminary ranking by priority of existing,

new, and special green programs, projects, and activities (PPAs); and (iii) evaluating these PPAs at the sector level as to their progress, feasibility, design, financing, and implementation requirements.

The GSC GCAP built upon the city's initiatives. In line with its vision to become "the Green City of the South," the city already has a favorable policy environment for green and sustainable development. This is evident in its various local laws that promote climate change adaptation and mitigation and disaster risk reduction management and that are now integrated into its various development plans and investment programs. Its Comprehensive Land Use Plan 2018–2026 and Zoning Ordinance set the spatial development strategy guiding the implementation of the city's plans and programs for improving its competitiveness, security, and resilience from all forms of disaster, as well as livability and quality of life. Among these plans are the Local Climate Change Adaptation Plan 2019–2022, DRRM Plan 2019–2022, Sustainable Urban Infrastructure Development Master Plan 2020–2040, Comprehensive Development Plan 2017–2022 (currently being updated to 2020–2026), Local Development Investment Program 2022–2024, Annual Investment Programs 2019–2021, Investment Priorities Plan 2020–2022, Beautification and Greening Master Plan, and Tourism Development Master Plan 2018–2028. The city is also fortunate to have been the recipient of past and ongoing TA from national and international development agencies in preparing and enhancing its local development plans and programs. The greater challenge for the GCAP preparation was sifting through these various plans to come up with a more integrated and focused green investment plan for the short term (2021–2022), medium term (up to 2027), and long term (up to 2040).

GSC's local development plans also provide a wealth of information on the city's geographic, demographic, economic, geo-bio-physical, environmental, land use, and institutional profile. As the only highly urbanized city of South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos (SOCCSKSARGEN) Region (Region XII), GSC serves as the region's premier agro-industrial, commercial, financial, and logistics hub. Agriculture and fisheries are the primary drivers of the city's economy. Its major crops include rice, corn, coconut, mango, banana, asparagus, cassava, pineapple, coffee, sugarcane, and assorted vegetables. The city is also a leading producer of hogs, cattle, and poultry. As host to the largest international fish port complex and seven of the eight tuna canneries in the country, GSC is considered the "Tuna Capital of the Philippines." It is also strategically located in BIMP-EAGA and, with its modern international gateway seaport, airport, and fish port, offers good prospects for cross-border connectivity, trade, investments, and tourism with its neighboring countries.

GSC is the fifth most populous city in the Philippines. Its 2015 population of 594,446 consisting of 144,988 households in its 26 barangays is projected to grow annually by an average of 1.91% and to reach 954,000 by 2040. It is rapidly urbanizing, with only four of its barangays (sharing 3% of the city's total population) still currently considered rural but are likely to become urban by 2040.

GSC's natural environment comprises complex and diverse terrestrial and aquatic ecosystems, which serve as natural habitats for endemic flora and fauna. It lies on the receiving end of the Daguma Mountain Range and is adjacent to two active volcanoes

in its neighboring province of South Cotabato. These mountains supply the headwaters and tributaries of the four major river systems that crisscross the city. The upstream portions and catchment areas of these watersheds, however, are within the jurisdiction of other provinces (i.e., South Cotabato, Sarangani, and Davao Oriental). The situation in the upstream portion inevitably affects the downstream portion. The sediments clogging the city's rivers, erosion leveling its embankments, and flood bringing damages are the results of the situation in the upstream portion.

Sarangani Bay, which spans about 215,950 hectares of coastal and marine waters, is a protected seascape under the National Integrated Protected Areas System Act of 1992 (RA 7586). It is a biodiverse coastal ecosystem with coral reefs, seagrass, mangrove forests, and many unique and endangered wildlife species. However, siltation of coastal waters due to domestic wastes and sedimentation in the uplands threatens this biodiversity and has led to serious ecological losses and declines in fisheries productivity.

Due to its geo-bio-physical characteristics and rapid urbanization, GSC faces certain risks and vulnerabilities to climate change effects such as drought, earthquake and ground shaking, typhoons, flooding, flash floods, storm surge, sea level rise, soil liquefaction, soil erosion, rain-induced landslides, and volcanic eruption. Thus, the city's physical, infrastructure, and socioeconomic development plans and programs consider its vulnerability to climate change and disaster risks seriously. They seek to address the city's challenges in various urban development sectors:

- water supply—inadequate supply of safe, clean water to serve all of the city's population mainly due to incomplete water service connections, overdependence on groundwater sources, inadequate water quality monitoring, climate change (e.g., rising temperature, increased rainfall variability, rising sea level), water pollution, and lack of alternative water supply methods (e.g., surface water sourcing, rainwater harvesting);
- sanitation—lack of proper septage and sewerage systems and treatment facilities and weak public compliance with the septage ordinance;
- flood management and drainage—flooding risks due to inadequate flood control and mitigation and drainage systems, and weak interlocal government integrated river basin and watershed management;
- solid waste management—inadequate collection and disposal of waste due to increasing waste generation from the growing population, inadequate solid waste management (SWM) facilities, and lack of public compliance with SWM regulations (e.g., waste segregation at source, illegal dumping, waste burning);
- transport—traffic congestion in the urban areas and increasing air pollution due to increasing number of vehicles, low interconnectivity of the road network, weak enforcement of traffic management measures, weak public transport structure, lack of parking areas and facilities for nonmotorized transport (e.g., bicycle lanes, sidewalks), and a relatively young program to modernize public transport and implement the Local Public Transport Route Plan;
- **built environment**—unbalanced and conflicting land use and growth of built-up area due to unintended densification of certain areas, urban blight and decay in some

areas, rapid growth of human settlements and conversion of open space to built-up area, encroachment of settlement areas into production and protection areas, settlements and informal settler families in danger and protected areas, inadequate green cover and landscaping in urban areas, overlapping claims in public land and unresolved ancestral domain claims, lack of affordable housing for low-income families, and lack of standards and investments in constructing disaster-resilient houses and resettlement facilities; and

energy—inadequate access to electricity of 30% of the population due to the growing regional demand and limited power supply (Mindanao grid); high volume of greenhouse gas emissions due to reliance on nonrenewable sources, lack of an energy efficiency program, and inadequate investments in renewable infrastructure.

The priority PPAs considered in the GSC GCAP are meant to address these challenges. As an inclusive exercise, the GCAP preparation involved the participation of local stakeholders. They are mainly the members of the City Green Team that the city mayor organized through Executive Order No. 37, series of 2019 specifically to facilitate the preparation and eventual implementation of the GCAP. The team consists of senior- and mid-level representatives of over 50 local government offices, national government agencies, the private sector, and nongovernment organizations. They participated in two virtual consultation workshops and several smaller meetings that prioritized an initial long list of 75 green PPAs, which were further validated and shortlisted, adopting a programmatic approach, into 23 priority programs with 56 component projects and activities in these urban development sectors. A few multisector and citywide PPAs were also identified.

The city's GCAP elaborates on these sector priority PPAs, including their target outcomes, success indicators, implementation period (short, medium, and long terms), estimated project costs and budget allocation, funding sources, responsible implementing offices, and potential issues that may hinder their implementation.

As a way forward, the GCAP recommends for the GSC government to consider the following actions:

- (i) Maintain the existence of the City Green Team and continue to support its activities in further validating and refining the GCAP, particularly in terms of project readiness and funding, having the plan approved for budgeting and implementation by the Sangguniang Panlungsod and City Development Council, promoting local stakeholder ownership and buy-in for the implementation of priority PPAs through an extensive information, education, and communication campaign, and enforcing close coordination, monitoring, and evaluation of GCAP implementation.
- (ii) Leverage the city's funds for implementing the priority PPAs by exploring other potential co-funding sources including the identified green and blue financing facilities of national government agencies, international and multilateral development agencies, nongovernment organizations, and the private sector through public-private partnerships.

- (iii) For projects that require "soft" activities (e.g., project proposals, prefeasibility and business case studies, feasibility studies, detailed design, surveys, training, and capacity building) to advance their project readiness, the city may explore possible TA from existing and potential development partners such as ADB, United States Agency for International Development, United Nations, Japan International Cooperation Agency, Australian Agency for International Development, etc. to help undertake these activities.
- (iv) As part of its efforts to promote investments and possible cofinancing for its GCAP projects, the City Green Team may consider actively participating in investment forums on sustainable development set up by national and international organizations. To enhance its institutional capacities in GCAP implementation, the city can also participate in knowledge-sharing forums where green city development strategies, technologies, and best practices are shared among other cities and countries that are similarly focusing on sustainable development, such as the pilot cities in BIMP-EAGA, Indonesia–Malaysia–Thailand Growth Triangle, and Greater Mekong Subregion, which have developed their respective GCAPs.





CHAPTER 1



BACKGROUND

he Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN [Association of Southeast Asian Nations] Growth Area (BIMP-EAGA) is a subregional cooperation initiative established in 1994 to spur development in remote and less developed areas in the four participating Southeast Asian countries. The subregion covers the entire sultanate of Brunei Darussalam; the provinces of Kalimantan, Sulawesi, Maluku, and West Papua in Indonesia; the states of Sabah and Sarawak and the federal territory of Labuan in Malaysia; and the island of Mindanao and the province of Palawan in the Philippines (Map 1). Through BIMP-EAGA, the four countries want to generate balanced and inclusive growth as well as contribute to regional economic integration in the ASEAN Economic Community. They aim to boost trade, tourism, and investments by easing the movement of people, goods, and services across borders, making the best use of common infrastructure and natural resources, and taking the fullest advantage of economic complementation. Thanks to strong ownership and commitment, BIMP-EAGA has grown over the last 25 years. In 2019, its combined gross domestic product reached \$334 billion, total trade in goods was \$107.6 billion, total foreign direct investments were \$9.7 billion, and total domestic investments were \$6.9 billion. However, because of the coronavirus disease (COVID-19) pandemic, the BIMP-EAGA economy contracted by 3.5% in 2020, with a combined gross domestic product of \$322.8 billion. Despite the 11.4% decrease in trade, both foreign direct investments and domestic investments grew by a third of their 2019 levels.

BIMP-EAGA's Vision (BEV) 2025 serves as the subregion's long-term development blueprint for 2017–2025. Prepared with support from the Asian Development Bank (ADB), BIMP-EAGA's regional development advisor, BEV 2025 provides a way forward for its member countries to pursue its five strategic thrusts of enhancing connectivity within and outside the subregion, establishing it as a food basket in ASEAN and the rest of Asia, promoting it as a premier tourism destination, ensuring sustainable management of its natural resources, advancing people-to-people connectivity through sociocultural understanding, and increasing mobility. In their recent 24th Ministerial Meeting on 11 October 2021, the BIMP-EAGA ministers noted that despite the COVID-19 pandemic, the subregion's "macroeconomic fundamentals remain robust" and that it remains on track in achieving its BEV 2025 goals.

BIMP-EAGA. 2021. Increased Investments, Improved Connectivity to Boost BIMP-EAGA's Recovery. 13 October. https://bimp-eaga.asia/article/increased-investments-improvedconnectivity-boost-bimp-eagas-recovery.

As part of its promotion of regional cooperation and integration and development in Southeast Asia, ADB has been assisting subregional cooperation programs such as BIMP-EAGA, the Indonesia–Malaysia–Thailand Growth Triangle, and the Greater Mekong Subregion. Among ADB's technical assistance (TA) projects is the Green Cities Initiative (GCI), which encourages and assists cities in embracing green infrastructure as well as climate change resilience, resource efficiency, and participatory planning to achieve the United Nations Sustainable Development Goals (SDGs) 11 and 13.² Technical and advisory support is provided in developing Green City Action Plans (GCAPs) for selected cities in the subregions under ADB TA 9572-REG: Enhancing Effectiveness of Subregional Programs to Advance Regional Cooperation and Integration in Southeast Asia.

Following the launch of the BIMP-EAGA GCI in 2016 as part of the BEV 2025 environment strategy, pilot cities have been identified to develop and implement GCAPs, including Bandar Seri Begawan in Brunei Darussalam; Kendari, Pontianak, and Tomohon in Indonesia; Kota Kinabalu in Sabah, Kuching in Sarawak, and Labuan in Malaysia; and Davao City and General Santos City (GSC) in the Philippines. The GCAPs for Kendari and Kota Kinabalu were completed in 2017 and 2019, respectively. The third GCAP is being developed for GSC in 2021, while those for Bandar Seri Begawan and Pontianak are expected to be prepared by 2022.

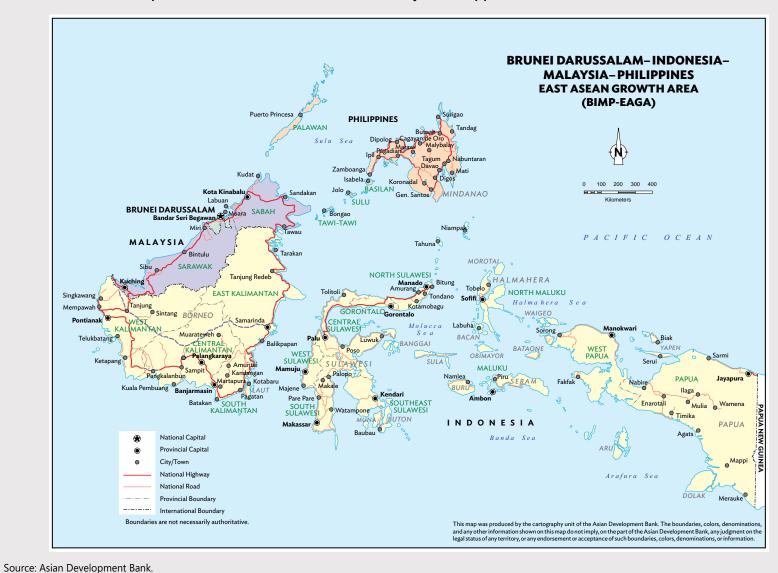
The GSC GCAP project aims to (i) promote the adoption by the GSC government of green policies, programs, and projects that support the achievement of SDGs 11 and 13; and (ii) assist the GSC government in preparing an integrated package of priority green investment projects that will contribute to the city's energy efficiency, reduced reliance on nonrenewable energy sources, climate change resilience, resource efficiency, sustainable and low carbon transportation systems, waste reduction and management, water cycle management, livability, and integrated and inclusive planning and implementation. The GCAP is a key deliverable presented by the Environment Cluster in the 29th BIMP-EAGA Senior Officials Meeting and discussed at the 24th BIMP-EAGA Ministerial Meeting in October 2021.

For the GCAP to be successful, local government ownership and commitment are vital, given that ADB's role is merely facilitating the process. Identification and prioritization of green projects should be made in a participatory manner with stakeholder involvement and local government leadership. The GSC mayor expressed strong support for GCAP development and issued Executive Order No. 37 on 26 July 2019, creating the City Green Team (Appendix 1), which forms part of the initial mobilization steps outlined in the Green City Development Framework.

Between June and November 2021, the City Green Team worked collaboratively with the Philippine-EAGA Environment Cluster and ADB to plan, organize, and develop the GCAP and endorse it to the *Sangguniang Panlungsod*³ for approval and policy support.

² SDG 11 is to "make cities and human settlements inclusive, safe, resilient and sustainable." SDG 13 is to "take urgent action to combat climate change and its impacts." United Nations Department of Economic and Social Affairs. Sustainable Development Goals. https://sdgs.un.org/goals.

³ The Sangguniang Panlungsod is the city's local legislative council.



Map 1: Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area





CHAPTER 2

METHODOLOGIES

2.1 Green City Development Framework

The preparation of the GSC GCAP was guided by ADB's Green City Development Framework (Figure 1) and the *Green City Development Tool Kit*. The framework follows these three steps:

- Step 1: Develop a comprehensive profile of the city to identify needs and priority intervention areas.
- Step 2: Conduct an assessment identifying strategic interventions, implementation mechanisms, and preliminary ranking by priority of existing, new, and special green projects.
- Step 3: Identify existing, new, and special programs and projects at the sector level; review concluding and/or completed programs and projects to incorporate lessons learned and progress to date; and evaluate them in terms of feasibility, design, financing, and implementation mechanisms.

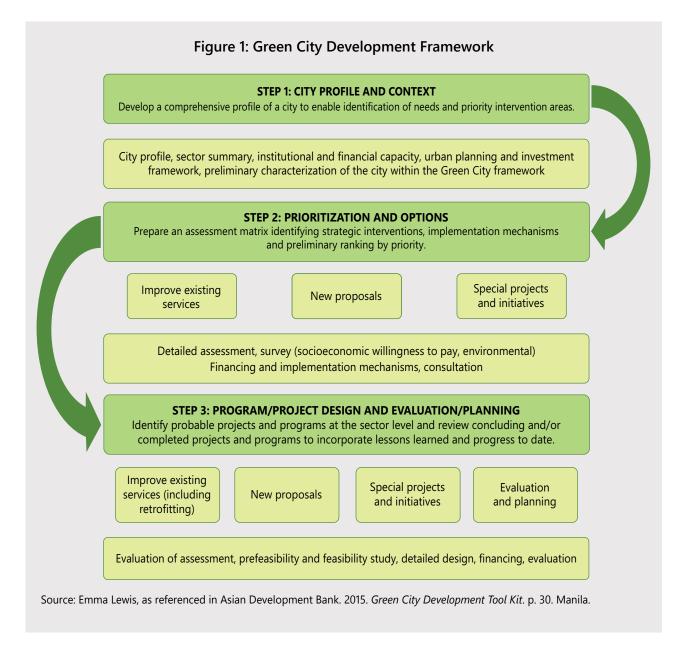
2.2 Green City Action Plan Activities

Based on this framework, the GCAP activities were implemented following the flowchart in Figure 2.

Data Gathering and Review of Related Literature

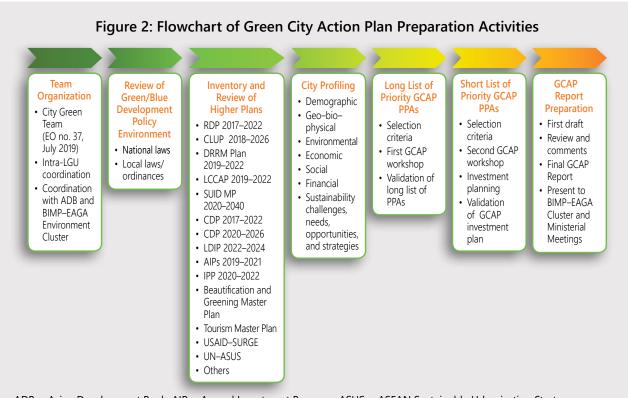
Primary and secondary data, documents, and reference materials were gathered and reviewed. These mainly included reference documents on green city development and regional development plans, as well as the GSC's land use plan, development plans, investment programs, financial statements, and other relevant information. The literature review contributed to the analysis and synthesis of existing plans, planning and implementation of project inception activities, stakeholder consultations, and the GCAP preparation.

The preparation of the GCAP built upon the city's ongoing initiatives. The GSC government has already been implementing various development plans geared



toward sustainable development, including many green city-related programs, projects, and activities (PPAs). These are enumerated below and further discussed in Chapter 4.

- Comprehensive Land Use Plan (CLUP) 2018–2026;
- Comprehensive Development Plan (CDP) 2017–2022 (currently being updated to CDP 2020–2026);
- Disaster Risk Reduction Management (DRRM) Plan 2019–2022;
- Local Climate Change Adaptation Plan (LCCAP) 2019–2022;
- Sustainable Urban Infrastructure Development Master Plan (SUID MP) 2020–2040;
- Local Development Investment Program (LDIP) 2022–2024;



ADB = Asian Development Bank, AIP = Annual Investment Program, ASUS = ASEAN Sustainable Urbanisation Strategy, BIMP-EAGA = Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area, CDP = Comprehensive Development Plan, CLUP = Comprehensive Land Use Plan, DRRM = disaster risk reduction management, EO = Executive Order, GCAP = Green City Action Plan, IPP = Investment Priorities Plan, LCCAP = Local Climate Change Adaptation Plan, LDIP = Local Development Investment Program, LGU = local government unit, PPAs = programs, projects, and activities, RDP = Regional Development Plan, SUID MP = Sustainable Urban Infrastructure Development Master Plan, SURGE = Strengthening Urban Resilience for Growth with Equity, UN = United Nations, USAID = United States Agency for International Development. Source: City Green Team.

- Annual Investment Programs (AIPs) 2019/2020/2021;
- General Santos City Investment Priorities Plan 2020–2022;
- Beautification and Greening Master Plan;
- General Santos City Tourism Development Master Plan 2018–2028; and
- Other development plans and studies prepared with TA from development partner organizations, such as the United States Agency for International Development (USAID) Strengthening Urban Resilience for Growth with Equity (SURGE) Project, UN-Habitat's ASEAN Sustainable Urbanisation Strategy (ASUS) Project, and, more recently, USAID's Safe Water Project.

The GCAP was designed to harmonize with these existing plans for the city. In preparing the GCAP, the City Green Team reviewed these plans, identified and integrated high priority green investments that are realistic and doable by the city, and strategized on how GSC can implement these PPAs in the short, medium, and long terms through a combination of internal and external funding. It was vital to clearly show how this package of GCAP

elements can contribute to GSC's vision of becoming the "Green City of the South," as enunciated in its CLUP and development plans.

City Profiling

These plans also provide recent data and analysis of the city's demographic, geo-bio-physical, environmental, economic, social, and financial profile, which constitute the first step in the Green City Development Framework. Table 1 presents a summary profile of GSC (further elaborated in Chapter 3). The review of the city's plans also contributed to analyzing the challenges and opportunities in its various urban development sectors, as discussed in Chapter 5.

Table 1: Summary Profile of General Santos City

General Information				
Name of city	General Santos City (GSC)			
Type of city	Highly urbanized city (since 5 September 1988)			
Year it became a city	8 July 1968			
District	Own Congressional District as of 2019			
State	SOCCSKSARGEN Region (Region XII)			
Country	Philippines			
	Location, Climate, and Population			
Geographical position of the city	Southernmost portion of the Philippines (6°20′N 125°10′E)			
Type of climate	Type IV under the modified Coronas Classification of Philippine Climate or no pronounced dry and wet seasons with rainfall evenly distributed throughout the year Tropical wet and dry climate under the Koppen Classification			
Average temperature	Average high of 32.9°C; Average low of 22.8°C (1981–2012)			
Average rainfall/precipitation (mm)	Average annual rainfall of 959.9 mm			
Number of rainy days (average/year)	125			
Average relative humidity (%)	79			
Average wind speed	1–2 meters per second			
Area (km²)	492.86			
Population (2015 and 2020)	594,446 (2015); 697,315 (2020)			
Decadal population growth rate (%)	1.91 (2010–2015)			
Population density (per km²)	1,260			

Table 1 continued

Land Use Composition (%)	Current: 2016 (%)	Proposed: 2026 (%)
Residential zone	6.60	12.80
Socialized housing	1.20	1.57
Commercial zone	0.69	1.34
Industrial zone	0.66	2.61
Institutional zone	1.14	1.15
Agriculture zone		
Crops	26.58	9.24
Livestock and poultry	0.66	1.07
Aquaculture	0.38	0.33
Mangroves	0.01	
Agri-industrial	0.14	
Protection forest (18% above slope)	4.31	27.53
Production forest	11.84	19.00
Parks and recreation	0.13	0.18
Dumpsite/sanitary landfill	0.12	0.12
Cemetery/memorial parks	0.09	0.13
Utilities, transportation, and service area	1.27	1.27
Roads	2.41	2.54
Tourism (including ecotourism)	0.67	0.63
Special use	0.01	
Urban forest	0.09	0.31
Water bodies (rivers and creeks)	1.30	1.28
Vacant land	39.46	
Planned Unit Development (PUD) 1		11.02
PUD 2		3.36
PUD 3		2.31
Quarry		0.21

Table 1 continued

Ecological/Natural Features				
Feature	Area/Extent (Including Cross-Boundary Aspects)		Exi	sting Conditions
Forestlands	This covers about 30,273 ha or 56% of the city's entire area. For forest protection, the area has been increased to include areas above 30% slope. Tree parks have also been proposed for protection in barangays Labangal and Siguel.		within the for activities sur tree cutting	raudulently titled lands prestlands, and destructive ich as quarrying, illegal g/harvesting, illegal illegal tourism activities, in the area.
Mangrove system	37,552 ha found in coastal sites of barangays Buayan, Baluan, Siguel, Tambler, and Calumpang. Mangroves are under threat of degradation due to siltation and human activities in coastal areas. The City Environment and Natural Resources Office (CENRO) coordinates protection activities for the areas.			
Downstream portions of watershed areas	and Buayan rivers. The upstream portions of these watersheds are within the jurisdiction of other LGUs.		Flash floods occur almost every year, particularly along Silway, Makar, and Buayan rivers. Affected barangays are Sinawal, Apopong, Labangal, Tambler, and Baluan. The area susceptible to flooding is 6% of the total land area, and the total population affected is about 26% of the city's residents.	
Protected seascape	under the National Integrated the second representation of the result of the second representation of the second representation of the result of the second representation of the second repre		the strict protection the multiple coastal water domestic with the uplan	wo management zones: rotection zone and e-use zone. Siltation of ers attributed to rastes and sedimentation ands has led to serious osses and declines in oductivity.
Financial Profile (₱)	2015 (Audited)	2019 (Au	udited)	2020 (Unaudited)
Total revenue	1,713,172,615	2,640,470,047		2,930,708,494
Total operating expenditures	1,215,872,499	2,080,285,673		3,557,000,068
Surplus/(Deficit) from current operation	497,300,116	560,184,374		(626,291,574)
Surplus/(Deficit) for the period	471,621,405	475,249,179		(59,996,283)
Total appropriations	1,745,578,659 3,866,1		88,003	4,865,542,396
Local Disaster Risk Reduction Management Fund (RA No. 10121)	288,575,348	379,4	37,398	1,231,166,914

Table 1 continued

Region XII water resources:	City Infrastructure Services					
• Groundwater/Aquifer = 803 MCM/year • Surface water (@80% dependability) = 8,541 MCM/year • Notal water resources potential = 9,344 MCM/year Mean annual rainfall = 926 mm • General Santos City Water District (GSCWD): Groundwater from 17 deep wells within the city • Rural Waterworks and Sanitation Associations (RWSAs): 183 deep wells, 24 improved springs, and 54 artesian wells GSCWD water supply (m²/hour) GSCWD production (m³/month) Households with access to water • GSCWD = 45,050 households (i.e., one connection is one household) • RWSAs = 48,413 households By level of service: • Level II (point sources water supply system) = 10,416 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • Level III (piped water supply system) = 82,694 households • As such, 64% of the 144,987 households (in 2015) have access to water. At 99 liters per capita/day; the total demand of GSC's population (592,884 as of 2015) is 21.42 MCM/year or 2.7% of the region's groundwater. GSC's population is 13% of the region. Wastewater Coverage Wastewater Goverage Wastewater generated daily (million gallon/day) No data No data There is no sewerage system. Desludging is done through private companies and disposal through the sewerage treatment plant (STP) of the Municipality of Alabel in Sarangani Province. Solid Waste Waste generation daily (tons/day) Collection efficiency (%) Alterials recovery facility (MRF) Alterials recovery facility (MRF) - Central MRF completed in 2018; processes 20 tons/day - All Darangays have MRFs, but 3 are not operational - Composting facilities in several barangays, puroks, and for immediate Composting facilities in several	Water Availability and Coverage					
17 deep wells within the city Pural Waterworks and Sanitation Associations (RWSAs): 183 deep wells, 24 improved springs, and 54 artesian wells 3,676 (or 1,021 liters per second) 1,825,315 (as of 2018) Households with access to water **GSCWD production (m³/month)** **Households with access to water** **GSCWD = 45,050 households (i.e., one connection is one household)	Water resources	 Groundwater/Aquifer = 803 MCM/year Surface water (@80% dependability) = 8,541 MCM/year Total water resources potential = 9,344 MCM/year 				
According to the companies of the region o	Water supply service	17 deep wells within the cityRural Waterworks and Sanitation Associations (RWSAs): 183 deep wells,				
GSCWD = 45,050 households (i.e., one connection is one household) RWSAs = 48,413 households By level of service:	GSCWD water supply (m³/hour)	3,676 (or 1,021 liters per second)				
RWSAs = 48,413 households By level of service: • Level II (point sources water supply system) = 10,416 households • Level III (point sources water supply system) = 22,694 households • Level III (piped water supply system) = 82,694 households • As such, 64% of the 144,987 households (in 2015) have access to water. Per capita demand (liters per capita/day) At 99 liters per capita/day; the total demand of GSC's population (592,884 as of 2015) is 21.42 MCM/year or 2.7% of the region's groundwater. GSC's population is 13% of the region. Wastewater Goverage Wastewater generated daily (million gallon/day) Disposal capacity (million gallon/day) Present operating capacity (million gallon/day) No citywide wastewater treatment facility (million gallon/day) Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Collection efficiency (%) Materials recovery facility (MRF) At 99 liters per capita/day; the total demand of GSC's population (592,884 as of 2015) is 21.42 MCM/year or 2.7% of the region. Waste generation daily (million gallon/day) No citywide wastewater treatment facility (million gallon/day) No citywide wastewater treatment facil	GSCWD production (m³/month)	1,825,315 (as of 2018)				
(liters per capita/day) as of 2015) is 21.42 MCM/year or 2.7% of the region's groundwater. GSC's population is 13% of the region. Wastewater Coverage Wastewater generated daily (million gallon/ day) Disposal capacity (million gallon/day) Present operating capacity (million gallon/ day) Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Autority (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) Materials recovery facility (MRF) Collection service The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate		 RWSAs = 48,413 households By level of service: Level I (point sources water supply system) = 10,416 households Level II (communal faucet) = 353 households Level III (piped water supply system) = 82,694 households 				
Wastewater generated daily (million gallon/ day) Disposal capacity (million gallon/day) Present operating capacity (million gallon/ day) Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Materials recovery facility (MRF) Mo citywide wastewater treatment facility No citywide wastewater treatment facility There is no sewerage system. Desludging is done through private companies and disposal through the sewerage treatment plant (STP) of the Municipality of Alabel in Sarangani Province. Solid Waste Waste generation daily (tons/day) 300 tons with overall waste per capita/day computed at 0.289 kilograms 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) Materials recovery facility (MRF) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	(liters per capita/day) as of 2015) is 21.42 MCM/year or 2.7% of the region's groundwater.					
(million gallon/ day) Disposal capacity (million gallon/day) Present operating capacity (million gallon/ day) Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Materials recovery facility (MRF) Collection service Mo citywide wastewater treatment facility There is no sewerage system. Desludging is done through private companies and disposal through the sewerage treatment plant (STP) of the Municipality of Alabel in Sarangani Province. Solid Waste Waste generation daily (tons/day) 300 tons with overall waste per capita/day computed at 0.289 kilograms 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	Wastewater Coverage					
Present operating capacity (million gallon/day) Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Materials recovery facility (MRF) Materials recovery facility (MRF) Collection service No citywide wastewater treatment facility No citywide wastewater treatment facility (There is no sewerage system. Desludging is done through private companies and disposal through the sewerage treatment plant (STP) of the Municipality of Alabel in Sarangani Province. Solid Waste 300 tons with overall waste per capita/day computed at 0.289 kilograms 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate		No data				
Households connected to underground sewerage collection (%) Solid Waste Waste generation daily (tons/day) Materials recovery facility (MRF) Materials recovery facility (MRF) Collection service Collection service Collection service There is no sewerage system. Desludging is done through private companies and disposal through the sewerage treatment plant (STP) of the Municipality of Alabel in Sarangani Province. Solid Waste Waste generation daily (tons/day) 300 tons with overall waste per capita/day computed at 0.289 kilograms 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate		No citywide wastewater treatment facility				
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Waste generation daily (tons/day) 300 tons with overall waste per capita/day computed at 0.289 kilograms 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) Materials recovery facility (MRF) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools Collection service The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	underground sewerage	companies and disposal through the sewerage treatment plant (STP) of the				
Collection efficiency (%) 45% (about 80–90 tons per day brought to the 64 ha sanitary landfill at Barangay Sinawal) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools Collection service The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	Solid Waste					
Materials recovery facility (MRF) • Central MRF completed in 2018; processes 20 tons/day • All barangays have MRFs, but 3 are not operational • Composting facilities in several barangays, puroks, and schools Collection service The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	Waste generation daily (tons/day)	300 tons with overall waste per capita/day computed at 0.289 kilograms				
 (MRF) All barangays have MRFs, but 3 are not operational Composting facilities in several barangays, puroks, and schools Collection service The city has 16 collection vehicles (9 are in fair running condition). It also has 3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate 	Collection efficiency (%)					
3 compactor trucks and 4 dump trucks (acquired in 1994 and for immediate	· · · · · · · · · · · · · · · · · · ·	All barangays have MRFs, but 3 are not operational				
	Collection service					

Table 1 continued

City Infrastructure Services					
Stormwater Drainage					
Annual rainfall	Average annual rainfall of 959.9 mm				
Length of stormwater drains (km)	No data. A drainage master plan exists but is outdated.				
Road and Transport					
City roads (km)	118				
National roads (km)	1,510				
Public Transport					
Tricycles registered (2018 LTO)	4,371 for public use and 6,873 for private use				
Tricycle capacity (passengers)	56,220 (5 passengers per unit)				
PUVs registered (2019)	587 (based on Local Public Transport Route Plan or LPTRP)				
Registered private vehicles (2018)	61,942 (as of 2018)				
Registered for-hire vehicles (2018)	5,228				
Housing					
Number of households (2015)	144,987				
Number of housing units	No data				
Number of households in danger zones	5,221 households in danger zones (storm surge, flood, and landslide prone)				
Area of informal settlements (ha, 2019)	212				
Area for socialized housing (ha, 2015)	748				
Housing backlog (2011)	7,990				

Table 1 continued

City Infrastructure Services

Land Use Planning and Urban Management System (from CLUP 2018–2026)

Existing and proposed plans

- The development thrust is agri-industrialization, which promotes balanced development and maximizes the city's economic potential.
- GSC adopts the multi-nodal dispersed concentration spatial strategy, which maximizes land use of the urban core while directing new development toward identified growth centers in the western and southern parts of the city. This will promote decongestion of the urban center while stimulating growth in the other areas. It will entail the improvement of the road network and connectivity.
- The city is defined by seven development/investment areas, utilizing any or a combination of the following general development policies/strategies:
 - protection and production areas (recognition of conservation value of natural environment, limited access for compatible uses);
 - city expansion areas (prepare for future expansion, set growth limit boundaries);
 - infill development areas (encourage further densification, prepare for strip commercialization of major roads, identify open spaces for development as recreational spaces); and
 - revitalization area (maintain growth as commercial/educational/government center, arrest inner-city decline, encourage densification within capacity limits, reduce risk to settlements within hazard areas).
- The seven development areas are as follows:
 - Central Development Area (barangays Dadiangas East, Dadiangas West, Dadiangas North, Dadiangas South, City Heights, Lagao, and Bula)—for revitalization and infill development including a walkable government center, redeveloped central public market, parks/plazas, green/landscaped corridors, riverside linear park, coastal "baywalk" (seaside promenade), vertical housing, business park and creative industries, commercial strips, malls, tertiary schools and hospitals, and improved street corridor;
 - East Coast Development Area (barangays Dadiangas South, Bula, Baluan, and Buayan)—for city expansion and protection and production including ecotourism park, resorts and recreation areas, mangrove reforestation, protection of coral reefs, wetlands, tidal mudflats, salt pans, rice fields, and aquaculture;
 - Economic Housing Area (barangays Sinawal, San Isidro, Lagao, Mabuhay, Katangawan, and Ligaya)—for city expansion including low cost and medium housing, open market subdivisions, retirement homes, neighborhood parks and open spaces, and commercial development;
 - Agri-Industrial Development Area (barangays Conel, Tinagacan, Olympog, Katangawan, Batomelong, and Ligaya)—for protection and production including croplands, livestock and poultry production, inland fishery, agri-processing, farm tourism, support infrastructure such as farm-to-market roads, and irrigation;
 - Northern Highlands Development Area (barangays Mabuhay, Conel, Olympog, Upper Labay, Batomelong, and Tinagacan)—for protection and production including reforestation, agroforestry, and ecotourism development;
 - Mid-Coast Development Area (barangays Sinawal, Apopong, Labangal, and Calumpang)— for city expansion, infill development, and protection including a potential new government center, infrastructure utilities, manufacturing and industrial service facilities, tourism, retail, green projects, mixed use, and housing development; and
 - Airport and Southern Development Area (barangays Apopong, Sinawal, San Jose, Fatima, Calumpang, Tambler, and Siguel)—for city expansion and protection including logistics and storage facilities, manufacturing and industrial service facilities, mixed use, green projects (solar, windmills), tourism and recreation, and retail and commercial development.

Table 1 continued

City Infrastructure Services

Disaster Management and Mitigation (from GSC DRRM Plan 2019–2022)

Existing and proposed plans and development initiatives

- Mainstream DRRM and CCA in various plans (CLUP and CDP), laws, policies, and/or ordinances enacted
- Effectively utilize the local DRRM Fund for DRRM-responsive CLUP, CDP, and related activities
- Create fully functional local DRRM councils and offices
- Formulate a DRRM- and CCA-sensitive environment code
- Integrate DRRM and CCA in the local building code and promote green technology in all infrastructure projects
- Conduct inventory, vulnerability, and risk assessments for critical facilities and infrastructure regularly
- Implement guidelines on the redesign, retrofitting, or operational modification of infrastructure
- Conduct hazard and risk mapping at the city and barangay levels
- Conduct studies on disaster prevention interventions for armed conflict situations and climate change effects
- Improve the availability of and access to various disaster risk financing and insurance schemes for vulnerable groups and communities
- Enhance monitoring, forecasting, and hazard warning at the local level
- Reduce human-induced hazards through peace and order
- Develop and implement a comprehensive local DRRM and CCA information, education, and communications program
- Operate and maintain the City Disaster Risk Reduction and Management Office (CDRRMO)
 Operation Center
- Establish and institutionalize the Incident Command System
- Strengthen partnership arrangements among stakeholders
- Develop and implement an integrated and coordinated search, rescue, and retrieval (SRR) system
- Implement safe and timely evacuation of affected communities
- Establish standard-based relief shelters and sites
- Ensure provision of basic health services to affected population inside and outside evacuation centers
- Provide mental health and psychosocial services to the disaster-affected population
- Implement a coordinated and integrated system for early recovery
- Conduct post-disaster needs assessment and formulate a strategic action plan for disasteraffected areas
- Implement appropriate programs to restore, strengthen, or expand economic activities of affected sectors
- Establish and maintain safe relocation sites with disaster-resilient housing and access to basic social services
- Restore, rehabilitate, and retrofit damaged infrastructure according to safety and resiliency standards
- Develop and implement an effective M&E system

.... = data not available, CCA = climate change adaptation, CDP = Comprehensive Development Plan, CLUP = Comprehensive Land Use Plan, DRRM = disaster risk reduction management, ha = hectare, LTO = Land Transportation Office, mm = millimeter, km = kilometer, km² = square kilometer, LGU = local government unit, M&E = monitoring and evaluation, m³ = cubic meter, MCM = million cubic meter, PUV = public utility vehicle, SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos.

Sources: City Green Team using the sample template City Profile in the *ADB Green City Development Tool Kit* and information from the GSC CLUP 2018–2026, DRRM Plan 2019–2022, Local Climate Change Adaptation Plan (LCCAP) 2019–2022, CDP 2017–2022, Local Development Investment Program (LDIP) 2022–2024, GSC Sustainable Urban Infrastructure Development Master Plan (SUID MP) 2020–2040, Annual Investment Programs (AIPs) 2019–2020, GSC Financial Statements (2015, 2019, 2020), and other reference documents from the GSC government and the internet.

Stakeholder Consultation Activities

Stakeholder consultations through face-to-face and virtual meetings were conducted. Smaller meetings, key informant interviews, and focus group discussions were also carried out among representatives of the core team members and GCAP focal persons to gather policy directions, guidance, technical inputs, and relevant documents to facilitate GCAP preparation and validate results of the outputs from the consultation activities. Two larger stakeholder consultation workshops were organized with most of the members of the City Green Team to present the initial results of GCAP preparation activities, review and validate the long list of candidate GCAP PPAs, and prioritize them into a shorter list of highest priority PPAs.

Selection of Priority Programs, Projects, and Activities

The set of green PPAs to be included in the GCAP should address most, if not all, of the sector challenges and needs identified in the city profiling. GSC already has many ongoing, pipelined, and proposed PPAs that are intended to address them. These, however, are in different stages of implementation. Many are already being implemented, albeit partially, while some either have completed or are still undergoing prefeasibility, business case, or feasibility studies. Others are in the very early stages of development, still awaiting concept papers or project proposals. The projects need to be effectively programmed, funded, and implemented in the short- to long-term periods, hence the need to prioritize them in the GCAP.

At least three rounds of PPA prioritization exercises were conducted. A preliminary longlisting of PPAs based on the review of the city's plans was prepared. The First GCAP Stakeholders Consultation Workshop was conducted via Zoom on 23 July 2021 with the City Green Team, to present the progress of GCAP preparation, validate a long list of 75 green PPAs, gather additional information on PPA status and funding, and select candidate priority PPAs for further shortlisting and consideration in the GCAP. Hosted and jointly facilitated by the City Economic Management and Cooperative Development Office (CEMCDO) and the ADB resource person, the half-day virtual workshop was participated in by 36 representatives of 17 member organizations of the City Green Team and development partner organizations, and ADB (Appendix 2).

During the workshop and as a take-home exercise, the participants were asked to score each of the listed PPAs (provided in separate Excel worksheets, one per office) from 1 (lowest priority) to 5 (highest priority) according to three criteria (Table 2). They were also asked to provide additional information and/or comments on any listed PPAs.

Table 2: Green City Action Plan Prioritization Criteria and Scoring for Programs, Projects, and Activities

Criteria	Definition	Scores
Effectiveness and urgency	Degree and urgency of attaining the impact or contribution of the project output to development goals/targets and sector outcomes	5 (highest priority) 4 (high priority) 3 (medium priority) 2 (low priority) 1 (lowest priority)
Efficiency	A broad assessment of project benefits relative to estimated project costs (where available)	5 (highest priority) 4 (high priority) 3 (medium priority) 2 (low priority) 1 (lowest priority)
Sustainability	A determination of the likelihood that the project will have sufficient funds allocated for operation and maintenance; that an organization or entity with technical competence will be established to manage the project effectively; and that the project has the broad acceptance of relevant implementing agencies, the city government, and stakeholders.	5 (highest priority) 4 (high priority) 3 (medium priority) 2 (low priority) 1 (lowest priority)

Note: As suggested by the workshop participants, the effectiveness criterion should also consider the urgency of the impact and contribution of the programs, projects, and activities to the development goals and outcomes.

Source: First GCAP Stakeholders Consultation Workshop, July 2021.

Appendix 3 summarizes the results of the first round of PPA prioritization. The stakeholders scored the following as among the high priority programs that merit consideration in the GCAP:

- (i) greening and landscaping of the urban built environment, including parks development;
- (ii) redevelopment of selected urban coastal and riverside areas (including mangroves);
- (iii) promotion of walkability and bikeability in the government center and central business district (CBD);
- (iv) flood prevention and management;
- (v) water resources management, including the development of alternative water supply sources;
- (vi) watershed management, including reforestation;
- (vii) septage and solid waste management;
- (viii) increased use of energy-efficient and renewable energy infrastructure (e.g., solar LED streetlights);
- (ix) improvement and rationalization of public transport services, including modern and low carbon public utility vehicles; and
- (x) improvement of early warning and DRRM systems and facilities.

Aside from prioritizing PPAs, another important result of the first workshop was the agreement among the stakeholders to adopt a programmatic approach for the GCAP.

Since some of the PPAs are similar or related and/or impact more than one sector, the different PPAs would be merged into several priority programs that may consist of several related projects and activities. These were considered in the further validation, shortlisting, and reorganization of the priority PPAs in August–September 2021.

The Second GCAP Stakeholders Consultation Workshop was held via Zoom on 24 September 2021. Also hosted by CEMCDO and co-facilitated by ADB, this whole-day virtual forum (i) updated the participants on the results of the first round of PPA prioritization in July 2021 and on the progress of GCAP preparation activities; (ii) reviewed, validated, and further shortlisted the candidate priority green PPAs for inclusion in the GCAP and implementation in the short term (2021–2022), medium term (2023–2027), and long term (2028–2040) using a programmatic approach; (iii) informed the participants on alternative sources of green and/or blue financing for GCAP PPAs; and (iv) gathered and discussed more detailed information on the shortlisted PPAs (e.g., status of implementation and funding, project costs, proposed implementation period, responsible offices, etc.) as well as potential constraints and issues that may hinder their sustainable implementation.

The second workshop drew the participation of the larger membership of the City Green Team, this time including representatives of national government agencies, nongovernment organizations (NGOs), and development organizations that support the planning and implementation of GSC's green city-related projects. A total of 41 representatives of 23 organizations participated in this meeting (Appendix 4).

A validated shorter list of green PPAs that were ranked highest priority during the first round of prioritization in July, reformatted according to program, was presented to the stakeholders at the second workshop. The list consisted of 23 programs with 56 component projects and activities. Where available, more detailed pieces of information were provided on project description and scope, implementation period, project cost, budget and funding sources, project status, and offices mainly responsible for project implementation to give the stakeholders a better basis for prioritization. The same criteria of project effectiveness and urgency, efficiency, and sustainability were applied in this second round of prioritization. Aside from their priority scoring, the stakeholders were also requested to provide additional information on the latest project status, costs, budget, funding sources, implementation schedule, and possible issues that may hinder project implementation. Such information was important in determining the readiness of the projects for implementation in the short, medium, or long term and in finalizing the short list of PPAs for the GCAP.

Knowledge Sharing on Green and Blue Financing

Judging from the identified funding sources for the priority PPAs, both ongoing and proposed, it was observed that the GSC government has been relying more on traditional financing from its local government funds, national government funds (e.g., Department of Public Works and Highways, Department of Budget and Management, congressional funds), private sector partners, and limited bank loans. GSC is currently amortizing its only outstanding loan with the Land Bank of the Philippines (LBP) for its sanitary

landfill, indicating a rather low debt-service ratio given the city's relatively large budget. In 2021, the city proposed to take out another substantial loan of almost ₱2 billion from LBP to finance further its solid waste management (SWM) program (including the purchase of heavy equipment, construction of a hospital waste facility, and construction of a weighbridge), the construction of a four-story city central public market building, development of the Queen Tuna Park, and purchase of a fire truck.

For some years now, GSC has identified several big-ticket projects targeted for public–private partnership (PPP) funding and implementation. However, the city's progress in attracting investments and implementing PPP projects has been rather slow, notwithstanding the TA from the PPP Center in Manila. A major reason is the lack of personnel to complete the necessary documentary requirements (e.g., prefeasibility studies, tender documents) and to consistently pursue the sequential PPP implementation stages. Nevertheless, the city continues to prioritize its proposed PPP projects.

In the context of sustainable development, there are many available green and blue financing options that GSC may consider for its GCAP PPAs. It seems though that there is a lack of awareness, much less familiarity, about such funding sources among the city's stakeholders. As part of the GCAP preparation, the ADB resource person prepared an indicative inventory of green and blue financing facilities of multilateral, international, national, and private funders (Appendix 5), which the city may consider for its GCAP PPAs. These financing facilities include the following:

- ASEAN Catalytic Green Finance Facility, under the ASEAN Infrastructure Fund (ADB);
- Green Climate Fund (Climate Change Commission and LBP are the Green Climate Fund National Designated Authority and Direct Access Accredited Entity, respectively, in the Philippines);
- Global Environment Facility (GEF) Trust Fund (World Bank);
- GEF Small Grants Programme (World Bank);
- GEF Special Climate Change Fund (World Bank);
- Climate Investment Funds (World Bank);
- Leading Asia's Private Infrastructure (LEAP) Fund (Japan International Cooperation Agency);
- International Finance Corporation (World Bank Group);
- Green Invest Asia (United States Agency for International Development [USAID]);
- Blue Natural Capital Financing Facility (International Union for Conservation of Nature);
- Access to Sustainable Energy Programme (European Union [EU] and Department of Energy [DOE]);
- Renewable Energy Asia Fund and Renewable Energy Asia Fund II;
- Green Financing Program (Development Bank of the Philippines);
- Financing Utilities for Sustainable Energy Development Program (Development Bank of the Philippines);
- Water for Every Resident (WATER) Program (Development Bank of the Philippines);

- Project Development and Monitoring Facility (administered by the PPP Center);
- Green, Green, Green Program (Department of Budget and Management);
- People's Survival Fund (Climate Change Commission);
- Disaster Management Assistance Fund (Municipal Development Fund Office of the Department of Finance);
- ASEAN Green Bond Standards; and
- COVID-19 Recovery Transition Bonds.

Many of the potential GCAP PPAs can qualify for funding under these facilities. Green and blue financing facilities can provide the city with more funding options to consider in its GCAP. ADB also presented the ASEAN Catalytic Green Finance Facility and other green and blue financing facilities during the Second GCAP Stakeholders Consultation Workshop in September 2021.

Drafting of the Green City Action Plan Report

The shorter list of highest priority PPAs resulting from the prioritization exercises was further validated, elaborated, and defined in the draft GCAP as to the scope, components, costs, funding sources, expected outcomes, implementation period (short, medium, or long term), etc. The draft was discussed with the City Green Team core group and subsequently submitted to the city government and ADB for comments. The GCAP was finalized for submission to the city government, ADB, and BIMP-EAGA in November 2021.





CHAPTER 3

PROFILE OF GENERAL SANTOS CITY

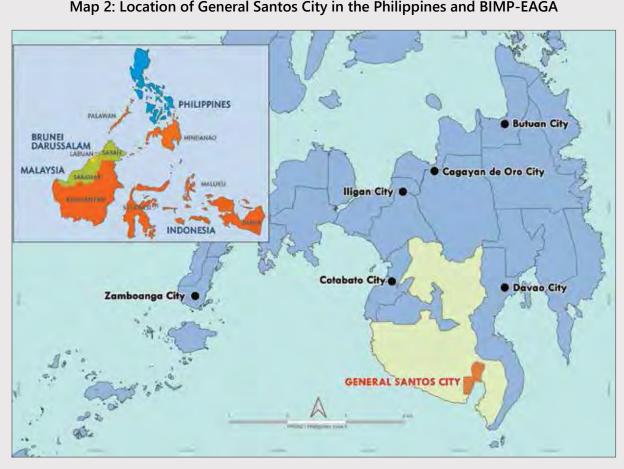
This chapter presents a profile of GSC, including its demographic, economic, physical, environmental, and institutional characteristics as well as its sustainable development challenges and opportunities. Much of the information is culled from the city's various development plans. In particular, the CLUP 2018–2026 and SUID MP 2020–2040 may be further referenced for a much more detailed profile of the city, including its urban infrastructure sectors (housing and settlements, transport, energy, water supply, flood management and drainage, waste management, and information and communication technology [ICT]). The LCCAP 2019–2022 and DRRM Plan 2019–2022 also serve as good references on the climate change and hazard and disaster profile of the city. The specific sectors covered by the GSC GCAP are discussed in Chapter 5.

3.1 Location

GSC is a port city at the southernmost portion of Mindanao between latitudes 5°58′ and 6°20′ north and between longitudes 125°1′ and 125°17′ east (Map 2). As the only highly urbanized city in Region XII, or the South Cotabato, Cotabato, Sultan Kudarat, Sarangani and General Santos (SOCCSKSARGEN) Region, it is the region's center of trade and commerce. GSC is a first-class city that accounts for about 13% of the regional population. With a total land area of 492.86 square kilometers (km²), the city's population density as of 2015 was about 1,260 per km².

The city plays a significant role in achieving Region XII's Sustainable Agri-Industrial Development Strategy, which positions the region as the agri-industrial hub and ecotourism center in Southern Philippines.

GSC is also strategically located in BIMP-EAGA, a subregional cooperation initiative that facilitates cross-border physical, economic, and people connectivity and mobility within the area. BIMP-EAGA also promotes the development of trade, investments, and tourism within the subregion as well as with the rest of the world. Because of its proximity, GSC is being positioned as one of the international transport gateways to Eastern Indonesia and Sabah, Malaysia.



Map 2: Location of General Santos City in the Philippines and BIMP-EAGA

BIMP-EAGA = Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

3.2 Demography

GSC is the fifth most populous city in the Philippines. In 2015, it registered a population of 594,446 consisting of 144,988 households in its 26 barangays (Table 3). Around 97% of its total population is urban, while the remaining 3% is rural population living in its four rural barangays. The male and female populations are almost equally distributed, with a male to female ratio of 1.02. The majority (64%) of the population is of working age, and only 36% is considered dependent population. The labor force participation rate is 63%, which means that majority of the working age population is employed—84% for male population and 34% for female population.

By ethnic origin, majority of the population is Cebuano (44%), followed by llonggo (20%), Bisaya/Binisaya (15%), B'laan (5%), Maguindanaon (4%), Ilocano (3%), Tagalog (3%), Boholano (2%), and others (4%). In terms of religious affiliation, Roman Catholic is the

dominant religion (69%), followed by Islam (9%), Evangelicals, Iglesia ni Cristo, other Protestants, Baptists, and others.

The city's population increased at an average annual rate of 1.91% from 2010 to 2015 (Table 4). While the population has been increasing over the years, the average annual growth rates at various censual year intervals exhibited a decreasing trend from 1995 to 2015. Its population density is 1,109 persons/km² in the urban areas and 222 persons/km² in the rural areas. The average population growth rate is higher in the rural barangays (3.89%) than in the urban barangays (2.05%), indicating that urbanization is starting to spill over to the rural areas. By 2040, the city's population is projected to reach 954,000. This increase may result in continued densification and urban blight in the city center and urban sprawl as people continue to move to the urban fringes (Map 3). By then, all barangays will most likely be classified as urban. Consequently, the needs and demand for infrastructure, housing, basic services, utilities, and employment opportunities will continue to increase.

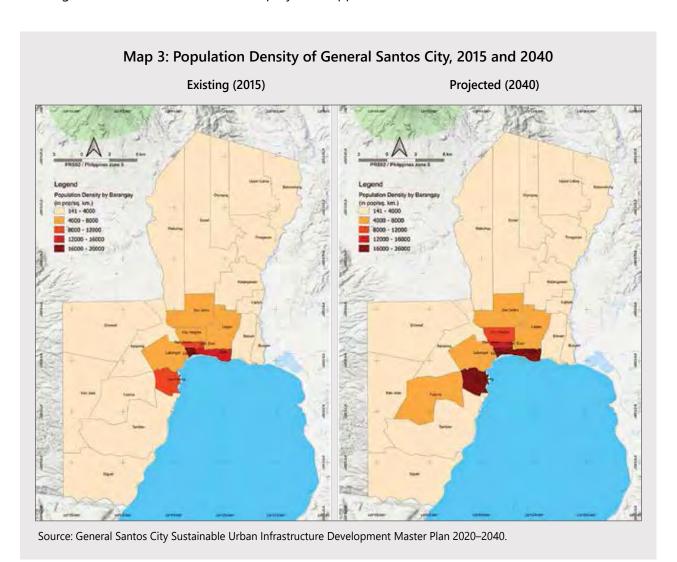


Table 3: General Santos City Population and Household Population by Barangay, 2015

Barangay	Population	Number of Households
A. URBAN		
Apopong	46,384	11,313
Baluan	7,611	1,856
Buayan	11,196	2,731
Bula	31,363	7,650
Calumpang	75,342	18,376
City Heights	24,014	5,857
Conel	11,164	2,723
Dadiangas East	4,746	1,158
Dadiangas North	8,056	1,965
Dadiangas South	6,199	1,512
Dadiangas West	13,827	3,372
Fatima	66,460	16,210
Katangawan	13,948	3,402
Labangal	61,713	15,052
Lagao	50,789	12,388
Mabuhay	28,288	6,900
San Isidro	52,832	12,886
San Jose	11,333	2,764
Siguel	12,757	3,111
Sinawal	13,285	3,240
Tambler	21,474	5,238
Tinagacan	6,322	1,542
Subtotal	579,103	141,246
B. RURAL		
Batomelong	3,235	789
Ligaya	5,298	1,292
Olympog	3,352	818
Upper Labay	3,458	843
Subtotal	15,343	3,742
TOTAL	594,446	144,988

Source: Philippine Statistics Authority.

		Census Year								
Item	1995	2000	2005	2010	2015					
Population	327,173	411,822	529,542	538,086	594,446					
Urban	97%	97%	98%	98%	97%					
Rural	3%	3%	2%	2%	3%					
Annual growth rate	5.14%	5.05%		2.71%	1.91%					
Urban		5.19%	4.14%	0.57%	2.05%					
Rural		4.64%	2.03%	(0.63%)	3.89%					
Density (persons/km²)	610	768	988	1,004	1,109					
Urban	679	855	1,104	1,122	1,237					
Rural	135	166	190	186	222					
Measures of urbanity										
Level of urbanization	87.2	84.2		97.6	97.4					
Average yearly tempo of urbanization		(0.68)		1.59	(0.04)					

Table 4: Summary of Historical Data on General Santos City Population, 1995–2015

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

3.3 Economy

Agriculture and fisheries are the main drivers of GSC's economy (Photo Collage 1). About 15,725 hectares (ha) of the city's total land area is agricultural lands. The major crops planted are rice, corn, coconut, mango, and banana. Other crops include asparagus, cassava, pineapple, coffee, sugarcane, and assorted vegetables. The city is also a leading livestock producer, with many large-scale commercial hogs, cattle, and poultry farms operating mostly in barangays Conel, Katangawan, Ligaya, Olympog, and Sinawal.

Operating mainly in the coastal barangays along Sarangani Bay, the fisheries sector is the city's leading industry, accounting for around \$\frac{2}{2}34.7\$ million production in 2015. It is home to the General Santos City Fish Port Complex, the second-largest fish port in the country (next to Navotas City in Metro Manila) in terms of total daily fish tonnage. It is, however, the biggest fish landing site for the high-value tuna—earning for the city the moniker "Tuna Capital of the Philippines." The city also hosts seven of the eight tuna canneries in the country.

 $[\]dots$ = data not available, () = negative, km^2 = square kilometer.

Photo Collage 1: Economic Activities in General Santos City































Economy of General Santos City. Agriculture, fisheries, agri-processing, trade, commerce, and tourism are the main drivers of the city's economy (photo sources: 1, 5, 10—General Santos City Sustainable Urban Infrastructure Development Master Plan; 2, 3, 4—City Economic Management and Cooperative Development Office; 6—Lisa's Meats; 7—Department of Agriculture; 8—wikimedia.org; 9—Red Fern Pavilions; 11, 12—RobSison Aerial Videography; 13—Jing Velos; 14—General Paulino Santos Museum; 15—Gensan News Online).

With its international seaport and airport and ancillary logistics infrastructure, GSC serves as Mindanao's premier trading, commercial, and transportation hub.⁴ It is the main service center for exports and imports for the SOCCSKSARGEN region. Fresh, frozen, and processed tuna and other seafood products; canned pineapple; fresh and processed fruits; and crude coconut oil are the leading export commodities in terms of volume and value. Major export markets include Germany, Japan, the Netherlands, the People's Republic of China, the Republic of Korea, the United Kingdom, the United States, and other European and Asian countries. In 2015, GSC exported \$295 million worth of tuna products. However, there has been a significant decline in tuna exports because of the COVID-19 pandemic.

GSC's rapid urbanization can be gleaned from the significant increase in industrial and commercial business and trade activities between 2013 and 2015. The number of these business establishments, the area they occupy, and the employment and revenues they generate significantly increased over this period. By 2015, there were 716 industrial and 7,431 commercial business and trade establishments in the city (Table 5). They provided about 223,000 jobs and earned \$\frac{1}{2}\$29.7 million gross revenue. Large industrial establishments include mostly fishing companies, canneries, other agri-industrial firms, and pharmaceutical companies. The commercial and trade establishments include agribusiness traders, malls, commercial complexes, hotels and restaurants, resorts, hardware shops, banks and financial institutions, automobile sales and service centers, and many other wholesale and retail establishments. Most of the commercial and financial activities are in the four urban barangays of Dadiangas (north, south, east, and west), which is considered the city's central business district. The city's four biggest malls are clustered in Barangay Lagao, while commercial strips are mostly in City Heights, Calumpang, Labangal, Apopong, and San Isidro.

Table 5: Industry, Commerce, and Trade in General Santos City, 2013–2015

Indicator/Type of Establishments	2013	2014	2015				
Area (ha)							
Industrial	68.70	79.28	137.94				
Commercial business and trade	357.13	369.05	467.64				
No. of establishments							
Industrial	440	511	716				
Commercial business and trade	6,603	7,471	7,431				
Employment							
Industrial	55,386	56,887	58,429				
Commercial business and trade	155,919	160,144	164,484				
Revenue (₱)							
Industrial	31,466,648	29,509,728	44,965,099				
Commercial business and trade	151,723,030	182,285,832	184,727,842				

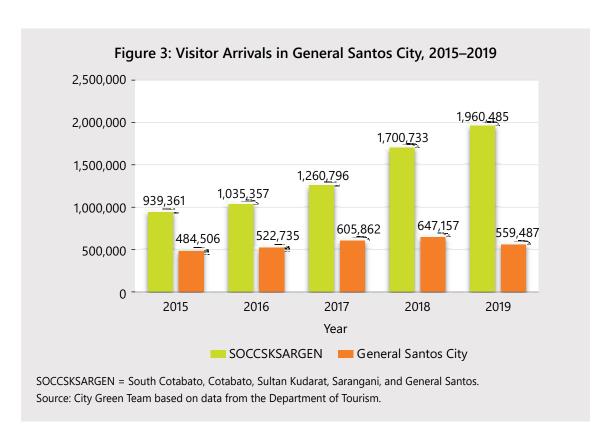
ha = hectare.

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

The Makar Wharf and General Santos International Airport have recently been renovated and expanded. There are also many warehouses, container yards, and logistics service providers operating in the city.

In terms of tourism, the city offers a combination of culture and heritage, as well as natural and traditional livelihood attractions and experiences. Other recreational and tourism-related enterprises include travel intermediaries, dining, entertainment facilities, and recreation and sports facilities. Farm tourism has been an emerging industry in more recent years. Tourist arrivals in GSC have been steadily increasing prior to the COVID-19 pandemic. From 2015 to 2018, overnight visitor arrivals to the city grew by an annual average rate of 11.2%, from 484,506 to 647,157 (Figure 3). This, however, decreased by 13.6% to 559,487 in 2019, accounting for 28.5% of almost 2 million arrivals to SOCCSKSARGEN that year. Domestic visitors account for 97% of all arrivals to the city. Participants of meetings, incentives, conferences, and exhibitions and those visiting friends and family are among the city's major visitor markets.

The COVID-19 pandemic greatly affected the tourism industry nationwide, especially in 2020 when tourist arrivals and hotel occupancy rates dipped to record lows. However, as travel restrictions started easing up and tourist destinations gradually reopened in 2021, the local tourism industry has been showing favorable signs of recovery. In the first quarter of 2021, over 1.3 million tourists visited the SOCCSKSARGEN region, with GSC accounting for 136,239 of this total number. The tourists, however, mostly consist of same-day rather than overnight visitors, with the latter segment continuing its sluggish growth.⁵



R. Gubalani 2021. SOCCSKSARGEN Tourist Arrivals Reach 1.3M in Q1. Philippine News Agency. 19 May. https://www.pna.gov.ph/articles/1140803.

GSC hosts several major economic support facilities that support its role as a transshipment point of people, goods, and services to international markets, such as the General Santos International Airport, Makar Wharf, GSC Fish Port Complex, agro-industrial and manufacturing economic zones, an information technology (IT) park, warehouses, container yards, and others. CEMCDO is the city government's frontline office that promotes investments and facilitates business development. The city's private sector business and trade organizations are the local government's strong partners in this endeavor.

3.4 Geo-Bio-Physical Characteristics

GSC is a vast and gently rolling plain stretching from Sarangani Bay. Due to the city's elevation of 2 meters above sea level, its 9 coastal barangays and 17 remaining barangays are vulnerable to storm surge and flooding, respectively.

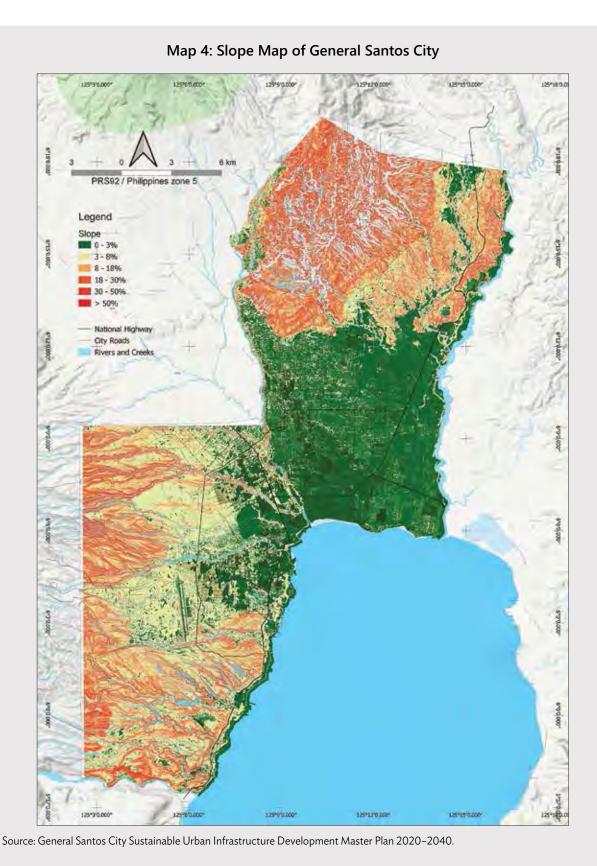
Most of the city's land area belongs to the 0%–3% slope range suitable for intensive agriculture and urban development. Flatlands with 0%–3% slope are 24,770 hectares (ha) or about 46% of the land area (Map 4). Flat and gently undulating lands with 0%–18% slope are about 39,271 ha. Lands suitable for agriculture are about 18,284 ha or 34% of the city's total land area. Lands suitable for grazing are areas with slopes ranging from 18% to 30% and over. Forest reserve areas for conservation should be those lands with a slope of 31% and above.

GSC's geological formation has been affected by uplift, subsidence, faulting, marine transgressions, volcanic activity, and water erosion in its surrounding provinces. Consequently, the geology of the area is diverse, with the presence of basalt, andesite, rhyolite, agglomerates, and similar materials from the base rock, which is overlain with alluvium, much of which is of volcanic origin. Sedimentary rock is present in about 49% of the surrounding area.⁶ The city has deposits of limestone, nitrate, luminate, rutile, sulfur, copper, gold, silver, and magnetite iron of uncertain commercial quantities. Abundant sand and gravel are being quarried at Silway, Siguel, and Buayan rivers. Physical development is also determined by soil depth. In GSC, the soil depth ranges from deep to very deep, particularly in the lowlands or alluvial plains.

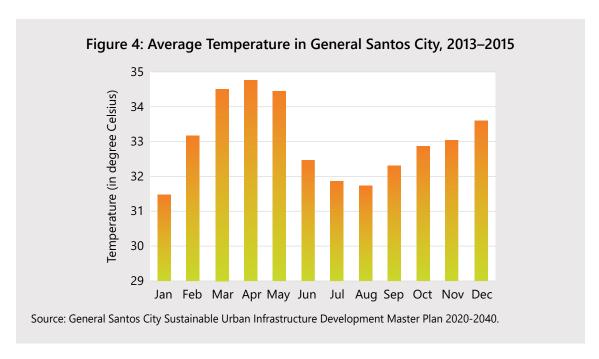
Of the city's total land area of 53,606 ha, 52.7% or 28,249 ha are alienable and disposable, and 28,289 ha or 52.8% are forestlands. In the forest ecosystem, problems encountered include continuous human encroachment into the forested area in search of land, timber poaching, charcoal making, unregulated hunting of wildlife, unabated gathering of flora, loss of endemic biodiversity, application of non-environment-friendly farm inputs, and many more. Thus, as part of the city's CLUP, forest protection and production in communal forests, watersheds, and built-up areas (e.g., tree parks, green belts) are among the priority programs of the City Environment and Natural Resources Office (CENRO).

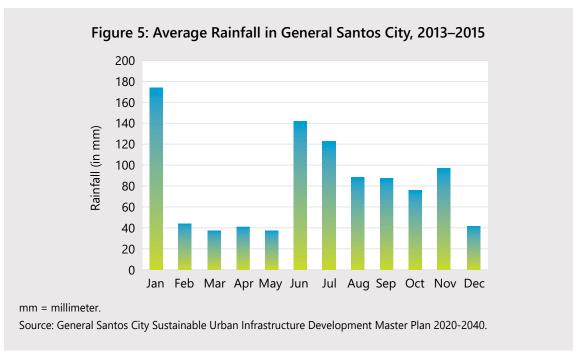
Under the modified Coronas Classification of Philippine Climate, GSC's climate is Type IV. This climate has no pronounced dry and wet seasons, and rainfall is evenly distributed throughout the year.

⁶ Provincial Government of South Cotabato. About South Cotabato. https://southcotabato.gov.ph/the-province/.



In 2015, the maximum temperature in the city ranged from 31.7°C to 35.0°C, with March and April as the hottest months, while its minimum temperature ranged from 22.4°C to 23.8°C, with January as the coldest (Figure 4). Generally, there is an increase in temperature from the observed seasonal baseline temperature in 1971–2000, ranging from 27.3°C to 28.3°C. Rainfall is evenly distributed throughout the year, with a mean annual rainfall of 926 millimeters (mm) and a mean annual number of 125 rainy days (Figure 5).





Wind velocity in the city ranges from 1 meter to 2 meters per second, with January, February, and June getting the strongest winds. Wind generally blows toward the north and northeast. The lowest monthly relative humidity of 74% occurs in March and the highest of 82% from June to October, with an annual average of 79%.

3.5 Environment

GSC lies on the receiving end of Daguma Mountain Range and is adjacent to two volcanoes in two neighboring municipalities: Mt. Parker in Tboli, South Cotabato at the western part of the city, and Mt. Matutum on the northwestern side in Polomolok, South Cotabato. These mountains supply the headwaters and tributaries of the major rivers that crisscross the city: Siguel, Silway, Buayan, and Makar. The upstream portions and catchment areas of these watersheds are within the jurisdiction of other local government units (LGUs) (South Cotabato, Sarangani, and Davao Oriental). Steeply sloping hills and mountains generally characterize these catchment areas. The situation in the upstream portion inevitably affects the downstream portion. The situation in the upstream portion results in sediments clogging the city's rivers, erosion leveling its embankments, and floods bringing damages.

The city's four rivers are estimated to have a total runoff of 6,438 million cubic meters per year. If they were to be developed, they would be enough surface water supply to meet the city's increasing domestic water requirement. Without an effective monitoring and water management system, however, water quality can be degraded due to siltation, overextraction of sand and aggregates, intrusion of informal settlements along the riverbanks, and dumping of domestic and industrial effluents.

GSC has diverse terrestrial and aquatic ecosystems, which serve as natural habitats for endemic flora and fauna. For example, the 250 ha Klaja Karst Ecotourism Park, encompassing the four barangays of Upper Labay, Olympog, Mabuhay, and Conel, has a mountainous karst landscape with an elevation of 150–886 meters above sea level. It is home to 145 species of trees; 19 species of ferns; 24 species of orchids; begonias and magnolias; and different kinds of native species of snails, butterflies, frogs, lizards, and snakes. Nopol Hills is the habitat of numerous fruit-eating bats. However, the threat of destruction and degradation of the area's natural resources and biodiversity needs to be constantly monitored and mitigated.

Sarangani Bay and its adjoining waters is a protected seascape under the National Integrated Protected Areas System (NIPAS) Act of 1992 (RA 7586) by virtue of Proclamation No. 756 of 5 March 1996. Spanning an area of about 215,950 ha of coastal and marine waters, the Sarangani Bay Protected Seascape is a biodiverse coastal ecosystem with coral reefs, seagrass, mangrove forests, and many unique and endangered wildlife species including whale sharks (*butanding*), sea turtles (*pawikan*), spinner dolphins, Risso's dolphins, pygmy killer whales, and pygmy sperm whale (*Kogia*). Sarangani Bay has both a strict protection zone and a multiple-use zone. The strict protection zone covers the coral reef areas and other associated ecosystems of significant diversity, including all existing and proposed marine sanctuaries in the bay. The multiple-use zone includes all areas designated for recreational, mariculture and aquaculture farming, communal fishing ground, reclamation, and commercial and industrial development. Siltation of coastal

waters due to domestic wastes and sedimentation in the uplands has led to serious ecological losses and declines in fisheries productivity.

The city has a total of 37,552 ha of mangroves in barangays Buayan, Baluan, Siguel, Tambler, and Calumpang. Its coastline has 11 species of seagrass, including *Thalassodendron ciliatum*, one of the rarest seagrass species found in the Sarangani Bay Protected Seascape. In addition, there are areas with good coral reef ecosystems including a 2 hectare (ha) fish sanctuary in Siguel and another 7 ha in Tambler. These areas are included in the strict protection zone of the Sarangani seascape, and some degraded coral habitats are currently under restoration.

Vulnerability to Climate Change, Hazards, and Disaster Risk

Due to its geo-bio-physical characteristics, GSC faces certain risks and vulnerabilities to climate change effects such as drought, earthquake and ground shaking, typhoons, flooding, flash floods, storm surge, sea level rise, soil liquefaction, soil erosion, rain-induced landslides, and volcanic eruption (Table 6 and Map 5).

Table 6: General Santos City Hazard Inventory Matrix

	Hazards								
Barangay	Flood	Rain-induced Landslide	Storm Surge	Earthquake	Soil Lique- faction	Volcanic Eruption	Sea Level Rise	Drought	
Apopong		with incident in 2013							
Baluan									
Batomelong									
Buayan									
Bula									
Calumpang									
City Heights									
Conel									
Dadiangas East									
Dadiangas West									
Dadiangas North									
Dadiangas South									
Fatima									
Katangawan									
Labangal		with incident in 2014							
Lagao									

continued on next page

Table 6 continued

		Hazards							
Barangay	Flood	Rain-induced Landslide	Storm Surge	Earthquake	Soil Lique- faction	Volcanic Eruption	Sea Level Rise	Drought	
Ligaya									
Mabuhay									
Olympog									
San Isidro									
San Jose									
Siguel (Bawing)									
Sinawal		with incident in 2014							
Tambler									
Tinagacan									
Upper Labay									

Note: At risk/susceptible With incidents of hazards

Source: General Santos City Disaster Risk Reduction Management Plan 2019–2022.

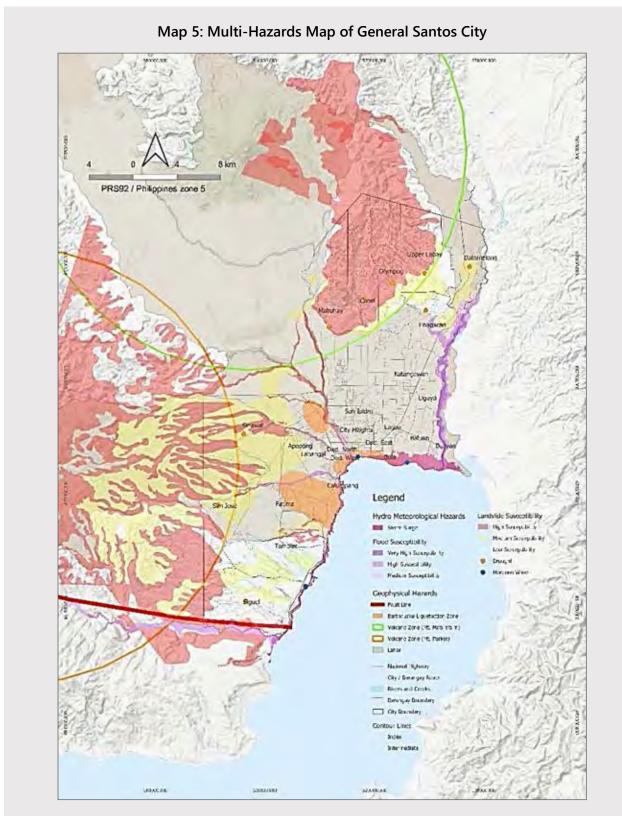
Among the hazard risks, most of the city's barangays are more vulnerable to drought, earthquake, and floods. Some of the coastal barangays are susceptible to sea level rise and storm surges. In the event of any volcanic eruption from Mt. Matutum or Mt. Parker, the barangays bordering GSC's neighboring provinces and along the riverways are most at risk.

Climate Change Scenario

Based on available information on climate projections,⁷ climate change (mid-range scenario) in 2020 and 2050 points to slightly more rain from December to February, but the rest of the year, particularly summer, will be hotter and drier, with the biggest projected decrease in rainfall from March to May (–12.1% in 2020 and –17.6% in 2050). Temperatures are projected to increase up to 1.2°C in 2020 and up to 2.4°C in 2050. The frequency of extreme rainfall events (days with rainfall exceeding 300 mm) will be 1 day in 2006–2035 and 2 days in 2036–2065. The frequency of extreme temperature events (days with maximum temperature exceeding 35°C) will be 3,748 in 2006–2035 and 6,430 in 2036–2065. The frequency of dry days (rainfall less than 2.5 mm) will be 7,526 in 2006–2035 and 8,052 in 2036–2065.

According to the National Oceanic and Atmospheric Organization Laboratory for Satellite Altimetry, the sea level in the coastal areas of GSC rose by around 10–11 mm per year for 1992–2012. If this trend continues, sea level in the coastal waters of the city will rise by about 7–8 centimeters (cm) in 2020 and 37–41 cm in 2050.

The sections on the climate change and disaster risk scenarios are mainly based on the GSC LCCAP 2019–2022.



Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

Climate change is likely to affect the city's major economic drivers such as agriculture and fisheries. Past events such as typhoons, floods, and droughts had adversely affected the city's agricultural production.

Sea warming has also influenced tuna migration patterns, driving fishing vessels farther out to sea. The people most vulnerable to climate change are likely to be the poor tenant farmers in rural areas whose livelihoods are dependent on agriculture and those living along riverbanks and coastal areas, which are vulnerable to flooding and sea level rise. A sea level rise simulation of 0.5 meters reveals that about 245 ha and an estimated 7,000 people living in the coastal areas of 9 barangays could be affected.

Projections of hotter and drier summers can also lead to power shortage in the future as long as the Mindanao power supply remains dependent on hydropower and the capacity of power generating plants does not increase.

Hazard and Disaster Risk Scenario

Based on historical records, GSC has been most affected by floods and drought. Tropical cyclones rarely hit the city. Based on Philippine Atmospheric, Geophysical and Astronomical Services Administration data from 1948 to 2005, the area around GSC has a cyclone passage frequency of one in 50 years. Most of the typhoons occur in June–September. Low pressure areas occur more commonly in the city than typhoons, which bring torrential rains and trigger floods, damaging properties and crops. However, with the changing climate patterns, and directions and intensity of typhoons, the city will become more vulnerable in the future.

In 2012, two typhoons unexpectedly hit the city hard. Typhoon Ofel in October 2012 affected around 596 families or 2,408 persons and dealt a total of ₱128,515 worth of damages to the city's crops and ₱137,633 of losses for its fishing industry. A more devastating Typhoon Pablo, which hit Mindanao in December 2012, brought an estimated ₱9.6 billion worth of damages and left 4 persons dead and 313 missing, all of whom were fisherfolk.

Flash floods have occurred almost every year in GSC (Photo Collage 2). The city is part of the lower portion of the four major river basins of Buayan, Silway, Siguel, and Makar. It is the catchment of all water inflows from the mountainous portions of Tboli, Tupi, and Polomolok in South Cotabato, and Malungon and Alabel in Sarangani Province. The rivers that flood frequently are Silway, Makar, and Buayan. The critical barangays affected include Sinawal, Apopong, Labangal, Tambler, and Baluan.

The Silway River poses the greatest risk among residents who have settled on both sides of the riverbanks along the villages of Dadiangas West and Labangal. These barangays have populations (2015 census) of 13,827 and 61,713, respectively. The heavily silted and quarried river also cuts across the city in half. In addition, the dead creek of what used to be Makar River, barely 2 kilometers west of Silway, runs directly into the heavily populated Purok Puting Bato of Barangay Calumpang, which has a population of 75,342.

The city experienced the most flash flood incidents in 2011, resulting in total damages to houses and private properties of ₱260,200. The June 2008 flash flood resulted in the greatest damages of ₱2 million, while the flash flood incident in February 2012 affected the most people (5,968).

Photo Collage 2: Floods and Earthquakes in General Santos City



May 2017 Flash Flood in General Santos City



September 2019 Flash Flood in General Santos City



Collapsed Abandoned Building in General Santos City from April 2017 Earthquake



Damages to Veranza Mall in General Santos City from April 2017 Earthquake



Fishing Boats Destroyed by Storm Surge in Sarangani Province in August 2018



Storm Surge in Maasim, Sarangani Province in June 2012

Disaster incidents in General Santos City. The city and its neighboring areas had experienced floods and earthquakes that caused loss of life and damages to livelihood and property (photo sources: 1—gmanetwork.com; 2—rmn.ph; 3, 6—news. abs-cbn.com; 4—eaglenews.ph; 5—TV Patrol South Central Mindanao).

There have also been storm surges in the city. On 12 June 2012, a storm surge caused by a passing low pressure area occurred off Sarangani Bay. The Sarangani Provincial DRRM Office noted that 368 fisherfolk were rescued following the incident. The storm surge triggered giant waves, reportedly reaching as high as 9 meters, leaving 13 fisherfolk missing, one of whom came from GSC.

Based on hazard maps from the Mines and Geosciences Bureau, GSC is susceptible to rain-induced landslides on its western and northern mountain slopes. These maps indicate that Barangay San Jose is highly susceptible to landslides, while significant portions of barangays Olympog, Upper Labay, and Sinawal are highly to moderately susceptible to landslides. There are, however, no official city records of any rain-induced landslides in these sparsely populated areas. The City DRRM Council lists Barangay San Jose as the only barangay with high susceptibility to landslides and Barangay Siguel as having moderate susceptibility to landslides. The rest of the barangays have low landslide susceptibility.

The city has also experienced droughts and dry spells that affected crop production. Studies have found that Sarangani Province (which straddles a large part of GSC) is the eighth most vulnerable province in the country when it comes to droughts. GSC is among the areas with a very high expected decrease in rainfall due to El Niño. The most recent events are the dry spells in 2012, 2010, and 2007 and the drought in 1997 brought on by El Niño.

The dry spell in January 2010 affected 582 farmers and about 1,187 ha of planted corn and 114 ha of planted rice in 15 barangays of the city. This resulted in a total loss of ₱18.2 million agricultural products. Areas vulnerable to dry spells are those not served by communal irrigation systems.

GSC is in a region characterized by moderate to high seismicity. Several fault zones in the region can produce major earthquakes and destructive local tsunamis. These fault zones include the Philippine Trench, Sulu Trench, Cotabato Trench, Davao Trench, Negros Trench, Philippine Fault, and Cotabato–Sindangan Fault. The Cotabato Fault traverses the city. The barangays directly under the path of the fault are Siguel, Tambler, Fatima, San Jose, and Sinawal. Existing residential areas are not within the earthquake fault. Most recently, in October 2019, earthquake events generated by nearby fault systems resulted in damages to both government and private properties and infrastructures.

Based on a study of the regional ground motion hazard in the Philippines,⁸ GSC is in an area of the Philippines where a peak ground acceleration of 0.6 g or 6 meters per second (m/s) has a 10% probability of exceedance in 50 years (for soft soil conditions). A peak ground acceleration of 6 m/s is equivalent to the Modified Mercalli Intensity Scale of X (Intense), where many well-built structures may be destroyed, collapsed, or moderately to severely damaged, and most other structures destroyed, possibly shifted off their foundation. Large earthquakes over magnitude 6.0 have occurred, causing extensive damage in nearby areas, but the city has been spared from major damage so far.

Thenhaus, PC et al. 1994. *Estimates of the Regional Ground Motion Hazard of the Philippines*. National Disaster Mitigation of the Philippines.

According to a Philippine Institute of Volcanology and Seismology regional fault and liquefaction map, certain parts of GSC may be susceptible to liquefaction. However, further studies are needed to validate and refine the liquefaction hazard map.

GSC's proximity to the Cotabato Trench makes it prone to trench-related local tsunamis. There is no tsunami inundation map available yet for the city. Although tsunamis have occurred in nearby areas, there are no historical accounts of tsunamis in GSC. In 1976, a tsunami generated by a 7.9 magnitude earthquake killed at least 5,000 in the western coastal region of Mindanao.

The city is threatened by the two active volcanoes in the adjoining municipalities. Mt. Matutum last erupted in 1911 and Mt. Parker in 1641. Should there be an eruption, volcanic ashes will most likely spread to about 50% of the southwestern and northwestern parts of the city. Lahar is also expected to follow the paths of these natural channels directly connecting to the slopes of these volcanoes: Sinawal, Makar, Silway, Tinagacan, and Buayan rivers, which go through the city's urban and urbanizing areas.

Greenhouse Gas Emissions

In 2018–2019, the United States Agency for International Development-Strengthening Urban Resilience for Growth with Equity (USAID-SURGE) Project provided GSC with TA to formulate the city's community-level greenhouse gas (GHG)9 inventory, the first-ever initiative of this kind. The study aimed to inform the city in setting measurable, reportable, and verifiable GHG emissions reduction targets and associated mitigation actions to help achieve its goal of low emission development. The inventory covered carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O)—three of the basic GHG emissions listed under the Kyoto Protocol—from the following sectors: stationary energy (electricity consumption and stationary fuel consumption), transport (on-road and off-road), waste (solid waste and wastewater), agriculture (crops and livestock), and forestry (land use) from January to December 2018 (Table 7 and Table 8). It was completed in accordance with the World Resources Institute's Greenhouse Gas Protocol, the current international standard for corporate GHG inventories, and other sources such as GHG Management in Local Governments: A Guide developed by the Greenhouse Gas Management Institute, the International Local Government Greenhouse Gas Emissions Analysis Protocol developed by Local Governments for Sustainability, and the Excel-based GHG calculation tool developed by the Climate Change Commission in partnership with USAID.

Stationary energy sources are energy systems fixed in place. Their GHG emissions are caused by fuel combustion as well as fugitive emissions released in generating, delivering, and consuming useful forms of energy such as electricity. These sources are among the largest contributors to a city's GHG emissions. GHG emissions from electricity consumption are classified as indirect (Scope 2) emissions. GSC's electricity is distributed by the South Cotabato II Electric Cooperative, Inc. (SOCOTECO II), which gets its electricity supply from

Much of the information in this section is referenced from the GSC community-level and entity-level GHG inventory reports 2018 prepared by the International City/County Management Association (ICMA) under the USAID-SURGE Project, June 2019.

Table 7: Greenhouse Gas Emissions per Sector, Local Government Unit General Santos City-Entity Level, January-December 2018

Scope	Sector	CO ₂	CH₄	N ₂ O
	Stationary Energy			
2	Institutional electricity consumption	√		
	Transportation			
1	On-road transport	√		
	Waste			
1	Solid waste		√	√

 CH_4 = methane, CO_2 = carbon dioxide, N_2O = nitrous oxide.

Note: Scope 1 classification is for direct greenhouse gas (GHG) emissions; Scope 2 is for indirect GHG emissions. Source: United States Agency for International Development (USAID), Strengthening Urban Resilience for Growth with Equity (SURGE). 2019. *General Santos City Entity-Level Greenhouse Gas Inventory Report 2018*. June.

Table 8: Greenhouse Gas Emissions per Sector, General Santos-Community Level, January–December 2018

Scope	Sector	CO ₂	CH₄	N ₂ O
	Stationary Energy			
1	Residential fuel consumption	\checkmark	√	√
1	Commercial and institutional fuel consumption	√	√	√
1	Industrial fuel consumption	√	√	√
2	Residential electricity consumption	√		
2	Commercial and institutional electricity consumption	√		
2	Industrial electricity consumption	√		
	Transportation			
1	On-road transport	√		
	Waste			
1	Solid waste	√	√	√
1	Domestic wastewater		√	√
	Agriculture			
1	Livestock		√	√
1	Crops		√	
	Forestry			
1	Forestland use	√		

 CH_4 = methane, CO_2 = carbon dioxide, N_2O = nitrous oxide.

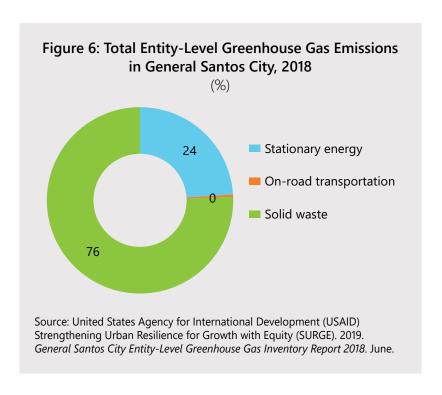
Note: Scope 1 classification is for direct greenhouse gas (GHG) emissions; Scope 2 is for indirect GHG emissions. Source: United States Agency for International Development (USAID), Strengthening Urban Resilience for Growth with Equity (SURGE). 2019. *General Santos City Community-Level GHG Inventory Report 2018*. June.

power plants within the Mindanao grid. Other activities considered under stationary energy sources include fuel consumption for cooking, lighting, heating, and cooling by households, commercial, and industrial establishments, as well as power machinery and generator sets. They use different types of fuel such as biodiesel, diesel, residual fuel oil, and liquefied petroleum gas.

The transport sector produces direct (Scope 1) GHG emissions of CO₂, CH₄, and N₂O from the combustion of various fuel types (biodiesel and diesel, gasoline and petrol, fuel oil), as well as several other pollutants such as carbon monoxide, non-methane volatile organic compounds, sulfur oxide, particulate matter, and oxides of nitrate, which contribute to local or regional air pollution. On-road vehicles include buses, cars, trucks, motorcycles, etc.

The waste sector is an important GHG emission sector because of its direct relevance to the lives of citizens through waste generation and disposal. Waste disposal and treatment produces CH_4 and N_2O through aerobic and anaerobic decomposition or incineration. Only solid waste was included in the inventory since there is no city-owned or operated centralized wastewater treatment facility. Municipal solid waste generated within the city is collected by the City Waste Management Office (CWMO). This waste includes food waste, garden waste, paper and cardboard, textiles, disposable diapers, rubber, plastics, glass, etc., which are collected and further segregated and processed before eventually disposing in the city's landfill.

The estimated GHG emissions from electricity consumption of the institutional or governmentowned and operated facilities of the city government in 2018 were 17,165.10 tons of carbon dioxide equivalent (tCO₂e). The total estimated emissions from the on-road LGU transport sector during the same period were 350.13 tCO₂e. The total estimated GHG emissions attributed to the solid waste subsector were 54,662.16 tCO₂e. These figures indicate that the largest contributor of GHG emissions by the LGU GSC comes from the solid waste subsector (76% share of the total), followed by stationary energy (24%) and transport (0%) (Figure 6).



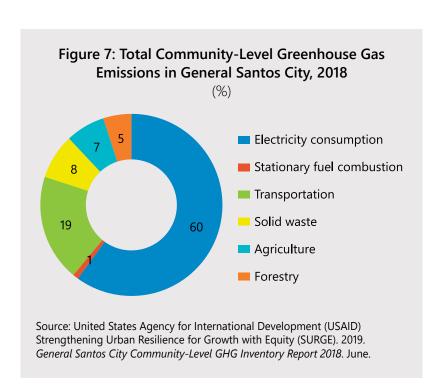
A community-level GHG inventory was also conducted with emission sources from agriculture, forestry and other land use, in-boundary water and wastewater, in-boundary transportation, and stationary fuel combustion for Scope 1. Scope 2 included data from grid-supplied energy.

The estimated total GHG emission from electricity consumption in residential, commercial, institutional, and industrial buildings in GSC was 428,346.35 tCO₂e. About 60% of the total emissions from electricity consumption come from residential uses, followed by commercial (30%), institutional (8%), and industrial (2%) sectors.

The GHG emissions inventory from stationary energy (other stationary fuel consumption) was derived from the national level stationary fuel consumption per fuel type of residential, commercial, and industrial data and scaled down using population. The results show that the total estimated GHG emission from stationary fuel consumption in the city was 9,983.02 tCO₂e. The total estimated GHG emission from on-road transport was 134,178.66 tCO₂e. A comparative scale shows that 49% of emissions from on-road transport come from B20 biodiesel/diesel, 48% from gasoline/petrol, 2% from 100% diesel, 1% from E85 ethanol/gasoline, and 0% from ethanol.

The total estimated GHG emission from the solid waste subsector was $54,662.16 \text{ tCO}_2\text{e}$. This was derived from the assumption that the local government had a waste diversion rate of 53% (CWMO data). The volume of waste sent to the landfill was 60,162.8 metric tons (t).

For agriculture, the GHG emissions inventory was taken from rice crop management. GSC has 1,202.34 ha of land dedicated to rice, and all of it is irrigated all year round. The farmers plant rice twice a year: during the rainy (wet) season and the dry season. Based on these data, the total estimated GHG emissions for CH_4 were 144.28 t in the dry season and 391.96 t in the wet season. The estimated CO_2 emission was 3,029.9 t CO_2 e in the dry season and 8,231.2 t CO_2 e in the wet season. GHG emissions from agriculture (livestock management) were 40,136.9 t CO_2 e.



The city has 12,048 ha of forestland and 18,225 ha of forest used for wood products harvesting. Based on these data on forested land area, the total estimated GHG emissions of the forestry sector were 32,744.93 tCO₂e, while the GHG removal by the forestry sector was 41,467.12 tCO₂e. GHG removal represents the amount of GHG absorbed by the forestland area in the city.

In summary, the 2018 community-level GHG emissions inventory revealed that of the six sources of GHG emissions, 60% came from electricity consumption, 19% from transportation, 8% from solid waste, 7% from agriculture, 5% from forestry, and 1% from stationary fuel combustion (Figure 7).

Upon completion of its GHG emissions inventory, GSC organized its Local Climate Change Adaptation Plan (LCCAP) Core Team through Executive Order No. 38, series of 2019. It was tasked to formulate the city's LCCAP, of which the GHG emissions inventory is a part. Among the key recommendations of the GHG study are the following: (i) LCCAP Core Team to institutionalize the conduct of community- and entity-level GHG emissions inventory regularly for monitoring and planning purposes; (ii) City Planning and Development Office (CPDO) as the oversight unit and data repository unit for the GHG emissions inventory and to designate a GHG inventory manager to ensure the efficient, proper, and timely implementation of the inventory process; (iii) CPDO to develop, jointly with the City Public Information Office, information materials to disseminate key findings of the inventory to concerned stakeholders of the city; (iv) CPDO and the GHG inventory manager to take the lead in coordinating the planning and implementation of all GHG inventory-related activities including budgeting, data collection and processing, database development, information dissemination, etc.; and (v) capacity building support to the GHG inventory manager and all LGU staff involved in the inventory process as well as the LCCAP Core Team.

3.6 Land Use

Settlement Pattern

GSC's existing settlement pattern is based on the following hierarchy:

- Rural barangays. These are mostly agricultural or production areas. Basic socioeconomic facilities and utilities such as farm-to-market roads, power, water, barangay health centers, and developed barangay centers are present. Appropriate land uses are proposed for the barangay to become a self-contained community.
- **Urban barangays.** These are developed barangays that are quite accessible by any mode of land transportation. The emergence of commercial establishments is prominent, as well as the presence of low-cost to high-end subdivisions. Wide paved roads, basic utilities, and developed government centers are noticeable characteristics of the urban barangays. Industrial establishments occupy the southwestern portion of the city. These developments require proper site and transport planning to ensure compatibility of uses and lessen traffic congestion along main city roads.
- Central business district. The CBD hosts local to major commercial establishments, schools, hospitals, and residential areas. Commercial and residential activities should be intensified while ensuring that uniform setback of buildings is observed and sufficient parking areas are provided.

In terms of development level and growth strategies, the city's 26 barangays are categorized as major and minor growth centers, emerging barangays, and satellite barangays (Table 9). Based on its CLUP 2018–2026, GSC will continue the existing settlement pattern to elevate the status of the lower-level barangays within this 9-year planning.¹⁰

Much of the information in this section is referenced from the GSC CLUP 2018–2026 and the GSC SUID Master Plan 2020–2026.

Table 9: Existing and Proposed Settlement Patterns in General Santos City, 2018–2026

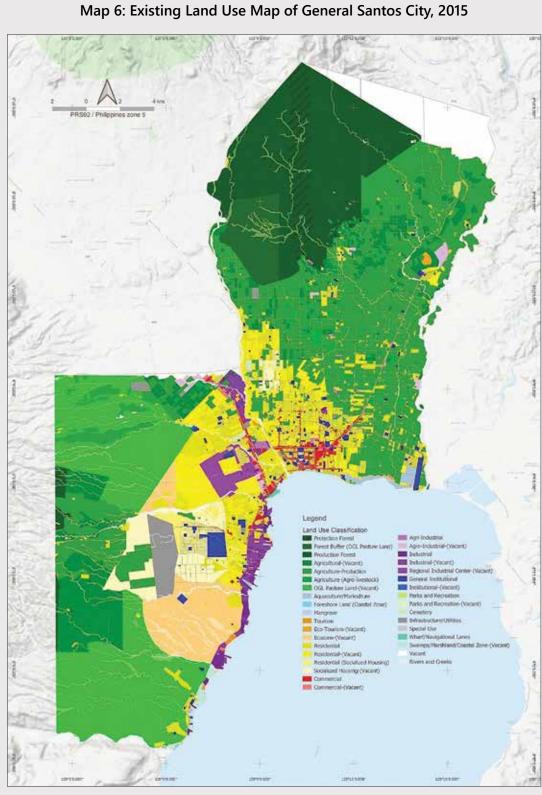
Settlement Pattern	Existing	Proposed	
Major growth center	CBD (Dadiangas East, Dadiangas West, Dadiangas North, Dadiangas South, Lagao, Bula, City Heights, San Isidro)	CBD, Apopong, Labangal, Calumpang	
Minor growth center	Apopong, Labangal, Calumpang	Mabuhay, Tambler, Fatima, Sinawal,	
Emerging barangays	Fatima, Sinawal, Tambler, Katangawan, Mabuhay	Conel, Ligaya, Katangawan, Siguel, Buayan, Tinagacan, Baluan	
Satellite barangays	Baluan, Buayan, Ligaya, Conel, Tinagacan, San Jose, Upper Labay, Olympog, Batomelong, Siguel	San Jose, Upper Labay, Batomelong, Olympog	

CBD = central business district.

Sources: General Santos City Comprehensive Land Use Plan 2018–2026; Local Climate Change Adaptation Plan 2019–2022.

Urban Growth Trends

Map 6 presents the existing land use map of GSC in 2015. Significant changes have been noted between the land use in 1998 and 2015, indicating the city's growing urbanization over 17 years (Table 10). There is a marked growth of settlements (especially residential housing) and infrastructure and utilities. Evidently, there is also a greater emphasis on protecting the environment, particularly forests. These urban growth trends are summarized in Table 11.



Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

Table 10: Comparison of Existing Land Use of General Santos City, 1998 and 2015

	Existing L	and Use			
	(hect				
Land Use Categories	1998	2015	Share of 2015 Total (%)	% Increase/ (Decrease)	Remarks
PROTECTION	6,994	8,917	16.85	27	
Production forest	6,893	6,729	12.71	(2)	
Protection forest		1,299	2.45		No protection forest use in 1998
Foreshore land (coastal zone)	101	3	0.01	(97)	
Mangrove		5	0.01		Mangroves may have been part of coastal zone in 1998
Rivers and creeks		751	1.42		Not indicated in 1998
Swamps/marshland/ coastal zone (vacant)		130	0.24		Not indicated in 1998
PRODUCTION	30,610	29,014	54.82	(5)	
Forest buffer (Open Government License pastureland)		1,357	2.56		Not indicated in 1998
Open Government License pastureland (vacant)	15,530	8,301	15.68	(47)	
Agricultural (vacant)		4,163	7.87		Not indicated in 1998
Agriculture (agro-livestock)	330	371	0.70	12	
Agriculture production	14,486	14,351	27.12	(1)	
Agro-industrial	70	76	0.14	9	
Agro-industrial (vacant)		198	0.37		
Aquaculture/mariculture	194	197	0.37	2	
SETTLEMENT	5,504	12,970	24.51	136	
Cemetery	57	62	0.12	9	
Commercial	363	373	0.70	3	
Commercial (vacant)		95	0.18		Not indicated in 1998
Eco-tourism (vacant)		29	0.05		Not indicated in 1998
Ecozone (vacant)		2,268	4.29		Not indicated in 1998
General institutional	613	595	1.12	(3)	
Industrial	310	306	0.58	(1)	
Industrial (vacant)		493	0.93		Not indicated in 1998
Institutional (vacant)		6	0.01		Not indicated in 1998

continued on next page

Table 10 continued

	Existing Land Use (hectare)				
Land Use Categories	1998	2015	Share of 2015 Total (%)	% Increase/ (Decrease)	Remarks
Parks and recreation	247	74	0.14	(70)	
Parks and recreation (vacant)		1	0.00		Not indicated in 1998
Regional Industrial Center (vacant)		416	0.79		Not indicated in 1998
Residential	3,535	3,559	6.72	1	
Residential (socialized housing)	326	541	1.02	66	
Residential (vacant)		2,939	5.55		Not indicated in 1998
Socialized housing (vacant)		1,165	2.20		Not indicated in 1998
Special use		3	0.01		Not indicated in 1998
Tourism	53	44	0.08	(17)	
Vacant		1	0.00		
INFRASTRUCTURE	1,237.92	2,025	3.83	64	
Infrastructure/utilities	1,237.92	2,009	3.80	62	
Wharf/navigational lanes		16	0.03		Not indicated in 1998
VACANT	9,082				Indicated for separate categories in 2015

^{() =} negative.

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

Spatial Strategy

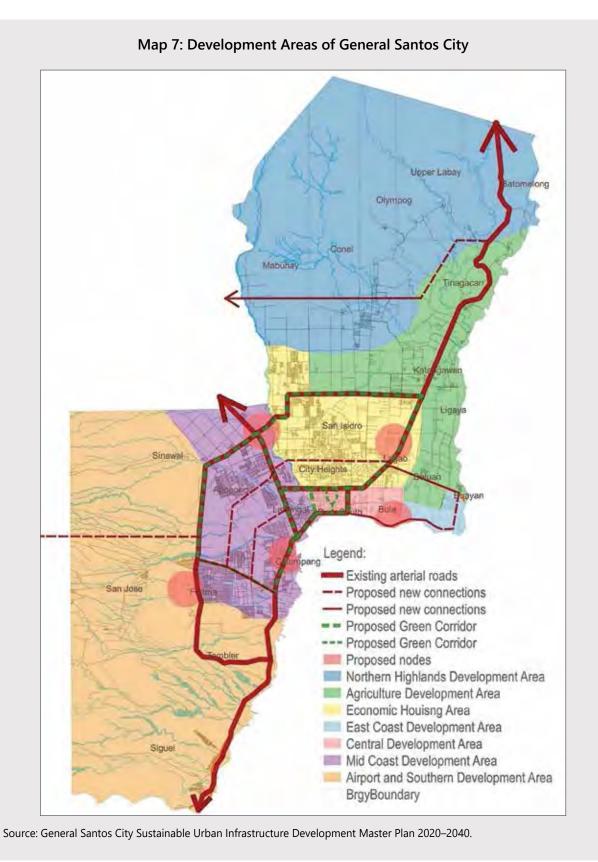
GSC adopts the centric and multi-nodal dispersed concentration spatial strategy, which maximizes land use of the urban core while directing new development toward identified growth nodes. It promotes decongestion in the urban core while decentralizing and localizing activities for socioeconomic development around established hubs such as the General Santos International Airport. The strategy also encourages the development of complementary industries that will disallow hazardous and pollutive industries unsafe for human health and the environment. Mitigating measures will be in place to address the impacts of industrialization. Identified production areas will be protected and further developed to ensure food security and crop and livestock production for input to processing activities.

The spatial strategy clusters the city into seven development areas (Map 7), each with unique physical characteristics and development direction and role to serve. These clustered development areas and their overall development strategies are as follows:

Table 11: Planning Implications of Land Use Patterns

Base Scenario (Patterns and Trends)	Future Scenario	Planning Implications
GENERAL		
 Increasing settlement area (136% in 17 years, mostly from additional reclassified/partially developed vacant land) Increasing built-up area (0.96% in 17 years) Urban growth due mainly to development of single-detached residential development/housing subdivisions 	Continuing increase in settlement and built-up area	Utilization of existing vacant settlement lands rather than further expansion
CENTRAL BUSINESS DISTRICT		
 High density but decreasing population Still developing as indicated by construction and permit data, although slower than adjacent barangays 	 Continued commercialization and densification Increasing traffic congestion 	 Maintain growth as commercial, educational, government center Arrest inner-city decline (develop open spaces, manage traffic, enhance walkability, waste management) Encourage densification within capacity limits Reduce risk to settlements within hazard areas
URBANIZING AREAS		
 Barangays surrounding the CBD area (Lagao, San Isidro, City Heights, Calumpang) are growing faster than CBD in terms of new buildings and businesses, and increasing in population Large tracts of undeveloped land 	 Increase in residential area by infilling of vacant lots/multistory/high-rise developments Increasing commercialization and densification, particularly along major roads Reduction of open space 	 Encourage further densification (pave unpaved roads, develop secondary roads) Prepare for strip commercialization of major roads (develop design guidelines for major streets) Identify open spaces for development as recreational areas
PERI-URBAN AND RURAL AREAS		
 Scattered settlements and subdivisions have sprouted in peripheral lowland barangays, which are still mainly agricultural in use Barangay Mabuhay is fast growing with an annual average population growth rate of 9% from 2010 to 2015, mainly due to the development of community mortgage projects 	 New subdivisions and socialized housing sites likely to be developed, especially around new developments (e.g., UST Campus in Ligaya) Scattered settlements and agriculture encroaching into protection areas 	 Prepare for future expansion in fast-growing areas (plan layouts of roads; blocks; potential location of institutional, commercial, recreational areas; utilities; and social services expansion) Set growth limit boundaries

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.



- Central development area. It is composed of barangays Dadiangas North, Dadiangas South, Dadiangas East, and Dadiangas West. The strategy for this city core is laying down the foundation for a smart city through the revitalization program that aims to arrest the inner-city decline and maintain its growth as a commercial, educational, and government center. This strategy includes developing green spaces; enhancing access to the Silway River and Sarangani Bay; and improving walkability, bikeability, road safety, and road efficiency.
- Economic housing development area. Composed of barangays San Isidro, City Heights, and Lagao, it will be further densified by developing vacant lands for residential and institutional uses.
- Agriculture development area. Composed of barangays Baluan, Ligaya, Katangawan, and Tinagacan, where most of the city's existing and production expansion areas are located, it will be preserved for agricultural and fisheries production to guarantee the city's food security. Only limited residential and commercial expansion will be allowed.
- Mid coast development area. Composed of barangays Apopong, Labangal, and Calumpang, it is on its way to becoming an urbanized area, with increasing population growth, especially around the port and industrial areas. The strategy is achieving a healthy balance between commerce and the area's livability by providing recreational landscapes and efficient road and drainage systems.
- East coast development area. Composed of the coastal barangays of Bula and Buayan, it is mainly agricultural with scattered settlements. Most of the area is within the floodplain of the Buayan River, with coastal wetlands and mangroves. The strategy for this area is protecting and conserving mangroves, marine resources, and the remaining agricultural lands, as well as improving existing infrastructure facilities.
- Northern highlands development area. Composed of barangays Mabuhay, Conel, Olympog, and Upper Labay, it is mostly mountainous, with areas with good potential as ecotourism destinations. The strategy for this area is to protect it from further encroachment of settlements and manage the watersheds going into the urban area.
- Airport and south coast development area. Composed of barangays Fatima, Tambler, San Jose, Sinawal, and Siguel, it is rapidly urbanizing due to the airport, seaport, fish port, and industrial and commercial businesses. The strategy for this area is planned expansion to support the operation of these gateway ports and industries.

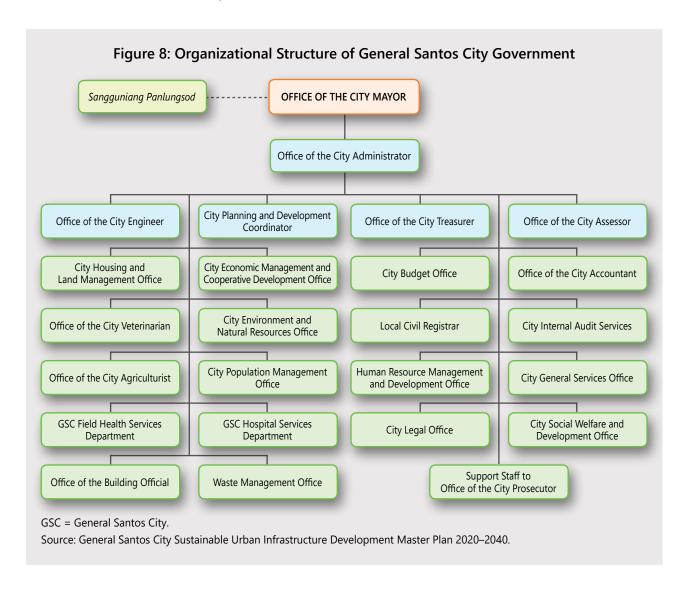
These development areas will be interconnected through a proposed movement network of existing major arterial roads, proposed new connections, and a proposed "Green Corridor" that will serve as an inter-area bike loop. In addition, transit and commercial nodes will be developed to serve as transport and commercial hubs within each area. The movement network assures better use of the existing transport infrastructures with road modifications (bike lanes and pedestrian ways) as well as placement of new road links, particularly in the high-density areas, to accommodate nonmotorized vehicles and encourage walking thereby contributing to lowering the city's carbon footprint. As such, the network offers opportunities for the inclusion of greenways.

3.7 Institutional Arrangements

The city government manages its affairs for urban development through different mechanisms and approaches. On the one hand, it has its governance processes and systems to ensure smooth and efficient delivery of public services. On the other hand, it has financial management procedures to guarantee the implementation of programs, projects, and activities (PPAs) that are intended to achieve the aspirations of its constituents and bring out better results for the communities.

Organizational Structure

The city government has two branches: executive and legislative. The executive branch is headed by the city mayor and assisted by various offices and departments (Figure 8). Since 2017, the various local departments have been divided into these four clusters:



good governance, bankability, competitiveness, and livability. Each cluster is responsible for preparing the short-, medium-, and long-term development plans for the sector assigned to it:

- Good governance and bankability: Institutional development,
- Competitiveness: Economic and infrastructure development, and
- Livability: Social development and environmental management.

The legislative branch, otherwise known as the *Sangguniang Panlungsod*, is headed by the city vice mayor. The *Sangguniang Panlungsod's* primary function is the issuance of local laws and policies, and the allocation of funds of the city government to enable it to finance its PPAs. It has various committees to handle its different sector concerns.

Development planning is spearheaded by the City Development Council (CDC) and the SP. The CDC has a multisector membership that includes representatives of the city departments, local private sector organizations, NGOs, and civil society organizations. In the case of GSC, its CDC composition exceeds the mandated 25% membership of the private sector. The CPDO serves as the CDC technical secretariat. The CDC also has different sector committees on social development, economic development, environmental management, institutional development, infrastructure development, and project monitoring. The department clusters are empowered to work closely with the relevant CDC sector committees in developing the city's development plans and investment programs.

Local Financial Management

The bulk of the city's revenue comes from the internal revenue allotment (IRA), which is the share of LGUs from taxes collected by the national government. This is about 62% of the city's total revenue based on the 3-year average for 2015, 2019, and 2020 (Table 12). Based on its latest audited financial statement, local tax revenues accounted for about 25% in 2019, while service and business income accounted for about 13%. Between 2015 and 2019, the city's IRA share has decreased while its service and business income grew.

In 2019, the city government had total revenue of about ₱2.64 billion. The trend from 2015 to 2019 shows that city revenue was increasing at an average of 14% a year.

Personnel services and maintenance and other operating expenses comprise the bulk of operating expenditures. Between 2015 and 2019, the share of personnel services to total expenditures decreased from 49% to 38%. Meanwhile, the share of maintenance and other operating expenses increased from 45% to 51%. Noncash expenses and other financial expenses accounted for 10% and 0.4%, respectively, of total operating expenditures in 2019. That year, the city's current operating expenses totaled about ₱2.08 billion, yielding a surplus of ₱560.2 million, which was higher than the 2015 amount.

However, the city's 2020 unaudited financial statement reveals a deficit of ₱626.3 million despite higher total revenue of ₱2.93 billion. This was due to the substantially increased current operating expenses in response to the COVID-19 pandemic. Even with the substantial

Table 12: Financial Profile of General Santos City Government (2015, 2019, 2020)

	2015 (Audited)		2019 (Audited)		2020 (Unaudited)	
Finance Items	Amount	%	Amount	%	Amount	%
Revenue						
Tax revenue	445,697,496	26.02	646,502,841.86	24.48	660,524,780.53	22.54
Share from internal revenue collections	1,086,282,536	63.41	1,606,361,666.00	60.84	1,803,585,457.00	61.54
Other share from national taxes	654,644	0.04	8,400.00	0.00	1,811,424.29	0.06
Service and business income	172,852,144	10.09	335,695,697.08	12.71	274,286,876.04	9.36
Shares, grants, and donations	845,707	0.05	2,580,349.12	0.10	165,241,531.55	5.64
Gains	4,042,872	0.24	4,017,963.15	0.15	1,370,588.00	0.05
Other income	2,797,215	0.16	45,303,130.20	1.72	23,887,836.68	0.82
Total Revenue	1,713,172,615	100.00	2,640,470,047.41	100.00	2,930,708,494.09	100.00
Operating Expenditures						
Personnel services	596,806,011	49.08	795,275,047.46	38.23	848,955,311.59	23.87
Maintenance and other operating expenses	542,006,430	44.58	1,061,724,350.29	51.04	2,437,275,301.07	68.52
Noncash expenses	75,721,615	6.23	215,081,337.30	10.34	263,666,682.52	7.41
Financial expenses	1,338,441	0.11	8,204,938.34	0.39	7,102,773.16	0.20
Total Operating Expenditures	1,215,872,499	100.00	2,080,285,673.39	100.00	3,557,000,068.34	100.00
Surplus or (Deficit) from Current Operation	497,300,116		560,184,374.02		(626,291,574.25)	
Add (Deduct):						
Transfers, assistance, and subsidy from external sources (incoming)	86,180,630		12,754,328.42		861,982,886.05	
Transfers, assistance, and subsidy to external sources (outgoing)	(111,859,340)		(97,689,523.79)		(295,687,594.84)	
Surplus (Deficit) for the Period	471,621,405		475,249,178.65		(59,996,283.04)	
Statement of Appropriations	2016		2019		2020	
Total appropriations	1,745,578,658.88		3,866,188,002.94		4,865,542,396.41	
Capital outlay (all sectors)	285,816,559		749,497,498.13		449,557,391.47	
Debt servicing	26,765,213		28,477,899.42		30,882,942.22	
Outstanding debts (loans payable)	No data		136,927,587.49		116,649,426.41	
Debt service ratio	0.014		0.011		0.011	
Local Disaster Risk Reduction Management Fund (RA No. 10121)	288,575,348		379,437,398.41		1,231,166,913.74	

Notes: 1. Numbers may not sum precisely because of rounding.

Source: Financial statements of the General Santos City Government for 2015, 2019, and 2020.

^{2.} Percentages may not total 100% because of rounding.

incoming transfers and subsidies from external sources that year, a ₱60 million deficit was still incurred.

Total appropriations of ₱3.9 billion in 2019 more than doubled from 2015. It grew by another 25% in 2020. This includes the city's amortization payments for its outstanding Land Bank of the Philippines loan for its landfill project. Nevertheless, this translates to a low debt service ratio of only 0.011.

In response to the COVID-19 pandemic, the city's Local Disaster Risk Reduction and Management Fund (LDRRMF) substantially increased by 224% to ₱1.23 billion from 2019 to 2020.¹¹ This fund was used to purchase drugs and medicines; medical, dental, and laboratory supplies; and medical equipment. It was also used for the (i) relief operations for residents affected by quarantine measures, (ii) establishment of the COVID-19 patient care center and testing facility at the local government-run Dr. Jorge P. Royeca Hospital, (iii) preparation of isolation and quarantine facilities, (iv) assistance to medical frontliners and first responders, and (v) other COVID-19 pandemic response measures. Aside from the LDRRMF, the city also realigned and reallocated part of its budget to its pandemic response program.

Future Directions

With the prospects of a protracted COVID-19 pandemic period, a substantial portion of the city budget will likely be allocated to its pandemic response program in the next several years.

A favorable development is the 2018 Supreme Court ruling on the Mandanas-Garcia case—also referred to as the Mandanas ruling or law—affirming that LGUs are entitled to a "just share" on all national taxes collected and not only from the Bureau of Internal Revenue. At present, the LGUs' IRA comes from 40% of national internal revenue taxes collected by the Bureau of Internal Revenue. With the Mandanas ruling implementation in 2022, it is projected that LGUs will have a 27.61% increase in the total IRA shares. In line with this prospective increase in LGU funding, Executive Order No. 138, signed by then President Duterte on 1 June 2021, mandates the full devolution of certain functions of the executive branch to the LGUs. Under the Local Government Code of 1991 (RA No. 7160), these functions will include agriculture, health, social services, maintenance of public works and highways, and environmental management and protection.

RA No. 10121, or the Philippine Disaster Risk Reduction and Management Act of 2010, mandates LGUs to set aside at least 5% of their estimated revenue from regular sources to support their disaster risk management activities such as, but not limited to, the pre-disaster preparedness programs including training, purchase of disaster response and rescue equipment, supplies and medicines for post-disaster activities and payment of premiums on calamity insurance. The LDRRMF covers 30% lumpsum allocation for Quick Response Fund (QRF) and 70% allocation for disaster prevention and mitigation, preparedness, response, rehabilitation, and recovery.

¹² The Mandanas-Garcia ruling is named after Batangas Governor Hermilando Mandanas and former Bataan Governor Enrique Garcia Jr. who petitioned before the Supreme Court on the local government shares of the IRA.

3.8 Sustainable Development Challenges

As can be gleaned from the profiling of GSC, its population and economy are rapidly growing, and it continues to urbanize and develop into a modern city. However, as in many other areas, rapid development and urbanization come with challenges that can hinder the city's sustainable development and the achievement of its competitiveness, security and resiliency from all forms of disaster, and livability or quality of life. The following summarizes GSC's major sector challenges and needs (Table 13):

- Water supply. Inadequate supply of safe, clean water to serve all of the city's population is mainly due to incomplete water service connections, overdependence on groundwater sources, inadequate water quality monitoring, climate change (e.g., rising temperature, increased rainfall variability, rising sea level), water pollution, and lack of alternative water supply methods (e.g., surface water sourcing, rainwater harvesting).
- **Sanitation.** There is a lack of proper sewerage system and treatment facilities and weak public compliance with the septage ordinance.
- Flood management and drainage. Flooding risks are due to inadequate flood control and mitigation and drainage systems, and weak inter-LGU integrated river basin and watershed management.
- Solid waste management. Inadequate collection and disposal of waste are due to increasing waste generation from the growing population, inadequate SWM facilities, and lack of public compliance with SWM regulations (e.g., waste segregation at source, illegal dumping, waste burning).
- Transport. Traffic congestion in the urban areas and increasing air pollution are due to increasing number of vehicles, low interconnectivity of the road network, weak enforcement of traffic management measures, weak public transport structure, lack of parking areas and facilities for nonmotorized transport (e.g., bicycle lanes, sidewalks), and a relatively young program to modernize public transport and implement the Local Public Transport Route Plan.
- Built environment. Unbalanced and conflicting land use and growth of built-up area are due to unintended densification of certain areas, urban blight and decay in some areas, rapid growth of human settlements and conversion of open space to built-up area, encroachment of settlement areas into production and protection areas, settlements and informal settler families (ISFs) in danger and protected areas, inadequate green cover and landscaping in urban areas, overlapping claims in public land and unresolved ancestral domain claims, lack of affordable housing for low-income families, and lack of standards and investments in constructing disaster-resilient houses and resettlement facilities.
- Energy. Inadequate access to electricity for 30% of the population is due to growing regional demand and limited power supply (Mindanao grid). High volume of GHG emissions is due to reliance on nonrenewable energy sources, lack of an energy efficiency program, and inadequate investments in renewable energy infrastructure.

These sector challenges are further elaborated on in Chapter 5.

Aside from these sector concerns, the city also faces the challenge of effectively implementing its various development plans and managing its many programs and projects. While the city continues to grow, aside from its development concerns, the size of its bureaucracy seems to lag. In particular, there is an apparent lack of technical and administrative personnel to efficiently manage and monitor the simultaneous implementation of its many programs, including the preparation of studies, surveys, project proposals, and other documentary requirements for advancing development projects. While GSC currently receives TA from its development partners (e.g., USAID, UN, ADB) in the preparation of some studies, among others, the city needs to develop long-term internal technical capacities in this respect.

GSC has a relatively robust financial capability to implement most of its local service delivery and development programs. However, for its GCAP projects, it needs to better leverage its internal local funds with external financing facilities from the private sector (for PPP projects), national government agencies and financial institutions, and green and blue financing facilities from bilateral and multilateral organizations and NGOs. For this purpose, the city will need to strengthen its institutional capacity to prepare project investment and financing proposals. In addition, the COVID-19 pandemic will continue to put a strain on the city's finances in the next few years. Nevertheless, the prospect of additional LGU funding resulting from the implementation of the Mandanas Law starting in 2022 should be a favorable development for the city.

Table 13: Issues and Needs Assessment Matrix

Sector	Environment/Resource Management	Policy and Governance	Financial Management	Implementation
Water supply	 Reliance on groundwater sources, which lowers the water table Climate change (e.g., rising temperature, increased rainfall variability) remains a threat to the city's water resources. Sea level rise may cause coastal flooding and saltwater intrusion, affecting water quality Settlements and ISFs along riverways and coastlines contribute to water pollution 	 Policy and ordinance on rainwater harvesting still has low awareness and compliance among the local population. Need to establish a water quality monitoring system with adequate facilities and equipment 	 Need to invest in developing more water sources (surface water) and increase coverage of piped water connections Need more LGU investment in water quality monitoring facilities and equipment 	 Incomplete coverage of GSCWD service connections (only 18 of 26 barangays covered and not all households are connected) Need to effectively regulate the private use of deep wells

 Table 13
 continued

Table 13 Continue	Environment/Resource			
Sector	Management	Policy and Governance	Financial Management	Implementation
Sanitation	 Lack of proper sewerage system and sewerage treatment plant, resulting in pollution of water bodies Lack of clean and hygienic public toilets with available clean water Settlements and ISFs along riverways and coastlines contribute to water pollution 	Lack of awareness and compliance among the local population of the city's septage ordinance	 Lack of personnel to monitor and inspect existing septic tanks and effect compliance with the septage ordinance Lack of septage management equipment (e.g., desludging trucks) Need more investment in public toilets 	Weak monitoring and enforcement of compliance with the septage ordinance
Flood management and drainage	 13 of 26 barangays are prone to flooding, especially those along Silway, Makar, and Buayan rivers Rivers are heavily silted and quarried, decreasing their capacity to drain floodwater to Sarangani Bay Informal settlements along riverbanks, creeks, and coastal areas hamper the restoration of the city's waterways. Inadequate forest/green cover in watershed areas 	 Weak integrated inter-LGU river and watershed management upstream with neighboring LGUs Need to update the city's Drainage Master Plan Need to formulate and implement a comprehensive Integrated River Basin Management Plan (a balanced approach to land, water, and natural resources management) 	Need more LGU investments in flood control and mitigation and drainage infrastructure projects	Insufficient drainage system to mitigate floods.
Solid waste management	8% of total community-level GHG emissions come from solid waste Waste generation continues to increase with the city's population growth	 Need to amend and/or expand local ordinances and policies on SWM to include waterways, streets, and drainage canals in the coverage of waste collection Need to promote alternative methods of waste disposal (e.g., waste-to-energy, agricultural uses) Need to strengthen "No segregation, no collection" policy 	 Lack of SWM facilities, equipment, and personnel Proposed PPP project on SWM is still uncertain. 	 Low waste collection efficiency (45%) Weak SWM policy implementation, monitoring, and regulation (e.g., waste segregation at source, street dumping, waste burning) Need to strengthen SWM information, education, and communication program

Table 13 continued

Table 13 continu				
Sector	Environment/Resource Management	Policy and Governance	 Financial Management	Implementation
Transport	 Transport sector is the second-highest contributor to community-level GHG emissions (19%). Increasing number of private and public vehicles (cars, motorcycles, tricycles) Traffic congestion especially in the urban areas due to low interconnectivity of the road network, weak enforcement of traffic management measures, and weak public transport structure Lack of parking areas Lack of facilities for nonmotorized transport (e.g., bicycle lanes, sidewalks) 	 Uncoordinated regulation and licensing of public transport (e.g., tricycles) Weak monitoring and regulation of traffic impacts of business establishments Need to establish a city office dedicated to transport planning and traffic management 	 Less investment in road development to farmlands and less populated areas due to limited funds for road development Private investments in modern PUVs (e-jeepneys, Euro IV minibuses) by local transport cooperatives are still new, albeit increasing. Lack of air pollution monitoring facilities and equipment 	 Missing road links in the city's road network Poor road conditions (80% of roads are unpaved) Implementation of the LPTRP is still new and will take some time to reach its viable operation. Declining quality of service of PUVs due to lack of technical standards
Built environment	 Unintended densification of certain areas Urban blight and decay in some areas Increasing housing demand particularly in urban areas Rapid growth of human settlements (e.g., residential subdivisions) and conversion of open space to built-up area Settlements and ISFs in danger and protected areas Encroachment of settlement areas into production and protection areas Inadequate green cover and landscaping in urban areas 	 Weak implementation and monitoring of mandatory 20 meter coastal and river easement Unresolved ancestral domain claims mainly due to overlapping jurisdiction and lack of coordination among line agencies involved in issuing and managing titles (e.g., DENR, LRA) Overlapping claims in public land (e.g., FLGMA, CALT) 	 Difficulty in procuring housing sites due to rising cost of land sites within urban areas Limited affordability of the population for housing Need more investments in constructing affordable, disasterresilient houses for low-income families Need more investments in developing green corridors 	 Lack of relocation or resettlement sites Poor infrastructure in existing socialized housing sites (e.g., subdivision roads, low water pressure) Weak monitoring of encroachment in production and protected areas

Table 13 continued

Sector	Environment/Resource Management	Policy and Governance	Financial Management	Implementation
	 Growth of informal businesses and illegal expansion of buildings on sidewalks and right-of-way Environmental threats to ecosystems and potential ecotourism zones 			
Energy	 Growing regional demand but limited power supply (Mindanao grid) Electricity consumption in residential, commercial, institutional, and industrial buildings is the highest contributor to GHG emissions (60%). Most of the power supply still relies on fossil fuels. 	 Need to diversify power mix and develop more renewable energy sources (e.g., solar, biomass, waste-to-energy) Need to develop and implement an energy efficiency program (e.g., building code incorporating energy efficiency principles) Need to develop a local green building code/ordinance Need to strengthen promotion of the use of energy-efficient transport 	Need to incentivize investments in renewable energy development Need to increase LGU investment in renewable energy infrastructure (LED streetlights, solar-powered lights)	Need to address the current inadequate access to electricity (30% of population still without electricity)

CALT = Certificate of Ancestral Land Title, DENR = Department of Environment and Natural Resources, FLGMA = Forest Land Grazing Management Agreement, GHG = greenhouse gas, GSCWD = General Santos City Water District, ISF = informal settler family, LGU = local government unit, LPTRP = Local Public Transport Route Plan, LRA = Land Registration Authority, PPP = public-private partnership, PUV = public utility vehicle, SWM = solid waste management.

Sources: Based on information from the General Santos City (GSC) Comprehensive Land Use Plan 2018–2026, Disaster Risk Reduction Management Plan 2019–2022, Local Climate Change Adaptation Plan 2019–2022, Comprehensive Development Plan 2017–2022, Local Development Investment Program 2022–2024, GSC Sustainable Urban Infrastructure Development Master Plan 2020–2040, and GHG Inventory 2018.





CHAPTER 4

GREEN CITY POLICY ENVIRONMENT

ational and regional development plans in the Philippines provide the framework and direction for local planning at the regional, provincial, city, and municipal levels. They serve as the higher plans that guide the LGUs in formulating their respective local development plans. The current SOCCSKSARGEN Regional Development Plan 2017–2022 sets the development directions and strategies for Region XII, where GSC belongs, over 6 years. It is aligned with the Philippine Development Plan's development pillars of *Malasakit* (Enhancing the Social Fabric), *Pagbabago* (Inequality-Reducing Transformation), and *Patuloy na Pag-unlad* (Increasing Growth Potential) toward the achievement of *Ambisyon Natin* 2040 long-term development goals.

In support of the 2030 UN SDGs, the Regional Development Plan promotes sustainable development and resilience in meeting human development goals and sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend. Thus, among the plan's goals are building resiliency of communities and reducing vulnerabilities of individuals and families, accelerating build-up of resilient infrastructure facilities, integrating disaster risk reduction and climate change adaptation measures, and harmonizing land use from ridge-to-reef by integrating forestland use plans, watershed management plans, protected areas management plans, and other related forestry plans into the LGUs' CLUP.¹³

As the SOCCSKSARGEN Region's only highly urbanized city, GSC is expected to take a catalytic role in achieving the SDGs espoused in the national and regional development plans. The city's local development plans and programs are already attuned to promoting sustainable development and resiliency, which are among the overarching goals of green city development.

Like many other LGUs, GSC has been conscious of protecting its natural environment as a matter of policy. This is particularly important since its economy depends a lot on its landscape and seascape, and its urban development is greatly affected by the conditions of its surrounding mountains, rivers, and coastline, as shown in the city profiling in the preceding chapter. This focus on environmental

Regional Development Council XII, National Economic and Development Authority (NEDA). 2017. SOCCSKSARGEN Regional Development Plan 2017–2022. Koronadal City: NEDA. March.

protection is reflected in the city's past and present local ordinances, especially during the last decade when the city experienced a spate of natural disasters such as flash floods, landslides, droughts, and earthquakes, resulting in damages to property and livelihood, displacement, and loss of lives. During these years, the international community started putting much greater importance on the effects of climate change and on addressing this through policy and program reforms.

GSC has passed landmark ordinances that mainstream and integrate climate change adaptation and mitigation (CCAM) as well as disaster risk reduction management (DRRM) into its policy formulation and development programs (Table 14). Its environment code, fisheries code, investment code, land transport and traffic code, and code of ordinances reflect conscious efforts to address the changing natural environment. Local bodies have been established to develop and implement the city's plans for CCAM, DRRM, protected area management, waste management, septage management, sustainable urban infrastructure development, and green development.

Table 14: General Santos City Local Ordinances Supporting Climate Change Adaptation and Mitigation and Disaster Risk Reduction Management (from 2001)

Ordinance	Description
City Ordinance No. 10 (2001)	Zoning Ordinance of General Santos City for 2001–2010
City Ordinance No. 3 (2003)	Ordinance amending the 2001 Zoning Ordinance
CDC Resolution No. 07 (2003)	Resolution endorsing the Stormwater Drainage Master Plan of 1st Priority Catchment-Central Business District, 2nd Priority Catchment-Barangay Fatima, and portion of 3rd Priority Catchment-Center of Barangay Bula, all of General Santos City, to the SP for approval
City Ordinance No. 12 (2004)	Ordinance declaring some areas in General Santos City as designated air sheds for comprehensive air pollution management and control
City Ordinance No. 14 (2005)	Ordinance creating the General Santos City Waste Management Board (GSCWMB). The GSCWMB primarily oversees the development, planning, implementation, monitoring, and operation of the city's environmental management program on all types of solid and liquid wastes.
City Ordinance No. 12 (2008)	Comprehensive Ecological Solid Waste Management Ordinance in support of the preparation and implementation of the city's 10-year ESWM Plan (2015–2025) by 2016
City Ordinance No. 10 (2009)	Fisheries Code of General Santos City to ensure the rational and sustainable management, conservation, and protection of the city's fisheries and aquatic resources, national protected areas, and Sarangani Bay as a protected seascape
City Ordinance No. 1 (2010)	General Santos City Septage Management Ordinance
City Ordinance No. 2 (2011)	Ordinance providing for the mechanisms for proper harvesting, storage, and utilization of rainwater in the City of General Santos
City Ordinance No. 3 (2011)	Ordinance creating the Disaster Risk Reduction and Management Office

Table 14 continued

Ordinance	Description
City Ordinance No. 4 (2012)	Ordinance prohibiting the use of coastal seawater from the seashores of urban barangays as storage medium for seafood being sold commercially
City Ordinance No. 11 (2013)	Enacting the code of ordinances of General Santos City. Title 10 on Environment and Natural Resources includes provisions pertaining to tree protection, river quarrying, discharge of wastewater effluent and other solid waste in Sarangani Bay, designation of air shed areas for comprehensive air pollution management and control, ecological solid waste management, and utilization of rainwater. Title 16 on Health and Sanitation includes provisions on the smoking ban in public places, institutionalizing the Integrated Solid Waste Management Program, implementing the septage management program, and prohibiting the use of coastal water.
City Ordinance No. 18 (2013)	Ordinance mainstreaming and integrating climate change adaptation and mitigation into the Local Government of General Santos City's policy formulation and for other purposes
City Ordinance No. (2013)	Ordinance creating the Technical Working Group on Climate Change under the Committee on Climate Change of the SP. The working group serves as an advisory board to the committee on the issue of climate change, including identifying current and future potential climate change impacts, recommending adaptation and mitigation measures, and developing a climate change action plan.
City Ordinance No. 28 (2014)	Ordinance creating the General Santos City Sustainable Waste Management Board
City Ordinance No. 16 (2015)	Ordinance enacting the General Santos City Investment Code of 2015. It mandates the preparation of the city's Investment Priorities Plan, including green projects as among the priority business sectors.
City Ordinance No. 26 (2015)	Ordinance establishing the General Santos City Plastic Recycling Facility within the sanitary landfill complex, prescribing guidelines on its operation and providing funds therefor
City Ordinance No. 45 (2017)	Ordinance establishing the buffer zone at the sanitary landfill in Barangay Sinawal as an eco park
City Ordinance No. 46 (2017)	Ordinance requiring all the barangay local government units, school administrators, port supervisors, and housing subdivision developers and owners to plant and grow historical Dadiangas trees in public tree parks, eco parks, open areas and spaces, plazas, school campuses, port areas, and housing subdivision areas in the City of General Santos and providing penalties therefor
City Ordinance No. 48 (2017)	Ordinance establishing the Pyroclave Facility at the sanitary landfill in Barangay Sinawal in General Santos City, prescribing guidelines for its operation and providing funds therefor. The pyroclave is an environmentally safe, low-cost, Filipino-invented medical waste management system capable of disinfecting 3 tons of medical garbage per day.
SP Resolution No. 62 (2017)	Resolution adopting the 2017–2022 City Comprehensive Development Plan and 2017–2019 Executive and Legislative Agenda of General Santos City

Table 14 continued

Ordinance	Description
City Ordinance No. 37 (2018)	Ordinance enacting the Comprehensive Land Transport and Traffic Code of the City of General Santos. It takes to heart the country's commitment to the international community with respect to climate change by promoting e-trikes, e-jeepneys, e-buses, e-trains, and electronic cars; by encouraging the use of bicycles with the provision of bicycle lanes by the city on every road or street within the city to minimize the adverse effects of dependence on nonrenewable sources of energy and fossil fuels; and by promoting other forms of mass transit.
City Ordinance No. 43 (2018)	Ordinance establishing the Datu Zainal Abedin Mangrove Ecotourism Zone
City Ordinance No. 44 (2018)	Ordinance prohibiting the disposal of used oil, grease, used cooking oil, wastewater, and any other polluting hazardous toxic liquid into the drainage canals that flow into the creeks, rivers, and seas of General Santos City, providing penalties thereof and for other purposes
City Ordinance No. 73 (2018)	Ordinance enacting the Environment Code of the City of General Santos. It integrates the concept of conservation, protection, and rehabilitation of the environment in various phases of policy formulation of local development plans and development processes, zoning regulation, forest and land use plans, climate change adaptation and mitigation strategies, and other development tools and techniques. It adopts and incorporates the applicable provisions of the city's Comprehensive Land Use Plan and Zoning Ordinance.
Protected Area Management Board (PAMB) Resolutions (2017–2019)	Various PAMB resolutions for implementing/enforcing relevant environmental laws, rules, and regulations; and conducting research studies, organizational development, conflict resolution, education and promotional events, and other activities for the sustainable management, conservation, and protection of the Sarangani Bay Protected Seascape.
Executive Order (EO) No. 37 (2019)	EO creating the City Green Team pursuant to the adoption of the Green Cities Initiatives Project of BIMP-EAGA in General Santos City for the development of Green City Action Plan (GCAP). The City Green Team will primarily work collaboratively with the Philippines-EAGA Environment Cluster and the Asian Development Bank in planning, organizing, and preparing the city's GCAP including post-plan subsequent activities, and recommend and endorse policy support requirements to the SP for its appropriate action.
Executive Order No. 38 (2019)	EO creating the Local Climate Change Adaptation Plan (LCCAP) Core Team to take the lead in developing and implementing the city's LCCAP 2019–2022
SP Resolution No. 104 (2021)	Resolution requesting the CENRO to prepare and submit to the SP the Master Plan for the Beautification of the City of General Santos

BIMP-EAGA = Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area, CDC = City Development Council, CENRO = City Environment and Natural Resources Office, ESWM = Ecological Solid Waste Management, SP = Sangguniang Panlungsod. Note: This list is not exhaustive and only includes selected ordinances promulgated since 2001.

Source: Government of General Santos City.

The Philippine Local Government Code of 1991 (RA 7160) mandates all LGUs to formulate their CLUPs and Comprehensive Development Plans (CDPs) as part of the local planning process. The CLUP is the long-term guide for the physical development and management of an LGU's local territory. It is formulated and enacted into a zoning ordinance by the SP, the highest policy-making body of the city. GSC is among the first few LGUs in the Philippines that have recently completed their updated CLUPs. More importantly, its CLUP 2018–2026 is among the first to comply with the 2013 Housing and Land Use Regulatory Board guidelines on mainstreaming climate change and disaster risk considerations in the CLUP. As such, its current CLUP gives primary consideration to CCAM and DRRM toward achieving the city's competitiveness, resilience, and livability and quality of life.



Housing and Land Use Regulatory Board approves Comprehensive Land Use Plan 2018–2026 of General Santos City. On 31 July 2019, the board approved the city's climate change adaptation- and disaster risk reduction management-enhanced current 9-year Comprehensive Land Use Plan (photo by General Santos City government).

The CLUP's spatial strategies and development programs are intended to achieve the city's vision of being

the Green City of the South...the Financial Center of Region XII...the Regional Agri-Industrial and Transshipment Hub of SOCCSKSARGEN...and a Model of Harmonious Multi-Cultural City; with a healthy, disciplined, socially-protected, empowered and educated citizenry; driven by a diversified, competitive, resilient and inclusive economy; endowed with a balanced, sustainable and well-managed environment; equipped with efficient, hazard-resistant and world-class infrastructures; and governed by a visionary, responsive, participatory and transparent leadership.

As per Local Government Code of 1991, all LGUs are mandated by the Department of the Interior and Local Government to update their CLUPs ideally every 6 years. However, most LGUs cannot comply with this schedule mainly because of difficulty in generating and organizing the necessary data and information for the CLUP—some of which need specialized surveys—and the lack of in-house capabilities to prepare one. It took the GSC LGU almost 3 years to complete the updating of its previous CLUP 2001–2010. Its current CLUP 2018–2026 was approved in 2019.

With the CLUP laying out the spatial strategies that serve as the bedrock for short- to long-term development programs, sustainable development and resilience are now embedded in the city's various development plans including the following:

- Comprehensive Development Plan 2017–2022. It is currently being updated to the Comprehensive Development Plan (CDP) 2020–2026. As a complementary plan to the CLUP, the CDP is the action plan used by the city government to develop and implement priority sector and cross-sector programs and projects in the proper locations until the desired shape or form of development is eventually attained over the long term.¹⁵ To achieve its "Livable GenSan 2040" vision, the CDP is pursuing a 10-point agenda to promote the city's good governance, bankability, competitiveness, and livability. This includes building business-, environment- and people-friendly infrastructures and transportation systems; improving access to basic services; ensuring people protection from threats to life, security, and property; and preserving environmental integrity through climate change adaptation (CCA) and disaster risk resilience.
- Disaster Risk Reduction Management Plan 2019–2022. Completed in 2019, it is a 3-year plan to make the city safe from disasters and the adverse effects of climate change. By building the resilience of local communities to disasters, it aims to substantially reduce injuries and the loss of lives and social, economic, and environmental assets when disasters strike. It draws up a set of key strategic actions for disaster prevention and mitigation, disaster preparedness, disaster response, and disaster rehabilitation and recovery.
- Local Climate Change Adaptation Plan 2019–2022. GSC prepared its Local Climate Change Adaptation Plan (LCCAP) in 2019 in compliance with Republic Act 9729, known as the Climate Change Act of 2009, which mandates all LGUs to serve as frontline agencies in formulating, planning, and implementing CCA plans. The plan includes an assessment of the impact of climate change on the more vulnerable communities in the city, and key strategies and actions to adapt to and mitigate the adverse impact of climate change on food security, water sufficiency, ecological and environmental stability, human security, and adaptive capacity of the local communities.
- Sustainable Urban Infrastructure Development Master Plan 2020–2040. With grant funding from the National Economic and Development Authority (NEDA), the Sustainable Urban Infrastructure Development Master Plan (SUID-MP) was prepared in 2019 to improve the city's competitiveness, security, resilience from disasters, and livability and quality of life of its people, and to support the planning and implementation of infrastructure development effectively and efficiently in the short, medium, and long terms. The master plan includes an integrated set of urban infrastructure development projects in various sectors (housing and settlement, transport, water supply, sanitation and septage/sewerage, waste management, flood management and drainage, energy, economic, environment, tourism and recreation, and information and communication technology [ICT]) that support the spatial development strategies of the city's CLUP.

Department of the Interior and Local Government (DILG). 2017. Local Planning Illustrative Guide: Preparing and Updating the Comprehensive Development Plan (CDP). Quezon City: DILG.

- Local Development Investment Program 2022–2024. The Local Development Investment Program (LDIP) is the principal instrument for implementing the CDP and certain aspects of the CLUP. It links the plan to the budget, thus operationalizing the approved local development plans. With a 3-year time frame, the LDIP presents a detailed list of the city's priority local development PPAs in the social, economic, environment, infrastructure, and institutional sectors, together with their corresponding implementing agencies, implementation schedule, success indicators (expected outputs), amount of investments, and fund sources. A special feature of the LDIP is the specification of CCAM expenditures in the total project investments.
- Annual Investment Programs for 2019, 2020, 2021. The Annual Investment Program (AIP) is the annual slice of the LDIP that constitutes the total resource requirements for all PPAs, consisting of the city's annual capital expenditure and regular operating requirements. Upon approval by the SP, the AIP serves as the basis for preparing the executive budget. The GCAP preparation referenced the AIPs for the last 3 years.
- General Santos City Investment Priorities Plan 2020–2022. The GSC Investment Board, which was created under City Ordinance No. 16, series of 2015, otherwise known as the General Santos City Investment Code of 2015, is empowered to grant fiscal and/or nonfiscal incentives to both local and foreign investors, particularly in the identified GSC investment priority areas to attract new investors, keep and retain existing investments, and encourage their expansion, in addition to generally creating and maintaining a business-friendly environment in the city. In December 2020, the board approved the updated General Santos City Investment Priorities Plan 2020–2022 with investment priority areas of GSC.¹⁶ The current investment priority areas include agriculture and agribusiness, creative industries and knowledge-based services, green projects, healthcare services and facilities, housing projects, infrastructure and logistics, manufacturing, retail, and tourism. Green projects include (i) the manufacture and assembly of goods and the establishment of energy-efficient facilities; (ii) projects that minimize or prevent pollution and/or reduce GHG emissions; and (iii) developers of renewable energy facilities and e-vehicles, including hybrid systems. Infrastructure projects include waste management facilities and disaster prevention, mitigation, and recovery projects.
- Beautification and Greening Master Plan. This draft plan was prepared in April 2021 in response to SP Resolution No. 104, series of 2021, requesting the CENRO to prepare and submit to the *Sangguniang Panlungsod* the Master Plan for the Beautification of the City of General Santos. The plan aims to address the escalating impacts and threats of global warming and climate change, enhance the aesthetic environment and surroundings of the city, and fulfill GSC's vision of the "Green City of the South." Its components include parks, plazas, road islands, and rotundas enhancement and development; barangay pocket parks and tree parks (urban forest) enhancement and development; greening of city roads, streets, and highways; subdivision and village parks enhancement and development; institutional, commercial, industrial establishments; pocket and tree parks development or pot and container greening; and perimeter and vacant lots greening.

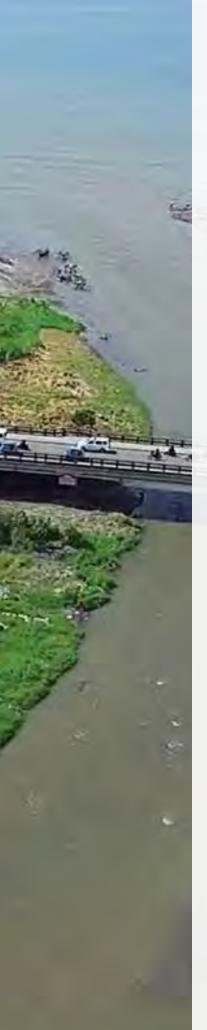
¹⁶ Excerpts from the Minutes of the Fourth Quarter Regular Meeting of the GSC Investment Board held on 3 December 2020 via Zoom.

- General Santos City Tourism Development Master Plan 2019–2028. Jointly undertaken by the GSC government and the Development Academy of the Philippines, the master plan was completed in early 2019. The plan investigates the strengths, weaknesses, opportunities, and threats in the city's tourism industry; formulates a tourism vision for the city; and proposes strategies, programs, and projects to promote its sustainable tourism growth. The master plan's guiding principles are respecting the environment and promoting conservation and sustainable development. Among its proposed projects are green PPAs being considered in the GCAP.
- Other development plans prepared with TA from development partner organizations such as the following:
 - United States Agency for International Development Strengthening Urban Resilience for Growth with Equity Project. The USAID-SURGE Project, which ended in October 2021, aimed to promote more balanced and resilient urban growth, reduce economic disparities, and improve socioeconomic conditions in highly urbanized secondary cities and their surrounding areas. It assisted cities and adjacent areas in planning effectively, guaranteeing basic public services, reducing business transaction costs, promoting competitiveness, supporting sustainable development, and reducing disaster risks while ensuring inclusive and sustainable growth. From 2017 to 2021, SURGE has provided GSC with TA in the updating of the GSC CLUP 2018–2026; assessment of land tenure and related issues in the city; capacity building on asset management; conduct of the 2018 GHG inventory; development of the city's LCCAP; TA to pilot Rural Waterworks and Sanitation Associations (RWSAs) in improving their management, operation, and water service delivery; conduct of a feasibility study on the Septage Management Program of General Santos City Water District (GSCWD); and conduct of the prefeasibility study for surface water source development for GSCWD.
 - United Nations Habitat's ASEAN Sustainable Urbanisation Strategy Project. In 2021, the ASUS Project started providing TA to GSC in preparing a technical proposal on a selected sector project that will contribute to the city's sustainable urbanization efforts. The city chose to focus on its integrated sustainable transport and traffic management plan, which includes the construction of 120 public transport users' transfer stations (one of the SUID MP's business cases), traffic signalization and CCTV installation at 22 key intersections, promotion of more environment-friendly public transport (e-jeepneys, Euro IV low-carbon emission vehicles), rationalization of tricycle operations, capacity building of the Public Safety Office (PSO), and updating of the Transport and Traffic Management Plan. Together with other participating cities in the ASUS Project, GSC presented its technical proposal to potential investors at the ASEAN Sustainable Urbanisation Virtual Forum on 6 October 2021. The forum was also a venue for sharing experiences and lessons learned from the sustainable urbanization projects of other ASEAN cities.
 - United States Agency for International Development Safe Water Project.
 The USAID's Safe Water Project aims to improve water security in Mindanao by increasing access to resilient water supply and sanitation (septage and sewerage) services and improving management for sustainable water resources. The project

will operate in selected watersheds or groups of contiguous watersheds that can strategically demonstrate how watershed, forest, and water source interventions, applied with integrated water resource management principles, will lead to improved quality and availability of water resources in cities and municipalities within the watershed boundaries or further downstream. GSC is one of the recipient LGUs for project assistance.

As evidenced by its various local development plans and ordinances, GSC's policy environment is certainly favorable to achieving its vision of becoming a green city. Furthermore, these plans provide a wealth of information on key strategies and the PPAs considered in formulating the city's GCAP.





CHAPTER 5

GREEN CITY ACTION PLAN

This chapter discusses the development challenges, opportunities, and strategies in the seven sectors covered by the GSC GCAP: water supply, flood management and drainage, ecological solid waste management, sanitation, transport, built environment, and energy. It also elaborates on the proposed GCAP PPAs in these sectors, as well as their target outcomes and success indicators.

A long list of PPAs for the GSC GCAP was drawn from 18 development plans for the city. Most of these PPAs are already contained in the GSC SUID Master Plan, which served to assess and integrate the PPAs into various other plans. The list was reviewed for recent updates to indicate project maturity and refreshed to include emerging projects from ongoing planning activities. These PPAs went through the first round of prioritization during the First GSC Stakeholders Consultation Workshop in July 2021 to rank the projects in terms of effectiveness, efficiency, and sustainability. Projects ranked lowest were set aside, and a shorter list of PPAs¹⁷ was reviewed and grouped for linear progression of actions and by linked activities. The shorter list then went through the Second GSC Stakeholders Consultation Workshop in September 2021 for further validation and priority setting.

5.1 Water Supply

General

GSC relies mainly on groundwater, through deep wells, as its water source. There are 17 deep wells supplying 3,676 cubic meters per hour or 1,021 liters per second of water. Water demand was estimated to be 21.42 million cubic meters per year¹⁸ for its 2015 population (i.e., 592,884 residents), and this is projected to reach 34.47 million cubic meters per year to serve the 2040 population (i.e., 953,965 residents). However, as of 2018, about 25% of the city's households still do not have access to safe water.

18 Estimated in the GSC SUID MP using 99 liters per capita per day.

The resultant list of PPAs ranked by 1st GCAP Stakeholders Consultation Workshop is provided in Appendix 3.

Water service is provided by the GSCWD, with 45,050 domestic connections, 2,514 commercial and industrial connections, and 391 government connections as of 2018. Of the 26 barangays, 8 barangays are not served by GSCWD. The water supply systems in these barangays were constructed by the Department of Public Works and Highways (DPWH) and the GSC government and are operated by the RWSAs. In 2018, there were 149 RWSAs, but only 124 were operational. The RWSAs served 48,413 households. By level of service, 82,694 households had access to Level III water service (piped water supply system), 353 households had Level II connection (communal faucets), and 10,416 households had Level I connection (point sources).

Sector Challenges

Given the climate change situation where shifts in temperature and rainfall greatly affect groundwater, there is a risk in the continuing availability of and sole dependence on groundwater sources. In addition, there is the risk of saltwater intrusion in the long run due to overextraction of the groundwater to serve the city's growing demand.

Difficulties in water service reaching areas not covered by the water providers are proving to be expensive, with housing settlements spreading farther out of barangay centers instead of densifying. Moreover, many private unregulated wells exist and are still being drilled by commercial, industrial, and domestic household entities for their own water needs.

The challenge, therefore, is to make safe water supply accessible and adequate for the entire future population and economic activities of the city. Per the UN SDGs, universal access of all to sustainable and affordable safe water supply should be achieved by 2030.

Opportunities

GSCWD's source of water supply is enough to meet the present requirements of its concessionaires, albeit limited in coverage in terms of connections. This water provider is, thus, afforded some time to develop additional water sources and install more pipelines to cope with the projected demand of its present and future connections.

The GSC SUID MP 2020–2040 posed several options to address future challenges of GSCWD (Photo Collage 3):

- (i) Drilling additional deep wells to meet the water demand till 2040. The drilling of GSCWD will include a georesistivity survey to determine potential sites. Additionally, drilling of new private wells should be regulated (i.e., requiring a permit from the National Water Resources Board), while existing private wells should be monitored.
- (ii) Tapping surface water sources such as the Makar River and Siguel River. Since the rivers are also utilized for irrigation by the National Irrigation Administration (NIA), there is a need to determine their availability for the use of GSCWD. In September 2021, the USAID-SURGE Project completed the Prefeasibility Study for Surface Water Source Development for GSCWD. The study recommends instead the development of Buayan River as a source of surface water supply estimated at 317,320 cubic meters per day, which is sufficient to provide for the demand–supply

gap of the proposed service area covering 15 barangays on the eastside of the city. Addressing the water demand of the barangays on the westside of the city requires developing Siguel and Makar rivers. Based on its technical evaluation, the abovementioned prefeasibility study already found the Siguel River suitable for surface water source development. However, further coordination with NIA and Alsons Hydropower Plant is required in terms of shared water use. The project scale may have to be determined to accommodate all water users.

(iii) **Encouraging sustainable use of water.** The city's residents should be encouraged to practice sustainable water use such as rainwater harvesting, water conservation, and water recycling.

For the RWSAs, the USAID-SURGE Project has also enhanced the operational state of the rural water supply through capacity development in the management, operation, maintenance, and service provision of six pilot RSWAs. Replication of the capacity building efforts can continue for the other RWSAs.

Strategies

The following strategies are set out to attain the SDG goal on water supply:

- (i) Improve the service and expand the coverage area of General Santos City Water District. Improvements are needed in the maintenance, monitoring, and inspection of pipelines to address leakages and replace dilapidated pipes to maintain water quality. Likewise, GSCWD should extend its coverage to other non-served areas.
- (ii) **Develop additional groundwater sources.** This step is underway with the scheduled construction of additional deep wells of GSCWD to meet the water requirements of the expansion area.
- (iii) **Develop surface water sources.** The recommendations of the USAID-SURGE prefeasibility study to develop Buayan River as surface water source for GSCWD should be considered. The development of Siguel River should also be considered for future development, particularly to serve the needs of the city's westside barangays.
- (iv) Install rainwater harvesting facilities. Building owners and households are encouraged to adopt rainwater harvesting measures (installation of rainwater harvest and storage facility) to reduce dependency on groundwater from GSCWD. Implementation of City Ordinance No. 2, series of 2011 (on proper harvesting, storage, and utilization of rainwater) should be strengthened.

Programs, Projects, and Activities

The priority PPAs for the water supply sector represent green actions tucked into two main programs: (i) Water Resources Development and Sustainable Water Utilization, and (ii) Improvement and Expansion of Water Supply Services.

¹⁹ USAID-SURGE Project, International City/County Management Association, CEST Inc. 2021. Pre-Feasibility Study for Surface Water Source Development for the General Santos City Water District. September.

Photo Collage 3: Water Supply Development Activities in General Santos City



GSC Water District Office



RWSA in Greenville Subdivision



GSCWD Pumping Station in San Jose



Deep Well Drilling and Construction



Rainwater Collection System (Example)

Providing safe water supply in General Santos City. General Santos City Water District (GSCWD) and the Rural Waterworks and Sanitation Associations (RWSAs) are the main water supply providers to the city. Aside from developing groundwater sources, there is a need to generate alternative supply from surface water, rainwater, and others (photo sources: 1—directmap.ph; 2—GREENRUWASA; 3—GSCWD; 4—Dadiangas Deep Well Construction; 5—dpwh.gov.ph).

As shown in Table 15, all projects are scored high, but the highest ranked belong to the first main undertaking where projects are for developing alternative water supply sources and conducting a georesistivity survey. A prefeasibility has already been conducted for the surface water supply project, but follow-through steps to be taken after the study should be made clear for the project to move forward. Once the city and GSCWD accept the study's recommendations, the next steps could include a full-blown feasibility study including the necessary technical surveys, preliminary engineering design, and detailed engineering design.

The georesistivity survey, on the other hand, is an action by itself prior to implementing various waterworks projects (such as the drilling of additional deep wells for RWSAs) to serve areas outside the reach of GSCWD. When funding for the survey has been allocated, the City Engineer's Office (CEO) should start the tendering process for the survey. The city may also seek possible technical and cofinancing assistance from development partners to conduct the survey.

Another highly ranked PPA is the formulation of the city's Comprehensive Integrated Water Resource Management Plan (Water Security Plan), which is ideally prepared every 5 years. The next plan period is 2022–2027. This action is invariably linked to the PPA on Co-Management of Transboundary Water Resources, making the plan a collaboration with the neighboring LGUs within the watersheds of rivers draining into the city and supported by national agencies such as the Department of Environment and Natural Resources (DENR), National Water Resources Board (NWRB), NEDA, NIA, etc. The initial step is to establish an inter-LGU agreement to study and implement a transboundary water resources management program. Both planning actions may be combined to ensure the city's water security with a wider benefit reach to include other LGUs sharing the same watersheds.

Supporting the actions on water security is the city's integrated social forestry program, which involves the participatory management of upland reforestation for five upland barangays (Conel, Mabuhay, Olympog, Sinawal, and Upper Labay). The program does not require much funding to succeed, especially with strong cooperation from local leaders, local communities, landowners, and civil society.

The second main water supply sector program consists of actions to improve and expand the city's existing water supply services. These include various waterworks projects intended for various barangays, especially the far-flung barangays of Olympog, Siguel, Sinawal, Batomelong, Upper Labay, Buayan, Bawing, and San Jose, as well as the fast-growing barangays of Mabuhay and Apopong. Other actions under this program are constructing water treatment facilities (for Makar and Siguel rivers) and establishing a monitoring facility for water quality of groundwater, surface water, and waters at the effluent and sewerage outfalls along Sarangani Bay.

Table 15: Programs, Projects, and Activities for the Water Supply Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 Water reso	urces development and sustain	able water u	tilization						
ACTION 1.1 Development of alternative water supply sources	GSC's current water resource management is highly dependent on groundwater supply. This action includes the development of alternative water supply sources for the city, such as surface water, rainwater harvesting systems, and water impoundment systems for future water supply expansion. One alternative source being explored by the city and the GSCWD is the bulk water supply source. A prefeasibility conducted in 2021 investigated 11 rivers for potential development. Ranked high in the assessment are the rivers of Tinagacan, Siguel, and Buayan. Finally, Buayan River was recommended for development.	2022–2041 Long-term	Total cost is 9.7 billion, consisting of 3.6 billion (capex) 3.4 billion (O&M) 2.6 billion (cost of debt and equity) 47 million (working capital)	TBD with long-term borrowing assumed in the prefeasibility	Proposed in CDP 2017–2022 and SUID MP 2020–2040. The USAID-SURGE prefeasibility for surface water source development for GSCWD was completed in September 2021. Can explore possible cofunding with green financing facilities (e.g., ACGF, CCC People's Survival Fund, etc.).	GSCWD, CENRO, DENR, NWRB, USAID- SURGE	Delays in implementation may occur after the prefeasibility due to the huge investment requirements as well as land and ROW acquisition.	14.3	1
ACTION 1.2 Conduct of a georesistivity survey for groundwater	Application of two-dimensional electrical sensitivity survey for groundwater study covering Purok Kidam, Olympog; Purok 12, Batomelong; Tucanop, Olympog; Purok 20, Mabuhay; and Bantilan, Sinawal.	2022 Short-term	1.2 million	LGU General Fund	Included in LDIP 2022–2024	CEO	This is not included in the 20% LDF Priority CY2022 but deemed necessary for the following water supply project proposal.	14.3	1

Table 15 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.3 Formulation of the GSC Comprehensive Integrated Water Resource Management Plan (Water Security Plan)	As provided in the GSC Environment Code of 2018, the city will prepare this comprehensive plan every 5 years to develop and implement policies, strategies, and programs for the conservation, protection, rehabilitation, and sustainable management of its water resources.	2022–2027 (every 5 years) Midterm	TBD	TBD	Proposed in CDP 2017–2022. Can explore possible technical assistance from development partners (e.g., USAID Safe Water, USAID CHANGE Project).	GSCWD, CENRO, DENR, NWRB, USAID Safe Water, NIA (for irrigation waters)	GSC is a downstream LGU. Consideration of upstream LGUs will be required.	14.2	2
ACTION 1.4 Comanagement of transboundary water resources	The major watershed areas that drain downstream to GSC's river systems are outside the city in its neighboring provinces (South Cotabato and Sarangani). Thus, effective and sustainable development and management of GSC's water resources will need the collaboration and support of these LGUs. This project will involve establishing inter-LGU agreements and bodies to jointly study and implement a transboundary water resources management program.	2021– continuing Long-term	TBD	TBD	Proposed in CDP 2017–2022; ongoing discussions at the Regional Development Council XII; inter-LGU River Basin Management (for 3 rivers) Councils for MOA signing	CENRO, PENROs of South Cotabato and Sarangani, DENR (PAWB, PAMB), NEDA, USAID Safe Water, GSCWD	Implementation of this program greatly depends on the cooperation of affected LGUs. The institutional mechanisms are outside the control of GSC.	13.4	5

Table 15 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.5 Integrated Social Forestry program and centralized nursery for watershed management	The program for participatory management of upland reforestation and sustainable development is targeted for 5 upland barangays (Conel, Mabuhay, Olympog, Sinawal, and Upper Labay).	2022–2024 Short-term	23,342,000	LGU General Fund	Included in LDIP 2022–2024. Can explore possible co-funding from green financing facilities (e.g., DOF Disaster Management Assistance Fund, etc.).	CENRO, DENR	Need to address possible land ownership issues in some of the proposed locations	14.0	3
2 Improveme	ent and expansion of water sup	ply services							
ACTION 2.1 Various waterworks projects	Construction, rehabilitation, and repair of deep wells, water reservoirs, water impoundment, distribution pipelines, spring development, and water systems in various barangays (Olympog, Siguel, Sinawal, Batomelong, Upper Labay, Bawing, San Jose, Buayan, Mabuhay, and Apopong)	2022–2024 Short-term	32,109,000	LGU General Fund	Included in LDIP 2022–2024	CEO, GSCWD	Georesistivity survey is needed prior to the detailed engineering preparation to project implementation phase.	13.4	5
ACTION 2.2 Construction of water treatment facilities (Makar and Siguel rivers)	This action entails the development of additional water supply sources from the Makar and Siguel rivers. A recent prefeasibility (by USAID-SURGE) recommended Buayan River for surface water source development. The study also found Siguel River suitable for development (ranked second in technical evaluation) but will have to deal with competing water use of NIA and an existing hydropower plant (Alsons Power).	2023–2024 Short-term	170 million (80 million for Makar and 90 million for Siguel)	GSCWD	Proposed in SUID MP 2020–2040. Can explore possible cofunding from green financing facilities (e.g., CCC People's Survival Fund, DOF Disaster Management Assistance Fund).	GSCWD	Accommodation of all water users will mean close coordination and collaboration with NIA and Alsons Hydropower Plant. Also, cooperation of upstream LGUs is needed for water quality.	12.7	6

Table 15 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
	Buayan River, as the recommended water supply source, is envisioned to serve the eastside barangays of the city. Siguel River can then serve the city's westside barangays.								
ACTION 2.3 Monitoring facility for water quality	Establishment of a water quality monitoring system, establishment of monitoring facility, and installation of equipment at major rivers, near effluent and sewerage outfalls along Sarangani Bay, stations proposed by DENR EMB, CENRO, PAMB, etc.	2021–2030 Long-term	100 million	LGU	Proposed in CDP 2017–2022 and SUID MP 2020–2040. Can explore possible co- funding from green financing facilities (e.g., CCC People's Survival Fund, DOF Disaster Management Assistance Fund).	CENRO, DENR, PAMB, Upstream LGUs	Operational framework should be clear in terms of budget and staffing for continuous operation. Upstream LGUs may not cooperate in improving water quality.	13.8	4

ACGF = ASEAN Catalytic Green Finance Facility, capex = capital expenditure, CCC = Climate Change Commission, CDP = Comprehensive Development Plan, CENRO = City Environment and Natural Resources Office, CEO = City Engineer's Office, CHANGE = Communication for Health Advancement through Networking and Governance Enhancement, CY = calendar year, DENR = Department of Environment and Natural Resources, DOF = Department of Finance, EMB = Environmental Management Bureau, GSC = General Santos City, GSCWD = General Santos City Water District, LDF = Local Development Fund, LDIP = Local Development Investment Program, LGU = local government unit, MOA = memorandum of agreement, NEDA = National Economic and Development Authority, NIA = National Irrigation Administration, NWRB = National Water Resources Board, O&M = operation and maintenance, PAMB = Protected Area Management Board, PAWB = Protected Areas and Wildlife Bureau, PENRO = Provincial Environment and Natural Resources Office, PPAs = programs, projects, and activities, ROW = right of way, SUID MP = Sustainable Urban Infrastructure Development Master Plan, TBD = to be determined, USAID SURGE = United States Agency for International Development Strengthening Urban Resilience for Growth with Equity.

Note: Some project costs and budget have not been determined yet.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

Outcomes, Indicators, and Targets

Development targets per sector are set by the national government (the Philippine Development Plan, the Regional Development Plan XII, the Mindanao Development Framework, etc.) and translated by the city in its CDP. This was followed by the SUID MP and incrementally increased forward till the target year 2040 to attain a 100% water supply service coverage for all households (Table 16).

Targets Baseline Short-Term Medium-Long-Term Means of Outcomes **Indicators** (2019)(2022)Term (2030) (2040)Verification* 100% of households 48% 60% 70% 100% **GSCWD** Access (universal) to with access to safe monthly sustainable water by 2040 data sheet, and affordable CPDO report, safe water CEMCDO supply report

Table 16: Water Supply Sector Outcomes, Indicators, and Targets

CEMCDO = City Economic Management and Cooperative Development Office, CPDO = City Planning and Development Office, GSCWD = General Santos City Water District.

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

5.2 Flood Management and Drainage

General

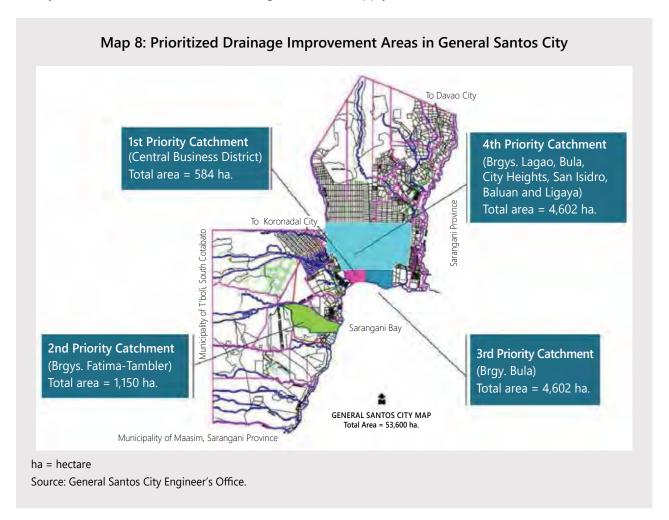
Floods and flash floods are an annual occurrence in GSC because the city is geographically situated downstream of the four major river systems: Siguel, Buayan, Silway, and Makar. As the catchment of water flows from these river basins, the city has experienced the severe effects of flooding, as recorded since 2012, due to heavy rainfall coupled with the high tide causing the rivers to swell over. The greater flood hazard risks are to the significant number of residents who have settled along riverbanks, particularly the Silway River. A single episode of flooding in 2012 affected many people (22,488).

Flooding in the city is also caused by the inadequate capacity to drain out stormwater to nearby waterways. Such occurrences are frequent during heavy rains but generally do not last long. Still, traffic movement is slowed down, and commuters and residents get stranded and inconvenienced.

The city has a drainage master plan, but implementation has been very gradual due to the high investment requirement. The focus of the drainage improvement is placed on four priority catchment areas (Map 8). As of 2018, only 36% of the priority areas, or 6.1 kilometers of the drainage facilities, has been constructed. Another study is to be conducted to design

^{*} GSCWD provides the monthly data sheet containing the number of service connections, while CEMCDO and CPDO provide the list of barangays with Rural Waterworks and Sanitation Association connections.

the drainage system of the remaining part of the city that lies north of Albert Morrow Road. Another initiative is the ADB-funded Watershed Ecosystem Rehabilitation and Flood Risk Reduction Project, which should have started in 2020. The project aims to reduce the flood risks and enhance climate resilience in the basin. Part of the project is implementing a large facility to serve as a water reservoir to augment water supply in the areas of the river basin.



Sector Challenges

The following are the city's challenges for flood management and drainage:

- (i) The city is prone to flooding, especially in 13 barangays.
- (ii) Heavy siltation and sedimentation of all its rivers aggravate the flood situation since the capacity of the rivers to drain floodwater is restricted.
- (iii) There is a great lack of coverage and capacity of the existing drainage system to function efficiently. In addition, many drainage canals are noted to be narrow and, often, too clogged with garbage to accommodate flood and stormwaters. Catch-up efforts to improve the drainage system have been slow.

- (iv) As with most fast-urbanizing cities, informal dwellings are found along the edges of rivers and creeks, which are high flood hazard risk areas. In coastal areas, informal settlers have encroached on mangrove areas, leading to loss of natural coastal protection and soil erosion.
- (v) The weak watershed management upstream of the rivers and inadequate integrated inter-LGU efforts affect the river flow downstream.

Opportunities

A well-planned flood management and drainage system can positively affect the city's water resources. It will not only maximize the potential of stormwater and floodwater for reuse for water supply and irrigation through the implementation of a comprehensive and sustainable watershed management plan, but also address flooding to a great extent. Furthermore, other measures and mechanisms can enhance the city's green environment, create a fresh microclimate, and protect water resources for current and future use.

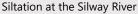
Strategies

The strategies to mitigate the effects of flooding are as follows (Photo Collage 4):

(i) Conduct integrated river basin management for the watershed areas of the city's major rivers, with strong collaboration of the national agencies concerned (DENR, Protected Areas and Wildlife Bureau, NEDA, etc.), other LGUs in the influence area, NGOs, and the private sector. This strategy strongly relates to the green actions for the water supply sector, specifically for the comanagement of transboundary water

Photo Collage 4: Flood Management and Drainage Activities in General Santos City







Flood Control Project at Silway River

Mitigating floods in the city. Dredging silted riverways, installing flood control facilities along riverbanks, and improving drainage are among the major activities to control flooding in the city (photo sources: 1, 2—RobSison Videography; 3—General Santos City Water District, GenSan News Online).

- resources (Action 1.4) and integrated social forestry for watershed management (Action 1.5) (Table 15).
- (ii) Conduct integrated flood and disaster risk management and integrated flood management approach in major river basins that cover the city since flooding is a natural event that can be managed and destruction can be avoided or minimized.
- (iii) Strengthen the city's intergovernmental and multisector collaboration for flood control and management, especially with multiple LGUs within the administrative jurisdiction of the river basins.
- (iv) Develop and provide adequate, efficient, and effective infrastructure that will address the effects of flooding.

Programs, Projects, and Activities

The PPAs for the flood management and drainage system sector represent green actions, which generally comprise the following four main programs (Table 17):

- (i) Construction and rehabilitation of flood mitigation structures and small water impounding projects. Under this program are the action projects for constructing the floodway at barangays Fatima and Baluan, stormwater drainage for barangays Fatima and Tambler, and the floodway at Albert Morrow Boulevard.
- (ii) Improvement of the city's drainage system. This includes the conduct of a drainage master plan for the northern part of the city; the construction and improvement of drainage systems for barangays San Isidro, Katangawan, Lagao, Ligaya, and Baluan; and the road concreting with drainage and drainage improvement for barangays Lagao, Calumpang, City Heights, San Isidro, Olympog, Dadiangas North, Sinawal, Bula, Labangal, and Fatima.





Drainage Projects

Table 17: Programs, Projects, and Activities for the Flood Management and Drainage Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 Construction	and rehabilitation of flood miti	gation struct	ures (dams, d	ikes, drainage	s) and small water i	mpounding p	rojects		
ACTION 1.1 Construction of floodway at barangays Fatima and Baluan	Construction of floodway and diversion channel	2022–2024 Short-term	70 million	LDRRMF and General Fund (LDF)	Included in LDIP 2022–2024; included in the 20% LDF for CY2022 portion of Floodways at Barangay Fatima amounting to \$\mathref{P}22\$ million	CEO	ROW issues and concerns have no budget allocation.	14.3	1
ACTION 1.2 Stormwater drainage for Fatima–Tambler	Construction of drainage	2021– continuing Short-term	Fragmented	General Fund (LDF)	Part of 2003 Drainage Master Plan that is already incorporated in other projects like road concreting with drainage	CEO	Incomplete links of drainage on existing roads	13.6	5
ACTION 1.3 Construction of floodway at Albert Morrow Road	Construction of floodway from Dacera Avenue to Buayan River	2022–2024 Short-term	273 million	General Fund (LDF)	Included in LDIP 2022–2024	CEO, DPWH	Land use issues	13.8	4

Table 17 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
2 Improvement of drainage systems									
ACTION 2.1 Study for the completion of Drainage Master Plan for the northern part of the city	Update of Drainage Master Plan	2022–2024 Short-term	TBD	TBD	Proposed in GSC SUID MP 2020–2040. Can explore possible technical assistance from the national government (e.g., DPWH) and/or development organizations (e.g., USAID).	CEO	Synchronization with road construction	14.0	2
ACTION 2.2 Construction and improvement of drainage systems for barangays	Construction of drainage in barangays San Isidro, Katangawan, Lagao, Ligaya, and Baluan	2022–2024 Short-term	376,250,000	General Fund/ National Fund	Included in LDIP 2022–2024	CEO, DPWH	Encroachment of residences along the road	14.3	1
ACTION 2.3 Road concreting with drainage and drainage improvement at various barangays	Road concreting including road improvements such as drainage in barangays Lagao, Calumpang, City Heights, San Isidro, Olympog, Dadiangas North, Sinawal, Bula, Labangal, and Fatima	2022–2024 Short-term	261.8 million	General Fund	Included in LDIP 2022–2024. Some of the projects are already included in 20% LDF CY2022.	CEO	Incomplete links of drainage on existing roads	13.6	5

Table 17 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank		
3 Construction of Silway–Apopong–Sinawal River Structural Improvement											
	Flood Control and Drainage Projects of Selected River Basins Nationwide Package 4 (Silway–Apopong–Sinawal River Basin)	Ongoing Long-term	368 million	DPWH	Feasibility prepared in 2010; no update on its status.	DPWH	Gradual implementation	13.0	6		
4 Watershed eco	4 Watershed ecosystem rehabilitation and flood risk reduction project (Silway–Apopong–Sinawal rivers, Makar–Saboay–Labangal, and Buayan–Malungon river basin)*										
ACTION 4.1 Riverbank rehabilitation program to establish forest corridors along the city's riverbanks	Reforestation of the city's riverbanks by undertaking massive tree growing along banks of the major river systems (Siguel, Silway, Buayan, and Makar) for the prevention and control of flooding, erosion, and siltation, thus maintaining ecological balance	2022–2024 Short-term	9,224,000	CENRO	Included in LDIP 2022–2024. Can explore possible co-funding from green financing facilities (e.g., DOF Disaster Management Assistance Fund).	CENRO, DPWH	Needs prior resettlement of ISFs along riverbanks	13.9	3		

CENRO = City Environment and Natural Resources Office, CEO = City Engineer's Office, CY = calendar year, DOF = Department of Finance, DPWH = Department of Public Works and Highways, GSC = General Santos City, ISF = informal settler family, LDF = Local Development Fund, LDIP = Local Development Investment Program, LDRRMF = Local Disaster Risk Reduction and Management Fund, PPAs = programs, projects, and activities, ROW = right of way, SUID MP = Sustainable Urban Infrastructure Development Master Plan, TBD = to be determined, USAID = United States Agency for International Development.

Note: Some project costs and budget have not been determined yet.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

^{*} Provided in the Comprehensive Development Plan for flood risk reduction.

- (iii) Construction of Silway–Apopong–Sinawal River structural improvement.

 This includes the river basin's long-term flood control and drainage projects (Nationwide Package 4).
- (iv) Watershed ecosystem rehabilitation and flood risk reduction project (Silway–Apopong–Sinawal Rivers, Makar–Saboay–Labangal, and Buayan–Malungon Basins). This involves establishing forest corridors along the city's riverbanks to prevent and control flooding, erosion, and siltation.

The action projects for these programs have been identified in the city's CLUP 2018–2026, the GSC SUID MP 2020–2040, and the CDP 2017–2022.

Outcomes, Indicators, and Targets

As with all sectors, overall targets are set at the national and regional levels, which the LGUs refer to for their own development. In like manner, the GSC SUID MP refines the targets depending on the current situation and incrementally increases them forward till 2040 to attain the highest possible percentage of people free from flood hazard, the most number of drainage lines implemented, and the largest area to be irrigated by impounded floodwaters (Table 18).

Table 18: Flood Management and Drainage Sector Outcomes, Indicators, and Targets

Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification
Reduced number of people exposed to flooding	Reduced % of people exposed to flooding (from 49,713 in 2018) by 98% by 2040	49,713 (CLUP 2018– 2026)	Decreased by 20%	Decreased by 80%	Decreased by 98%	CDRRMO reports
Reduced number of flood-prone barangays	Reduced number of flood-prone barangays (from 13 in 2018)	13 (CEO Progress Report September 2018)	10	5	0	CDRRMO monitoring reports
Increased drainage lines/ floodways implemented	Increased length of drainage canals/ floodways from 6.1 km in 2018 to 49.18 km in 2030	6.1 km (CLUP 2018– 2026)	15 km	49.18 km	North of Albert Morrow Road included*	CEO inventory reports
Increased area of irrigated lands/ areas using stored/ impounded floodwaters	100% of irrigable lands irrigated with stored/impounded floodwaters	3,454 hectares	Increased by 20%	Increased to 70%	Increased to 100%	NIA reports

CDRRMO = City Disaster Risk Reduction and Management Office, CEO = City Engineer's Office, CLUP = Comprehensive Land Use Plan, km = kilometer, NIA = National Irrigation Administration.

^{*} This will also cover the northern part of the city (north of Albert Morrow Road) as it is not yet included in the existing city drainage master plan. The length of canals and floodways to be implemented in the long term is yet to be determined. Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

5.3 Ecological Solid Waste Management

General

The city generates about 300 metric tons (t) of waste per day, as estimated using the factor of 0.289 kilogram/capita/day.²⁰ However, the recorded volume of waste reaching the city's sanitary landfill (SLF) in Barangay Sinawal is only 80–90 t/day, and only 20 t/day of this are processed by the central materials recovery facility (MRF) at the SLF. All the barangays own barangay-level MRFs, but three are not operational. Smaller MRFs are at a few schools and puroks.²¹

The garbage collection efficiency is at 45%, according to the City Waste Management Office (CWMO). The city has 16 collection vehicles, but only 9 are useful. Other machineries such as dump trucks and compactor trucks are old and due for immediate replacement.

The city's SLF, with an area of 64 ha, started operation in 2016. Waste cell no. 1, measuring about 2 ha, is currently used as the tipping area with soil cover applied occasionally. However, this is already nearing full capacity, so a second cell is proposed to be developed.

Sector Challenges

The city's Ecological Solid Waste Management (ESWM) sector has the following challenges:

- (i) Coordination among implementers of the ESWM plan (city, barangays, and private sector) is weak.
- (ii) Laws and policies on ESWM are not strictly enforced in many respects. For example, not all households and offices carry out waste segregation at source; trash dumping on streets and open spaces still happens; and burning of garbage is still practiced. No monitoring and imposition of sanctions for violators exist.
- (iii) Procurement of units or equipment to replace old and unserviceable units is not urgently done.
- (iv) Uniformity and regularity of waste collection route and schedule are not practiced due to the lack of machineries or equipment.

Opportunities

GSC's 10-year ESWM Plan 2015–2025 is still current, but it needs to be fully implemented. The procurement of new equipment is proposed in 2021 under a possible loan with the Land Bank of the Philippines (LBP) to augment the existing dilapidated machines.

²⁰ A factor derived from a Waste Analysis and Characterization Survey in 2017.

²¹ Puroks are administrative sub-units of a barangay.

Strategies

The key strategies to improve the existing condition of the ESWM sector are as follows (Photo collage 5):

- (i) Invest in new waste management equipment. The GSC government is now procuring heavy equipment to augment this sector, including 22 dump trucks for the barangays; 17 dump trucks for the SLF; 14 compactors; and other equipment such as backhoes, sweepers, payloaders, ballers, and graders. On a smaller scale and downstream of waste management, the city can also effectively manage its recyclables and compostable waste by activating or repairing the MRFs in all barangays and other existing locations.
- (ii) Strengthen the Ecological Solid Waste Management information and education campaign. A massive information and education campaign must be continuously mounted through today's various media platforms. The campaign is to focus on the 3Rs (reduce, reuse, and recycle), provisions of the law on illegal disposal of waste, best practices by households, etc.
- (iii) Develop alternative methods of waste disposal. The city can connect ESWM to resource optimization strategies such as the use of waste for electricity generation and agricultural uses. The waste-to-energy (WTE) facility has been brought to the city's attention through unsolicited proposals from private sector groups. This is a worthwhile project but far advanced in the waste treatment cycle. The residents must primarily be prepared in terms of waste segregation practices to support such a system. The commercial, industrial, and agricultural entities should also be included in the loop. This will take some time to achieve.

Programs, Projects, and Activities

Two main programs are espoused for the ESWM sector (Table 19):

- (i) Full implementation of the city's Ecological Solid Waste Management Program. The ESWM Program consists of the short-term actions for the information and education of the public for the enforcement of the ESWM ordinance. The medium-term action is the full implementation of the components of the 10-year ESWM that covers waste segregation and reduction at source, segregated collection, materials recovery processing, and disposal management. Long-term actions are to make the waste collection system efficient and improve the operations of the city's SLF. Huge investments are being programmed for long-term actions in terms of procurement of equipment and construction of additional facilities. However, allocation of funds is found wanting for the short-term actions on the ESWM information and education drive. These short-term actions are significantly important to ingrain proper behavior of the public (e.g., in the segregation and treatment of their garbage, manner and schedules of garbage collection, etc.) in support of the program.
- (ii) Increase in alternative uses of waste. Relating to the above program is the alternative uses of waste. The use cycle of waste is to benefit other sectors such as

energy. To date, an identified action is the WTE facility proposals received by the city. This is a huge leap from the current situation to bring it to the levels of advanced cities or countries using the WTE technology. Caution should be exercised as to the technology to employ without adverse effects on the environment.

Photo Collage 5: Solid Waste Management Activities in General Santos City



Waste Segregation at Source



Garbage Collection



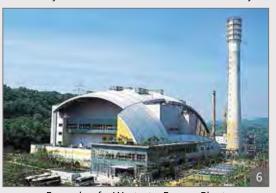
Garbage Compactor (Davao City)



Sanitary Landfill at Sinawal, General Santos City



Central MRF Operations at Sinawal, General Santos City



Example of a Waste-to-Energy Plant (Republic of Korea)

Managing the solid waste sector. While General Santos City continues to implement its ecological solid waste management (ESWM) program, there are opportunities to further improve its ESWM facilities such as the sanitary landfill, materials recovery stations, waste collection equipment, and a possible waste-to-energy facility, as well as to strengthen its public information, education, and communications campaign on ESWM practices (photo sources: 1—Carousell; 2—RMN Networks; 3—Davao CENRO; 4, 5—RobSison Videography; 6—development.asia).

GREEN CITY ACTION PLAN

Table 19: Programs, Projects, and Activities for the Ecological Solid Waste Management Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 GSC Ecolog	ical Solid Waste Management	(ESWM) Pro	gram						
ACTION 1.1 Ecological Solid Waste Management enforcement and education services	Includes various activities not limited to information, education, and communication (IEC); enforcement; and provision of technical assistance to barangays in relation to the ESWM ordinance	2022–2024 Short-term	24,134,000	LGU General Fund	Included in LDIP 2022–2024. Can explore possible technical assistance and co-funding from development organizations (e.g., USAID).	CWMO, CENRO	Weak application of IEC actions and poor monitoring of impact at the barangay level. Budget may not be sufficient for a continuing extensive program for 26 barangays.	13.5	2
ACTION 1.2 Environmental education and research and development	This IEC campaign aims to increase the level of awareness of the local citizenry about the present climate situation, its threats, and the LGU actions to help mitigate its effects. This will involve lectures in different institutions such as the academe, business establishments, public and private sectors, and barangay councils down to the purok level.	2022–2024 Short-term	100,000	LGU General Fund	Included in LDIP 2022–2024. Can explore possible technical assistance and co-funding from development organizations (e.g., USAID).	CENRO	Weak application of actions and poor monitoring of impact in general. Budget may not be sufficient for a continuing extensive program.	13.2	3

Table 19 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.3 Full implementation of the components of the 10-Year (2015–2025) ESWM Program	The 10-Year ESWM Program has the following components: Stage 1: Waste Segregation and Reduction at Source; Stage 2: Segregated Collection; Stage 3: Materials Recovery and Processing; and Stage 4: Disposal Management (closure and rehabilitation of existing dumpsite and establishment of the SLF at Barangay Sinawal). Some of these components, such as the operation of the SLF (under an existing LBP loan) since 2015 and a central materials recovery facility, are ongoing. Proposed new components include the construction of a weighbridge, construction of a weighbridge, construction of a healthcare waste treatment facility, purchase of a modern fleet of ESWM heavy equipment (backhoes with dozer blade, backhoe loader, sweepers, baller, grader, payloaders, compactors, dump trucks), and improvement of the SLF including a special cell for treated special waste (e.g., COVID-19).	2015–2032 Medium- term	1.32 billion over 10 years (40% capex or 524 million + 31% MOOE or 403 million)	1.32 billion— LBP loan; 30 million— LGU General Fund	Included in GSC proposed LBP loan projects in 2021 and in LDIP 2022–2024. Can explore possible co-funding from green financing facilities (e.g., DBP Green Financing Program).	CENRO, CWMO, CEO	Without penalties imposed, there is weak public compliance with the adoption of waste segregation and materials recovery components of the program. Long duration in attaining desired efficiency.	13.7	1

Table 19 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
2 Increase al	ternative uses of waste								
ACTION 2.1 Development of a waste-to- energy (WTE) facility	This project will involve the collection of waste and construction of a waste reception area, tipping floor, storage pit, boilers, electrical systems, etc. Aside from contributing to waste collection in a wider area, this will increase power supply in the city. The project will involve a prefeasibility to determine the appropriate technology, feasibility, detailed engineering, facility construction and procurement of equipment, and facility operation and maintenance.	2023–2040 Long-term	8.6 billion	PPP	Since 2019, unsolicited proposals from private investors have been received by the LGU and are currently being evaluated. Can explore possible technical assistance for project evaluation (e.g., ADB, PPP Center).	CENRO, CWMO, CEMCDO	Proper groundworks entailed in the ESWM Program should be strengthened (i.e., ACTIONS 1.1 to 1.3) for the WTE project to be effective. Need to adopt appropriate technology with minimal environmental impact.	11.6	4

ADB = Asian Development Bank, capex = capital expenditure, CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CEO = City Engineer's Office, COVID-19 = coronavirus disease, CWMO = City Waste Management Office, DBP = Development Bank of the Philippines, GSC = General Santos City, LBP = Land Bank of the Philippines, LDIP = Local Development Investment Program, LGU = local government unit, MOOE = maintenance and other operating expenses, PPAs = programs, projects, and activities, PPP = public-private partnership, SLF = sanitary landfill, USAID = United States Agency for International Development.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

Outcomes, Indicators, and Targets

The expressed actions for the ESWM sector are targeted to improve efficiency in the solid waste collection system; decrease the volume of waste collected; and increase alternative uses of waste, such as the WTE method. Table 20 outlines the outcomes, indicators, and targets for this sector on the short-term and long-term planning horizons.

Table 20: Ecological Solid Waste Management Sector Outcomes, Indicators, and Targets

				Targets		
Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification
Increased collection efficiency	Increased collection efficiency (from 45% in 2018) to 100% by 2040	45%	50%	90%	100%	CWMO report
Increased capacity of waste disposal facilities	Increased number of operational equipment (new pay loaders, bulldozers, compactors) in the SLF (from 1 in 2018) to at least 4 by 2040	1 operational bulldozer ^a	2 repaired payloader and bulldozer	anew payloaders, bulldozers, compactors	new payloaders, bulldozers, compactors	CWMO report
Decreased volume of waste generated	Decrease in waste generated by at least 70% by 2040	185 t/day in 2018 ^b	25% waste reduction	40% waste reduction	70% waste reduction	CWMO report
Decreased volume of mixed waste collected	Decrease in volume of mixed wastes collected by at least 90% by 2040	80.12 t/day in 2018	25% decrease	40% decrease	90% decrease	CWMO report
Increased diversion rate	Increased solid waste diversion rate from 46% in 2015 to 80% by 2022 onward	46%°	80%	80%	80%	CWMO report
Increased use of alternative methods for waste disposal	45% of waste managed using alternative methods of waste disposal (e.g., WTE facility) by 2040	None	15%	30%	45%	CWMO report

CWMO = City Waste Management Office, SLF = sanitary landfill, t = metric ton, WTE = waste-to-energy.

Source: GSC SUID MP 2020-2040.

^a Based on the interview of General Santos City GSC Sustainable Urban Infrastructure Development Master Plan (SUID MP) team with CWMO in March 2019.

^b Computed based on 2018 projected population and 2012 waste analysis and characterization study from GSC Ecological Solid Waste Management Plan 2015–2025.

^c Outside Metro Manila (Philippine Development Plan 2017–2022).

5.4 Sanitation

General

City data reveal that 90% of the households have sanitary toilets and basic sanitary facilities such as septic tanks to treat their domestic wastewater. However, the city does not have a sewerage system, and the effluent from the septic tanks is mostly discharged to the street drainage system or directly to the ground. With the city heavily relying on groundwater for its water supply, this situation should not be allowed to continue.

Waterborne diseases are not among the leading causes of mortality and morbidity in the city, but without addressing the current septage and sewerage situation, future adverse cases are bound to occur.

At present, septic tanks are desludged by private companies, and sludges are disposed of at the sewerage treatment plant (STP) of the adjacent Municipality of Alabel in Sarangani. The two existing STPs in the city, with a combined capacity of 840 cubic meters/day, are for the use of the GSC Fish Port Complex and the agro-industrial area.

In partnership with the GSC government and with TA from the USAID-SURGE Project and funding assistance from DENR Environment Management Bureau XII, a feasibility study was completed in April 2019 for the planned implementation by GSCWD of the Septage Management Program in a phase-by-phase manner. All existing public, private, residential, commercial, industrial, and government buildings will then have to regularly desludge their septic tanks.²² The groundbreaking ceremony for GSCWD's septage treatment plant (SpTP) on a 1 ha land at Purok Udagre, Barangay Conel was held on 14 November 2019.

In addition, another feasibility study commissioned by the Department of Public Works and Highways (DPWH) for the National Septage and Sewerage Management Program was recently completed in 2021, implementing the city's sewerage system. The project will involve constructing a conveyance system and STPs to address the sewerage outfalls at the coastal areas of the central business district (CBD).

Sector Challenges

The Revised General Santos City Septage Management Ordinance was enacted in 2017, but most city dwellers are not aware of this ordinance and their responsibility to have their septic tanks desludged regularly. There is a lack of an extensive and continuing information and education drive to increase awareness of and compliance with this ordinance.

As per the Department of Health standards, septic tanks should be desludged every 3–5 years or when the tanks are already half full. The Revised Plumbing Code of the Philippines 1993–1994 stipulates a two-chamber design for septic tanks where the bottom of the tank is layered with gravel to separate the sludge from the water. In recent years, however, some LGUs (e.g., Davao City) under their local Septage Management Ordinance have begun requiring a three-chamber design for septic tanks with sealed bottoms.

There is also an absence of any monitoring and inspection activity as to the quality of septic tanks constructed and whether septic tanks are properly done to avoid any possible contamination of groundwater sources.

The lack of public toilets had been mentioned especially at public terminals, parks, riverbanks, and coastal areas where informal settlers reside. The presence of clean public toilets eliminates the disposal of human waste into open spaces and water bodies.

Opportunities

The enactment of the septage management ordinance has laid the foundation for the city to protect its water resources and prevent waterborne illnesses. The target (as per the Philippine Development Plan) is to achieve 97% access of the population to basic sanitation services by 2022.

The two recently completed feasibility studies for GSCWD's septage management program (USAID-SURGE) and the city's sewerage system (DPWH) provide an opportunity to implement large-scale sanitation infrastructure projects. Both studies show high positive returns financially, environmentally, and economically for these proposed projects.

Strategies

The strategies for this sector are to achieve the city's target with 97% of its residents having access to adequate sanitation services by 2030 and ultimately increasing this level to 100% by 2040. These strategies are as follows (Photo Collage 6):

- (i) **Develop septage facilities and equipment.** This entails the implementation of a septage management system with the construction of SpTPs. Sewer systems entail a longer time to implement; hence the more manageable option to develop is the use of desludging method and disposal and treatment at the SpTP.
- (ii) Start an information campaign immediately. The GSCWD should raise awareness of its septage management program and availability of septage services soon (date to be ascertained upon implementation of the septage management project).
- (iii) Launch an information and education drive. GSC needs to undertake continuous and intensive information, education, and communication (IEC) on the septage management ordinance. Gradual acceptance and adherence must be in place once the SpTPs are fully functional.
- (iv) Construct more public toilets. The GSC CLUP 2018–2026 identified the Central Public Market, the Queen Tuna Park, and the government center to be part of the redevelopment of the CBD. The plan also features a proposed "baywalk" (seaside promenade) along the coastal area. Hygiene and sanitation in these areas need to be improved. The construction of pay public toilets is proposed to eliminate open defecation in the coastal area, bodies of water, bushes, etc.

Photo Collage 6: Sanitation Management Activities in General Santos City



Visit of GSCWD to Baliwag Water District Sewage Treatment Facility



Groundbreaking Ceremony for the GSCWD Septage Treatment Plant



General Santos City Septage Management Info Drive



Desludging Truck



GSCWD Sanitation Info Drive in Barangays



Septage Management Guide for Local Governments

Improving the city's sanitation management program. Led by the General Santos City Water District (GSCWD), the city is currently developing a septage treatment plant; upgrading its septage equipment; and stepping up its septage/sanitation public information, education, and communications campaign (photo sources: 1, 2, 5—GSCWD; 3—GSC government; 4—Maynilad; 6—smartnet.niua.org).

Table 21: Programs, Projects, and Activities for the Sanitation Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 GSC Sanita	tion Program								
ACTION 1.1 Construction of additional wastewater treatment facility at the government center	Construction of 150 m ³ underground wastewater treatment facility that will accommodate the wastewater produced in all offices at the government center (additional appropriation)	2022–2024 Short-term	10 million	LGU General Fund	Included in LDIP 2022– 2024	CEO	Proper maintenance of the facility	13.8	1
ACTION 1.2 GSCWD Septage Management Program	Establishment of a septage management program to serve all the customers of GSCWD and an increasing population of GSC that is not connected to GSCWD. It will include the construction and operation of a fully mechanized septage treatment plant (SpTP) capable of handling 160 m³/day (Cycle 1) to 240 m³/day of septage; acquisition and operation of a fleet of desludging trucks (5 units of 10 m³ and 3 units of 5 m³ vacuum trucks) and 1 unit 5 m³ dump truck. The SpTP, together with an administration office building, laboratory, generator set room, sludge storage area, chemical storage room, blower room, and buffer zones, will be located on a 1 ha property in Purok Udagre, Barangay Conel in GSC.	2021–2030 Medium- term	215 million (capex) 300 million (O&M costs for 10 years)	GSCWD (30% equity, 70% DBP loan)	Feasibility was completed in April 2019; the groundbreaking of the SpTP was held in November 2019. Can explore possible co-funding from green financing facilities.	GSCWD	Slow implementation as households and business entities need to comply with this sanitation practice. Setting up the system and building capability is also crucial for the program.	13.8	1

Table 21 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.3 Establishment of sewerage treatment plants (STPs)	Construction and operation of STPs near effluent/sewerage outfalls at the coastal areas of the CBD. Construction is envisioned in 2023–2024, with operation commencing in 2025–2039 (15 years). Two of the three STP systems will be operational in 2025, while the third STP system is for future planning. STP 1 will be located at Barangay Bula, while STP 2 will be at Barangay Dadiangas West. 13 barangays will be served by these systems.	2023–2039 Long-term	1.687 billion (capex for conveyance system and STPs) 988 million (O&M costs for 15 years)	50% of project cost with DPWH NSSMP grant subsidy, while the rest will be sourced from available financial sources	Proposed in GSC SUID MP 2020–2040; DPWH-commissioned feasibility for GSC sewerage project was completed in mid-2021. Can explore possible co-funding from green financing facilities.	DPWH, GSCWD, CEMCDO, CEO	Requires huge investments, land and ROW acquisition, public protests, proper delegation of operation and maintenance.	13.7	2

capex = capital expenditure, CEMCDO = City Economic Management and Cooperative Development Office, CEO = City Engineer's Office, DBP = Development Bank of the Philippines, DPWH = Department of Public Works and Highways, GSC = General Santos City, GSCWD = General Santos City Water District, ha = hectare, LGU = local government unit, LDIP = Local Development Investment Program, m³ = cubic meter, NSSMP = National Septage and Sewerage Management Program, O&M = operation and maintenance, PPAs = programs, projects, and activities, ROW = right of way, SUID MP = Sustainable Urban Infrastructure Development Master Plan.

Sources: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021; CEST, Inc. and LCI Envi Corp. 2019. Final Report on the Conduct of Feasibility Study for the Septage Management Program of General Santos City. April; DPWH and Woodfields Consultants, Inc. 2021. Draft Report on the Preparation of the Feasibility Study on the GSC Sewerage Project. June.

Programs, Projects, and Activities

The projects lined up under the GSC Sanitation Program represent action plans toward establishing the SpTPs and STPs (Table 21). The stakeholders have assigned priority to facilities at the government center and the GSCWD septage program for the city to be implemented in the short and medium terms, respectively.

Another priority is the establishment of STPs, as proposed by the GSC SUID MP. Fortunately, the DPWH-commissioned study recommends a substantial National Septage and Sewerage Management Program grant subsidy of 50% of project cost for the sewerage project. The rest of the project cost can be sought from local funding and other available financing sources.

Outcomes, Indicators, and Targets

The sector development targets for the sanitation sector, set by the government's national and regional development plans, are adopted by the city in its CDP. This was followed by the GSC SUID MP and incrementally projected to attain 100% sanitation service coverage of all households by 2040 (Table 22).

Table 22: Sanitation Sector Outcomes, Indicators, and Targets

				Targets			
Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification	
Universal access to adequate and sustainable sanitation services	100% of households with improved sanitation facilities by 2040 (from 2019 level)	90%	92%	97%	100%	GSCWD monthly data sheet; CPDO report	
Improved septage collection system	100% of households with access to septage collection services by 2040 (from 2020 level)	42% (2020)	60%	70%	100%	GSCWD monthly data sheet; CPDO report	

CPDO = City Planning and Development Office, GSCWD = General Santos City Water District.

Source: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040.

5.5 Transport

General

The focus of the transport sector is on the city's patterns and trends in transportation with implications to green action planning. This includes the public transport service and traffic management.

Urban sprawl is evident with pockets of residential areas sprouting in the city's peripheries, but the road network is disjointed, incomplete, and generally in poor condition. Only about 20% of the city roads are paved, and paving progress is slow and incomplete (i.e., without drainage and sidewalks).

The current public transport service is dominated by numerous tricycles serving the majority of the transport needs of commuters in the city. They are akin to a taxi service that provides on-demand door-to-door service and is allowed to ply on national roads. The number of tricycles grows by 3% per year. With this trend of public transport service, capacities of roads are reduced, violations on road use go unchecked, congestion worsens, and air quality continues to deteriorate. There is intense competition between tricycles and higher-capacity public modes, with the latter suffering due to low occupancy and patronage.

In terms of traffic management, the following trends are noted:

- (i) Uncontrolled use of sidewalks by vendors and illegal parking of vehicles discourage pedestrians from using the sidewalks.
- (ii) Attention to installing sidewalks on many roads is low.
- (iii) Many intersections do not have traffic lights and are already experiencing high traffic volumes and congestions, especially during peak hours.
- (iv) The public transport modal share decreased from 81% to 49% in 2011, while the private transport modal share increased from 19% to 33% in 2019.²³
- (v) Trip demand profile of total trips is at 34% by tricycles, 15% by walking, and 17% by motorcycles.

Sector Challenges

The interrelated challenges in the transport sector are as follows:

- (i) Low quality of and poorly regulated public transport service. The capacities of tricycles, which dominate the public transport service, will not be sufficient to address the growing traffic demand without adverse impacts on the environment. The challenge is rationalizing the tricycle service to complement the higher-capacity public modes on trunk roads as part of a next level public transport structure.
- (ii) Weak high-capacity public transport service. As the city revived several jeepney routes to balance traffic demand, their operations are still at risk of not gaining a sufficient share of the commuters. The challenge is to support the jeepney operators to increase their number, expand their vehicle fleet and sustain their operations.
- (iii) Quick erosion of the public modal share and increase in private modal share. As incomes rise, preference for private modes also increases. The challenge is to encourage more people to use public transport services that are modern, comfortable, safe, and reliable while keeping the number of vehicles on streets low; and to promote walking and biking.

²³ Based on a 2011 survey of the city and a 2019 survey of GSC SUID MP.

Opportunities

The city's transport and traffic code, enacted in 2018, provides rules and regulations for road use, pedestrian, use of sidewalks, motor vehicles (private or public including e-vehicles, bicycles, etc.), public transport terminals, parking spaces, public transport loading and unloading zones, and the optimum utilization of the road networks.

The Department of Transportation has guided the city in creating its Local Public Transport Route Plan (LPTRP), with organized jeepney transport cooperatives receiving support from the GSC government. Along with this plan is upgrading the jeepneys to electric jeepneys and Euro IV low carbon emission minibuses.

A traffic management unit has been created under the city's Public Safety Office (PSO). More traffic management measures are sought to improve traffic flow.

The city is currently the recipient of TA from the UN-ASUS Project, which helps package a technical proposal on the city's transport sector projects for possible funding by national and international organizations.

Photo Collage 7: Transport Management Activities in General Santos City



E-Jeepney in General Santos City



Modern Air-conditioned Minibuses in General Santos City





Concept Designs of Public Transport Waiting and Transfer Facilities (Type 1 and Type 2) in General Santos City.

Strategies

Congruent with the vision of GSC being a green city, sustainable transport development strategies are geared toward reducing climate change risks and increasing socioeconomic benefits for the city's population. These strategies are as follows (Photo Collage 7):

- (i) prioritize efficient public transport modes (e-jeepneys and hybrid minibuses) in the short term, which can eventually be upgraded to a next level high-capacity mass transit in the future;
- (ii) establish safe walking networks and nonmotorized ways (e.g., bike lanes);
- (iii) reduce traffic demand; and
- (iv) implement effective traffic management measures placing order in the use of roads.



Traffic Signalized Intersection in General Santos City



Example of Command and Control Center (Davao City)







Example of Bike Lane Network (Davao City)

Toward a safer and more environment-friendly transport sector. To improve its transport sector, the city is promoting the gradual shifting to modern, low carbon public transportation modes, strengthening the public transport route plan, improving traffic management infrastructure, and promoting nonmotorized transport (photo sources: 1, 2—RobSison Videography; 3—GSC SUID Master Plan; 4—GenSan News Online; 5—d0ctrine.com; 6—byahengdo30.com, brigadanews.ph, mb.com.ph).

Programs, Projects, and Activities

There are four main programs for the transport sector under the GCAP (Table 23):

- (i) Local Public Transport Route Plan implementation. This introduces higher-capacity modes of e-jeepneys and Euro IV vehicles with low carbon emission to the public transport service routes. Local government actions support service operators on these routes by installing LED streetlights along their routes and providing waiting and transfer facilities for commuters.
- (ii) Tricycle operation rationalization for climate change mitigation. This entails assigning transport service corridors according to road hierarchy, demand, and capacity. Tricycles are proposed to be upgraded to low-carbon emission vehicle models. Likewise, tricycle reduction schemes are to be applied.
- (iii) Traffic Signalization System and CCTV Synchronization Program (Phase 2). Phase 1 of this project is underway and is expected to be implemented in 2022 for 22 new road intersections and the upgrading of 11 existing intersections. A command and control center is part of this first phase. Preparation for Phase 2 is being pursued with initial efforts in identifying more intersections.
- (iv) Construction of bicycle lanes and stamped concrete sidewalks. This program is within the CBD and other urban barangays.

GREEN CITY ACTION PLAN

Table 23: Programs, Projects, Activities for the Transport Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.1 Public utility vehicles modernization program	Upgrading of the current public utility jeepneys to e-jeepneys and Euro IV minibuses (low carbon emission) as required by DOTr (Department Order No. 2017-001). Based on the LPTRP, 867 units need to be upgraded to low carbon transport.	2019– continuing Short-term	1.2 billion	Private sector investment under DBP, LBP loans	LGU support is ongoing. Also included in the list of interventions under the UN ASUS Project. So far, 1 of 6 cooperatives has been granted a loan (i.e., LADOTRANSCO) from DBP for 185 units with fund release in 4 tranches)	PSO, CEMCDO, LTFRB	Low occupancy and unfair competition with tricycles, lengthy and tedious loan process, organizational capacity of transport cooperatives, and 1 of 4 developmental routes may not be of high demand	12.8	4
ACTION 1.2 Installation of more streetlights along LPTRP jeepney routes (Barangay Katangawan)	Installation of streetlights and power lines, 25 poles (LED lights) along LPTRP Jeepney Route-3 from A. Morrow Blvd. to corner Supsup Road and 45 poles (LED lights) from Nursery Road to Makar Road National Highway. This is proposed to be expanded to other routes but not yet included in the AIP and LDIP.	2022–2024 Short-term	6.3 million	LGU General Fund	Included in LDIP 2022–2024. This is one of the proposed projects under the LPTRP Route 3 wherein the funds allocated for Phase 1 installation of streetlights along Nursery Road of ₱13 million was reverted to COVID-19 PPAs.	CEO	No issues	13.9	1

Table 23 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.3 Public transport users' waiting/ transfer facilities	An initiative to support and promote the services of the LPTRP and establish a transit corridor focusing on the comfort and security of passengers. The project entails the construction of 62 facilities.	2020–2022 Short-term	235 million (without land acquisition)	Partial funding from Congress- ional Fund	Business case study conducted in 2019 under GSC SUID MP. Facilities along Santiago Blvd. are implemented by CEO, while some facilities along Mabuhay Road have received congressional funding. Business case was presented to the NEDA RDC XII and MEDAFC on 19 August 2021. Can explore possible co-funding from green financing facilities (e.g., PPP Center).	CEO, DPWH	Misuse of facilities as intended for commuters and maintenance of facilities Land/road right-of-way acquisition	12.7	5

Table 23 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
2 Tricycle	operation rationalization for climate c	hange mitiga	ntion						
	Management plan: (a) Define the service areas of public transport modes according to the hierarchy of roads and demand and capacity corridors for the overall efficiency of traffic flow; (b) propose the upgrading of 7,500 franchised units of tricycles to e-trikes or low carbon emission transport, automation of the tricycle franchising, introduction of technology-based service monitoring and evaluation system, implementation of tricycle cap and other alternative volume reduction and livelihood programs; and (c) federate all the tricycle operators and drivers associations (TODAs) and provide capacity building to form into cooperatives for service upgrading.	2021–2023 Short-term	1 million (plan preparation) 75 million (fleet upgrading) 3 million (annual operating cost for the TODA fleet manage- ment and capacity building)	LGU General Fund (coordination and capacity building) Private sector (for fleet upgrading)	Database on public transport modes (including tricycles) was built in 2019. Current collaborative research agreement with UPNCPAG for the deployment of SafeTravel PH app and RFID readers Ongoing technical assistance from UN ASUS Project	MTFRB, PSO	Noncooperation of tricycle operators, lack of private sector investment funds for fleet upgrading, limited capacity of the motorized tricycle permitting section	13.9	1
3 Traffic S	ignalization System and CCTV Synchro	onization Pro	gram (Phase	2)					
	Installation of traffic signals and CCTVs in additional intersections not covered by the initial program phase is currently being bid out in 2021. Phase 1 includes the creation of a command and control center.	2023–2024 Short-term	452 million, including median island, pavement markings, and road signs	LGU General Fund	Project bidding for Phase 1 is ongoing, while locations for Phase 2 are being identified.	CEO, CDRRMO, PSO	Implementation may be pushed back due to the high investment requirement.	13.7	2

Table 23 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank			
4 Construct	4 Construction of bicycle lanes and stamped concrete sidewalks within the CBD and other urban barangays											
	Concreting of bicycle lanes within the Carlos P. Garcia area in 2020; Application of pavement markings in 2021; Concreting of sidewalk with stamping within CBD and other urban barangays Target of 10 km annually for the next 5 years to cover the main city roads (national roads not included)	2020–2026 Medium- term	1.4 million/km of shared bikeways (pavement markings and signages) 3,000/lineal meter of concrete with stamped sidewalk	5 million (2020); 18 million (2021) from LGU General Fund 2022– onward (TBD)	11 km shared bike lanes for implementation in 2021; Complete plan for the government center; included in AIP 2021. Can explore possible co-funding from the national government (e.g., DOTr, DPWH) and green financing facilities (e.g., DBM Green Green Green Program).	PSO, CEO	No citywide bikeways master plan yet. Therefore, connectivity with other areas is incomplete. RROW acquisition and clearing of existing structures	13.4	3			

AIP = Annual Investment Program, ASUS = ASEAN Sustainable Urbanisation Strategy, CBD = central business district, CDRRMO = City Disaster Risk Reduction and Management Office, CEMCDO = City Economic Management and Cooperative Development Office, CEO = City Engineer's Office, COVID-19 = coronavirus disease 2019, DBM = Department of Budget and Management, DBP = Development Bank of the Philippines, DOTr = Department of Transportation, DPWH = Department of Public Works and Highways, km = kilometer, LADOTRANSCO = Lagao Drivers Operators Transport Cooperative, LBP = Land Bank of the Philippines, LDIP = Local Development Investment Program, LDRRMF = Local Disaster Risk Reduction and Management Fund, LGU = local government unit, LTFRB = Land Transportation Franchising and Regulatory Board, MEDAFC = Macro-Economy Development Administration and Finance Committee, MTFRB = Motorized Tricycle Franchising and Regulatory Board, NEDA = National Economic and Development Authority, PPAs = programs, projects, and activities, PPP = public-private partnership, PSO = Public Safety Office, RDC = Regional Development Council, RFID = radio frequency identification, RROW = road right-of-way, SUID MP = Sustainable Urban Infrastructure Development Master Plan, TBD = to be determined, UN = United Nations, UPNCPAG = University of the Philippines National College of Public Administration and Governance. Note: Some project costs and budget have not been determined yet.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

Outcomes, Indicators, and Targets

Target outcomes for the transport sector are reduced traffic accidents, improved walkability and bikeability in the city, and improved public transport service with high occupancy and modern and low carbon public utility vehicles (Table 24).

Targets Baseline **Short-Term** Medium-Term Long-Term Means of **Outcomes Indicators** (2019)(2030)(2040)Verification **Enhanced GSC as** • Increased modal 15% 20% 25% increase 30% Traffic share of walking a walkable and increase increase Management bikeable city with from 15% to 30% Unit reporta by 2040 high occupancy public transport 50% 55% Increased modal 42%^b 55% increase Traffic service share of affordable Management increase increase public transport Unit reporta (high-capacity low carbon emission vehicles) from 42% to 55% in 2040

Table 24: Transport Sector Outcomes, Indicators, and Targets

GSC = General Santos City.

Sources: General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040 and City Green Team.

5.6 Built Environment

General

The city's physical makeup is a ridge-to-reef profile. It has forest, marine, and river ecosystems. Unfortunately, encroachment of human activities has caused and continues to cause degradation in all three ecosystems.

In the forestlands, there are timber poaching, charcoal making, unregulated hunting of wildlife, unabated gathering of flora, commercial farming activities, and the like. The weak monitoring of illegal activities and enforcement of the law portends continuance of these unwanted activities.

The city is within the protected seascape of Sarangani Bay, which has an assigned area of 215,950 ha of coastal and marine waters. The protected seascape comprises the strict protection zone and the multi-use zone. The strict protection zone covers the coral reef

^a Verification was previously under the Interim Committee on Transport Concerns. This office has been absorbed by the newly created Traffic Management Unit of the Public Safety Office.

^b Excludes two-wheeled motorized and nonmotorized vehicles.

areas and an ecosystem of marine sanctuaries. The rarest seagrass species is found in the protected area. The multi-use zone is where recreational, mariculture, and aquaculture farming; communal fishing ground; and reclamation, commercial, and industrial development are allowed. Siltation and contamination of coastal waters due to domestic wastes and sedimentation from the uplands have led to ecological losses and declines in fisheries productivity.

Mangrove sites are present in the city along the coastal areas of barangays Buayan, Baluan, Siguel, Tambler, and Calumpang. Based on the GSC DRRM Plan 2019–2022, the total area planted with mangroves is 37,552 ha.

Sector Challenges

Sector challenges include the following:

- (i) Degradation of coastal and river ecosystems due to natural, human, and economic activities. Water at the coastal areas (sampled areas) has high levels of fecal coliform. Wastes from the city and sediments from the upland areas pollute the aquatic environment. Water quality is greatly affected by informal settlements at riverbanks and coastal areas since their domestic wastes are disposed of at the river or sea. Pollution is also partly due to the noncompliance of some industries along the coast to DENR effluent standards. The polluted waters contribute to the decline in marine productivity and biodiversity.
- (ii) Degradation of the river ecosystem due to commercial quarrying. This current practice of extraction and mining of river materials as construction materials is done haphazardly, causing erosion. This problem is compounded with the neglect of the riverbanks. Although not yet felt in the city, erosion could deteriorate or destroy infrastructures nearby, such as roads, bridges, flood control structures, and even irrigation systems. Quarrying is known to affect water quality due to sedimentation, which in turn affects the coastal ecosystems.
- (iii) Destruction of forestland by unsustainable practices of the forest dwellers. This issue goes unchecked due to the weak monitoring of forestland. Without any alternative livelihood, people turn to exploit forest resources beyond their recovery capacity.
- (iv) **Degradation of biodiversity brought about by climate change and disaster.** There is a decline in the number of species in the area due to the destruction of marine habitats.

Opportunities

The city has enacted the GSC Environment Code of 2018 with the guiding principle that "the city shall conserve and protect the environment and natural resources and ensure the rehabilitation of its degraded ecosystems for the benefit of the present and future generations."

Likewise, the city has the approved Forest Land Use Plan, the CLUP 2018–2026, and the LCCAP 2019–2022. Programs and plans are set in motion among the city's various offices and barangays. More are being identified to improve the city's built environment.

With the above, some initiatives have been formulated and planned for implementation. The city has collaborated with national agencies (e.g., DENR Protected Area Management Board, DENR Environment Management Board, Multisectoral Forest Protection Committee, etc.), NGOs, barangays, neighboring LGUs, the academe, and other law enforcement agencies.

Strategies

Sector strategies employed by the city are as follows:

- (i) Promote greening programs. The city programs are in line with the national programs such as the DENR's National Greening Program. GSC's greening program includes the planting of mangroves along the coastline, propagation and planting of seagrasses and corals, and establishment of agroforestry demonstration farms, among others.
- (ii) **Develop pollution control programs.** This strategy aims to improve the quality of air and water.
- (iii) Increase compliance with environmental laws and policies. Included in these laws and policies are those reflected in the city's Environment Code.
- (iv) **Conduct an information, education, and communication drive.** This strategy raises awareness and promotes respect for the city environment.
- (v) **Enhancement of greenery areas of the city.** Urban use of water retention ponds for gardens and parks is one technique. Another is the creation of the city's natural water paths and drainage.

Programs, Projects, and Activities

The PPAs for the built environment sector are grouped into the following six main programs (Table 25):

- (i) GenSan East Coast Ecotourism Management Plan and Urban Coastal Zone Redevelopment Program. This program carries the combined features of two studies: the Urban Coastal Zone Redevelopment Program of the GSC SUID MP prepared with NEDA assistance, and the GenSan East Coast Ecotourism Management Plan by CENRO (Photo Collage 8). Both are harmonized plans formulated during the same period and cover overlapping areas along the coastline (i.e., from Barangay Dadiangas South to Barangay Buayan). The former is a completed business case study, while the latter is a proposed management plan submitted to DENR. The component action projects under this program are the coastal resource profiling and management for nine coastal barangays; mangrove forest management program; development of ecotourism zones; establishment of a mangrove park at Barangay Bula; establishment of a mangrove ecotourism zone straddling the barangays of Bula, Baluan, and Buayan; and a multiphase urban coastal zone redevelopment program.
- (ii) **Beautification and Greening Program.** This is a program espoused by the city's Environment Code of 2018. Action projects include the formulation of a city tree planting master plan, a comprehensive urban landscaping and greening program (sidewalks, median islands, etc.), pocket parks and recreational open space

Photo Collage 8: Coastal Development Programs in General Santos City

Upgrading and enhancement of P. Acharon Boulevard into Green Corridor with improvement of Coastal Access Roads

Construction of General Santos Coastal Baywalk Construction of New Passenger Boat Dock



Concept Plan of the Urban Coastal Zone Redevelopment Program



Concept Plan of the GenSan East Coast Ecotourism Management Plan





Sources: 1– General Santos City Sustainable Urban Infrastructure Development Master Plan 2020–2040; 2– City Environment and Natural Resources Office and AsiaKonzults.

- development for all barangays, walkable government center, redevelopment of Queen Tuna Park, Silway River Esplanade project, and GenSan Sarangani Baywalk project (Photo Collage 9).
- (iii) **Disaster and climate change-resilient infrastructure**. This includes promoting green technology in the design and implementation of all infrastructure projects.
- (iv) Construction of a three-story building for an environment laboratory facility, research, and education. This is a project supporting the improvement of the city's air, water, and noise conditions.
- (v) Green infrastructure interventions. This initiative is derived from the GSC LCCAP 2019–2022, entailing technical and financial support for green infrastructure interventions such as green buildings, permeable pavement, etc. New actions not proposed elsewhere have been added, including the establishment of a Green Building Code, promotion of Green Building Certification, and green engineering adaptations.
- (vi) Air quality, water quality, and noise pollution management. This is advocated by the city's Environment Code of 2018, which covers all activities contributing to pollution.

Photo Collage 9: Beautification and Greening Program in General Santos City



Walkable Government Center



Greening of Streets and Sidewalks



Greening of Open Spaces

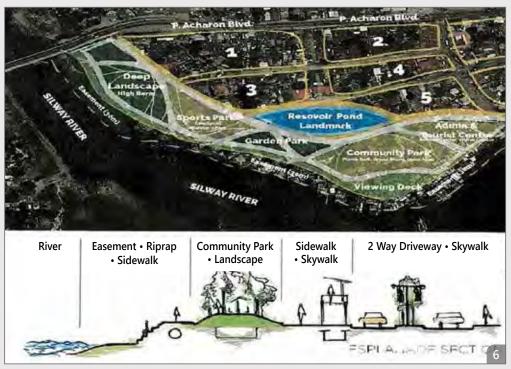


Development of Barangay Pocket Parks

Photo Collage 9 continued



Conceptual Design of Queen Tuna Park Redevelopment



Concept Plan for Silway River Coastal Eco Park Development

Greening the city. To build a more livable environment, General Santos City is developing more parks, green spaces, and walkable areas as well as managing protected areas effectively (photo sources: 1, 2—RobSison Videography; 3—City Environment and Natural Resources Office [CENRO]; 4, 5 - United Architects of the Philippines SOCCSKSARGEN Chapter, CENRO; 6—Office of Congresswoman Shirlyn Bañas-Nograles).

Table 25: Programs, Projects, and Activities for the Built Environment Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 GenSan East	t Coast Ecotourism Management	t Plan and Ur	ban Coastal Z	one Redevelo	pment Program				
ACTION 1.1 Coastal resource profiling and management	Increase awareness in coastal communities (9 barangays) by conducting an IEC campaign relative to the conservation, protection, and management of resources. Also includes coastal resource profile updating, gender-sensitive management scheme, community development, enterprises and economic development, and coastal law enforcement.	2022–2024 Short-term	3,849,000	LGU General Fund	Included in LDIP 2022–2024 for coastal resource management	CENRO, DENR, barangays	More funding resources may be needed for a continuing IEC campaign to cover all barangays	13.0	8
ACTION 1.2 Mangrove forest management program	The city's Environment Code includes (a) mangrove planting and protection of established mangrove forest ecosystems along the city coastline, (b) planting of mangrove species for reforestation, (c) coastal and marine waters cleanup, (d) immediate restoration of converted mangrove areas, (e) establishment of mangrove reservation sites, (f) mounting of adopt-a-mangrove area campaign, and (g) establishment and maintenance of mangrove nurseries.	2022–2024 Short-term	TBD	TBD	TA is needed. Collaboration with DENR is needed.	CENRO, DENR, barangays	Protection of endangered flora and fauna (e.g., rare species of seagrass)	13.7	1

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.3 Development of ecotourism zones	The East Coast Ecotourism plan includes (a) coral reef sanctuary, (b) mangrove sanctuary, (c) birdwatching towers/viewing decks, (d) visitor center and pasalubong center, (e) marine museum, (f) mangrove village, (g) Japanese bunkers circuit tours, and (h) coral diving/glass bottom coral reef tours.	2022–2026 Medium- term	331.5 million	For possible co-funding by LGU, DENR, DPWH, DOT, private sector	Included in the GSC Ecotourism Management Plan submitted to DENR. Can explore possible co-funding from green/blue financing facilities (e.g., GEF Special Climate Change Fund, IUCN Blue Natural Capital Financing Facility).	CENRO, CEMCDO, CEO, CPDO, DOT, DENR, GSCTC, barangays	Fragmented with portions addressed in ACTION 1.4 and ACTION 1.5	12.4	12
ACTION 1.4 Establishment of Bula Mangrove Park	Mangrove park development at Barangay Bula	2022–2024 Short-term	15 million	LGU General Fund	Included in LDIP 2022–2024. TA is needed.	CENRO, DENR PAWB, barangays	Capability to maintain and monitor	13.0	8
ACTION 1.5 Datu Sharif Zainal Abedin Mangrove Ecotourism Zone	Proposed Mangrove Park Village straddles the coastal areas of 3 barangays (Bula, Baluan, and Buayan)	2022–2024 Short-term	10 million	LGU General Fund	Included in LDIP 2022–2024. Additional funding is needed.	CENRO, CEO, DENR PAWB, DOT, barangays	Sharing of responsibility for operation and maintenance needs to be clear.	12.6	11

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.6 Urban coastal zone redevelopment program	From the SUID MP, this project comes in 3 phases: Phase 1 is the Queen Tuna Park and public market complex; Phase 2 is the baywalk and access roads; and Phase 3 is the public rental housing and settlement upgrading.	2019–2040 Long-term	Estimated costs: 425 million (Phase 1) 382 million (Phase 2) 212 million (Phase 3)	For possible co-funding by LGU, DPWH, private sector	Phase 1 is under the greening program, while the baywalk is sought under congressional funding. Business cases have been conducted. Can explore possible co-funding from green and blue financing facilities (e.g., GEF Special Climate Change Fund, IUCN Blue Natural Capital Financing Facility).	CENRO, CEMCDO, CHLMO, DPWH, barangays	Organizing informal settlers for Phase 3	13.3	5
2 Beautification	on and Greening Program								
ACTION 2.1 Formulation of a city tree planting master plan	As provided for in the GSC Environment Code of 2018 (Ordinance No. 73)	2021–2022 Short-term	TBD	TBD	Explore possible technical assistance.	CENRO, DENR	Landscape maintenance	13.6	2

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 2.2 Comprehensive landscaping and greening program (aka the Aesthetics and Urban Greening Program)	Continuing maintenance, rehabilitation, protection, and conservation of plants and trees in parks, plazas, playgrounds, road center islands. It requires the involvement of the barangays in urban forest rehabilitation, especially those with existing barangay tree parks that have signed partnership agreements with CENRO.	2022–2024 Short-term	54,350,000	LGU General Fund and other sources	Included in LDIP 2022–2024. Can explore possible co-funding from other sources (e.g., DENR, DBM Green Green Green Program, etc.)	CENRO, barangays	Weak support from barangays	13.1	7
ACTION 2.3 Parks and recreational open space development program	Construction of pocket parks or tree parks within all 26 barangays of the city.	2022–2024 Short-term	15 million	LGU General Fund and other sources	Included in LDIP 2022–2024. Can explore possible co- funding from other sources (e.g., DENR, DBM Green Green Green Program, etc.)	CEMCDO, CENRO, CEO, barangays	Citywide attention needed	12.7	10
ACTION 2.4 Walkable government center project	Completion of the ongoing walkable government center with grandstand	2022–2024 Short-term	50 million	DBM/LGU General Fund	Included in LDIP 2022–2024 (Note: 3 tranches from DBM at 35 million, 21 million, 28 million)	CEO, CENRO	Maintenance and security	13.4	4

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 2.5 Establishment of the Silway River Esplanade and Gensan Sarangani Baywalk projects	Combined plan features of the following: (1) GSC SUID MP—Silway River Corridor Redevelopment Program; and (2) Baywalk Plan under the Silway River—Marine Coastal Eco Park Program of Congresswoman Shirlyn Bañas-Nograles.	2019–2040 Long-term	1.6 billion (Silway River) 2 billion (Coastal Eco Park)	Proposed for congress- ional funding; Other funding sources	Business case conducted in 2019 by GSC SUID MP. Concept designs and budget proposal prepared for the Eco Park by the Office of Congresswoman Bañas-Nograles. Can explore possible co-funding from green financing facilities (e.g., GEF Special Climate Change Fund).	DPWH, CEO, CENRO, CHLMO, Office of Congresswo- man Bañas- Nograles	Presence of many informal settlers in the area.	12.3	13
ACTION 2.6 Redevelopment of Queen Tuna Park	Redevelopment of Queen Tuna Park at Barangay Dadiangas South	2022–2024 Short-term	Estimated cost is 55 million	LGU; LBP loan; other sources	55 million in LDIP 2022–2024 and LBP loan of 21 million for walkable Queen Tuna Park	CEMCDO, CEO, barangays	Fragmented implementation, park maintenance and security	12.8	9

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank			
3 Disaster an	3 Disaster and climate change resilient infrastructures											
	Construction of safe temporal shelters for displaced persons or families in times of disasters (e.g., evacuation centers); Promotion of green technology in all infrastructure projects	2021– continuing Short-term	12 million	LGU General Fund (5%) LDRRMF (70%)	Included in LDIP 2022–2024. Can explore possible co-funding from green financing facilities (e.g., DOF Disaster Management Assistance Fund, DBP Green Financing Program, GEF Special Climate Change Fund).	CDRRMO, CEO, CHLMO, OBO	Temporal solution may not be sufficient	13.5	3			
4 Construction	on of 3-story building for enviror	ment lab fac	ility, research	, and educatio	n							
	Construction of a 3-story building for the environmental laboratory, research, and education center in Espacio Heneral in Barangay Buayan	2022–2024 Short-term	15 million	LGU General Fund	Included in LDIP 2022–2024. Additional funding for equipment is needed.	CEO	Capability building, operation and maintenance	13.2	6			

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank	
5 Green Infrastructure Interventions										
ACTION 5.1 Establishment of Green Building Code for GSC	Formulation of Green Building Code and capacity building of local officials for green building assessment/rating	2022–2024 Short-term	TBD	TBD	New initiative. Can explore possible TA and collaboration with Philippine Green Building Council and other potential partners.	CENRO, CEO, OBO	Preparation of the city in terms of capability	13.1	7	
ACTION 5.2 Promotion of green building certification	Setting incentives for certified green buildings of new structures	2022–2024 Short-term	TBD	TBD	New initiative. Can explore possible TA and collaboration with Philippine Green Building Council and other potential partners.	CEMCDO, CENRO	Audit and monitoring	13.1	7	
ACTION 5.3 Green engineering adaptations	Best practices for green engineering solutions for streetscape design and construction	2022–2024 Short-term	TBD	TBD	New initiative. Can explore possible TA and collaboration with Philippine Green Building Council, DPWH, and other potential partners.	CEO	Absorptive capacity of the city	13.4	4	

Table 25 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank		
6 Air quality,	6 Air quality, water quality, and noise pollution management										
	Coverage includes industries, motor vehicles, slaughterhouses, markets, agri-industries, hotels, commercial businesses, households, and other activities that contribute to pollution. Ensure the city has air, water, and noise quality monitoring instruments and equipment. Conduct annual GHG and air emissions inventory of sources.	2022- Continuing Long-term	18,685,000	LGU General Fund	Included in LDIP 2022–2024. Can explore possible co-funding with green financing facilities (e.g., DBP Green Financing Program).	CENRO	Maintenance of equipment	12.0	14		

CDRRMO = City Disaster Risk Reduction and Management Office, CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CEO = City Engineer's Office, CHLMO = City Housing and Land Management Office, CPDO = City Planning and Development Office, DBP = Development Bank of the Philippines, DBM = Department of Budget and Management, DENR = Department of Environment and Natural Resources, DOF = Department of Finance, DOT = Department of Tourism, DPWH = Department of Public Works and Highways, GEF = Global Environment Facility, GHG = greenhouse gas, GSC = General Santos City, GSCTC = GSC Tourism Council, IEC = information, education, and communication, IUCN = International Union for Conservation of Nature, LBP = Land Bank of the Philippines, LDIP = Local Development Investment Program, LDRRMF = Local Disaster Risk Reduction and Management Fund, LGU = local government unit, OBO = Office of the Building Official, PAWB = Protected Areas and Wildlife Bureau, PPAs = programs, projects, and activities, SUID MP = Sustainable Urban Infrastructure Development Master Plan, TA = technical assistance, TBD = to be determined.

Note: Some project costs and budget have not been determined yet.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

Outcomes, Indicators, and Targets

Target outcomes for the sector include sustained implementation of the Multi-Nodal Dispersed Concentration Spatial Strategy (7 clustered development areas); increased area of green spaces; improved walkability, bikeability, road safety, and efficiency; preservation of production, protection, and ecological areas; reduced number of ISFs living at high-risk and danger zones; and increased number of households with secure housing tenure and access to basic services of housing development (Table 26).

5.7 Energy

General

Power demand in Mindanao is supplied by the Mindanao grid, which has an installed capacity of 3,162 megawatts (MW) (2018) coming from (i) 1,264 MW from renewable energy (geothermal, hydro, biomass, solar, and wind); (ii) 1,070 MW from coal; and (iii) 828 MW from oil. As of March 2019, the grid had a reserve of 569 MW.

Region XII has nine power plants with a total installed capacity of 361.80 MW. The mix of power generated in the region is 35% by bunker/diesel-fueled plants, 30% by geothermal, 33% by coal fuel, and 2% by ground-mounted solar. Two of these power plants of the bunker/diesel-fueled type are in the city, with a combined capacity of 34.8 MW.

GSC is provided with electricity by the distribution utility of South Cotabato II Electric Cooperative, Inc. (SOCOTECO II). The National Power Corporation provides 80 MW to SOCOTECO II to cover the demand of GSC and neighboring municipalities of Sarangani and South Cotabato with 204 barangays. SOCOTECO II was projected to have a power surplus of 40.5 MW in 2019 but a deficit of 1.25 MW in 2026 and 0.17 MW in 2027.

As of 2018, the city's total power consumption reached 628 GWh (from 394 GWh in 2010), with 36% consumed for residential use, 24% for commercial use, and 40% for industrial use.

Sector Challenges

The two issues in the energy sector affecting people's daily lives and the city's economic activities are as follows:

(i) Power outages. The worst periods of grid-wide blackouts in Mindanao were 2014 and 2015. Furthermore, in 2015, some transmission towers were bombed. Scheduling of power use in the city became the norm, especially during the summer months when hydropower output is historically low. During 2015–2018, the power situation has improved with the entry of several power plants that are more of fossil fuel types. Any brownouts experienced in the city now are usually due to energy transactions and distribution issues, or maintenance and improvement works of SOCOTECO II.

Table 26: Built Environment Sector Outcomes, Indicators, and Targets

				Targets		
Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification
Increased land area provided for green recreational spaces within the city	Increased total combined area (in ha) of public parks and green spaces within the city by at least 5% by 2040	74 ha	At least 0.5%	At least 2.5%	At least 5%	CEMCDO report
Increased forest/green cover	Increased % of forest cover	18%ª	20%	22%	23%	Survey and mapping
Improved coastal	Increased coral reef area	23.29 ha ^b	27.29	29.29	31.29	Survey and mapping
environment	Increased mangrove area	37.55 ha ^b	44.5	51.55	58.55	Survey and mapping
	• Increased seagrass area	6.64 ha ^b	7.64	8.64	9.64	Survey and mapping
Improved water quality in major rivers and Sarangani Bay	Reduced concentration of fecal coliform in major rivers (Silway, Buayan, etc.) by 30% by 2040 (from 2018 level)	Fecal coliform	10%	20%	30%	Sampling and analysis
	Reduced concentration of fecal coliform in Sarangani Bay by 30% by 2040 (from 2018 level)	Fecal coliform	10%	20%	30%	Sampling and analysis
	Reduced biological oxygen demand (BOD) load in Sarangani Bay by 30% by 2040 (from 2018 level)	BOD	10%	20%	30%	Sampling and analysis
Improved air quality in the city	Annual geometric mean of particulate matter (PM ₁₀) is maintained or improved but does not exceed 60 micrograms per normal cubic meter (ug/Ncm).	PM₁₀ (2015) 35/49 ug/Ncm	Good	Good	Good	CENRO reports

CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, ha = hectare.

^a GSC SUID MP.

^b General Santos City (GSC) Comprehensive Land Use Plan 2018–2026 data showing 2018 levels. Source: GSC Sustainable Urban Infrastructure Development Master Plan 2020–2040.

(ii) Lack of access to electricity. About 31% of households in the city have no access to electricity. On top of that, about 41% of GSC residents experienced power interruptions, with 33% experiencing power interruptions lasting longer than 4 hours (based on the 2019 household survey of the GSC SUID MP Project).

The challenge for GSC, therefore, is complying with the Department of Energy (DOE) Mindanao Energy Plan 2018–2040, which would entail a climate-resilient and reliable energy mix, securing energy infrastructure and increasing the number of households with electricity.

Opportunities

The following are the opportunities for the energy sector in GSC:

- (i) The city is connected to the Mindanao grid and is host to the 25 MW (expandable to 75 MW) solar power plant of Harbor Star Energy Corp. in Barangay Siguel, which started its commercial operation in 2019.
- (ii) To avoid recurring power crises, the Interim Mindanao Electricity Market was established to provide real-time correction on energy imbalances and transport utilization of all available capacities in the grid to meet supply deficiency.
- (iii) There are seven new power projects in the SOCCSKSARGEN Region as of 2019, with a total installed capacity of 155.31 MW. Mindanao-wide, there is about 2,895 MW of additional power projects to be initiated by the private sector.
- (iv) Programs are in place such as (a) the expansion and security of transmission lines and power plants under the Transmission Development Plan prepared and implemented by the National Grid Corporation of the Philippines; (b) Interruptible Load Program where customers can de-load itself from the grid during peak hours and operate their own power generating facility; and (c) Mindanao Modular Generator Sets Program for acquiring modular generator sets by electric cooperatives at low interest rates, with the option to return these sets to the national government when new capacities meet supply requirements.

Strategies

The following strategies are set forth to address the challenges of the energy sector in GSC (Photo Collage 10):

- (i) Diversify sources of energy. About 64% of power to be generated from committed power projects in SOCCSKSARGEN is the coal fuel type. More renewable energy projects should be explored for implementation, such as solar power plants, solar rooftops, floating solar panels, and biomass. This strategy can be complemented with energy-efficient measures and conservation.
- (ii) Provide incentives to developers of renewable energy projects. Developers can be incentivized through (a) Household Electrification Program using renewable energy technologies such as solar home systems, solar streetlights, micro-hydro systems (if applicable), etc.; and (b) Photovoltaic Mainstreaming under Access to Sustainable

Photo Collage 10: Energy Sector Development in General Santos City



Solar Panel Roofs of Notre Dame of Dadiangas University in General Santos City



Solar Panel Roofs on Houses



Harbor Star Energy Corp. (HSEC) Solar Power Plant in Siguel, GSC



LED Streetlights in General Santos City



Signing of Contract between SOCOTECO II and AboitizPower (Hedcor) to supply 20 MW from Hedcor's Hydropower Plant in Bukidnon



Partnership among SOCOTECO II, Mahintana Foundation, Peace and Equity Foundation, and EU-assisted SOLARES Project to provide solar home units to off-grid local communities





Ongoing Construction of Alsons Power Group's Siguel Hydropower Plant in Sarangani

Developing a more sustainable energy sector. The city is promoting the development of more sustainable sources of power, an increased share of renewable energy in its energy supply mix, and increased use of more energy-efficient facilities and infrastructure (photo sources: 1, 3—RobSison Videography; 2—Solar Power Gensan; 4—mindanews.com; 5—aboitizpower.com; 6—mahintana.org; 7—Alsons Power Group).

Energy Programme of National Power Corporation, the EU, and the World Bank. More recently, in 2021, SOCOTECO II is one of the recipients of the Rural Network Solar Project under Access to Sustainable Energy Programme to develop a 1.4 MW solar power plant at the back of its New Society Substation in Barangay Apopong.²⁴ The EU will fund 70% of the ₱73 million project, with the remaining 30% as SOCOTECO II's equity counterpart. This project will provide electricity to mostly indigenous peoples (Blaans, Tbolis, Tagakaolos) living within SOCOTECO II's service area.

- (iii) Promote greater renewable energy use by increasing public awareness and knowledge. Creating awareness can be pursued through social media, in schools, etc. Knowledge dissemination can be conducted for the use of systems with high energy efficiency ratio, such as LED lights, air conditioners, and other appliances in homes and buildings.
- (iv) Improve household access to electricity. Households without access to electricity can be identified and included in the database of the DOE as the target for electrification by distribution utility infrastructure. Likewise, renewable energy systems can be decentralized (e.g., solar power, biomass), specifically targeting the 31% of households not connected to the grid.
- (v) Improve transmission and distribution lines and SOCOTECO II's reliability. Support the implementation of the Transmission Development Plan 2016–2040 through close coordination with the National Grid Corporation of the Philippines and the DOE, especially on projects near and within GSC.
- (vi) Improve energy infrastructure to be resilient to storms and flooding. Conduct capability training of the city's engineers on the latest technologies on resilient energy infrastructure.

Programs, Projects, and Activities

The action projects for the energy sector, like the other sectors, are grouped into umbrella programs (Table 27):

- (i) Improvement and expansion of energy-efficient facilities and services. This program includes three actions geared toward increasing the electrification of streets in all barangays, the CBD, and the national road. Other initiatives for energy efficiency are found in other sectors such as the transportation sector with energy-efficient vehicles and the built environment with the promotion of green buildings.
- (ii) Development of alternative sources of energy. Two actions are sought here, with the first directed to setting the long-term Energy Master Plan and energy-related studies, which benefit both the electric cooperative and the city. This is followed by the development of renewable energy sources and facilities that can tie in with increasing electrification of unserved households as well as increasing the renewable share in the source of energy mix.

Indigenous Peoples Plan of SOCOTECO II, under EU Access to Sustainable Energy Programme Network Solar. National Power Corporation, 2021.

GREEN CITY ACTION PLAN

Table 27: Programs, Projects, and Activities for the Energy Sector

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 Improveme	ent and expansion of energy-ef	ficient facilit	ies and servi	ces					
ACTION 1.1 Barangays Street Lighting Program (within barangays)	Replacement of existing sodium streetlamps into LED lights, and installation of LED streetlights in new locations in the city's 26 barangays	2022–2024 Short-term	70 million	LGU General Fund	Ongoing. Included in LDIP 2022–2024.	CEO	Maintenance of facilities	13.8	3
ACTION 1.2 Electrification and street lighting project at the central business district (CBD)	Installation of solar-powered LED streetlights at the CBD	2022–2024 Short-term	70 million	LGU General Fund	Ongoing. Included in LDIP 2022–2024.	CEO	Maintenance of facilities	14.5	1
ACTION 1.3 Electrification and street lighting at Albert Morrow Road	Installation of streetlights and power lines, 310 poles (LED lights) along the Diversion Road (A. Morrow Road) from Barangay Sinawal to South Cotabato–Sarangani Road Junction	2022–2024 Short-term	14 million	National Fund	Included in LDIP 2022–2024	CEO, DPWH	Maintenance of facilities	13.9	2

Table 27 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
2 Developme	ent of alternative sources of en	ergy							
ACTION 2.1 Conduct of a long-term energy master plan and energy-related studies	Conduct of a long-term energy master plan and studies/projects on the manufacture/assembly of goods and the establishment of energy-related facilities leading to efficient utilization of energy	2022–2024 Short-term	TBD	TBD	Included in SUID MP 2019–2040 and in GSC Investment Priority Areas 2020–2022. Can explore possible technical assistance from DOE, ADB, etc.	CEMCDO, CPDO, SOCOTECO II	Stakeholders' cooperation	13.1	5
ACTION 2.2 Development of renewable energy sources and facilities	Development of renewable energy sources and facilities such as solar power (e.g., large-scale PV power plant, solar rooftops for industrial/commercial/residential buildings, solar home systems for high- and low-income areas, solar streetlights, etc.), biofuel production and biomass power plants, wind farms, etc.	2022–2040 Long-term	180 million	LGU, PPP, private	Proposed new project in SUID MP 2020–2040. More private funding to be infused as necessary. Can explore possible technical assistance and co-funding from PPP Center, ADB ACGF, WB CIF, EU/DOE ASEP, JICA LEAP, REAF, DBP FUSED).	CEMCDO, CPDO, CEO	Inputs from various DOE offices	13.2	4

ADB = Asian Development Bank, ACGF = ASEAN Catalytic Green Finance Facility, ASEP = Access to Sustainable Energy Programme, CEMCDO = City Economic Management and Cooperative Development Office, CEO = City Engineer's Office, CIF = Climate Investment Fund, CPDO = City Planning and Development Office, DBP = Development Bank of the Philippines, DOE = Department of Energy, DPWH = Department of Public Works and Highways, EU = European Union, FUSED = Financing Utilities for Sustainable Energy Development, GSC= General Santos City, JICA = Japan International Cooperation Agency, LDIP = Local Development Investment Program, LEAP = Leading Asia's Private Infrastructure Fund, LGU = local government unit, PPAs = programs, projects, and activities, PPP = public-private partnership, PV = photovoltaic, REAF = Renewable Energy Asia Fund, SOCOTECO II = South Cotabato II Electric Cooperative, SUID MP = Sustainable Urban Infrastructure Development Master Plan, TBD = to be determined, WB = World Bank. Note: Some project costs and budget have not been determined yet.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

Outcomes, Indicators, and Targets

Table 28 shows the expected outcomes and indicators to monitor progress against the baseline and targets at a given time frame until 2040. Progress verification should be available through the reports of responsible offices or agencies.

The outcomes are as follows:

- (i) all households provided with a stable supply of electricity;
- (ii) increased power supply from existing and future energy sources;
- (iii) increased share of renewable energy in the energy mix; and
- (iv) improved energy efficiency in residential, institutional, commercial, and industrial buildings.

Table 28: Energy Sector Outcomes, Indicators, and Targets

				Targets		
Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification
Access to electricity in all households in	• 100% of households with electricity by 2040	54% or 66,694 households in 2017 ^a	60%	80%	100%	SOCOTECO II report, CPDO report
the city	 Reduced frequency and average duration of blackouts annually by 98% by 2040 	41%	0% decrease	44% decrease	98% decrease	SOCOTECO II report, CPDO report
	• 100% of city streets lighted by 2030	85% ^b	90%	95%	100%	SOCOTECO II report, CPDO report
Increased energy supply from existing and future sources of energy	Increased reserve margin to 25% in 2040	23.78% ^c	25%	25%	25%	SOCOTECO II report, CPDO report
Diversified sources of energy in the Mindanao energy mix	Increased capacity of different types of fuel, including liquefied natural gas and renewable energy sources, to 19,545 MW by 2040	3,482 MW (in 2017)	3,482 MW	11,514 MW	19,545 MW	SOCOTECO II report, CPDO report
Augmented reliable energy infrastructure	Increased number of power substations and other infrastructure	2 (35 MVA and 20 MVA capacity)	2	3 (plus 1)	4 (plus 1)	SOCOTECO II report, CPDO report

Table 28 continued

				Targets		
Outcomes	Indicators	Baseline (2019)	Short-Term (2022)	Medium-Term (2030)	Long-Term (2040)	Means of Verification
Developed renewable energy sources comprising ahigher share of energy mix	Increased renewable energy share in the energy mix coming from GSC to 33.8% by 2040	About 20% ^d	20%	25%	33.8%	SOCOTECO II report, CPDO report

CPDO = City Planning and Development Office, GSC = General Santos City, MVA = megavolt ampere, MW = megawatt, SOCOTECO II = South Cotabato II Electric Cooperative.

- ^a Estimates based on 2017 SOCOTECO II data.
- ^b Based on the assumption that only the urban barangays have well-lit streets.
- ^c Department of Energy Mindanao Energy Plan 2018–2040.
- ^d (MW renewable energy/MW total energy mix) * 100

Source: GSC Sustainable Urban Infrastructure Development Master Plan 2020–2040.

5.8 Multisector and Citywide

General

The DRRM and the information and communication technology (ICT) sectors have a far-reaching influence on almost all other sectors. The DRRM sector addresses hazards and crises in the natural or manufactured environments and is thus mentioned in the overview and situational analysis of the built environment sector in this report. The ICT sector, on the other hand, is a necessary support for activities of all development sectors especially economic, transportation, environment, solid waste, water supply, sanitation, and energy.

Currently, there are six major ICT infrastructure and service providers, or telcos, in the city—Globe, Smart, Sun, Sky Broadband, DC Tech, and DITO. These companies provide wired and wireless internet connections. The ICT Council was established in the city in 2016 to promote ICT use, provide capacity building, and enhance the information technology and business process management (IT-BPM) business environment. The council comprises the GSC government, Department of Information and Communications Technology, other government agencies, and private sector stakeholders.

Mabuhay IT Park, a 2.8 ha IT park, is in the heart of the city for IT-BPM companies. It has a one-stop shared facility capable of carrying voice, video, and data services. However, this is currently not fully populated with locators.

The city embarked on a wireless area network—Worldwide Interoperability for Microwave Access (WiMAX)—project, which provided key offices of the city government with internet and intranet connectivity to the city hall. It also addressed the communication needs for public service delivery and deployment of automated systems.

Sector Challenges

The challenges and issues in the sector are defined in an E-readiness survey conducted jointly by the Department of the Interior and Local Government, Department of Science and Technology, and Department of Trade and Industry. The findings are briefly listed below:

- (i) Information and communication technology capability. For the WiMAX project, the rural barangays and other key facilities still have separate service subscriptions from the telcos, which are expensive.
- (ii) **Technology environment.** The data center needs improvement in terms of scalability to handle future systems deployment for the LGU, particularly in making online service available to the greater public.
- (iii) **Connectivity.** Problems in connectivity still exist, especially in tourist areas and rural barangays. The slow average speed and high cost are still issues for residential subscribers.
- (iv) Capacity. Senior specialists to support advanced ICT project development are lacking. The ICT Council is focused only on the IT-BPM sector. Its mandate needs to be expanded to cover smart city development. LGU funding is not sufficient for ICT projects.
- (v) Cooperation. Smart city initiatives through PPP projects are not well explored.

Opportunities

The opportunities for the DRRM sector, which plays an important role in mitigating hazard risks, are shared with the environment sector and other sectors.

Meanwhile, the opportunities of the ICT sector are as follows:

- (i) Demand for connectivity is growing due to population growth and urban expansion, as well as the growing demand for efficient and accessible online public services. Demand is even more strongly felt during the COVID-19 pandemic when people rely on internet connectivity for commerce, education, work, and other daily living activities.
- (ii) There is active participation of the ICT Council. The ICT Development Roadmap has recently been completed for 2021–2025, with support from 12 national agencies.
- (iii) The ICT supports, complements, and works with other sectors toward contributing to the city's competitiveness, security and resiliency, and livability and improved quality of life of its residents. Smart city applications and Internet of Things technologies can generate substantial socioeconomic benefits for the citizens.

Strategies

Four sector strategies were identified (Photo Collage 11):

- (i) **Policy making and enforcement.** Enhance the enabling environment for the ICT sector through policies that support the implementation of the ICT PPAs.
- (ii) Promote the development of a citywide ICT infrastructure. This includes wired and wireless internet and intranet facilities (especially the long-range communication facilities) and real-time data gathering devices; construction of a city data center, network security operations center, and intelligent command and control center; and establishment of a public Wi-Fi in built-up places and the CBD.
- (iii) **Data integration.** Integrate government electronics systems and applications to improve the city's e-Governance capacity.
- (iv) Smart applications. Establish shared application and ICT services at the LGU level to make government services accessible online anytime and anywhere; and leverage national government-led ICT projects for e-commerce, and technology for education and employment.

Programs, Projects, and Activities

For the citywide multisector PPAs, three main programs were identified with high priority (Table 29):

- (i) Operation and maintenance of the City Disaster Risk Reduction and Management Office Operation Center. This program's subcomponents are the establishment and institutionalization of the Incident Command System; the establishment of an end-to-end early warning system linked to disaster risk reduction; and the IEC campaign on climate change adaptation and mitigation (CCAM).
- (ii) Digital Cities Program for the development of the information and communication technology infrastructure. The action projects formulated for this program will contribute to developing a world-class ICT infrastructure by implementing the Digital Cities Roadmap. This will entail, among others, the setting up of the city intranet and public Wi-Fi and the expansion of the Data Center and Command Center for common use.
- (iii) Projects to minimize or prevent pollution and reduce greenhouse gas emissions. This is an integral part of the GSC Investment Priority Areas for 2020–2022. The only identified action project for this program is the overall management of air quality and the city's noise and wastewater situation.

The following changes to the original listing were introduced by some offices during the stakeholders' consultations:

 (i) Under the CDRRMO Operation Center, the project on the establishment of an end-to-end early warning system linked to disaster risk reduction (ACTION 1.2)

Photo Collage 11: Disaster Risk Reduction Management and Information and Communication Technology Development in General Santos City



City DRRM Office in General Santos City



COVID-19 Vaccines Delivery by CDRRMO



Mabuhay IT Park in General Santos City



General Santos City Information and Communication Technology Road Map



General Santos City Government E-Portal



General Santos City Digital Cities Road Map

Building a smart city. General Santos City is pursuing initiatives to develop itself into a smart city with modern information and communication technology infrastructure, facilities, and technologies that will support e-commerce and trade as well as promote a safer and more resilient environment (photo sources: 1, 2—City Disaster Risk Reduction and Management Office; 3—Ariel C. Lalisan; 4—academia.edu; 5—eportal.gensantos.gov.ph; 6—The Design Thinking Factory).

Table 29: Programs, Projects, and Activities for Citywide Sector (Multisector)

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
1 Operation	and Maintenance of City Disas	ter Risk Redu	ction and M	anagement	Office Operation Co	enter			
ACTION 1.1 Establishment and institutionalization of the Incident Command System	CDRRMO was established under the GSC DRRM Plan 2019–2022. The Command Center was established at CDRRMO in 2018. The Incident Command System (ICS) is a standardized approach to the command, control, and coordination of emergency response, providing a common hierarchy within which responders from multiple agencies can be effective. It includes facilities, equipment, personnel, procedures, and communications within a common organizational structure.	2018– continuing Short-term	TBD	LDRRMF	The Disaster Operation Center has been established but needs improvement to be fully operationalized. The ICS Policy is being implemented.	CDRRMO	Requires effective coordination with DENR, adjacent LGUs, barangays, national government. agencies, NGOs, and civil society Needs adequate capability for collecting and analyzing big data, and for regular updating, monitoring, and evaluation	13.9	1

Table 29 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
ACTION 1.2 Establishment of end-to-end early warning system linked to disaster risk reduction	A multi-hazard early warning system will entail increasing data stations, earthquake recording instruments, and CCTVs.	Proposed and funded in 2019, to be resubmitted in 2023 Medium- term	25 million	LDRRMF 2019 (Conti- nuing appro- priation)	Installation of CCTVs and Command and Control Center project are now under bidding with the Traffic Signalization Project (Phase 1). Suspended fund was utilized to augment the COVID-19 response program.	CDRRMO	Limited CCTV network Availability of funds Availability of qualified suppliers	13.9	1
	Installation of additional flood and rain monitoring devices with early warning system at major river systems to link with CDRRMO Operation Center	To be included in PPAs 2023 Medium-term	25 million	TBD	New proposed project by CDRRMO	CDRRMO	Funding timing undetermined	_	_
	Installation of automatic tidal gauge (high frequency radar) to monitor wave heights, storm surge, and tsunami	Proposed and funded in 2019, to be resubmitted in 2023 Medium- term	25 million	LDRRMF	Proposed and funded in 2019, but funding was diverted to augment the COVID-19 response program.	CDRRMO	Funding timing undetermined	-	_

Table 29 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
	Installation of X-band radar to measure the amount of rain, rain rate, wind profile within a 50–60 km radius from the center	2022– onward Short-term	TBD	TBD	Proposed project for implementation of DOST-PAGASA	CDRRMO, DOST	Availability of funds Available site for construction of the facility	-	-
ACTION 1.3 IEC campaign on Climate Change Adaptation and Mitigation	As an integral part of the GSC LCCAP 2019–2022 and the CDP, the IEC campaign aims to increase the public's knowledge about and capacity to address climate change.	2019–2022 Short-term	TBD	LDRRMF	Ongoing	CENRO, CEMCDO, CDRRMO	Impact not closely measured as feedback mechanism	13.7	2
2 Digital Citie	es Program								
ACTION 2.1 Development of world-class ICT infrastructure	Implementation of the Digital Cities Roadmap especially relating to basic ICT infrastructure, city intranet, public Wi-Fi, Data Center and Command Center expansion for common use	2021–2025 Medium- term	TBD	TBD	Partially implemented under other projects such as the Traffic Signalization and CCTV Synchronization Project. Can explore possible co-funding from green financing facilities (e.g., JICA LEAP).	CEO, ICTD, CDRRMO, PSO	Integrity and security of data	13.3	3

Table 29 continued

PPAs	Description	Imple- mentation Period	Project Cost (₱)	Budget/ Source	Status/ Remarks	Responsible Offices	Potential Issues	Total Score (Ave.)	Rank
3 Projects to	minimize or prevent pollution	and reduce g	greenhouse	gas emissior	ns (2020–2022)				
ACTION 3.1 Air, noise, and wastewater management	Management policies and strategies while the enforcement team conducts site inspections and testing to determine compliance with pollution control and waste management policies. Coverage is 26 barangays.	2022–2024 Short-term	18,685,000	LGU General Fund	Included in LDIP 2022–2024. Can explore possible co-funding from green financing facilities (e.g., DBP Green Financing Program).	CENRO	Overlaps with DENR EMB function. Close collaboration may be needed.	12.4	4
4 Proposed	construction of the Public Safe	ty Office loca	ted at Espac	io Heneral ir	n Buayan				
ACTION 4.1 Construction of a new PSO building	A four-story building to house the integrated public safety operations of the city to implement road safety, civil security, disaster risk reduction, and traffic management services.	2023-2025 Medium- term	TBD	TBD	Concept/new proposal	PSO, CEO	Maintain integrity and security of a single Command and Control Center	-	-

CDP = Comprehensive Development Plan, CDRRMO = City Disaster Risk Reduction and Management Office, CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CEO = City Engineer's Office, CMO = City Mayor's Office, COVID-19 = coronavirus disease 2019, DBP = Development Bank of the Philippines, DENR = Department of Environment and Natural Resources, DOST = Department of Science and Technology, DRRM = disaster risk reduction management, EMB = Environmental Management Bureau, GSC = General Santos City, ICT = information and communication technology, ICTD = Information and Communications Technology Division, IEC = information, education, and communication, JICA = Japan International Cooperation Agency, km = kilometer, LCCAP = Local Climate Change Adaptation Plan, LDIP = Local Development Investment Program, LDRRMF = Local Disaster Risk Reduction and Management Fund, LEAP = Leading Asia's Private Infrastructure Fund, LGU = local government unit, NGO = nongovernment organization, PAGASA = Philippine Atmospheric, Geophysical and Astronomical Services Administration, PPAs = programs, projects, and activities, PSO = Public Safety Office, TBD = to be determined.

Note: Some project costs and budget have not been determined yet. Some additional projects have no ranking (denoted with "-") as they did not go through priority scoring by all the stakeholders.

Source: City Green Team based on the results and inputs from the Second Green City Action Plan Stakeholders Consultation Workshop, September 2021.

was expanded based on new information provided by CDRRMO to include the following: (a) installation of additional flood and rain monitoring devices with early warning system at major rivers to be linked with the CDRRMO Operation Center; (b) installation of an automatic tidal gauge (high frequency radar) to monitor wave heights, storm surge, and tsunami; and (c) installation of X-band radar to measure the amount of rain, rain rate, and wind profile within a 50–60 km radius from the center.

(ii) Another new citywide and multisector project is the proposed construction of the Public Safety Office building at Espacio Heneral in Barangay Buayan. This will be a four-story building to house the city's integrated public safety operations to implement road safety, civil security, disaster risk reduction, and traffic management services.

These additional projects did not go through priority scoring by all the stakeholders. As such, no ranking was assigned to the projects to not skew the results of other crowd-scored projects.

Outcomes, Indicators, and Targets

storm surge by 40%

in 2040

Table 30 presents the outcomes, indicators, and targets for the DRRM and ICT sectors.

Targets Short-Long-Baseline Term Medium-Term **Term** Means of (2019)(2040)Verification Outcomes Indicators Reduced % of people 98%ª 88% 78% 38% Reduced CENRO exposed to drought to exposure of (2018)reports population to 38% in 2040 hazards 4% Reduced % of people 5% 3% 2% CENRO exposed to storm (2018)reports surge to 2% in 2040 6% 5% 4% CENRO Reduced % of people 7% exposed to landslide to (2018)reports 4% in 2040 Reduced % of people 5% 4% 3% 2% CENRO exposed to flood to 2% reports in 2040 Reduced Reduced number of 529,781° 423,825 370,847 317,869 CENRO number people affected by reports of people drought by 40% in 2040 affected by Reduced number of 26,681 18,676 16,009 CENRO 21,345 disasters people affected by (2018)reports

Table 30: Multisector Outcomes, Indicators, and Targets

Table 30 continued

				Targets		
Outcomes	Indicators	Baseline (2019)	Short- Term (2022)	Medium-Term (2030)	Long- Term (2040)	Means of Verification
	Reduced number of people affected by landslide by 40% in 2040	35,118 (2018)	28,094	24,583	21,071	CENRO reports
	Reduced number of people affected by flood by 40% in 2040	25,613 (2018)	20,490	17,929	15,368	CENRO reports
Increased ICT-associated businesses	Increased number of innovative ICT-related businesses to at least 125 in 2040	About 100	5% increase	15% increase	25% increase	CEMCDO reports
	Increased number of ICT-enabled local businesses by 50% of 2018 level by 2040.	2.8 ha Mabuhay IT Park	5% increase	15% increase	50% increase	CEMCDO reports, ICTD-CMO reports
Improved access to local government	Increased number of local government services available online to 26 by 2040	13 online systems	15% of existing applications online	50% of existing applications online	100% of existing applications online	ICTD-CMO reports
services	95% of population availing themselves of local government services through e-government by 2040	11,000 business registered	25% take- up rate	50% take-up rate	95% take- up rate	ICTD-CMO reports
Increased number of people with access to online	Increased number of people into ICT-related businesses and services by at least 25% from 2018 level	8.16% graduates are IT- related	5% increase	15% increase	25% increase	ICTD-CMO reports
services	At least 75% of adult population are accessing online services by 2040	11,438 ^b	25% take- up rate	50% take-up rate	75% take- up rate	ICTD-CMO reports
Increased ICT-associated equipment	Increased number of ICT-related equipment being used for security, resiliency (early warning systems), and peace and order to at least 200 by 2040	11 traffic signals installed	25% coverage of sensor devices installed	50% coverage of sensor devices installed	100% coverage of sensor devices installed	ICTD-CMO reports

CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CMO = City Mayor's Office, ha = hectare, ICT = information and communication technology, ICTD = Information and Communications Technology Division, IT = information technology.

Source: GSC Sustainable Urban Infrastructure Development Master Plan 2020–2040.

^a General Santos City (GSC) Comprehensive Land Use Plan 2018–2026.

^b Number of business permits processed in 2019.





CHAPTER 6

THE WAY FORWARD

"You don't have to have it all figured out to move forward. Just take the next step."

- Anonymous

ike most development plans, the GSC GCAP should be considered a "living document," the implementation of which should be subject to regular monitoring, reevaluation, and, when necessary, updating and revision to remain responsive to the city's changing conditions and needs. Therefore, the City Green Team that participated in the GCAP preparation should continue its existence to implement the plan and update it over time. For this purpose, CENRO as the GCAP secretariat will continue providing technical and administrative support in close coordination with CPDO, CEMCDO, CDRRMO, CEO, PSO, CWMO, GSCWD, SOCOTECO II, and all the other city government offices particularly involved in the urban development sectors covered by the GCAP. The city government should provide adequate funds to support the team's activities.

National and local elections in the Philippines will be held in May 2022. During the Second GCAP Stakeholders Consultation Workshop, a valid question was raised: "How can we 'protect' the GCAP from politics and ensure its sustained implementation despite any potential changes in political administrations?" Within the city government, the mayor and vice mayor should work toward having the GCAP approved for implementation through legislation by the Sangguniang Panlungsod and the CDC. The implementation of the GCAP also requires multistakeholder cooperation and participation. Ownership of the plan is not only the city government's but also that of its citizens since the target outcomes to enhance the city's competitiveness, resilience, and quality of life affect everyone. Thus, the City Green Team should undertake efforts to promote inclusive stakeholder buy-in to plan implementation mainly through a focused sponsorship and IEC program. The Philippine Institute of Environmental Planners, whose membership includes many from the different city offices, local private sector, and the academe, and is a staunch supporter of the city government, can collaborate with the team in leading an IEC campaign to garner the support of the public for the GCAP implementation.

The GCAP has already undergone at least three rounds of prioritization of PPAs. The plan still contains many PPAs, all considered by the stakeholders as equally important in helping achieve the city's vision of being "the Green City of the South." Plan implementation should be tempered with the availability of financial and human resources. Considering the huge investments involved, it might be prudent for the city to further trim down the GCAP projects into more manageable chunks or phases. Project readiness—in terms of the availability of documentary requirements (e.g., studies, investment proposals, etc.) and implementation resources in the short to medium terms—should be a primary consideration in this further vetting of PPAs. One strategy that has been proven effective in local development programs is focusing limited resources on just a few anchor GCAP programs and projects that can trigger development in other related sectors and/or other locations. For example, the Urban Coastal Redevelopment and GenSan East Coast Management Program would not only stimulate business and tourism in the city but also stand to address the challenges of flooding, water quality degradation, solid waste, pollution, urban blight, etc.

Most of the GCAP projects are ongoing and proceeding as planned but may need further investments to complete. To leverage the city's financial resources for implementing these projects, the city government should explore co-funding from national and international green and blue financing facilities. The broad list of potential funders and funding facilities (Appendix 5) may be an initial reference.

Table 31: Green City Action Plan Projects for Technical Assistance

Sector	PPAs	Action Period ^a	Priority Rank ^b	Remarks
Water supply	ACTION 1.3 Formulation of the GSC Comprehensive Integrated Water Resource Management Plan (Water Security Plan)	M	2	Possible TA may be sought from the identified funding agency (e.g., USAID Safe Water Project, USAID CHANGE Project).
Flood management and drainage	ACTION 2.1 Study for the completion of Drainage Master Plan for the northern part of the city	S	2	Possible TA may be sought from the identified funding agency (e.g., DPWH, USAID).
Solid waste management	ACTION 1.2 Environmental education and research and development	S	3	TA may be needed for pilot projects of barangays in the practice of 3Rs and MRF operation. Allocated LGU funding is not sufficient.
	ACTION 2.1 Development of a waste-to-energy (WTE) facility	L	4	LGU receives unsolicited proposals. TA may be sought from the identified funding agency (e.g., PPP Center, ADB) for proposal evaluation, project tender supervision, and/or feasibility study activities.

Table 31 continued

Sector	PPAs	Action Period ^a	Priority Rank ^b	Remarks
Sanitation	ACTION 1.3 Establishment of a sewerage treatment plant (STP) at coastal areas	М	2	Based on the prefeasibility study by DPWH, 50% of the project cost will be subsidized under the NSSMP. Depending on the selected mode of implementation, TA may be required to prepare the detailed design plan (during the project development period) for an eventual loan from the funding agency.
Built environment	ACTION 1.2 Mangrove Forest Management Program	S	1	Possible TA may be sought from the identified funding agency for preparing the program design and funding requirements. Existing national government programs may also be tapped.
	ACTION 2.1 Formulation of a City Tree Planting Master Plan	S	2	Possible TA may be sought from the identified funding agency, and an existing national program may be tapped.
	ACTION 2.5 Establishment of the Silway River Esplanade and GenSan Sarangani Baywalk Projects	L	13	Possible TA may be sought from existing national programs and other identified funding agencies for activities during the project development period (e.g., preparation of detailed design plan, environmental impact assessment, etc.).
	ACTION 5.1 Establishment of a Green Building Code for GSC	S	7	Possible TA may be sought from the identified funding agency, and an existing national program may be tapped.
Energy	ACTION 2.1 Conduct a long-term Energy Master Plan and energy- related studies	S	5	Possible TA may be sought from the identified funding agency, and an existing national program may be tapped (e.g., DOE, ADB).

3Rs = reduce, reuse, and recycle, ADB = Asian Development Bank, CHANGE = Communication for Health Advancement through Networking and Governance Enhancement, DOE = Department of Energy, DPWH = Department of Public Works and Highways, GSC = General Santos City, LGU = local government unit, MRF = materials recovery facility, NSSMP = National Septage and Sewerage Management Program, PPAs = programs, projects, and activities, PPP = public-private partnership, TA = technical assistance, USAID = United States Agency for International Development.

Source: City Green Team based on prioritized Green City Action Plan (GCAP) PPAs.

However, some of the projects require "soft" activities that involve the preparation of technical studies or surveys and/or capacity building for project implementers (Table 31). In most cases, these studies are prerequisites for advancing the implementation of these and other programs/projects and making them ready for full implementation. The city should also explore tapping external funding and TA from its current development partners (e.g., USAID, UN, ADB) as well as other potential partners from international donor organizations, national

^a Action periods are S = short-term, M = medium-term, and L = long-term.

^b Based on the ranking of City Green Team stakeholders.

and foreign governments, international and local NGOs, private sector organizations, and the academe. A few newly emerged or conceptualized projects also need further validation, deliberation, and detailed planning for inclusion in the city's development plans.

As part of its efforts to promote investments and possible cofinancing for its GCAP projects, the City Green Team may consider actively participating in investment forums on sustainable development organized by national and international organizations (e.g., DOF, PPP Center, Climate Change Commission, ASEAN, UN, USAID, ADB, etc.).

To enhance its institutional capacities in GCAP implementation, the city can also participate in knowledge sharing forums where green city development strategies, technologies, and best practices are shared among other cities and countries that are similarly focusing on sustainable development, such as the pilot cities in BIMP-EAGA, Indonesia–Malaysia–Thailand Growth Triangle, and Greater Mekong Subregion, which have developed their respective GCAPs.



APPENDIX 1

Executive Order No. 37, Series of 2019



EXECUTIVE ORDER NO. 37

Series of 2019

AN EXECUTIVE ORDER CREATING THE CITY GREEN TEAM PURSUANT TO THE ADOPTION OF THE GREEN CITY INITIATIVES PROJECT OF BIMP-EAGA IN GENERAL SANTOS CITY FOR THE DEVELOPMENT OF GREEN CITY ACTION PLAN (GCAP)

WHEREAS, The BIMP-EAGA Green Cities Initiative promotes a paradigm shift – where cities pursue integrated urban development and environment planning as they make a transition to a cleaner, greener, and more prosperous future;

WHEREAS, Green Cities development aims to enhance city management's capacity in integrated planning and management of urban infrastructure in cities. The aim in supporting Green Cities lit to achieve smart, green and livebte cities and attain sustainable urban development through the adoption of Green City Action Plans (GCAPs) by cities in BIMP-EAGA sub-region;

WHEREAS, Green Cities concept was first presented during the 5" BIMP-EAGA Environment Cluster Meeting where it was proposed to include Green Cities Initiative in the projects of the BIMP-EAGA Vision 2025 and name the program as "BIMP-EAGA Green Cities (nitiative" (BGCI);

WHEREAS, during the 20th BIMP-EAGA Ministers Meeting, it was resolved to adopt the following: aupport the proposal to establish a BGCI in response to rapid urbanization; BGCI as one of the projects to be included in the BEV 2025; Malaysia's Kota Kinabalu in Sabah and Kuching in Sarawak as the pilot cities for the BGCI; and request Asian Development Bank (ADB) to assist in developing the comprehensive Green City Action Plan (GCAPs);

WHEREAS, During the Strategic Planning Meeting of P-EAGA Environment Cluster in Kota Kinabalu, Malaysia last February 12-14, 2019, the ADB approved the implementation of the first GCAP Project in the Phillippines choosing General Santos City as the pilot city.

WHEREAS, to show and express its serious intent in pursuing the GCAP Project, the local government unit of General Santos City through the local chief executive must create the City Green Team to spearhead the implementation of GCAP Project in General Santos City.

NOW THEREFORE, I, RONNEL CHUA RIVERA, City Mayor of General Santos City, by virtue of the powers vested in me by law and sovereign will of the people, do hereby order the creation of the city green team pursuant to the adoption of the green city initiatives project of BIMP-EAGA in General Santos City for the development of Green City Action Plan (GCAP).

SECTION 1. STRUCTURE OF THE CITY GREEN TEAM (as based on the recommended structure of BGCI)





SECTION 2. COMPOSITION OF THE CITY GREEN TEAM. The GSC Green Team shall be composed of the following:

Chairperson:

City Mayor or his duly Authorized Designate

Steering Committee:

Chairperson, Sangguniang Panlungsod (SP) Committee

on Climate Change Adaptation and Environment; President, Liga ng mga Barangay; City Administrator;

City Planning and Development Coordinator, City Economic Management and Cooperative

Development Coordinator;

City Engineer; City Bullding Official;

Waste Management Officer, and, City Disaster Risk Reduction Management Officer.

Secretariat:

City Environment and Natural Resources Office

Working Group/Technical Team:

A. Sub-Team for Planning and Programming
Technical Staff from the following offices:

1. City Planning Development Office
2. City Budget Office
3. City Engineer's Office
4. City Economic Management and Cooperative Development Office
5. City Environment and Natural Resources Office
6. City Articularity Office

City Agriculturist's Office

Office of the City Building Official

Waste Management Office GSC Interim Committee on Transportation Concerns

National Government Agencies Regional/City Extension Offices:
 Mindanao Development Authority

National Economic Development Office
 Department of Environment and Natural Resources Office

d. Department of Public Works and Highways

Department of Agriculture Department of Trade and Industry

11. General Santos City Water District

12. SOCOTECO II

13. Philippine Institute of Environmental Planners (PIEP) Gensan District

14. Department of Science and Technology

B. Sub-Team for Communication and Advocacy Technical Staff from the following offices:

City Public Information Office City Health Office





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- 4. City Veterinarian's Office
- 5. City Disaster Risk Reduction and Management Office
- 6. Liga ng mga Barangay
- 7. GSC Tourism Council
- National Government Agencies Regional/City Extension Offices;
 - a. Department of the Interior and Local Government
- Philippine Information Agency
 Non-Government Organizations
 - a. RD Foundation
 - b. Mahintana Foundation

C. Sub-Team for Partnerships and Finance

Technical Staff from the following offices:

- 1. City Administrator's Office
- 2. Olty Legal Office
- 3. City Budget Office
- 4. City Economic Management and Cooperative Development Office
- National Government Agencies Regional/City Extension Offices:
 - a. Mindanao Development Authority
 - b. National Economic Development Office
 - c. Board of Investments
 - d. Philippine Economic Zone Authority
- e. Tourism Infrastructure and Enterprise Zone Authority
- 6. NGOs/Private Sector
 - a. GSC Chamber of Commerce Inc.
 - b. SMEDCI
 - c. SAFFAI

SECTION 3. DUTIES AND RESPONSIBILITIES. The GSC Green Team shall have the following duties and functions:

- Work collaboratively with Philippines-EAGA (P-EAGA) Environmental Cluster and the Asian Development Bank BCGI Teams in planning, organizing, and implementing the preparatory activities and project work plan, and in the development of the City's Green City Action Plan Including post-plan subsequent activities;
- Recommend or endorse policy support requirement to the Sangguniang-Panlungsod for its appropriate action; and,
- Perform other tasks as may be agreed upon between the City and P-EAGA/ADB Teams.

SECTION 4. REPEALING CLAUSE, All orders, memoranda, rules and regulations, or any part(s) thereof, inconsistent with the provisions of this Order are hereby revoked or modified accordingly.

SECTION 5. SEPARABILITY CLAUSE. If any provision or part hereof is held invalid or unconstitutional, the remainder of this Order not otherwise affected shall remain in full force and effect.

SECTION 6. EFFECTIVITY. This Order shall take effect immediately and shall remain in full force and effect unless otherwise revoked or amended.

Done this 20th day of July 2019 in General Santos City, Philippines.





APPENDIX 2

First GCAP Stakeholders Consultation Workshop

1ST GCAP STAKEHOLDERS CONSULTATION WORKSHOP



General Santos City Green City Action Plan (GCAP)



1st Stakeholders Consultation Meeting on the GSC GCAP 23 July 2021 | 8 a.m. – 12 noon @ General Santos City via Zoom

PROGRAM

8 a.m.	Technical tests	CEMCDO Secretariat
0.20	Zoom etiquette	
8:30 a.m.	Preliminaries Invocation/national anthem	CEMCDO Secretariat
	Welcome remarks	Dr. Leonard V. Flores Head, CEMCDO
		Hon. Shandee Theresa O. Llido- Pestaño Chairperson, SP Committee on Climate Change Adaptation and Environment
	Opening remarks	Ms. Allison Woodruff Senior Urban Development Specialist Southeast Asia Regional Department, ADB
8:45 a.m.	Introduction of participants	CEMCDO Secretariat
9 a.m.	Overview of the meeting presentation on the GCAP objectives and process	Mr. Ronald G. Sison Resource Person, ADB
9:20 a.m.	Presentation on the GCAP candidate PPAs (long list)	Mr. Ronald G. Sison Resource Person, ADB
9:45 a.m.	Prioritization of GCAP candidate PPAs Prioritization process and criteria Prioritization of GCAP candidate PPAs by the stakeholders Open forum/discussion Remarks from CENRO, CPDO, CEMCDO	Moderator/Facilitator: Mr. Ronald G. Sison Resource Person, ADB Meeting participants Meeting participants EnP Allan D. Marcilla Head, CENRO Engr. Nael Joseph D. Cruspero Head, CPDO Dr. Leonard V. Flores
11:40 a.m.	The way forward: Next steps	Head, CEMCDO Mr. Ronald G. Sison Resource Person, ADB
11:50 a.m.	Closing remarks	EnP Allan D. Marcilla Head, CENRO
12 noon	Adjournment	

ADB = Asian Development Bank, CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CPDO = City Planning and Development Office, GCAP = Green City Action Plan, PPAs = programs, projects, and activities, SP = Sangguniang Panlungsod. Source: ADB, July 2021.

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PARTICIPANTS

Nam	е	Position	Organization
1.	Hon. Shandee Theresa O.	City Councilor/Chairperson	SP Committee on Climate
	Llido-Pestaño		Change Adaptation and
			Environment
2.	Mr. George Tapel	Legislative Staff Officer IV	Office of Congresswoman Shirlyn Bañas-Nograles
3.	Engr. Nael Joseph D.	City Planning and	City Planning and Development
	Cruspero	Development Coordinator	Office (CPDO)
4.	Engr. Carmencita Bautista	Assistant City Planning and	CPDO
		Development Coordinator	
5.	Engr. Niño Arancon	Planning Officer IV	CPDO
6.	Ms. Nadine Yson	Planning Officer II	CPDO
7.	Ms. Doruthie Mae Almirante	Planning Officer II	CPDO
8.	Dr. Leonard V. Flores	Department Head	City Economic Management and
			Cooperative Development Office (CEMCDO)
9.	Ms. Ellorence Cruz	Economist IV	CEMCDO
10.	Ms. Vanessa Claire Pleña	Economist III	CEMCDO
11.	Mr. John Paul Lumanta	Quality Management System Assistant	CEMCDO
12.	Mr. Eliodoro Alcaya, Jr.	Tourism Officer IV	CEMCDO
13.	Mr. Jayson Mark Pido	Project Development Officer I	CEMCDO
14.	Ms. Adelyn Yucamco	Project Development Officer	CEMCDO
15.	EnP Allan D. Marcilla	Department Head	City Environment and Natural Resources Office (CENRO)
16.	Engr. Emerald Signar	Department Head	City Engineer's Office (CEO)
17.	Dr. Aurea Pascual	Department Head	Office of the Building Official (OBO)
18.	Dr. Agripino V. Dacera, Jr.	Division Chief	City Disaster Risk Reduction and Management Office (CDRRMO)
19.	Engr. Riza Marie Paches	Assistant Department Head	Public Safety Office (PSO)
20.	Arch. Arnold N. Alberca	Planning Officer II	City Housing and Land
			Management Office (CHLMO)
21.	Mr. John Philip D. Quimosing	Department Head	City Budget Office (CBO)
22.	Engr. Ergie Pabon	Watershed Management Officer	General Santos City Water District (GSCWD)
23.	Engr. Keen Jade Asparin	Forestry Assistant	GSCWD
24.	Engr. Mario Pelobillo	Watershed Forester	GSCWD
25.	EnP Marjorie Bandolon- Cartojano	Academe/ICT Sector Representative	General Santos City Tourism Council (GSCTC)
26.	Arch. Michael Ang	Private Sector Representative for Urban Planning	Regional Land Use Committee (RLUC), Regional Development Council XII
27.	Ms. Gemma Borreros	GSC Program Coordinator	USAID Strengthening Urban Resilience for Growth with Equity (SURGE) Project
28.	Ms. Kharen Quetulio	City Project Assistant	USAID SURGE Project
29.	Mr. Felicisimo Tejuco Jr.	Local Project Officer	UN ASEAN Sustainable Urbanisation Strategy (ASUS) Project
30.	Engr. Ginalyn Fe Cachuela	Project Manager	SOCSKSARGEN Area Development Project Office
			(ADPO)

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Name		Position	Organization
32.	Ms. Merianne Bedrejo	Project Development Officer IV	SOCSKSARGEN ADPO
33.	Ms. Allison Woodruff	Senior Urban Development Specialist	Southeast Asia Regional Department, Asian Development Bank (ADB)
34.	Ms. Maria Theresa Abaquita- Bugayong	Operations Officer (Resource Planning)	Southeast Asia Regional Department, ADB
35.	Ms. Pamela C. Asis-Layugan	Consultant	ADB
36.	Mr. Ronald G. Sison	Resource Person	ADB

GSC = General Santos City, ICT = information and communication technology, SOCSKSARGEN = South Cotabato, Sultan Kudarat, Sarangani, and General Santos, SP = Sangguniang Panlungsod, USAID = United States Agency for International Development.

Source: CEMCDO, July 2021.

APPENDIX 3

First Round Priority Ranking of Programs, Projects, and Activities

PRIORITY RANKING OF PROGRAMS, PROJECTS, AND ACTIVITIES (FIRST ROUND – JULY 2021)

Programs, Projects, and Activities ^a	Relevant Plans (Coded) ^b	Average Score ^c	Rank
Construction of bicycle lanes within the government center and a bicycle lane network	11, 2	14.7	1
Formulation of City Tree Planting Master Plan	15	14.6	2
Establishment of Bula Mangrove Park	4, 8, 11, 15, 18	14.5	3
Construction of floodways, diversion channel (dams, dikes, drainages) as well as construction and improvement of drainage systems (Barangays San Isidro, Katangawan, Lagao, Ligaya and Baluan)	1, 2, 11, 8	14.4	4
Mangrove ecotourism project (protection of mangrove forest)	1, 2, 8, 11, 15, 18	14.4	4
Construction of more streetlights along LPTRP jeepney routes (Barangay Katangawan)	11, 18	14.4	4
Establishment of end-to-end early warning system linked to disaster risk reduction (including increasing data stations, earthquake recording, instruments, and CCTVs)	1, 2, 10, 12	14.4	4
Riverbank rehabilitation program to establish forest corridors along the city's riverbanks	1, 11, 18	14.3	5
GSCWD Septage Treatment Facility Project	1, 2, 11, 14	14.3	5
Traffic signalization system and CCTV synchronization program of additional intersections	1, 11, 2, 16	14.3	5
Watershed: Integrated social forestry program and centralized nursery	1, 11, 2, 10	14.3	5
Watershed ecosystem rehabilitation and flood risk reduction project (Silway–Apopong–Sinawal rivers, Makar–Saboay–Labangal, and Buayan–Malungon river basins)	2, 11	14.2	6
Upland reforestation and development	2, 11	14.1	7
Walkable government center project	4, 15, 18	14.1	7
Monitoring facility for water quality	1, 2, 11, 13, 18	14.1	7
Study for the completion of Drainage Master Plan for the northern part of the city	1, 2, 11, 13, 15, 18	14.0	8
Parks and recreational open space development program (including barangay pocket parks/tree parks)	2	14.0	8
LPTRP implementation: PUV modernization program (e-jeepneys, Euro IV minibuses)	1, 12	13.9	9
Comprehensive landscaping and greening program (including maintenance, rehabilitation, protection, and conservation of plants and trees in parks/plazas, playgrounds, road center islands)	1, 2	13.9	9
Redevelopment of Queen Tuna Park at Barangay Dadiangas South	1, 2, 11, 13, 15, 18	13.9	9
Georesistivity survey for groundwater	11, 18	13.9	9
Establishment and institutionalization of the Incident Command System	2, 4, 8, 13, 18	13.9	9
Coastal resource profile upgrading and management, community development enterprise and economic development, and coastal law enforcement and mangrove tree growing	8, 11, 15	13.8	10
Datu Sharif Zainal Abedin Mangrove Ecotourism Zone at Barangays Bula, Baluan, and Buayan	11, 18	13.8	10
Electrification and street lighting (along Diversion Road from	4, 8, 13, 15, 18	13.8	10

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Programs, Projects, and Activities ^a	Relevant Plans (Coded) ^b	Average Score ^c	Rank
Barangay Katangawan to the airport)			
Mangrove reforestation	1, 12	13.7	11
Disaster- and climate change-resilient and reconstructed infrastructure, including the promotion of green technology in all infrastructure projects	2, 3, 12, 15	13.7	11
Enforcement of forest and other environmental laws	10	13.7	11
Operation and maintenance of City Disaster Risk Reduction and Management Office (CDRRMO) Operation Center	12	13.7	11
Projects to reduce greenhouse gas (GHG) emissions	11	13.7	11
10-year (2015–2025) SWM with the following component: Stage 1: Waste segregation and reduction at source; Stage 2: Segregated collection; Stage 3: Materials recovery and processing; Stage 4: Disposal management (closure and rehabilitation of existing dumpsite and establishment of SLF at Barangay Sinawal)	9	13.7	11
Construction of floodway at Barangays Fatima and Baluan	11	13.6	12
Wastewater Pollution Prevention Program	15	13.6	12
Implementation of the city's transportation and traffic plan	10	13.6	12
Technical and financial support for green infrastructure interventions (such as green roofs, permeable pavement, urban parks, and forests)	18	13.6	12
Water resources development and sustainable utilization to include the formulation of the GSC Comprehensive Integrated Water Resource Management Plan (every 5 years)	11	13.6	12
Implementation of information, education, and communication (IEC) program and training on waste management policies and strategies (enforcement and education) based on City Ecological Solid Waste Management Ordinance	2, 11, 12	13.6	12
Road concreting with drainage and drainage improvement at various barangays (Lagao, Calumpang, City Heights, San Isidro, Oympog, Dadiangas North, Sinawal, Bula, Labangal, and Fatima)	4, 8, 10, 13, 15	13.5	13
Construction of Silway–Apopong–Sinawal River Structural Improvement	18, 10	13.5	13
Mangrove Forest Management Program to include (i) mangrove planting and protection of established mangrove forest ecosystems along the coastline of the city; (ii) planting of mangrove species for reforestation; (iii) coastal and marine waters cleanup; (iv) immediate restoration of converted mangrove areas; (v) establishment of mangrove reservation sites; (vi) adopt-a-mangrove area; and (vii) establishment and maintenance of mangrove nurseries	7	13.5	13
Establishment of the Silway River Esplanade and Gensan Sarangani Baywalk Projects	1, 2, 13	13.5	13
Long-term Energy Master Plan and studies/projects on the manufacture/assembly of goods and the establishment of energy-related facilities leading to efficient utilization of energy	15, 2, 9	13.4	14
Development of alternative water supply sources (including a feasibility study for water supply from surface water)	1, 11, 2	13.4	14
Proposed construction of water treatment facilities (Makar and Siguel rivers)	2	13.4	14
Construction of additional wastewater treatment facility at the government center	11	13.3	15
Construction of 150-cubic meter wastewater treatment facility at the	15	13.3	15

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Programs, Projects, and Activities ^a	Relevant Plans (Coded) ^b	Average Score ^c	Rank
government center (additional appropriation)			
Air quality, water quality, and noise pollution management of industries, motor vehicles, slaughterhouses, markets, agri-industries, hotels, commercial businesses, households, and other activities that contribute to pollution; ensure the city has air, water, and noise quality monitoring instruments and equipment; conduct annual GHG and air emission inventory of sources	11	13.3	15
Conservation, protection, and rehabilitation of water resources	2, 11	13.3	15
Waste collection improvement program (PPP project)	2, 9, 11, 12, 15, 18	13.3	15
Electrification and solar powered street lighting project using LED lamps at CBD	1, 11, 2, 18	13.2	16
Barangay Electrification Program (within barangays)	2, 11, 18	13.2	16
Digital Cities Program	5, 6	13.2	16
Comanagement of transboundary water resources	1, 11	13.1	17
Solid waste management program/ disposal management program (sanitary landfill) / materials recovery and processing program including the aftercare maintenance of Tambler dumpsite	15	13.1	17
Sanitation program (establishment of a sewerage treatment plant, procurement of desludging truck)	2	13.0	18
Construction of a 3-story building for environment laboratory facility, research, and education	10	13.0	18
Waste-to-energy project (upgrading of sanitary landfill)	18	13.0	18
Climate-resilient fish farming and aquaculture practices	1, 2	13.0	18
World-class ICT infrastructure	5, 6	13.0	18
Projects to minimize or prevent pollution	9	13.0	18
Stormwater drainage for Fatima–Tambler		12.8	19
Develop ecotourism zones to include (i) coral reef sanctuary, (ii) mangrove sanctuary, (iii) birdwatching towers/viewing decks, (iv) Visitor Center and Pasalubong Center, (v) Marine Museum, (vi) Mangrove Village, (vii) Japanese bunkers circuit tours, and (viii) coral diving/glass bottom coral reef tours	8	12.8	19
Urban coastal zone redevelopment program	10	12.8	19
Construction of water harvesting structures	2, 8, 13, 15	12.8	19
Construction of floodway at Albert Morrow Blvd. from Dacera Ave. to Buayan River	18	12.6	20
IEC campaign on climate change adaptation and mitigation	10, 11	12.5	21
Waterworks projects (involving the construction of deep wells, water reservoirs, water impoundment, distribution pipelines, spring development, and rehabilitation of water system) in the barangays of Olympog, Siguel, Sinawal, Batomelong, Upper Labay, Bawing, San Jose, Buayan, and Mabuhay	11, 2, 18	12.4	22
Construction/rehabilitation of flood mitigation structures, drainage, and small water impounding projects (SWIPs)	2	12.3	23
Adopt a Mountain Program	1, 2, 15, 18	12.1	24
Development of renewable energy sources (establishment of solar panels, installation of windmills, biogas)	15	12.1	24

Programs, Projects, and Activities ^a	Relevant Plans (Coded) ^b	Average Score ^c	Rank
Tricycle service rationalization for climate change mitigation	2	11.6	25
Development of waste-to-energy facility	1, 2	11.5	26
Transport-oriented development for Mindanao Railway	2	11.2	27
Proposed construction of a skywalk connecting the city's 4 major malls	11	10.8	28
Sabo dams and/or multipurpose dams upstream of major rivers	2	9.8	29

CBD = central business district, GSC = General Santos City, GSCWD = General Santos City Water District, ICT = information and communication technology, LPTRP = Local Public Transport Route Plan, PPP = public–private partnership, PUV = public utility vehicle, SLF = sanitary landfill, SWM = solid waste management.

- ^a This is the long list of green city-related programs, projects, and activities (PPAs) culled from the city's various development plans and investment programs. The PPAs underwent the first round of prioritization by the City Green Team during the 1st GCAP Stakeholders Consultation Workshop on 23 July 2021.
- b The relevant plans are the city's key development plans and investment programs where the PPAs are included. They are coded as follows: 1 = Comprehensive Land Use Plan 2018–2026; 2 = GSC Sustainable Urban Infrastructure Development Master Plan 2020–2040; 3 = GSC 10-Year Ecological Solid Waste Management Plan 2015–2025; 4 = GSC Tourism Master Plan 2018–2028; 5 = GSC Digital Cities Roadmap 2021–2025; 6 = ICT 5-Year Development Plan (2018–2022); 7 = Flood Control and Drainage Projects of Selected River Basins Nationwide Package 4 (Vol. 1B Silway–Apopong–Sinawal River Basin, 2010); 8 = GenSan East Coast Ecotourism Management Plan (2019); 9 = GSC Investment Priority Areas 2020–2022; 10 = GSC Local Climate Change Adaptation Plan 2019–2022; 11 = Comprehensive Development Plan 2017–2022 and Executive and Legislative Agenda 2017–2019; 12 = GSC Disaster Risk Reduction Management Plan 2019–2022; 13 = Beautification and Greening Master Plan (2021); 14 = Feasibility Study on the Septage Management Program of GSC (2019); 15 = GSC Environment Code of 2018 (Ordinance No. 73 series of 2018); 16 = Comprehensive Land Transport and Traffic Code of GSC (Ordinance No. 37 series of 2018); 17 = ASEAN Sustainable Urbanisation Strategy (2021); 18 = Local Development Investment Program 2022–2024.
- ^c Each PPA was scored on a scale of 1 (lowest priority) to 5 (highest priority) according to the three criteria of (i) effectiveness and urgency (impact on development goals, targets, outcomes); (ii) efficiency (project benefits vs. project costs); and (iii) sustainability (sufficiency of funds, technical competence, acceptance of implementing agencies and stakeholders). The highest possible score is 15 (5 each for effectiveness, efficiency, and sustainability). 11 of 17 offices that participated in the 1st GCAP workshop submitted their scoring worksheets, which were then tallied to get the total and average scores. Since some of the raters did not score all of the PPAs due to their unfamiliarity with some of them, the scores were averaged over the actual number of raters for each PPA. The PPAs were then priority ranked according to their total average scores.

Sources: City Green Team based on the city's development plans and investment programs; and results of the first round of PPAs prioritization during the 1st GCAP Stakeholders Consultation Workshop on 23 July 2021.

APPENDIX 4

Second GCAP Stakeholders Consultation Workshop

2ND GCAP STAKEHOLDERS CONSULTATION WORKSHOP





General Santos City Green City Action Plan (GCAP)



2nd Stakeholders Consultation Meeting on the GSC GCAP 24 September 2021 | 8 a.m. – 3 p.m. @ General Santos City via Zoom

PROGRAM

8 a.m.	Technical tests Zoom etiquette	CEMCDO Secretariat
	Online registration	
8:30 a.m.	Preliminaries Invocation/national anthem	CEMCDO Secretariat
	Welcome remarks	Dr. Leonard V. Flores Head, CEMCDO
		Hon. Shandee Theresa O. Llido- Pestaño Chairperson, SP Committee on Climate Change Adaptation and Environment
	Opening remarks	Mr. Jason Rush Principal Operations Communications Specialist Southeast Asia Department, ADB
8:45 a.m.	Introduction of participants	CEMCDO Secretariat
9 a.m.	Overview of the meeting	EnP Allan D. Marcilla Head, CENRO
9:10 a.m.	Update on GCAP activities Presentation of the results of first round prioritization of GCAP PPAs	Mr. Ronald G. Sison Resource Person, ADB
9:45 a.m.	Presentation on alternative green/blue financing facilities Open forum	Mr. Rodrigo Fermin P. Martinez Consultant, ADB
10:15 a.m.	BREAK	
10:30 a.m.	Validation and priority short listing of GCAP candidate PPAs	
	Prioritization process and criteria	Mr. Ronald G. Sison Resource Person, ADB
	 Prioritization of GCAP candidate PPAs by the stakeholders [by office] 	Meeting participants
12 noon	LUNCH BREAK	
1 p.m.	 Continuation of prioritization of GCAP candidate PPAs and sharing of additional information [by office] 	Meeting participants
1:30 p.m.	 Plenary presentation of sample prioritization results 	Selected meeting participants
	Open forum/discussion	Meeting participants

	Remarks from CENRO, CPDO, CEMCDO, CDRRMO	EnP Allan D. Marcilla Head, CENRO
		Engr. Nael Joseph D. Cruspero Head, CPDO
		Dr. Leonard V. Flores Head, CEMCDO
		Dr. Agripino V. Dacera, Jr. LDRRM Officer IV, CDRRMO
2:40 p.m.	The way forward/next steps	Mr. Ronald G. Sison Resource Person, ADB
2:50 p.m.	Closing remarks	Ms. Allison Woodruff Senior Urban Development Specialist Southeast Asia Department, ADB
3 p.m.	Adjournment	

ADB = Asian Development Bank, CDRRMO = City Disaster Risk Reduction and Management Office, CEMCDO = City Economic Management and Cooperative Development Office, CENRO = City Environment and Natural Resources Office, CPDO = City Planning and Development Office, GCAP = Green City Action Plan, LDRRM = Local Disaster Risk Reduction and Management, PPAs = programs, projects, and activities, SP = Sangguniang Panlungsod.

Source: ADB, September 2021.

PARTICIPANTS

Nan	ne	Position	Organization
1.	Hon. Shandee Theresa O. Llido-Pestaño	Chairperson	SP Committee on Climate Change Adaptation and Environment
2.	Ms. Maria Cecilia P. Parcasio	Executive Assistant II	SP Committee on Climate Change Adaptation and Environment
3.	Mr. George Tapel	Legislative Staff Officer IV	Office of Congresswoman Shirlyn Bañas-Nograles
4.	Engr. Nael Joseph D. Cruspero	City Planning Development Coordinator	City Planning and Development Office (CPDO)
5.	Ms. Rosita Lehito	Project Development Officer III	CPDO
6.	Dr. Leonard V. Flores	Department Head	City Economic Management and Cooperative Development Office (CEMCDO)
7.	Ms. Vanessa Claire Pleña	Tourism Officer IV	CEMCDO
8.	Mr. Jayson Mark Pido	Project Development Officer I	CEMCDO
9.	Mr. Eliodoro Alcaya Jr.	Tourism Officer IV	CEMCDO
10.	EnP Allan D. Marcilla	Department Head	City Environment and Natural Resources Office (CENRO)
11.	Mr. Manuel Torres	Assistant Department Head	CENRO
12.	Engr. Emerald P. Signar	Department Head	City Engineer's Office (CEO)
13.	Engr. Larnie Rodriguez	Engineer III/Acting Division Chief – Planning Division	CEO
14.	Dr. Aurea Pascual	Department Head	Office of the Building Official (OBO)
15.	Engr. Riza Marie T. Paches	Assistant Department Head	Public Safety Office (PSO)
16.	Ms. Elsie S. Villanueva	City Assistant Agriculturist	City Agriculturist's Office (CAO)
17.	Ms. Ivy Jesto	Agriculturist II	CAO
18.	Mr. Darwin Santos	Project Evaluation Officer	City Social Welfare and

Page 3 of 3

Name	Position	Organization
rano	II	Development Office (CSWDO)
19. Ms. Jocelyn M. Arzaga	Social Welfare Officer IV	CSWDO
20. Engr. Ergie Pabon	Watershed Management	General Santos City Water District
20. 2.ig.: 2.g.o : azo.:	Officer	(GSCWD)
21. Engr. Keen Jade Aspirin	Forestry Assistant	GSCWD
22. Engr. Mario L. Pelobillo	Watershed Forester	GSCWD
23. Mr. Dennis Fel T. Matutina	IT Officer II/OIC	Information and Communications
		Technology Division, Office of the
		City Mayor
24. Ms. Desiree T. Jacinto	Supervising Economic	National Economic and Development
	Development Specialist	Authority (NEDA) – Region XII
25. Mr. Aurel Raymund P.	Senior Economic	NEDA – Region XII
Betque	Development Specialist	NEDA – Region XII
26. Ms. Annie C. Deputado	Senior Economic	NEDA – Region XII
20. Ms. Alille C. Deputado	Development Specialist	NEDA – Region XII
27. Mr. Roy Hatague	Senior Economic	NEDA – Region XII
27. Will Hoy Hatagae	Development Specialist	14LB/(Region /(iii
28. Ms. Lyka Ebreo	Ecosystem Management	Department of Environment and
20. Ma. 2y. Ma 22. 00	Specialist	Natural Resources (DENR) Region
		XII
29. Ms. Jocelyn S. Misterio	Agricultural Center Chief II	Department of Agriculture – Regional
,	– Agricultural Program	Field Office XII
	Coordinating Office	
	(APCO) SarGen	
30. Ms. Krisha Jae Manapsal	Support Staff	Department of Trade and Industry
		(DTI) – GSC Office
For. Nabil Hadji Yassin	Acting Provincial Director	Department of Science and
	 Sarangani Province and 	Technology (DOST) – Region XII
	General Santos City	
32. Mr. Patrick Jerome Guasa	President	Philippine Institute of Environmental
		Planners (PIEP) –
00 A Mi-h T A	Deixarta Ocartan	SOCCSKSARGEN Chapter
33. Arch. Michael T. Ang	Private Sector Representative for Urban	Regional Land Use Committee
	Planning	(RLUC), Regional Development Council XII
34. Mr. Felicisimo A. Tejuco Jr.	Local Project Officer	UN ASEAN Sustainable
34. Mil. Pelicisiilio A. Tejuco Ji.	Local Project Officer	Urbanisation Strategy (ASUS)
		Project
35. Engr. Jenelyn Matondo	Project Evaluation Officer	SOCSKSARGEN Area Development
co. Engr. conciyii watendo	1 Tojost Evaluation Officer	Project Office (ADPO)
36. Mr. Jason Rush	Principal Operations	Southeast Asia Regional
	Communications	Department,
	Specialist	Asian Development Bank (ADB)
37. Ms. Allison Woodruff	Senior Urban	Southeast Asia Regional
	Development Specialist	Department, ADB
38. Ms. Maria Theresa	Operations Officer	Southeast Asia Regional
Abaquita-Bugayong	(Resource	Department, ADB
	Planning)	
39. Mr. Rodrigo Fermin P.	Consultant	ADB
Martinez		
40. Ms. Pamela C. Asis-	Consultant	ADB
Layugan		1.22
41. Mr. Ronald G. Sison	Resource Person	ADB

GSC = General Santos City, IT = information technology, OIC = Officer in Charge, SOCSKSARGEN = South Cotabato, Sultan Kudarat, Sarangani, and General Santos, SP = Sangguniang Panlungsod, UN = United Nations. Source: CEMCDO, September 2021.

Facilities

MATRIX OF POTENTIAL GREEN/BLUE FINANCING SOURCES

Fund/Funder	Description	Eligible Projects	Funding Requirements
ASEAN Catalytic Green Finance Facility (ACGF)— ADB and finance ministries of 10 ASEAN member countries. Cofinancing partners are Agence Française de Développement (AFD), ASEAN Infrastructure Fund, European Investment Bank, European Union, KfW, and the Republic of Korea	ACGF, an initiative of the ASEAN Infrastructure Fund, was launched in April 2019 to accelerate green infrastructure investments in Southeast Asia. ACGF provides ASEAN member governments with technical assistance (TA) and access to over \$\frac{1}{2}\$ billion in loans from cofinancing partners. ACGF's TA supports governments to identify and prepare commercially viable green infrastructure projects, provide knowledge services and training programs to strengthen the regulatory environment, and build the institutional capacity of ASEAN governments to scale up green infrastructure investments. The ACGF loans cover upfront capital investment costs and mobilize cofinancing from development partners. This two-pronged approach "de-risks" green infrastructure projects, making them more attractive to private capital investors.	Focuses on projects that promote renewable energy, energy efficiency, sustainable urban transport, waste management, climate-resilient agriculture.	Projects must be sovereign or sovereign- guaranteed and must demonstrate contribution to climate change mitigation and/or adaptation and other environmental sustainability objectives; potential for ACGF support to improve bankability, as measured against standard financial indicators; and potential to catalyze further resources, including private, commercial, and institutional capital.
Green Climate Fund (GCF)—owned by various countries that contribute to the fund	The Green Climate Fund (GCF), a critical element of the historic Paris Agreement, is the world's largest climate fund, mandated to support developing countries raise and realize their nationally determined contributions (NDCs) ambitions toward low-emission and climate-resilient pathways. This goal is achieved by investing across four transitions—built environment; energy and industry; human security, livelihoods, and well-being; and land use, forests, and ecosystems—and employing a four-pronged approach: (i) transformational planning and programming by promoting integrated strategies, planning, and policy-making to maximize the co-benefits between	GCF supports projects that contribute to reducing emissions from energy generation and access; transport; buildings, cities, industries, and appliances; and forests and land use; and increasing resilience of livelihoods of people and communities; health, food, and water security; infrastructure and the built environment; and ecosystems and ecosystem services.	

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Fund/Funder	Description	Eligible Projects	Funding Requirements
	mitigation, adaptation, and sustainable		
	development;		
	(ii) catalyzing climate innovation by		
	investing in new technologies, business		
	models, and practices to establish a proof		
	of concept; (iii) de-risking investment to mobilize		
	finance at scale by using scarce public		
	resources to improve the risk-reward		
	profile of low-emission and climate-		
	resilient investment and crowd-in private		
	finance, notably for adaptation, nature-		
	based solutions, least developed countries		
	(LDCs), and small island developing states		
	(SIDS); and		
	(iv) mainstreaming climate risks and		
	opportunities into investment decision-		
	making to align finance with		
	sustainable development by promoting		
	methodologies, standards, and practices		
	that foster new norms and values.		
	GCF is funded by contributions and pledges		
	from various countries. The initial \$8.3 billion		
	fund confirmed from the initial pledging session		
	in 2014 has been replenished to at least \$10.3		
	billion of pledges from 49 countries, regions,		
	cities as of 31 July 2020. GCF employs part of		
	its funds to help mobilize financial flows from		
	the private sector to compelling and profitable		
	climate-smart investment opportunities.		
	GCF operates through a network of over 200		
	accredited entities and delivery partners who		
	work directly with developing countries for project design and implementation. They		
	include international and national commercial		
	banks; multilateral, regional, and national		
	development finance institutions; equity fund		
	institutions; United Nations (UN) agencies; and		
•	civil society organizations.		

Fund/Funder	Description	Eligible Projects	Funding Requirements
	In the Philippines, the Climate Change Commission (CCC) is the GCF National Designated Authority, and the Land Bank of the Philippines (LBP) is the Direct Access Accredited Entity. The ACGF: Green Recovery Program is a recipient of GCF funding.		
Global Environment Facility (GEF) Trust Fund—owned by 40 GEF donor countries and administered by the World Bank as GEF Trustee	The GEF was established 30 years ago on the eve of the Rio Earth Summit to tackle the planet's most pressing environmental problems. Since then, it has provided more than \$21.5 billion in grants and mobilized an additional \$117 billion in cofinancing for more than \$,000 projects and programs. The GEF is the largest multilateral trust fund focused on enabling developing countries to invest in nature and supports the implementation of major international environmental conventions, including on biodiversity, climate change, chemicals, and desertification. It brings together 184 member governments in addition to civil society, international organizations, and private sector partners. Through its Small Grants Programme (SGP), GEF has supported more than 25,000 civil society and community initiatives in 135 countries. GEF funds are available to developing countries and countries with economies in transition to meet the objectives of the international environmental conventions and agreements. It is provided to government agencies, civil society organizations, private sector companies, research institutions, among the broad diversity of potential partners to implement projects and programs in recipient countries.	The GEF provides funding through the following four modalities: • full-sized project (FSP)—a GEF project financing of more than \$2 million; • medium-sized project (MSP)—a GEF project financing of less than or equivalent to \$2 million; • enabling activity—a project for the preparation of a plan, strategy, or report to fulfill commitments under a convention; and • program—a longer-term and strategic arrangement of individual yet interlinked projects that aim to achieve large-scale impacts on the global environment.	All projects or programs must fulfill the following criteria to be eligible for GEF funding: • Eligible country. Countries may be eligible for GEF funding in one of two ways: (i) if the country has ratified the conventions the GEF serves and conforms with the eligibility criteria decided by the Conference of the Parties of each convention; or (ii) if the country is eligible to receive World Bank (IBRD and/or IDA) financing or if it is an eligible recipient of UNDP TA through its target for resource assignments from the core (TRAC) system, specifically TRAC-1 and/or TRAC-2. TRAC-1 refers to the annual level of regular program resources targeted for an individual country during the programming period. TRAC-2 is more flexible in allocating regular program resources to high-impact, highleverage, and high-quality program activities to help UNDP respond effectively to different country needs. • National priority. The project must be driven by the country (rather

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Fund/Funder Description **Eligible Projects Funding Requirements** than by an external partner) and be The following are other trust funds under the consistent with national priorities GEF: that support sustainable Special Climate Change Fund (SCCF) development. Adaptation Fund • **GEF priorities.** The GEF must Least Developed Countries Fund support country priorities that are ultimately aimed at tackling the (LDCF) Capacity Building Initiative for drivers of environmental Transparency (CBIT) degradation in an integrated Nagoya Protocol Implementation Fund fashion to achieve the objectives of multilateral environmental agreements. For this reason, the focal areas (biodiversity, climate change mitigation, land degradation, international waters, and chemicals and waste), which remain the central organizing feature in the GEF-7 Programming Directions, provide countries with the opportunity to participate in selected "Impact Programs" focusing on (i) food systems, land use, and restoration; (ii) sustainable cities; and (iii) sustainable forest management. Financing. The project must seek GEF financing only for the agreed incremental costs on measures to achieve global environmental benefits. • Participation. The project must involve the public in project design and implementation, following the Policy on Public Involvement in GEF-Financed Projects and the respective auidelines. **GEF Small Grants** Established in 1992, the GEF SGP provides CBO and NGO projects in biodiversity, climate change All project proposals submitted to SGP Programme (SGP)financial and technical support to projects that mitigation and adaptation, land degradation and country teams need to owned by 40 GEF conserve and restore the environment while sustainable forest management, international waters, and demonstrate how the proposed donor countries and enhancing people's well-being and livelihood. chemicals project proposal meets the GEF

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Fund/Funder	Description	Eligible Projects	Funding Requirements
			submitted by the national coordinator to the NSC. (vi) The NSC reviews the proposal and either accepts it, rejects it, or returns it to the proponent with a request that further work be done on formulating and refining the project data. (vii) Approved proposals enter the national SGP work program. SGP grants are usually paid in three installments: an upfront payment to initiate the project, a mid-term payment upon receipt of a satisfactory progress report, and a final payment on receipt of a satisfactory project completion and final report.
GEF Special Climate Change Fund (SCCF)— owned by 40 GEF donor countries and administered by the World Bank as GEF Trustee	The Special Climate Change Fund (SCCF) was established under the UN Framework Convention on Climate Change (UNFCCC) in 2001 to finance activities, programs, and measures relating to climate change that are complementary to those funded by the resources allocated to the GEF's climate change focal area and by bilateral and multilateral funding. The SCCF was established with four different funding windows: (i) adaptation; (ii) transfer of technologies; (iii) energy, transport, industry, agriculture, forestry, and waste management; and (iv) economic diversification for fossil fuel-dependent countries. As of date, only the adaptation and transfer of technologies windows are active.	Any non-Annex I country party to the UNFCCC is eligible for project funding under the SCCF. Annex II countries of the UNFCCC provide the funding for the SCCF along with some Annex I countries and any non-Annex I countries that may wish to contribute to the fund voluntarily. SCCF adaptation projects support the implementation of adaptation actions in non-Annex I parties. Adaptation projects eligible for SCCF funding are in the following areas: (i) water resources management, (ii) land management, (iii) agriculture, (iv) health, (v) infrastructure development, (vi) fragile ecosystems (including mountain ecosystems), (vii) integrated coastal zone management, and (viii) climatic disaster risk management. Technology transfer under the SCCF focuses on the transfer of environmentally sustainable technologies.	The SCCF follows the GEF procedures and fiduciary standards, result-based frameworks, and monitoring and evaluation practices. Application Process (i) The SCCF Project Proponent develops a concept for a project and requests assistance from an implementing agency of the GEF. (ii) The SCCF Project Proponent secures the endorsement of the national GEF Operational Focal Point. (iii) Projects over \$1 million are referred to as FSPs; those of \$1 million or below are referred to as MSPs. MSPs follow a further streamlined project cycle, compared to FSPs. (iv) For FSPs, submission to the GEF under the SCCF starts with a

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Fund/Funder	Description	Eligible Projects	Funding Requirements
		concentrating on, but not limited to, technologies to reduce emissions or atmospheric concentrations of greenhouse gases, in line with the recommendations from the national communications, technology needs assessments (TNAs), and other relevant information. The SCCF can support (i) implementation of the results of TNAs, (ii) technology information, (iii) capacity building for technology transfer, and (iv) enabling environments.	project identification form (PIF), followed by a CEO endorsement form. (v) MSPs may start with the CEO endorsement form. Once the GEF CEO endorses the project, the funding is released to the implementing agency.
Climate Investment Funds (CIF)—14 donor countries with the World Bank as trustee	Since the CIF was established in 2008, 14 donor countries have contributed over \$8 billion to scale up mitigation and adaptation action in developing and middle-income countries. These precious public resources are held in trust by the World Bank and disbursed as grants, highly concessional loans, and risk mitigation instruments to recipient countries through multilateral development banks (MDBs). The CIF is the only multilateral climate fund to work exclusively with MDBs as implementing agencies. This ensures due diligence and high standards, and the CIF benefits from the banks' ability to leverage financing, mobilize other actors, and harmonize policy support. The CIF, in turn, facilitates cooperation among MDBs, benefitting recipient countries, climate-friendly market growth, and the MDBs themselves. In consultation with the other MDBs, developed and developing countries, and other development partners, the World Bank proposed establishing the Clean Technology Fund (CTF) along with the Strategic Climate Fund (SCF) as one of two strategic CIFs.	The CTF will invest in projects and programs that contribute to the demonstration, deployment, and transfer of low carbon technologies with a significant potential for long-term GHG emissions savings. These technologies include renewable energy as well as other efficient technologies to reduce carbon intensity in the transport sector and improve energy efficiency in buildings, industry, and agriculture. The SCF aims to finance targeted programs in developing countries to pilot-test approaches to adaptation and mitigation with the potential for scaling up. The SCF comprises three targeted programs with dedicated funding: (i) the Pilot Program for Climate Resilience (PPCR), to mainstream climate resilience into national planning and budgeting; (ii) the Scaling Up Renewable Energy Program (SREP), to demonstrate the viability of low-carbon development in the energy sector; and (iii) the Forest Investment Program (FIP), to support the efforts of developing countries to reduce emissions from deforestation and forest degradation. As country circumstances differ, investment programs will be developed on a country-specific basis to achieve nationally defined objectives. The range of options include programs and large-scale projects; at the sector or subsector level in a given country;	Access to CIF funding depends on a country's eligibility for official development assistance, according to the guidelines of the Organisation for Economic Cooperation and Development (OECD) Development Assistance Committee and the presence of an active MDB country program. For both the CTF and the SCF, the first step in gaining access to funding is preparing a country investment plan. The investment plan is developed under the leadership of the government and comprises a clearly articulated multiyear proposal identifying how CIF resources together with additional cofinancing will support the country's existing development strategies. The investment plan is agreed and owned by the government and the MDBs. After completion, the investment plan is submitted to the relevant trust fund committee or subcommittee for funding approval.

Fund/Funder	Description	Eligible Projects	Funding Requirements
		 subnationally, by focusing activity on a particular province, state, and municipality; regionally, particularly where regional cooperation is required; and through the private sector or public–private partnerships (PPPs). 	
Leading Asia's Private Infrastructure (LEAP) Fund— Japan International Cooperation Agency (JICA)	The LEAP Fund was established in March 2016. It is an infrastructure cofinancing fund, expected to leverage and complement ADB's existing non-sovereign platform to fill financing gaps and increase access to finance for infrastructure projects in the region. JICA has contributed to the fund. The fund will provide cofinancing to non-sovereign infrastructure projects at different stages of development, including early stage, growth stage, and greenfield and brownfield projects. It will support projects with strong anticipated development impacts and alignment with the strategies of ADB and JICA. The fund will undertake project finance (nonrecourse or limited recourse) and corporate finance transactions and seek to support a range of private sector participation modalities including PPPs, joint ventures, private finance initiative projects, and privatizations, as well as conventional project finance.	Eligible project types include the following infrastructure subsectors: (i) energy, including renewable energy generation, energy efficiency and conservation, and natural gas transmission and distribution; (ii) water and other urban infrastructure and services, including water, wastewater, and solid waste management; (iii) transport, including road transport, water transport, rail transport, air transport, multimodal logistics, urban roads and traffic management, and urban public transport; (iv) information and communication technology; and (v) health. The fund will provide financing to companies and projects as well as to financial intermediaries (e.g., holding companies and local currency vehicles) where there is a link to infrastructure (with the exclusion of private equity funds). Eligible countries include ADB developing member countries that are also eligible for Official Development Assistance (ODA) from Japan.	
International Finance Corporation (IFC)— World Bank Group	IFC works with the private sector to encourage sustainable and efficient approaches to manufacturing and waste management while identifying solutions that increase energy efficiency, decrease greenhouse gas emissions, and improve livelihoods. From producers to manufacturers and consumers, private sector players are required to help create a circular global economy as a sustainable and long-term solution.	IFC is working with the private sector to enhance their production, conversion, and manufacturing processes. Approaches include using alternative materials, improving traditional manufacturers' processes for higher recycled content use, and improving packaging design innovation and products to be more durable and multiuse or easier to recycle. In 2020 IFC's first-ever blue loan to a global plastic resin manufacturer exclusively focused on mitigating marine	To be eligible for IFC funding, a project must meet several criteria. The project must • be in a developing country that is a member of IFC; • be in the private sector; • be technically sound; • have good prospects of being profitable; • benefit the local economy; and

Fund/Funder	Description	Eligible Projects	Funding Requirements
	IFC works to improve the connection between supply and demand to develop climate-smart waste management systems, create long-term markets for recycled content, and enable private sector investments. Additionally, the inclusion of the informal sector in investments and solutions is essential to ensure sustainability, development impact, and improve livelihoods.	plastic pollution. The funding will help the company increase its recycling capacity in Thailand, Indonesia, the Philippines, India, and Brazil—countries grappling with mismanaged waste and serious plastic contamination in the environment—and invest in renewable energy and resource efficiency projects. IFC works directly with private sector entities and municipalities to improve solid waste management and recycling approaches, specifically collection of recyclable plastics, sorting, disposal, and energy recovery.	be environmentally and socially sound, satisfying IFC's environmental and social standards as well as those of the host country. IFC does not lend directly to micro, small, and medium-sized enterprises or individual entrepreneurs, but many of its investment clients are financial intermediaries that onlend to smaller businesses. Investment Proposals A company or entrepreneur seeking to establish a new venture or expand an existing enterprise can approach IFC directly by submitting an investment proposal. After this initial contact and a preliminary review, IFC may proceed by requesting a detailed feasibility study or business plan to determine whether or not to appraise the project.
Access to Sustainable Energy Programme (ASEP)—European Union (EU) and Department of Energy (DOE)	The ASEP is a joint undertaking of the EU and the Philippine DOE. Through ASEP, the EU has allocated a grant of over ₱3 billion to assist the Government of the Philippines to meet its rural electrification targets by means of renewable energy, and to promote energy efficiency.	Eligible projects are those involving	
Renewable Energy Asia Fund (REAF and REAF II)	The REAF I and REAF II invest in small hydro, wind, geothermal, solar, and biomass projects in Asian developing markets, with a primary focus to date on India, the Philippines, and Indonesia.	REAF has made equity investments in small renewable energy projects such as on-grid solar, wind, waste-to-energy, and hydropower projects of between 5 megawatts (MW) and 100 MW in these three countries.	
Blue Natural Capital Financing Facility (BNCFF)—led and	The BNCFF supports the development of sound, investable blue natural capital projects with clear ecosystem service benefits, based	The facility supports projects in developing countries that conserve, protect, and restore coastal ecosystems;	Project proposals will be examined continuously and assessed against the following criteria:

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Fund/Funder	Description	Eligible Projects	Funding Requirements
managed by International Union for Conservation of Nature (IUCN), with support from the Ministère du Développement durable et des Infrastructures (MDDI), Government of Luxembourg	on multiple income streams and appropriate risk-return profiles. By assessing, preparing, and structuring blue nature capital opportunities into bankable investments, the BNCFF helps reduce the risk of natural capital investments. The facility is being managed by International Union for Conservation of Nature (IUCN) as the facility manager on a daily basis; IUCN will execute the implementation of activities and support the evaluation of activities and results. An expert support unit supports the facility manager in evaluating proposals for their potential to comply with the Positive Impact Framework and the compatibility of their business model. The Environment and Social Committee evaluates the proposals, ensuring that proper environmental and social safeguards are observed and positive impacts are met. The Supervisory Committee will approve the proposals and funds spent as well as review project outcomes and provide BNCFF endorsement.	 create jobs and livelihoods for local people; contribute toward the SDGs, the UNFCCC's Paris Agreement, and the CBD's Aichi targets; have several sources of income, for instance by also providing broadband, clean water, and/or renewable energy or generating cost savings due to coastal protection; have (potentially) viable business model; and need some guidance to design the "missing pieces" required by investors to close the deal. 	 conservation, protection, and/or restoration of coastal ecosystems; creation of jobs and livelihoods as part of a country's sustainable development; capacity, experience, resources, and legal authority of the counterparts; strength and coherence of the (potential) business model; contribution to climate change adaptation and mitigation; compliance with environmental standards; access to environmental markets; and minimum size and stage of development.
Blue Finance	Blue Finance is a social enterprise with expertise and a track record in managing and financing marine protected areas (MPAs). Its objective is to improve the management of at least 20 MPAs by 2030. When properly managed and financed, MPAs restore marine habitats and fish populations, generate food and incomes from sustainable fisheries for local communities, create job opportunities in tourism and other blue economy sectors, enhance shoreline protection, and provide	The MPAs should be officially designated by governments. They should have clear objectives to reduce local threats to vibrant coral reef ecosystems and improve the livelihoods of coastal communities. They should be lacking in basic management and financing.	Each MPA is proposed to be jointly managed with a nonprofit comanagement entity through a collaborative management lease agreement signed with each government. The agreement usually covers a renewable 10-year period. The nonprofit comanagement entity is formed by a coalition of NGOs, scientific institutions, and community associations which manage the day-to-day operations, with guidance from a multi-stakeholder

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Fund/Funder	Description	Eligible Projects	Funding Requirements
	environment-friendly processes and technologies and incorporating climate change adaptation and mitigation and disaster risk reduction measures by providing financing and TA.	climate change adaptation and mitigation (CCAM) and disaster risk reduction (DRR) Other environmental or green projects and initiatives Eligible Borrowers Private corporations or enterprises LGUs Government owned and controlled corporations (GOCCs) Government agencies (GAs), where allowed Water districts and private service providers Cooperatives or associations Participating financial institutions (PFIs) or microfinance institutions (MFIs)	Loan Amount • Up to 80% of total project cost for private corporations, enterprises, cooperatives, or associations • Up to 90% of total project cost for LGUs, GOCCs, or GAs Basic Documentary Requirements • Letter of intent • Company information or profile • Audited financial statements (past 3 years) • Feasibility study or project proposal • Applicable environmental permits, e.g., environmental compliance certificate (ECC) or certificate of non-coverage (CNC) • Other additional documents as may be required based on the nature of the project
Financing Utilities for Sustainable Energy Development (FUSED)— Development Bank of the Philippines (DBP)	The FUSED Program aims to increase access to electricity services through financing to help achieve inclusive growth and poverty reduction. At the end of the FUSED Program by 2030, it is expected to have at least funded P40 billion of the estimated investment requirement for power generation and distribution in the Philippine Energy Plan 2012–2030. Specific Development Objectives 1. Power Generation Increase in electricity exported to the grid Potential additional/existing connections generated/supported Carbon dioxide emissions avoided	Eligible Borrowers Private corporations Electric cooperatives LGUs GOCCs Private financial institutions Eligible Projects Development and construction of energy generation or mini-grid rural electrification projects through conventional (coal, diesel, bunker, etc.) and renewable energy resources (hydro, wind, solar, biomass, geothermal, and other emerging technology) to address power supply system constraints Power distribution and transmission projects that will improve power supply system safety, reliability, and efficiency, such as reduction of	Basic Documentary Requirements For Renewable Energy Power Projects Feasibility study Detailed engineering design ECC/CNC including environmental impact assessment (EIA) report or initial environmental examination (IEE) checklist Water rights permit Renewable energy development service contract Certification pre-condition or certificate of non-overlap Grid impact study Electricity sales agreement

Appendix 5

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Fund/Funder	Description	Eligible Projects	Funding Requirements
	Volume of fossil fuel avoided Power Distribution Additional connections generated Avoided system loss Power Distribution Additional connections generated Power Distribution Power D	system losses and power service quality for existing customers through rehabilitation and upgrading of distribution system Purchase of necessary equipment (hardware and software), service vehicles, tools, and other non-network projects (e.g., office building, warehouse) to improve efficiency and service delivery Any project that improves the reliability and efficiency of rural power supply and increases access to electricity services Eligible Expenditures Capital investment Institutional development Working capital requirement (i.e., prompt payment rebate, operations and maintenance) Interest during construction Plant acquisition and/or refinancing of existing loan Consultancy services Project preparation activities for renewable energy projects (feasibility study, detailed engineering design)	approved by the Energy Regulatory Commission (ERC) or renewable energy supply agreement EPC contract Proof of ownership or authority to use project site and right of way For Conventional Power Projects (coal, diesel, bunker, etc.) Feasibility study Detailed engineering design ECC/CNC including EIA report/IEE checklist Water rights permit EPC contract Certificate of endorsement by DOE Certificate of endorsement by DOE Certificate of non-overlap Grid impact study or distribution impact study Electricity sales agreement approved by ERC Fuel supply agreement Description of air pollution control facilities and the expected quality of emission. Note that the supplier should guarantee compliance of the emission to the National Emission Standards for Source Specific Air Pollutants. Proof of ownership or authority to use project site and right of way For Transmission and Distribution Projects CAPEX application submitted to ERC including the Distribution Development Plan Latest monthly engineering report

Fund/Funder	Description	Eligible Projects	Funding Requirements
			ECC/CNC including EIA report/IEE checklist NEA clearance to borrow Certification pre-condition or certificate of non-overlap Proof of ownership or authority to use project site and right of way
Water for Every Resident (WATER) Program—DBP	The WATER Program is the umbrella program for the bank's water supply projects. Its objective is aligned with the thrust of the national government as defined under the Philippine Water Supply Sector Roadmap prepared by the National Economic and Development Authority, which aims, among others, to ensure adequate long-term availability of and accessibility to potable water. Program Objectives WATER Program intends to expand coverage from waterless areas to include the entire water supply sector, which would mean increasing target investment from ₱5 billion (2011–2016) to ₱25 billion up to the end of the WATER Program by 2025. The program is expected to achieve the following specific objectives: 1. Source development Increase in billed volume (m³) Potential additional/existing connections generated/supported 2. Water system rehabilitation, expansion, and upgrading Additional connections generated Reduction in non-revenue water (NRW)	Eligible Borrowers Private corporations Water districts LGUs Other water service providers Private financial institutions/micro-finance institutions Eligible Projects Source development for distribution or bulk water supply Water transmission and/or distribution system rehabilitation, expansion, and upgrading Development/installation of water treatment facilities/equipment Investment for NRW reduction or other efficiency-enhancing measures such as but not limited to computerization of accounts, billing and collection system, installation of energy-saving equipment Purchase of necessary tools and equipment such as but not limited to generator sets, service vehicles, trucks, water leak detectors, including construction or rehabilitation of existing non-network facilities (e.g., office building, warehouse) to improve efficiency and service delivery Investment for climate change adaptation technologies (e.g., rainwater collection system) Eligible Expenditures Capital investment Working capital requirement	

Fund/Funder	Description	Eligible Projects	Funding Requirements
		 Interest during construction Refinancing of existing loan Consultancy services Project preparation activities (feasibility study, detailed engineering design) 	
Project Development and Monitoring Facility (PDMF)—Philippine government, AusAID, ADB, and administered by the PPP Center	The general objective of the PDMF is to provide a facility to fund and facilitate preinvestment activities of potential PPP projects and develop a robust pipeline of viable and well-structured PPP projects for implementing agencies or LGUs. Specifically, the PDMF may be utilized for, but not limited to, the following: • preparation of project prefeasibility and feasibility studies, • project structuring, • preparation of bid documents and draft contracts, • transaction advisory, and • assistance in the tendering process including bid evaluation and award of PPP projects through competitive selection. The Philippine government allocated an initial \$7 million for the PDMF revolving fund and the Australian government provided a grant cofinancing of \$6 million (which grant is administered by ADB).	Sectors and subsectors eligible for PDMF financing Transport infrastructure (roads, bridges, interchanges, railways, etc.) Non-rail based mass transit facilities Port infrastructures Airports, air navigation, and related facilities Power generation, transmission, distribution, and related facilities Telecommunications facilities Information technology (IT) and database infrastructure Irrigation and related facilities Water supply, sewerage, drainage, and related facilities Land reclamation, dredging, and other related development facilities Environmental and solid waste management related facilities Government buildings, housing projects Industrial and tourism estates or townships including related infrastructure facilities and utilities Education and health infrastructure Markets, slaughterhouses, and related facilities Warehouses and post-harvest facilities Public fish ports and fishponds, including storage and processing facilities	The implementing agency shall identify PPP projects and apply for PDMF financing. It shall, as a minimum, attach to its application the following: • project concept note; • indicative terms of reference (TOR), including cost estimates; and • letter nominating the implementing agency's representatives to the Special Bids and Awards Committee (SBAC), Project Study Committee (PSC), and Technical Working Group (TWG). The PPP Center shall undertake the screening/evaluation of the PDMF application based on a set of eligibility criteria. The PPP Center shall make a recommendation to the PDMF Board. • If the PDMF Board approves the application, the implementing agency/LGU shall execute a TA agreement with the PPP Center. • If the PDMF Board disapproves the application, the following shall apply: o The implementing agency/LGU may submit a written request for reconsideration to the PPP Center. The request shall

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Fund/Funder	Description	Eligible Projects	Funding Requirements
			include additional information and data that will justify the reevaluation of the PDMF application. The PPP Center shall review the request for reconsideration and submit recommendations to PDMF Board based on additional information and justification submitted by the implementing agency/LGU. The decision of the PDMF Board on the request for reconsideration shall be final and executory, and the PPP Center shall entertain no further request for reconsideration.
			The PPP Center shall establish PSC to oversee the work of the transaction advisor/consultant; SBAC to select and recruit the transaction advisor/consultant; and TWG to support the SBAC.
			The PPP Center shall sign the consulting contract with the selected project development consultants/transaction advisors with conformity of the implementing agency/LGU. The selected consultants/transaction advisors shall conduct the pre-investment studies, prepare draft tender documents, and provide PPP transaction advisory services.
			The implementing agency/LGU shall be responsible for obtaining the approvals, permits, authorizations, and the like from

Fund/Funder	Description	Eligible Projects	Funding Requirements
			appropriate authorities, e.g., NEDA Investment Coordination Committee (ICC) for approval. If approved, public bidding for the PPP project shall be conducted and shall be in accordance with the Build-Operate-Transfer (BOT) Law. The winning bidder shall reimburse all the project-related costs and availments from the PDMF.
Green Green Green Program— Department of Budget and Management (DBM)	The DBM's Green, Green, Green is a unique assistance program that aims to make the country's 145 cities more livable and sustainable through the development of public open spaces. It is a component of the Duterte administration's massive national infrastructure development program, "Build, Build, Build." P2.5 billion has been appropriated for the program in the 2018 national budget. The allocation for each city was computed based on their respective population counts and land area measurements. Green, Green, Green will help city governments create greenscapes, improve livability of urban areas, increase connectivity and accessibility of public open spaces, and enhance sustainability through the construction of green infrastructure (which aid during the rainy season and flooding). As of January 2021, 145 LGUs have already been recipients of the program.	Eligible project types include	Conditions for Participation Expression of interest Conceptual design of proposed projects Fund Release Requirements A circular shall be Issued to prescribe the guidelines. Fund Release Process (i) The beneficiary LGU complies with and submits the fund release requirements. (ii) The DBM Central Office evaluates and issues special allotment release orders (SARO) to the Bureau of Treasury and notice of cash allocation (NCA) to government servicing banks (GSBs). (iii) The Bureau of Treasury prepares the authority to debit account (ADA) and issues the notice of authority to debit account issued (NADAI) to beneficiary LGUs.
People's Survival Fund (PSF)— Climate Change Commission	The PSF is a domestic initiative led by the Climate Change Commission (CCC), which was created as an annual fund intended for LGUs and accredited local/community	The PSF is intended for water resources management, land management, and agriculture and fisheries, among others, and serves as a guarantee for risk insurance needs of farmers, agricultural workers, and other	To apply for funding, proponents must submit proposals to the CCC, which is tasked to evaluate and review proposals in coordination with the Technical Evaluation

Fund/Funder	Description	Eligible Projects	Funding Requirements
	organizations to implement climate change adaptation projects that will better equip vulnerable communities for the impacts of climate change. The Philippine government programmed at least P1 billion into the fund, sourced from the national budget, which may be augmented by mobilizing funding sources such as counterpart LGUs, the private sector, and individuals who support adaptation initiatives.	stakeholders.	Committee before recommending its approval to the PSF Board. Proponents will also be assessed for their readiness to receive the fund and implement the proposed projects. Proponents will be guided by the following reference documents: - accreditation guidelines for local/community organizations accessing the PSF, - checklist of requirements, and - operational policies and guidelines.
Disaster Management Assistance Fund (DMAF)— Department of Finance (DOF) Municipal Development Fund Office (MDFO)	In line with the government's program of strengthening the country's disaster control capability, the Municipal Development Fund Office-Policy Governing Board (MDFO-PGB) of the DOF created the Disaster Management Assistance Fund (DMAF). It aims to provide financing support to mitigation and prevention, response and relief, and recovery and rehabilitation initiatives of LGUs. Objectives Provide timely financial support to LGUs' disaster management programs. Enhance community resilience to natural hazards Promote economic growth through disaster risk management Attract supplemental funding from local and international donors.	Fund Categories and Eligible Subprojects Category 1 (C1) caters to financing disaster prevention and mitigation initiatives of all provinces and municipalities. Soft Components DRM-related training/capacity building activities, hazard mapping, vulnerability assessment, risk mapping, conduct of local assessment to LGU capacity and vulnerability to natural disasters, cost to be incurred in preparing for mainstreaming of climate change and DRR into local development plans and programs, preparation of comprehensive land use plan, development of Local Disaster Risk Reduction and Management Plan (LDRRMP), contingency planning, conduct of community drills/exercises, augmentation for health-related epidemics (i.e., outbreaks on diarrhea, dengue, etc.), and development of IEC and other advocacy materials Infrastructure Reforestation, afforestation, rehabilitation of declared watersheds and establishment of green areas, funding hazard resistant construction and engineering works	Letter of intent duly signed by the local chief executive Sanggunian Resolution affirming the interest of the LGU to apply, negotiate, and borrow funds from the DOF-MDFO for the implementation of the subproject Feasibility study/project proposal Commitment letter Certificate of Net Debt Service Ceiling and Borrowing Capacity issued by the Bureau of Local Government Finance (BLGF)

Fund/Funder	Description	Eligible Projects	Funding Requirements
Bonds (AGB)	(Islamic bonds), which comply with the ASEAN Green Bonds Standards (GBS) where the proceeds will be exclusively applied to finance or refinance, in part or in full, new and/or existing eligible green projects. The GBS is an initiative that facilitates ASEAN capital markets in tapping green finance to support sustainable regional growth and meet investor interest for green investments and is part of the ASEAN Capital Market Forum's broader efforts in developing green finance for the region. The GBS have been developed in collaboration with the International Capital Market Association (ICMA) based on ICMA's Green Bond Principles (GBP). The GBP have been used as the basis of the GBS, as they are internationally accepted and widely used for the development of national green bond guidelines or standards issued globally. While the GBP have provided broad principles on green bonds, the ASEAN GBS aim to provide more specific guidance on how the GBP should be applied across ASEAN for green bonds to be labeled as AGB. In this respect, issuers who wish to issue and label the green bonds as AGB must comply with the ASEAN GBS. In the Philippines, SEC Memorandum Circular No. 12 series of 2018 provides the guidelines for issuing AGB.	benefits, which will be assessed and, where feasible, quantified by the issuer. The following list is intended to be indicative and captures the most used types of projects supported or expected to be supported by the green bond market: I renewable energy; I energy efficiency; I pollution prevention and control; I environmentally sustainable management of living natural resources and land use; I terrestrial and aquatic biodiversity conservation; I clean transportation; I sustainable water and wastewater management; I climate change adaptation; I eco-efficient and/or circular economy adapted, production technologies, and processes; and green buildings that meet regional, national, or internationally recognized standards or certifications GPs may relate to more than one category. Fossil fuel power generation projects are ineligible.	project evaluation and selection prior to the issuance of the AGB. Issuers are encouraged to position the information within the context of the issuer's overarching objective, strategy, policy, and/or processes relating to environmental sustainability. The issuer should disclose the project evaluation and selection process to investors in the documentation for the issuance of AGB. These requirements include the following: • environmental sustainability objectives; • process on how the project fits within the eligible GP categories; • related eligibility criteria or any process applied to identify and manage potentially material environmental and social risk associated with the GP; and • any green standard or certifications referenced in project selection. Issuers must make public on the issuer-designated website on the time of issuance and throughout the tenure of AGB the following: • process for project evaluation, and • use of proceeds. Issuer must disclose to investors the • proceeds from the AGB, and • intended types of temporary placement for the balance of unallocated proceeds.

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Fund/Funder	Description	Eligible Projects	Funding Requirements
			Issuer must report to investors at least annually until full allocation, and as necessary thereafter in the event of material development, the following: I ist of projects to which the AGB proceeds have been allocated; brief description of the project/s; amount allocated and their expected impact; and qualitative performance indicators and, where feasible, quantitative performance measures with disclosure of the key underlying methodology and/or assumptions used in the quantitative determination.
COVID-19 Recovery Transition Bonds (CRTB)	The COVID-19 Recovery Transition Bonds (CRTB) are green bonds tailored and structured to the needs of the period impacted by COVID-19, supported by government and MDB funds providing risk assurance. These bonds will carry the same level of diligence in terms of green definition to avoid any greenwashing, but with a focus on recovery and an ambition to build back better.	Eligible green projects are similar to those for the ASEAN Green Bonds.	Key features of the instrument structured as a two-step bond include the following: Zero coupon period. The first 5 years of bond repayments are to be pegged at a 0% coupon rate. This is designed to enable onlending of funds raised at concessional rates to projects with very low revenue projections in the next 4–5 years due to COVID-19 impacts. Stepped-up coupon period. A second period of repayment of 5–15 years (ideally long tenure bonds are better suited for infrastructure) would see bond repayments pegged at a market return, likely on a yield to maturity basis coupon payment. This stepup is suggested to ensure returns

Fund/Funder	Description	Eligible Projects	Funding Requirements
			to investors who have supported the transition period and enable greater liquidity for the bonds.
			The above step-up structure builds on the concept of deep discount bonds that have been undertaken in several instances, including in Asia. However, there is a risk that zero coupon or deep discount bonds are perceived as inherently risky and are issued at a market price much below face value, more so in circumstances that make COVID-19 impacts unclear. Hence, it will be critical to ensure credit enhancement wraps for these bonds, at least for the initial period. There have been several instances of guarantees or first loss structures provided to various bonds, including from development agencies, and climate funds such as the Global Environment Facility. Therefore, it is proposed that the CRTB instruments be supported by an assurance fund, as detailed below.
			The COVID-19 Recovery Transition Bonds Assurance Fund. An assurance fund will be critical to providing credibility to the CRTB structure, with clear guarantee parameters, and hence create an appetite and interest in the global investor community. The fund can be financed from government budgets as well as government-raised sovereign loans from MDBs. Critically, such sovereign funds can also be leveraged to attract funds from private sector investors into the fund. A regional fund can also be created instead of a national fund, providing guarantees for a group of countries. A regional example is

Fund/Funder	Description	Eligible Projects	Funding Requirements
			the ACGF, managed by ADB.
			Funds usage. The CRTB Assurance Fund would provide guarantees to bonds raised by green projects in the country through a state-owned entity, a PPP entity, or a local government entity. Guarantees can be in the form of first loss, exit guarantees, and completion guarantees. A guaranteed exit payment offered to investors at a specific time, perhaps 6 years after the initial investment (assuming 3–4 years for construction completion and at least 1–2 years of operations), could create the appropriate incentives for investors.
			In addition to guarantees to CRTBs, the fund could also provide some concessional financing (either as debt or convertible grant or debt) to green projects, especially if these are seen as riskier projects due to greater revenue risks (e.g., social sector projects) or construction difficulties (e.g., extensive tunneling). This blends the concept of a viability gap fund with bond guarantees and might be more attractive for investors interested in the fund. Any provision of such financing should be linked not only to green eligibility but also financial bankability thresholds, such that support is only provided up to the level of need (for instance, the debt service coverage ratio exceeds a minimum level of 1.05) to attract private capital.
			A portion of funds could also be invested in liquid assets such as government securities to be available to governments to meet quick response financing in the case of future disasters. This combination of

Fund/Funder	Description	Eligible Projects	Funding Requirements
			uses for the fund should provide investors with assurance while also allowing the fund to be financially sustainable and thereby protecting government liabilities.

ADB = Asian Development Bank, ASEAN = Association of Southeast Asian Nations, COVID-19 = coronavirus disease 2019, IBRD = International Bank for Reconstruction and Development, IDA = International Development Association, m³ = cubic meter, TRAC = Target for resource assignments from the core

Note: This inventory is not exhaustive. It is intended to present an indicative sample of the types of green/blue financing resources available for co-funding green city-related programs, projects, and activities (PPAs). It is proposed that General Santos City considers tapping any of these funds for possible cofinancing of its GCAP PPAs.

Source: ADB resource person based on information gathered from websites of various green financing facilities/funders, July 2021.

Green City Action Plan

General Santos City

The General Santos City Green City Action Plan (GCAP) is built upon the city's ongoing initiatives and guided by the city's vision to become "the Green City of the South." The GCAP was developed with assistance from the Asian Development Bank (ADB) based on ADB's Green City Development Framework and Toolkit. It includes a comprehensive profile of General Santos City; strategic interventions and programs, projects, and activities in urban development sectors including water supply, sanitation, flood management and drainage, solid waste management, transport, energy, and built environment; and a green investment plan for the short (2021–2022), medium (up to 2027), and long (up to 2040) terms. Estimated project costs and budget allocation, funding sources, responsible implementing offices, potential implementation issues, and monitoring and evaluation are likewise identified.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members —49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.



