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Smart Urban Green Practices in ASEAN:

An Assessment of Best Practices in Indonesia and the Philippines

February 2024


Source www.hinrichfoundation.com

I. Executive Summary

Urbanization is a crucial catalyst of economic growth. In 2018, half of the ASEAN population is reported to live in urban areas and this is expected to grow to 70 percent by 2025. This growth has led to stifling population density and various environmental issues (i.e., poor quality of air, water supply, and the never-ending pile of waste produced by urban activities), generating unsustainable urban areas.

This study is a collaborative effort to investigate how cities are dealing with the growing urban issues of infrastructure, waste management, and green spaces. Local governments, increasingly confronted with limited financing avenues and insufficient data, are aware of the insurmountable list of environmental problems. This study aims to provide insights and solutions to these challenges.

This publication highlights six best practices shared by cities in ASEAN, primarily that of Makassar, Indonesia, and Quezon City, the Philippines. The practices – *Smart Aparong*, Waste Bank, *Lorong Garden*, Solarization of Public Schools, Trash-to-Cashback Program, and GrowQC – have the potential to significantly impact the environmental issues in their respective territories. They offer hope and optimism for other local governments facing similar challenges.

Smart Aparong

Source: www.berita-sulsel.com

Smart Aparong was created to address disaster impacts in Makassar. Though still in the planning phase, it has two main goals: to provide affordable housing for vulnerable populations and to offer temporary shelter during emergencies. The building will feature resource-conservation technologies and a retention pond to save resources and reduce flooding.

Smart Aparong aims to promote economic efficiency by conserving energy and resources, improving residents' purchasing power, providing security, enhancing living conditions for those in poor housing, and increasing Urban Green Spaces (UGS) and safe playgrounds for children.

Waste Bank

Source www.merdeka.com

Waste Bank is a platform for exchanging waste with economic value, whether organic or non-organic. There are two types of waste banks: the central waste bank and waste bank units. The central waste bank is run by a technical body created by the Makassar city government, while the local community manages the waste bank units. This means the community can be both administrators and beneficiaries of the waste banks. Any individual in the city can exchange their waste for compensation.

The program provides significant economic benefits to the community. From 2016 to 2023, the central waste bank contributed USD 816,203 (approximately 12.2 billion IDR) to the local community. All parties involved, from waste bank unit administrators to beneficiaries, gained an additional source of income from this initiative. The program also promotes social equality and reduces income inequality through this additional income. Environmentally, the program secured 450 tons of recyclable materials in 2021, contributing to resource and energy conservation. The waste banks in Makassar help protect the environment and slow the progression of climate change. From 2016 to 2023, the program reduced 5,828,117 kg of inorganic waste.

Lorong Garden


Source www.makassarbicara.id

Lorong Garden is a program that provides citizens with green spaces by installing plantations in alleyways. It also aims to control food price inflation and maintain food security by generating nutritious vegetables from green spaces. This program is mainly implemented by agricultural groups and SMEs.

The program is full of social, environmental and economic benefits. Regarding economic benefits, it diminishes the necessity to purchase vegetables, thereby reducing the financial burden on members of agricultural groups who would otherwise spend on market-bought vegetables for personal consumption, and creating opportunities for further growth. Under social impacts, the program facilitates the involvement of women in the program and even places them at the forefront of decision-making.

It also strengthens social cohesion among residents within the neighborhood, especially between women, and acts as a poverty reduction tool. Its effect, however, is relatively small. Ultimately, *Lorong Garden* also promotes the increase of urban green spaces in the city. From 2021 to 2023, it has contributed to a rise in urban green space coverage of almost 2.5 percent. Given the method to calculate UGS in the city, it is impossible to distinguish or isolate the impact of green space addition derived from the program alone.

Solarization

Solarization of public schools is part of the Quezon City government's effort to lessen GHG emissions in the area. The project is predicted to reduce 1691 tCO2e of GHG emissions per year (or 50,723 tCO2e in the span of 30 years) and produce 3,880 MWh of clean energy per annum, all while saving the city government USD 750,266 annually.


Source www.metronewscentral.net

Trash to Cashback

Quezon City's Trash to Cashback Program encourages participants to separate their waste and exchange recyclables at designated trading booths. In return, they receive remuneration that varies by item.

From the program's start until late 2022, participants received about 252,000 environmental points, equivalent to 252,000 Philippine pesos (approximately USD 4,500), and around 80 tons of recyclables were collected.

Source www.trashtocashback.com

GrowQC

Grow Quezon City is an initiative that tries to stimulate the growth of green spaces in the city. The city utilizes tax abatement to borrow idle land from landowners and convert the newly borrowed land into productive Urban Green Spaces (UGS). Economically displaced citizens were encouraged to participate as farmers in this program.

Source www.quezoncity.gov.ph

They will then receive a fair share of produce from the land, and additional income from selling said produce.

From the start of the pandemic in 2020 to early 2022, GrowQC has established 337 urban gardens and ten model farms, creating livelihoods for 4,119 urban farmers, 258 displaced workers, and 298 vendors and jeepney drivers and converting 381,650 m2 of land for urban agriculture.

Best Practices

This study identifies several commonalities in urban practices that can serve as lessons for cities aiming to implement similar initiatives. Most practices demonstrate high adaptability, evolving in response to changing urban conditions and significant events.

Additionally, many programs incorporate co-benefits in their design. For instance, Garden Alley provides food security and additional income while enhancing urban green spaces and carbon sequestration. Cost-saving measures are also standard, but collaboration with private entities and the third sector is vital, ensuring longevity, operational feasibility, and necessary expertise.

Community participation is crucial in at least four of the six programs discussed: Lorong Garden, Waste Bank, GrowQC, and Trash to Cashback. These initiatives place the community at the forefront of change, often using financial and non-financial incentives to maintain high community involvement. It identified innovative climate financing options available to support these initiatives. While these options are primarily tailored to local governments in Indonesia and the Philippines, these financing instruments may be appropriate for other countries.

For Indonesian local governments, climate financing options range from using PPP schemes (i.e., BOT, BTO, Rent, and VGF) to loans, municipal bonds, insurance, and guarantees. Similarly, local governments in the Philippines are free to choose from various PPP schemes (e.g., BLT, BOO, and DOT), tax abatement, and the use of municipal bonds.

Source www.one-more-tree.org

II. About UCLG ASPAC

The United Cities and Local Governments (UCLG) is a worldwide association of local governments and the officially recognized voice of local governments by the United Nations. UCLG was established on 1 January 2004 and is headquartered in Barcelona, Spain. UCLG is an amalgamation of the International Union of Local Authorities (IULA), United Towns Organization (UTO), and the World Association of the Major Metropolises (METROPOLIS) set up in Ghent (Belgium) in 1913 in Aix-les-Bains (France) in 1957, and in Paris (France) in 1985, respectively.

Following this unification, UCLG ASPAC was established in Taipei on 14 April 2004 as the new entity of IULA ASPAC. UCLG ASPAC's Secretariat is hosted by the Jakarta Provincial Government. UCLG ASPAC is the largest regional section of UCLG. It has links to more than 10,000 cities and local governments, and represents well over 3.76 billion people – more than half of the world population – and incorporates economically fast-developing countries such as China, India, and Indonesia.

UCLG ASPAC is the key knowledge management hub on local government issues in Asia- Pacific. It promotes democratic local government, supports cooperation between cities, local governments and their associations, and facilitates programs, networks and partnerships to develop the capacity of local governments and associations. Moreover, UCLG ASPAC represents local governments politically within the international community and with the United Nations and its agencies. It also promotes inclusive societies that safeguard equality, social and economic justice, and sustainable community development.

In the wider context, UCLG ASPAC works closely with cities and partner organizations, to promote various aspects of people's well-being including local economic development, public spaces, disaster risk reduction, climate change, gender equality, SDGs localization, and overall urban development.

Source www.uclg-aspac.org

III. About UNCDF

UNCDF mobilizes and catalyses an increase in capital flows for SDG impactful investments to Member States, especially Least Developed Countries, contributing to sustainable economic growth and equitable prosperity.

In partnership with UN entities and development partners, UNCDF delivers scalable, blended finance solutions to drive systemic change, pave the way for commercial finance, and contribute to the SDGs. We support market development by enabling entities to access finance in high-risk environments by deploying financial instruments, mechanisms and advisory.

IV. About SGAC Project

The Smart Green ASEAN Cities (SGAC) is a European Union (EU)-funded program implemented by UNCDF in partnership with the ASEAN Secretariat in Jakarta, Indonesia.

SGAC works with subnational governments to catalyze financing from the private sector and design innovative financing mechanisms to address environmental and climate change impacts. Through seed financing grants and technical and capacity development support, the program aims to identify green and smart city solutions and design appropriate financing mechanisms in collaboration with local governments. The SGAC-supported projects will contribute reducing the environmental and carbon footprints through smart solutions enabled by digitalization and the use of technologies.

The ASEAN region leads in innovation and success stories with projects addressing environment and climate change at the local levels. Simultaneously, cities and mayors are equally championing the need for more funds and investments to finance their smart and green initiatives. The gap in resources has led to subnational governments exploring other opportunities and partnerships.

In this regard, the SGAC program engages with the cities to:

1. Support design, planning and implementation of green and innovative city solutions in selected cities
2. Strengthen national capacity for green and smart city development through EU-ASEAN experience sharing
3. Increase the exchange of good smart and environmental city management practices between the EU and ASEAN Cities

The SGAC program is implemented in the eight ASEAN member states (Cambodia, Indonesia, Malaysia, Thailand, Laos, Vietnam, Philippines, and Myanmar) in close collaboration with the National Focal Points of the ASEAN Working Group on Environmentally Sustainable Cities (AWGESC), which is supported by the Environment Division of the ASEAN Secretariat in Jakarta.

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VI. List of Acronyms

AI	Artificial Intelligence
APBD	*Anggaran Pendapatan dan Belanja Daerah* (Regional Revenue and Expenditure Budget)
APAC	Asia-Pacific
ASEAN	The Association of South-East Asian Nations
BNPB	*Badan Nasional Penanggulangan Bencana* (National Agency for Disaster Management)
BLT	Build-Lease-Transfer
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
BSF	Black Soldier Fly
BTO	Build-Transfer-Operate
CMCI	Cities and Municipalities Competitiveness Index
COVID/COVID-19	Coronavirus Disease of 2019
DOT	Develop-operate-and-transfer
EFT	Ecological Fiscal Transfer
EPMC	Environment Policy Management Council
EPWMD	Environmental Protection and Waste Management Department
GHG	Greenhouse Gases
Jakstrada/Jakstranas	*Kebijakan dan Strategi Nasional/Daerah* (Direction of National/Regional Policy and Strategy)
KSP	*Kerja Sama Pemanfaatan* (Asset Utilization Cooperation)
KSPI	*Kerja Sama Penyediaan Infrastruktur* (Cooperation of Infrastructure Provision)
MoU	Memorandum of Understanding
NDC	Nationally Determined Contribution

NSF	National Science Foundation
PPP	Public-Private Partnership
PV	Photovoltaic
QC	Quezon City
RPJMD	*Rencana Pembangunan Jangka Menengah Daerah* (Regional Mid-Term Development Plan)
Rusun/Rusunawa	*Rumah Susun* (Government Flats)/*Rumah Susun Sewa* (Government Rental Flats)
SMEs	Small and Medium-sized Enterprises
SUMP	Sustainable Urban Mobility Planning
TAKE	*Transfer Anggaran Kota/Kabupaten Berbasis Ekologi* (Ecology-Based Municipal Budget Transfer)
TANE	*Transfer Anggaran Nasional Berbasis Ekologi* (Ecology-Based National Budget Transfer)
TAPE	*Transfer Anggaran Provinsi Berbasis Ekologi* (Ecology-Based Provincial Budget Transfer)
tCO2e	Tonnes of Carbon Dioxide equivalent
UGS	Urban Green Spaces
UPT/UPTD	*Unit Pelaksana Teknis/Unit Pelaksana Teknis Daerah* (Technical Implementation Unit/Regional Technical Implementation Unit)
VGF	Viability Gap Fund
WACS	Waste Analysis and Characterization Study

VII. Glossary

Ad valorem tax	*Ad valorem tax* is a tax derived from an assessed value, such as the value real estate or personal property, with a tax rate applied.
Artificial Intelligence (AI)	AI refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.
Alley Corporation	Alley corporation, *Badan Usaha Lorong* (BULO), is an entity supporting the growth of alleyways (i.e., garden alley, cultural alleys, culinary alleys) in Makassar.
Angin Puting Beliung	It is a strong wind vortex with a speed of 120 km/h or more.
Barangays	Barangay is a small territorial and administrative district forming the most local level of government.
Dinas Ketahanan Pangan (Food Security Department)	The Food Security Department assists the head of region in carrying out government affairs relating to that of food security.
Dinas Lingkungan Hidup (Department of Environment)	The Department of Environment assists the head of region in carrying out government affairs relating to that of the environment.
Dinas Perikanan dan Pertanian (Department of Agriculture and Fisheries)	The Department of Agriculture and Fisheries assists the head of region in carrying out government affairs relating to that of agriculture and fisheries.
Dinas Perumahan dan Permukiman (Department of Housing and Settlement)	The Department of Housing and Settlement assists the head of region in carrying out government affairs relating to that of housing and settlement.
Idle Land Tax	Idle Land Tax is a tax given to non- agricultural lands in urban and urbanized areas on which no improvements have been made by the owner, as certified by the relevant governing authority assessor.
Kecamatan (District)	It is the third-level administrative division in Indonesia, a sub-division of a city.
Kelompok Tani (Agricultural Group)	Farmer groups are several farmers who gather themselves into a group because they have harmony in goals, motives, and interests. Farmer groups were formed based on a decree issued by a governing authority and were formed with the aim of being a forum for communication between farmers. It can also function as production units to develop local agricultural businesses.

Machine Learning	The use and development of computer systems that can learn and adapt without following explicit instructions, by using algorithms and statistical models to analyze and draw inferences from patterns in data.
Minyak Jelantah (Used Cooking Oil)	Used cooking oil is waste oil that can come from various types of cooking oil such as corn oil, vegetable oil, and so on. Used cooking oil is oil that was previously utilized for general household needs.
Rainwater Harvesting	Rainwater Harvesting is the process of collecting water from rainfall events and store it for later use.
Retention Pond	It is a pond designed with additional storage capacity to attenuate surface runoff during rainfall events.
UPTD Rumah Susun Sewa	It is the subsidiary technical unit of the city's housing and settlement department that operates Rusunawa in their area.
Solar PV System	Solar PV system is a power system that converts sunlight into electricity by utilizing the Photovoltaic (PV) effect.
UPTD Bank Sampah Pusat	It is the subsidiary technical unit of the city's environmental department that runs the central waste bank.
Water Treatment	It is a process that improves the quality of water to make it appropriate for a specific end-use.

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X. Acknowledgements

The producers of this report would like to express their sincere thanks and gratitude to the Makassar and Quezon City governments for their insights regarding urban smart green practices (e.g., *Smart Aparong*, Waste Bank, *Lorong Garden*, Solarization, Trash to Cashback, and GrowQC) being implemented in their cities. Their help is paramount to our effort to foster the exchange of good smart and environmental city management practices among ASEAN cities.

1. Introduction

1.1 Environmental Challenges Faced by ASEAN Cities

ASEAN is home to about 660 million people, accounting for about 8.5 percent of the world's aggregate population in 2021 (ASEAN, 2023). Roughly 329 million people, or half of the total population, were urban dwellers (Ong et al., 2023). By 2025, the urban population of ASEAN is predicted to soar to 400 million, growing at a pace of three percent annually (ASEAN, 2018).

The exponential growth of the ASEAN urban population has led to a heightening need for urban resources, an inability of supply to keep pace with urban demand, depletion of urban resources supply, and the overall degradation of urban ecosystems (Galli et al., 2020).

The coverage of urban green space in several ASEAN cities has reduced from 45 percent to 20 percent between 1989 and 2014 (Muhamad Nor et al., 2021). Meanwhile, energy demand in ASEAN, especially in its cities, is expected to rise from 427 to 653 million tons of oil equivalent by 2025 (ASEAN, 2018). Subsequently, carbon dioxide (CO_2) emissions have increased by 6.1 percent annually in ASEAN urban areas (ASEAN, 2018).

The impact of rapid urbanization is further reflected in waste management. The United Nations Environment Program (UNEP) estimates that municipal solid waste generation per capita in ASEAN is 1.14 kg per capita per day – about four times the APAC average (ASEAN, 2018). While access to safe drinking water has increased from 76.9 percent in 1990 to 91.1 percent in 2016, almost 27 percent of people in ASEAN still do not have access to improved sanitation facilities (ASEAN, 2017, 2018).

These changes have culminated in rising vulnerability, steeper average and extreme temperatures, increases in wet season rainfall, rainfall intensity and duration, and greater frequency of extreme events such as droughts, floods, land, and forest fires (ASEAN, n.d.).

1.2 Relevance and Objectives

Urbanization is a crucial propeller of economic growth. In 2018, half of the people in ASEAN lived in urban areas, and an additional 70 million people are expected to reside in ASEAN cities by 2025 (ASEAN, 2018). This growth has led to stifling population density and various environmental issues (e.g., the poor quality of air and water supply, and the never-ending pile of waste produced by urban activities), generating unsustainable urban areas.

Local governments are aware of said issues. However, tackling the multitude of "wicked" environmental problems arising from urban growth is an entirely different matter (Lönngren & van Poeck, 2021; Termeer et al., 2019). This is because limited financing avenues and incomplete information often weaken local governments.

For this reason, this research study wishes to enrich local governments with additional reference material on successful green practices, novel approaches to achieving urban resilience, and methods to localize creative and sustainable financing. In doing so, the study encapsulates innovative green urban development practices in ASEAN cities. The said practices are broad in focus and encompass seven thematic areas, including air pollution and clean urban transport solutions, sustainable urban mobility planning (SUMP), water and sanitation, climate-smart and sustainable infrastructure, waste management, renewable energy and energy efficiency, as well as green spaces and urban biodiversity. Additionally, this report will be the first out of a three-part multiple case-study series produced conjointly by United Cities and Local Governments Asia-Pacific (UCLG ASPAC) and United Nations Capital Development Fund (UNCDF) under the Smart Green ASEAN Cities (SGAC) program. However, only a handful of issues will be showcased for the first part of this series. This includes climate-smart and sustainable infrastructure, waste management, and urban green spaces.

1.3 Methodology

This publication utilized a qualitative multiple case-study method to obtain an in-depth and structured understanding of how local governments solve "wicked" environmental issues with leading practices (Lönngren & van Poeck, 2021; Termeer et al., 2019). This piece of inquiry wishes to explore the results, replicability, and sustainability components of

these practices. However, this project is not in the business of determining whether or not a best practice is, indeed, "best" (i.e., this project accepts any practices the city government believes are at face value).

Since we aim to provide holistic details for each selected intervention, this necessitates a deeper understanding of the technicality, complexity, sustainability, and results of every selected intervention. To do so, we employ semi-structured qualitative interviews with the respective focal points from the selected city governments. A semi-structured interview was chosen because it allows us to gain a substantial edge to freely retrieve information and construct a detailed account of the interventions (Jamaludin & Yusof, 2013). Accordingly, an interview guide was developed to satisfy the above purposes. The interviews were conducted via teleconference and lasted between 45 minutes and 120 minutes. All written consents were retrieved from the respective focal points prior to the interviews. All interviews were recorded and consequently transcribed. Narrative analysis was performed to acquire details of the implementation processes, followed by a deductive content analysis (see Elo et al., 2014; Gibbs, 2007), using close coding (see Bingham, 2023), to identify and assess the components of replicability, sustainability, and results.

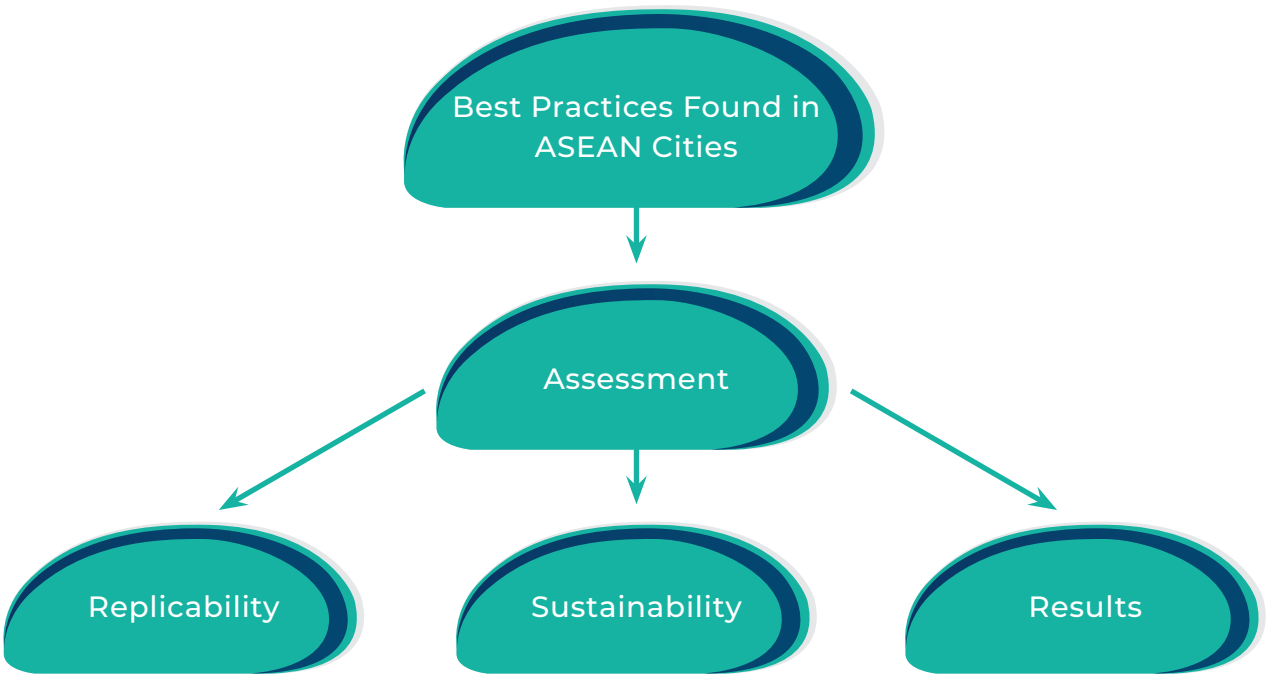


Figure 1. Best Practices Assessment Framework

Results can be interpreted as how an initiative could answer the pre-designated objective and bring much-needed benefits to all layers of society. Results, in this case, include that of (i) relevance; (ii) performance (i.e., the number of awards received by the subnational government from the practice) (Lyver & Lu, 2018; Pradana et al., 2022); (iii) impact on the economy; (iv) social impact; and (v) impact on the environment (APEC, 2021; OECD, 2021).

Sustainability can be referred to as the extent to which the initiative's benefits (are likely to) continue (OECD, 2021). A practice can be said to bear the potential of durability when

it possesses (i) alignment with national and subnational plans and policies (De Vries et al., 2016; de Vries et al., 2018; Korac et al., 2017); (ii) the level of community participation – this element of sustainability will only be eligible for assessment if a strong case of co-production scheme is identified (Osborne & Strokosch, 2022; Pradana et al., 2022); and (iii) sound financial and regulatory support from the subnational government (Cinar et al., 2019, 2022). Subsequently, this study wishes to explore these elements of sustainability within each practice.

Replicability here is defined as the local governments' ability – using their pre-existing resources and regulations – to resemble the program(s) being studied. Replicability considers the stakeholders involved, the extent of regulatory changes required, the depth of infrastructure modification or addition considered to be necessary, and the financial arrangement as well as expenditure incurred to finance the program (APEC, 2021; OECD, 2021).

This study also incorporates the use of secondary data to complement that of semi-structured interviews (Carter et al., 2014). The secondary data includes news, journal articles, documents published by non-governmental bodies, and government publications. The secondary data were sampled according to the predetermined thematic areas of green smart urban practices (i.e., climate-smart and sustainable infrastructure, waste management, and green spaces) and confined solely to ASEAN cities. If deemed necessary, the authors use data triangulation, specifically for news articles, to test the validity of the information through the convergence of information from different sources (Carter et al., 2014). This is carried out by carefully selecting information from mainstream news media and comparing and contrasting the news contents to find similarities amongst news from different mainstream platforms. The gathered secondary data were then analyzed using document analysis.

This study has its limitations. The difference in the number of government officials interviewed per practice may have resulted in differences between data saturation levels per initiative. Consequently, differing depths in data may contort the accuracy of the analysis. However, this study has tried to cover the deficiencies associated with the above mishap using secondary data.

Source makassartoday.com

2o Best Practices Overview and Assessment

This subsection will explore and assess cities' current efforts in developing climate-smart infrastructure, municipal waste management, and urban open green spaces. The assessment will encompass the respective city profiles, issues, solutions, and their programs' abilities to provide replicability, sustainability, and results.

Table 1. Overview of the Initiatives

Country	City	Thematic Area	Name of the Initiative
Indonesia	Makassar	Climate-Smart and Sustainable Infrastructure	*Smart Aparong (Apartemen Lorong* or Alley Apartment)
		Waste Management	Waste Bank
		Urban Open Green Spaces and Urban Biodiversity	*Lorong Garden* (Alley Farming)
The Philippines	Quezon City	Urban Open Green Spaces and Urban Biodiversity	GrowQC
		Waste Management	Trash to Cashback Program
		Climate-Smart and Sustainable Infrastructure	Solarizing Public School Rooftops in Quezon City

2.1 Makassar City

Population:
1,432,189
Inhabitants (Makassar City Bureau of Statistics, 2022a)

GDRP:
$13.544 billion (Makassar City Bureau of Statistics, 2022b)

Area:
199.26 km2
(South Sulawesi Province Bureau of Statistics, 2019)

Figure 2. Makassar City

Makassar is the capital of South Sulawesi Province, Indonesia, and is home to approximately 1.43 million citizens, according to Makassar's Bureau of Statistics (Makassar City Bureau of Statistics, 2022a). Makassar is the largest city in the eastern part of Indonesia, with a total area of 199.26 square kilometers, and is thought to be one of the biggest urban hotspots in Indonesia (Makassar City Government, n.d.; South Sulawesi Province Bureau of Statistics, 2019) Situated on the southwest coast of Sulawesi, Makassar is particularly famous for its culinary dishes, tourism, and a strategic trading port connecting Indonesia with other parts of the world.

However, given Makassar's topography, demography, and geography, the city is prone and susceptible to environmental disasters. The mounting urban population also poses an ever-increasing threat to waste management and urban green space. The following subsections will explore these issues in depth and provide readers with the best practices the city has managed to develop in recent years.

2.1.1 Climate-Smart and Sustainable Infrastructure Program Overview

Program Overview

Smart Aparong was conceived to mitigate the potential impacts of disasters. This program has two primary functions. The first is to provide the vulnerable population with affordable housing, while the second function is to provide citizens with a safe place to seek temporary shelter during adversities.

Problems

Makassar is a densely populated city in a predominantly low-lying area along the coastline. Several water bodies, including rivers, flow through and around it. These geographical features, combined with the impacts of human-induced climate change over the past few decades, make the city vulnerable to various disasters.

Table 2: Disaster Risks in Makassar City

Makassar Disaster Risk	
Disaster Risks	**Level of Risk**
Flood	High
Angin Puting Beliung	Low
Tidal Wave and Abrasion	Medium
Earthquake	Low
Drought	Medium
Tsunami	Medium
Epidemic and Infectious Disease	Low
Technological Failure	Low

Source: Indonesia's National Agency for Disaster Management (BNPB) (2021)

Table 3 shows disaster risks in Makassar. The city is particularly at risk of flooding, moderately susceptible to tidal waves, abrasions, droughts, and tsunamis, and comparably less prone to *angin puting beliung* (tornados), earthquakes, epidemics, and technological failure. BNPB (2021) further stipulates that, at any given moment, 930,447 citizens are potentially exposed to flooding, 1,265,823 inhabitants may be susceptible to *angin puting beliung*, 24,661 citizens are prone to tidal waves and abrasions, earthquake risk for 1,265,823 residents, tsunami risk for 22,001 residents, and epidemic risk for 1,265,823 residents. This affirms that Makassar is susceptible to an array of hazards that may affect many lives.

Solutions

Smart Aparong (*Apartemen Lorong*/Alley Apartment) was first initialized in the mid-2010s when the current mayor, Danny Pomanto, first took office. *Aparong* was designed as one of the many salvations to adversities, particularly dangerous hydro-meteorological-related adversities (i.e., flooding). While the main purpose of the solution still stands, its design has changed several times throughout the years. Initially, *Aparong* was primarily prescribed to improve private housing conditions, particularly in housing areas with high exposure. However, due to legal limitations (i.e., the city government is forbidden from conducting any changes to private properties), *Aparong* pivoted into what it is today: a fusion of disaster shelters and government-controlled apartments.

In the reinvented version of the solution, *Aparong* is intended to become a four-story building housing over 18 rooms: the first three levels are where these rooms are located, whilst the uppermost level consists of a child-friendly roof garden. On top of that, the building will also be equipped with resource-conservation technologies and a retention pond. The former

includes the use of water-treatment technologies to convert wastewater into usable water for residential purposes (i.e., watering the plants) and efficient windows to help regulate temperature on the inside (and negate the need for air conditioners) and let natural light into the building (and consequently curb the demand for electric lighting) during the day. The latter helps to hold and distribute rain runoff, which helps prevent flooding. When the building is up and running, it will be managed by a subsidiary administrative organization under the Department of Housing and Settlement called the *UPTD Rumah Susun Sewa (Rusunawa)*.

Figure 3. Smart *Aparong*

Source: Makassar City Government (2023)

When there is no disaster in the city, the building functions as an apartment for citizens from lower economic background to live in but leaves about 40 percent of the total rooms unoccupied to prepare for any unforeseen adverse event – keep in mind that this initiative is at its planning stage, so changes may occur throughout the its designing process. Throughout their stay, residents will be subjected to a rental fee of 200,000 IDR per month, or about USD 13 per month, while disaster refugees are not subject to any payment. Consequently, when a disaster strikes (or is expected to occur), 40 percent share of rooms – approximately seven of all available rooms – will be vacated for citizens to temporarily reside until whatever danger has been claimed to subside.

The first vertical *Aparong* will be placed on top of a 1,200-square-meter land in Tamalate District, Makassar. If deemed successful, the city government plans to expand its use to every single regent (*kecamatan)* in the city.

Challenge(s)

Legal

The first challenge within this initiative's design is legal limitation. In this sense, the law forbids the city government from improving private domiciles. In navigating the next best solution for this initiative, the government moved away from the initial idea of renovating existing private domiciles to designing an entirely new building that shelters the least fortunate citizens from both disasters and informal settlements. In doing so, however, it stumbles upon another challenge: the availability of land. Finding a 1,200-square-meter idle land is a challenging feat. In growing cities like Makassar, land is rarely unoccupied. However, even when a plot of land is deemed fitting to the needs of the city government, the city must go through a sequence of bureaucratic red tapes and back-and-forth negotiation with the landowner(s) to free the said land. This is particularly true in the case of Makassar, which is worsened by the lack of experience in this area.

Financial

Financial compliance from renters is also a potential challenge to this initiative. Based on Makassar's past government-controlled apartment units, many residents struggled to keep pace with the monthly rental payments, leading to arrears and failure to pay rent.

Assessment

Results

Relevance

This report defines relevance as the extent to which the intervention responds to the issue at hand. The initiative ought to provide refugees of an adverse event with a sanctuary for the time being, serve as an additional housing for people in need, and address climate change, although the extent of its effects may be arguable, via the use of a retention pond and water-treatment technologies, among others.

Performance

The initiative is at the planning stage and is not yet qualified for an award.

Impacts on the Economy

Because this initiative is still in the works, it has not yielded any tangible economic benefits for the citizens. Even so, this does not mean that the initiative bears zero potential for the citizens. The program has the propensity to promote economic efficiency via the conservation of energy and resources (i.e., the use of water treatment technology) and improve purchasing power for the permanent residents of the building.

Social Impacts

If everything goes as planned, the citizens are bound to experience an improvement in comfort and mental stability during the time they spend in the *Aparong* as disaster survivors. In the event of a disaster, a shelter acts as a place of security and provides access to food, water, and medical treatment. It also has the propensity to promote better living conditions for those who previously lived in improper settlement areas.

Impacts on the Environment

Aparong also has the potential to lessen the possibility of a disease outbreak, conserve energy consumption, and contribute to the increase of Urban Green Spaces (UGS) and child-safe

playgrounds. While the construction of *Aparong* may disturb the ecological balance of the area, the city government plans to develop a retention pond within the vicinity to distribute water runoff and prevent flooding.

Alignment with National and Subnational Plans and Policies

This initiative is aligned with Law No. 24 Year 2007 concerning Disaster Management. The law mandates the fulfillment of the rights of communities and refugees affected by disasters and community protection from the impacts of disasters. Additionally, the program adheres to Makassar's 2021-2026 Regional Mid-Term Development Plan (RPJMD) (2021, Chapter 5) targets, such as improving the "availability of green open spaces... increasing the quality of the drainage system and flood management... realizing Makassar as a Livable City based on alleys and communities [and] increasing control of pollution and environmental damage." Additionally, this initiative is aligned with the city government's minimum standard of service delivery, as outlined on the city's 2021-2026 RPJMD (2021, Chapter 6): "provision and rehabilitation of habitable houses for disaster victims... [and] protection... during and after disaster emergency response for disaster victims." (2021, Chapter 5) (2021, Chapter 5) (2021, Chapter 5) (2021, Chapter 6) (2021, Chapter 6) (2021, Chapter 6).

The Level of Community Participation

The community is not involved as the project's co-designer and will not be involved in the implementation stages as the co-implementer. Therefore, assessing this aspect of the program can be rendered irrelevant.

Subnational Budget and Regulatory Support

The Housing and Settlement Department receives a designated post of financing from the local government budget, and the amount of funding allocated for the program has been increasing for the past year. The local government has allocated 3 billion IDR or ~ USD 195,000 (out of a total of 32 billion IDR or approximately USD 2 million) in 2022 and 11 billion IDR or ~USD 710,000 (out of a total of 64 billion IDR or ~USD 4.1 million) in 2023 – or 10 and 23 percent of the housing and settlement department budget, respectively – to the department of housing and settlement

of Makassar for the construction of the building and its surrounding. Additionally, no specific city regulation that supports the development of an *Aparong*. However, Local Regulation No. 2 Year 2019 on Government-Controlled Apartments (*Rusun)* does govern the development of government-controlled apartments.

Stakeholder Involvement

The program's only other-party involvement is the mere use of private contractors to deepen and materialize the wishes of the department – the city government hires an external contractor, via procurement processes to develop the details for *Aparong* and, later, build the very idea.

The Extent of Regulatory Change

No regulatory changes or additions were made in the effort to develop *Aparong*.
The Depth of Infrastructural Changes

Aparong requires the development of a residential building, a roof garden, and a retention pond. Financial Arrangement and Expenditure

The financing scheme of *Aparong* is entirely dependent on the use of the local government budget, in this case the *Anggaran Pendapatan dan Belanja Daerah* (APBD). As of 2023, 14 billion IDR (roughly equivalent to USD 900,000) have been sunk into the program. The said expense covers, among other things, the purchase of the land and the design of the building.

Once up and operational, the *UPTD Rumah Susun Sewa (*Rusunawa*)* will bear any operational expenses. However, aid from the city government via the department of housing and settlement can be employed when needed. Consequently, the same governing authority will capitalize on the revenue it receives from rent payments (200,000 IDR per month per room, or about USD 13 per month per room).

2.1.2 Waste Management Program Overview

Makassar is battling against the mounting of waste in the city. The city introduced waste banks to reduce waste going into landfills, developing a circular economy.

Makassar produces about 1,000 tons of waste per day or approximately 0.7 kg per capita per day (Munsir, 2022), of which biodegradable waste (i.e., food waste) is predominant (54 percent). Some might regard the above number to fall under the typical ranges of waste a city produces daily. However, this number is substantially worse when the Makassar landfill operates beyond its ability. The Antang landfill, constructed in 1993, is the sole landfill anticipating waste generation from the residents of Makassar, covering a total area of approximately 20 hectares. In recent

years, the landfill has witnessed an ever-increasing amount of waste and is home to colossal piles of garbage that have reached 50 meters in height (Munsir, 2022). It is then imperative for the city government to reduce the amount of waste, be it by curbing the number of materials produced or the amount of waste disposed into the landfill.

Solutions

Waste banks are particularly prominent in Makassar. Waste bank is a place for exchanging waste with perceived economic value, be it organic or non-organic waste**.** In waste banks, organic wastes (i.e., waste cooking oil and food remains) are often converted into compost, biodiesel, and beauty products, whilst non-organic wastes are sorted into plastic, paper, glass, and metal. There are two sub-forms of waste banks in Makassar: the central waste bank and waste bank units. The former is carried out by a technical body created by the city government whilst the latter is managed by the local community (i.e., schools, offices, and residences). In other words, the community can be both the administrator and the beneficiaries of waste banks – the latter refers to any individual within the city who wishes to exchange their waste for compensation.

As a beneficiary, an individual who segregates waste at source is welcome to exchange their waste at the pre-designated trade points. This program has no barriers, as all citizens can enroll. Suppose the individual is foreign to the program, the individual must first register and open an account before any transaction commences. The individual will then be allowed to admit any waste they accumulated at the collection point, where it will be weighed, verified, and prescribed the appropriate economic value – much of the calculation usually depends upon the weight and the prevailing rate for each eligible waste. The following value received from the above process will be deposited into the account, which will accrue greater economic value over time, assuming that the individual continues to dispose of their waste at the waste bank unit. Should the individual require the money from the account, the individual is free, at any point, to withdraw their money.

As an administrator, individuals within each community are responsible for coming up with an organizational structure, fulfilling the required legalities, and carrying out tasks relevant to waste bank unit management on a daily basis – the waste bank units also receive training and socialization from time to time. The latter ranges from weighting the wastes to verifying the waste against the prevailing criteria to keeping track of the accounts and amounts of economic value gained by the participants on a daily basis. The waste bank units earn money from selling the compiled recyclables to the central waste bank. The profit received from the transaction is re-injected into the unit and distributed to each member. Additionally, any prerequisite or resources necessary to kickstart the initiative will be provided.

The central waste bank, on the other hand, provides a greater longevity foundation for waste bank units. In this sense, central waste banks guarantee that recyclable items garnered by the waste bank units are consistently purchased by another entity, palpitating a just version of a monopsony. The central waste bank earns its profit by

selling the collected materials derived from the waste bank units on a margin to companies or other parties specializing in processing these materials, promoting further longevity. The use of margin covers the cost of fuel (i.e., to retrieve materials from waste bank units and distribute them to clients and vendors), wages, transport, and equipment maintenance, with the most dominant expense being wages. If there is anything left in the profit pool, the remaining profit will be funneled into the city's income revenue, and the same exact process is repeated every fiscal year.

On top of that, the central waste bank prioritizes vendors that utilize recyclables to produce other products – it ascertains the validity of the vendor via a vetting process. Olymplast is one of the vendors for the city's central waste bank, specializing in plastic furniture. This vendor utilizes plastic waste from the central waste bank and turns it into cabinets, chairs, tables, and more. It is important to note that the city's central waste bank does not possess an MoU with any of the vendors due to the fluctuating nature of the recyclable prices. At the same time, a contract can be exerted to shelter the central waste bank from a sudden dip in the prices of recyclables, being able to pick out the best price possible at any given point (i.e., maximize profit if there is a staggering increase in prices) is perceived as the utmost priority for the central waste bank. Additionally, the central waste bank will allow the transfer of certain resources (i.e., black soldier fly maggots) to waste bank units in need.

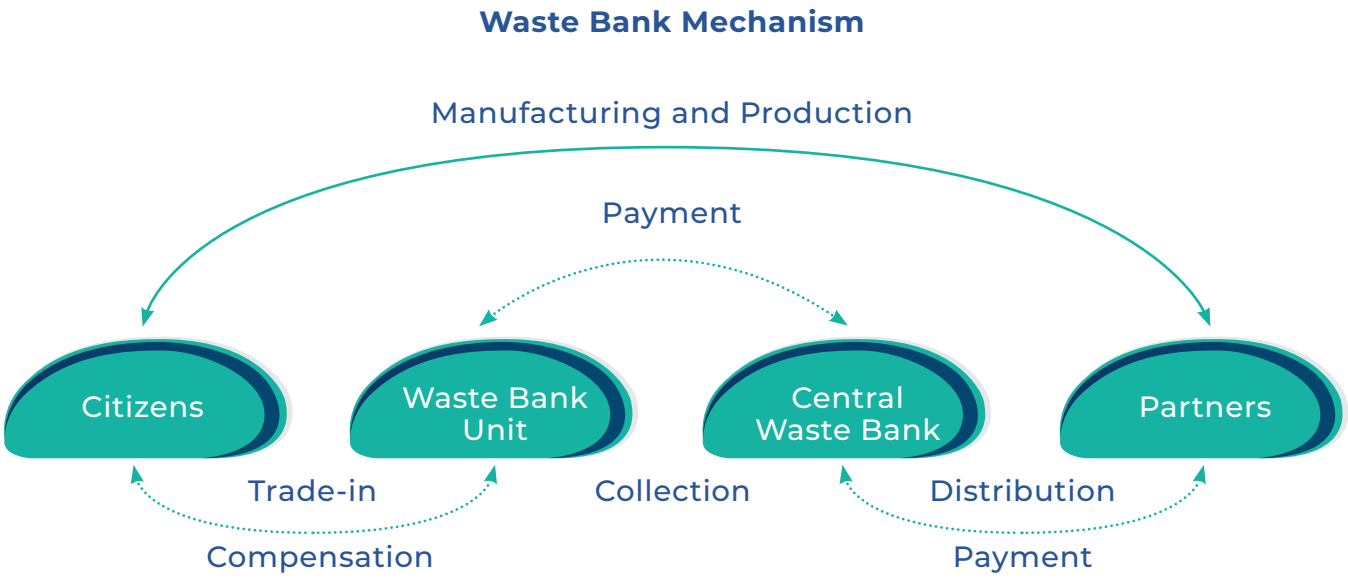


Figure 4. Waste Bank Mechanism

Source: Authors' own interpretation of the waste bank initiative

Waste banks are not conceptually new to the city of Makassar. In fact, they were introduced back in mid-2010. However, the city government has not deemed the results from the first ten or so years of this initiative sufficient.

Consequently, the city government decided to devise a series of solutions to surge community participation in 2022. It is essential to highlight that waste bank units

are initiated and run by the local community, such as school administrators, office workers, and district residents. These strategies include (i) instilling better information about recycling and waste bank processes via local champions, (ii) making the existence as well as the implementation of a waste bank unit under an RT and RW a requisite for the provision of incentives for the head of RTs and RWs in Makassar (RT, or *Rukun Tetangga*, and RW, or *Rukun Warga*¸ are administrative units used for local governance and community organization) and (ii) the diversification of waste accepted and produced at waste banks. The latter, in particular, involves a high degree of adaptation to surrounding practices and contexts. The city learned that *jelantah oil* (waste cooking oil) is being improperly disposed of in water streams and that food and organic wastes constitute the city's most significant components of waste generation. Thus, it now accepts *jelantah oil* (this can be upcycled into biodiesel), produces eco-enzymes, and utilizes black soldier fly maggots to help digest and reduce waste generation derived from the above sources.

Challenge(s)

Community Participation

In the past years, the program has witnessed a steady decline in community participation. This decline can be identified partly from the steep decrease in mobility due to COVID-19 and the political transition from 2019 to 2021.*Administrative*

The addition of waste cooking oil into the mix of the accepted list of waste increases the occurrence of citizens trying to game the system. The value of wasted cooking oil is judged per kilogram: heavier content translates to greater reward. To maximize the income generated from depositing waste cooking oil into the waste bank unit, some citizens have been found to surge the liters of oil by fabricating its content, primarily by adding water to the waste cooking oil. In doing so, this practice jeopardizes the ability of the said cooking oil to be reused or repurposed. Fortunately, the city has managed to tackle this issue by providing a standard of purity for waste cooking oil and encouraging the staff at the waste bank units to be more vigilant to this practice.

Technical

The mechanism for processing food waste differs from that of other materials, posing technical issues for the program. There are two ways of processing food waste within this program: the first is using black soldier flies, and the second is transforming food waste into eco-enzymes.

Rather than selling food waste to vendors and clients, the first method processes food waste in-house with the equipment possessed by the central waste bank (waste bank units can also organize this method, but it is primarily the work of the central waste bank). Using black soldier flies (i.e., it feeds its maggots with food waste), the central waste bank utilizes additional technology to facilitate the black soldier fly's ability to decompose food waste. Once they reach maturity, the black soldier flies (and any of their by-products) will be sold as beauty products, while the digestate can be used as compost later. However, the machines used to process the

said material are now broken and are stifling the ability of the central waste bank to break down food waste. Furthermore, this method requires an adequate amount of knowledge.

Similarly, using eco-enzymes requires knowledge that must be transferred from one another. Utilizing food remains, waste bank units transform fruits and vegetables into organic cleaners, compost, and pesticides. However, the finished product is not required to be sold to other parties; it can be utilized for personal purposes instead. While training and socialization were conducted to ensure that waste bank unit administrators possess adequate knowledge to produce eco-enzymes, not all units are equipped to produce eco-enzymes.

Assessment

Results

Relevance

Figure 5. Waste Composition, Makassar (Makassar City Government, 2023)

Makassar produces approximately 373,000 tons of waste annually (see Figure 5 for details regarding waste composition). However, the city only has one landfill – the Antang landfill – to anticipate waste generation for the residents of Makassar.

In recent years, the landfill has witnessed an ever-increasing amount of waste. The local government is aware of this paramount issue and is trying to reduce the amount of waste the Antang landfill receives via waste banks. These waste banks accept various waste materials, ranging from paper, plastic, glass, and metal, and just recently incorporated waste cooking oil and organic waste (i.e., food remains) into the mix of accepted materials.

Performance

Numerous waste bank units have won awards for retrieving recyclable materials (Harian Fajar, 2023; Laraspati, 2023). In 2017, Makassar was conferred the 4th Environmentally Sustainable Cities Award (Burhani, 2017).

Impacts on the Economy

Waste banks have had a notable impact on the city's economy. The central waste bank operator, *UPTD Bank Sampah Pusat Kota Makassar* (a subsidiary technical unit of the environmental department that runs the central waste bank), is subject to a target of 50 million IDR (or about 3,200 USD) in revenue per annum. This target has been achieved consistently throughout the years of implementation, as it earns about 3 to 7 million IDR (or USD 193 to USD 450) in profits per month.

Figure 6. Annual income generated from the sale of recyclable material at waste bank units (in USD) 2016-2022 (Makassar City Government, 2023)

Figure 6 illustrates the annual income generated from the sale of recyclable materials at waste bank units from 2016 to June 2023. The peak revenue occurred in 2017, totaling USD 192,529.54, with a subsequent downward trend. By the first half of 2023, the income had decreased to USD 31,270.73. The program promotes economic benefits to the community. From 2016 to 2023, the central waste bank injected USD 816,203 (or approximately 12,2 billion IDR) into the local community. All parties involved, from the waste bank unit administrators to the beneficiaries (i.e., students, office workers, and residents), enjoyed additional income from this injection (i.e., revenue from the central waste bank buying materials). For instance, an average waste bank unit may receive between 300,000 IDR and 3 million IDR in gross profit per month in 2022 (or USD 19 to USD 192 per month). Unfortunately, this found no data revealing the specific reward amount received per beneficiary.

Social Impacts

The majority of participants in this program are at an economic disadvantage. The compensation received from program involvement provides another layer of income that can increase the participant's purchasing power and subsequently serves as a tool to lessen the participant's vulnerability. However, since this report could not retrieve any indication of the specific amount of compensation received per participant, the extent of this effect is unknown.

Impacts on the Environment

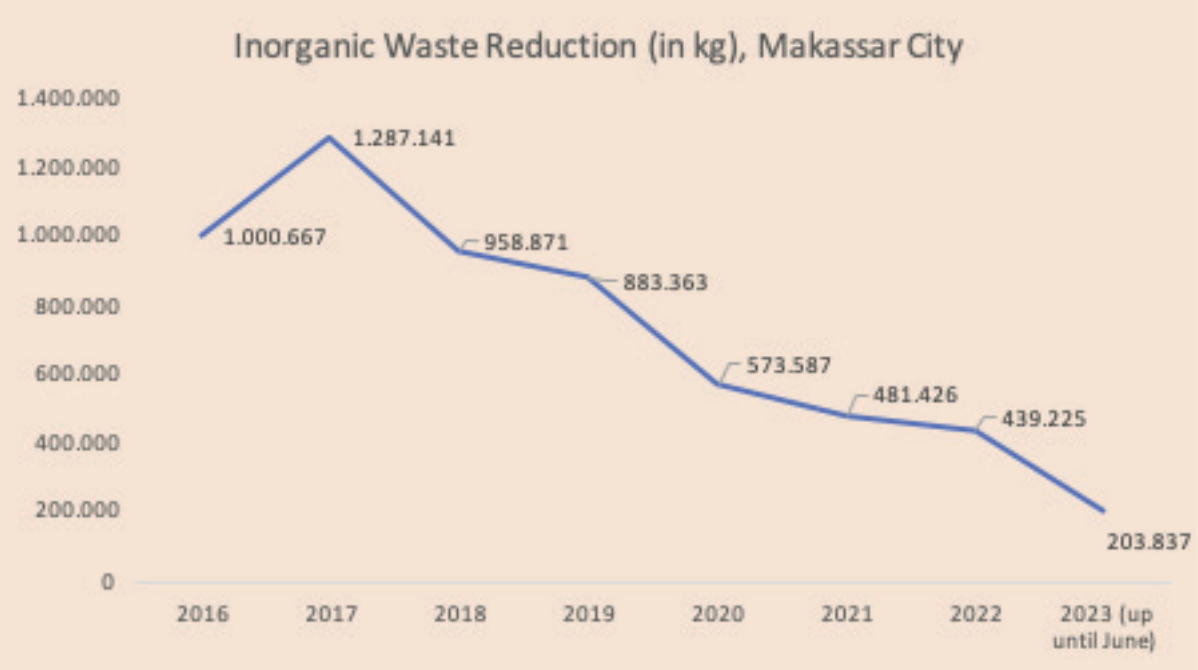


Figure 7. Waste Bank Inorganic Waste Reduction (in kg) 2016-2023, Makassar (Makassar City Government, 2023)

The existence of waste banks in Makassar helps to protect the environment and lessen the rapid progression of climate change. From 2016 to 2023, the program has reduced 5,828,117 kg of inorganic waste (i.e., glass, metal, paper, and plastic) (see Figure 7). From the reduction number above, paper and plastic wastes constitute the two most significant inorganic recyclable items – approximately 60 percent and 25 percent, respectively – and are subject to various manufacturing purposes. For instance, some of the plastic waste retrieved by the central waste bank is utilized by one vendor as input to produce plastic furniture.

Additionally, the city government has scaled down organic waste. From 2022 to 2023, 634 kg of *minyak jelantah* was reduced and transformed into biofuel. There is no comprehensive data detailing the ups and downs of food waste reduction. However, at one point, food waste was reduced to 600 kg per day and consequently transformed into beauty products and compost (i.e., oil retrieved from black soldier flies can be utilized as face oil). Unfortunately, the damage done to the machines stifles the processing of food waste entirely.

Altogether, this means that the city has contributed to resource conservation, lessened energy consumption and emissions associated with resource extraction and manufacture, prevented materials from entering landfills, and moderated the degree of soil contamination due to waste decay.

Sustainability

Alignment with National and Subnational Plans and Policies

This program is aligned with various laws at the national level. The initiative is supported as well as facilitated by Law No. 18 Year 2008 concerning Waste Management; Government Regulation No. 81 Year 2012 on Management of Household Waste and Types of Household Waste and No. 27 Year 2020 concerning Specific Waste Management;

and Presidential Regulation No. 97 Year 2017 on the Direction of National Policy and Strategy Regarding Waste Management (Jakstranas); Minister of Environment and Forestry Regulation No. 75 Year 2019 concerning Roadmaps for Waste Reduction by Producers; and minister of Environment Regulation No. 13 Year 2012 concerning 3R (Reuse, Reduce, Recycle) Waste Management through Waste Banks.

At the local level, this program is aligned with Mayoral Regulation No. 36 Year 2018 concerning the Policies and Strategies in Waste Management – it stipulates that the city's waste generation must be reduced by 30 percent in 2025 while the rest (70 percent) must be adequately treated (e.g., sorting, collection, delivery, and so on). The regulation further states that waste can be reduced by reducing, reusing, and recycling waste. Thus, it can be said that the inception of waste banks aligns with the city's ambition to reduce waste.

The Level of Community Participation

Community participation has shown a consistently declining trend in the past years. Drawing from the amount of waste reduced by the program from 2016 to 2022 (see Figure 7), it shows that the reduced amount has lessened substantially over the years. While several interventions, such as the addition of *minyak jelantah* into the mix of accepted materials, were introduced to propel the extent of community support in mid-2022, it seems too early to ascertain the extent of effectiveness from the interventions (as data for 2023 is only available up to June 2023).

Subnational Budget and Regulatory Support

Several city-wide regulations were issued in support of the program. These regulations include Mayoral Regulation No. 126 of 2016 on the inception of *UPTD Bank Sampah Pusat Kota Makassar*, Mayor Regulation No. 36 Year 2018 regarding the Direction of City Policy and Strategy on Waste Management (Jakstrada), and Mayoral Regulation No. 99 Year 2017 on the Management of Waste Cooking Oil. The regulations mentioned above govern, among other things, the management of the central waste bank, the supposed reduction of waste target of 30 percent by 2025, and the addition of *minyak jelantah* to the list of accepted materials.

In addition to the previous, the central waste bank receives a certain amount of budget from the city government on top of the profits made by both the central waste bank and the waste bank units via *Uang Persediaan* (UP, which is a work advance payment in a certain amount given to finance the daily operational activities of the Working Unit, which, according to their nature and purpose, are not possible through a direct payment mechanism) of 25 million IDR per month (or approximately USD 1,600 per month). This provision will be returned to the city government at the end of each month. On top of that, the city also incorporates a conditional incentive scheme for the heads of RTs and RWs, with incentives ranging from 500,000 IDR to 2,000,000 IDR per month for RTs (or USD 32 to USD 128 per month) and 1,250,000 IDR to 2,500,000 IDR per month for RWs (or USD 80 to USD 160 per month). One of the conditions stipulated by Mayoral Regulation No. 27 Year 2022 is to incorporate waste bank units in their respective region.

Stakeholder Involvement

In this initiative, community involvement holds a pivotal role in ensuring the efficacy as well as the performance of waste banks. As a beneficiary, the community's role is indispensable: the input of recyclable materials depends on how many items the citizens give to the waste bank units. Consequently, should there be a decrease in citizens' participation, the waste bank units will suffer from reduced received materials. As a waste bank unit administrator, the community ensures these units' viability by carrying out daily operations and managing transactions through the community fund.

The program also involves vendors in preserving longevity. Vendors specialize in processing or selling recyclable materials, although prioritization is given to those who conduct the former. Vendors are responsible for buying and, most of the time, processing the recyclables collected by the central waste bank from the waste bank units. This ensures that materials received from the waste bank units can be sold for profit, therefore preserving the economic longevity of the program.

A vendor is selected on a rotating basis based on the current market price; whichever vendor provides the best price for a particular subtype of recyclable material will be appointed**.** A vendor may hold one or more subtypes of waste. For instance, Olymplast, a business entity specializing in producing plastic furniture, has been a vendor for the central waste bank on numerous occasions. They have had the opportunity to purchase most subtypes of plastic waste and utilize the waste as raw material to produce their plastic furniture.

The city government supports the program by initially covering capital expenses for acquiring tools and equipment for the central and waste bank units (i.e., weight scale). They also contribute to the operational expenses of the central waste bank via *Uang Persediaan*. Additionally, the city government, via the environment department (i.e., motivators), offers training sessions and socialization programs for administrators and beneficiaries of waste bank units. On top of that, the city government also introduces new rules and interventions to be implemented by

other stakeholders within the program (i.e., the acceptance of *minyak jelantah* into the mix of accepted items).

The central waste bank serves as a vital link between waste bank units and vendors, ensuring the program's sustained success. On specific occasions, the central waste bank extends support by providing technical assistance and resources to waste bank units in need, including items like maggots.

The Extent of Regulatory Changes

The implementation of the waste bank initiative entails various rule inventions. As a derivative of the city's effort to adapt to the surrounding environment and elevate participation amongst citizens, the city had laid out several regulations, such as Mayoral Regulation No. 126 Year 2016 on the inception of *UPTD Bank Sampah Pusat Kota Makassar*, Mayor Regulation No. 36 Year 2018 regarding the Direction of City Policy and Strategy on Waste Management (Jakstrada), Mayoral Regulation No. 99 Year 2017 on the Management of Waste Cooking Oil, and the Mayoral Regulation No. 27 Year 2022 to take into consideration the existence and implementation of waste bank units in RTs and RWs as a requisite for the provision of incentive for the heads of RTs and RWs.

The Depth of Infrastructural Changes

Implementing the waste bank initiative involves creating storage facilities and procuring transportation modes to transport the materials retrieved from the waste bank units. On top of that, a set of tools and equipment is needed to weigh the materials and process them – the latter is only relevant for organic waste. The city is currently acquiring a technology to process organic waste from overseas. The city will adopt a new technology to increase the economic value of waste, improve efficiency, and surge its current output. In this case, the current central waste bank has utilized a rather traditional method, Black Soldier Fly (BSF) maggots, to reduce the amount of organic waste going into landfills. While cheap, this method is perceived to be inferior in efficiency and output production to that of others. The city is now procuring new technology from South Korea to replace the current technology. If implemented, this technology will process organic waste (i.e., food) much faster and produce a much larger output.

Financial Arrangement and Expenditure

The program's funding comes from the city's local budget, community funding, and grants (to replace the broken technology utilized to process organic waste).

The local government budget is incorporated to incentivize the heads of RTs and RWs to promote waste bank units in their area. It is also employed to aid waste bank units with the financial backing to kickstart their operation. Similarly, the local government budget also provides the central waste bank with the necessary capital expenses, and this includes the purchase of transportation modes to transport the recyclable items from one place to another and to imbue the central waste bank with *Uang Persediaan* to cover its operational expenses. The central waste bank may extend support to waste bank units but usually does not incur any cost (i.e., the provision of maggots and technical assistance are free) on both parts.

Once waste bank units have been deemed financially self-sufficient, profit from selling the items to the central waste bank will be pooled under the waste bank units' respective community funds. The community fund is set up to serve several purposes, such as to cover the maintenance of tools, to put together accumulated savings made by the beneficiaries (accruing from the transactions made between the beneficiaries and the waste bank unit), as well as to serve as a capital to process organic waste – the latter is not mandatory but can be done should the waste bank unit wishes to do so.

The program's financing scheme also involves grants, with the city securing new technology from South Korea. If implemented, this technology promises to enhance the economic value of waste, improve overall efficiency, and significantly increase output. Specifically, the new technology has the capability to process organic waste, such as food, at a considerably faster pace and yield a substantially greater output compared to the current technology in use.

2.1.3 Urban Green Spaces and Biodiversity

Program Overview

Due to rapid urbanization, Makassar has struggled to provide open green spaces for its inhabitants. The city tries to address this issue by creating a program called *Lorong Garden*. This program serves the citizens with green spaces by installing plantations in alleyways. Additionally, *Lorong Garden* aims to control the inflation of food prices and maintain food security by generating nutritious vegetables from green spaces. This program is mainly implemented by agricultural groups and Small and Medium-sized Enterprises (SMEs).

Problems

Makassar is one of the largest urban centers in Indonesia. It is home where various economic activities and opportunities have burgeoned for years. Nevertheless, becoming a hub where most of eastern Indonesia's economic activity resides has disadvantages. As urban economies grow, they are compelled to fulfill the desires of the entities living within the city, such as the need for more land to conduct their activities. Over time, the constant need for land diminishes the available green spaces, sometimes to a point where urban green spaces become marginal or insignificant. Makassar is no exception to this urban occurrence. The program's inception was also driven by the citizen's distaste for soaring prices of agricultural commodities.

Solutions

Alley Farming, also known as *Lorong Garden*, was introduced by the city government in mid-2010. *Lorong Garden* is an initiative that seeks to reverse the problems mentioned earlier by making use of the otherwise unutilized side of the alley (i.e., gutter covers) – or unutilized land – as platforms for productive vegetation to grow (i.e., chili, mustard green, and tomato). This initiative is spread across the subdistricts'

alleys and operationalized by agricultural groups (*kelompok tani*), with the maximum number of members allowed being 25 people and SMEs.

The program has approximately nine hundred agricultural groups, classified into three distinct types: general agricultural groups, youth agricultural groups, and women agricultural groups. Among these categories, those led by women comprise approximately 95 percent of the total nine hundred agricultural groups participating in the program. Each agricultural group is structured with key roles, including a head, advisor (i.e., usually the head of the subdistrict, also known as *pembina*), instructor (i.e., usually an appointed bureaucrat from the department of fisheries and agriculture, also known as *penyuluh*), secretary, marketers, treasurer, results processor, and plant cultivators.

Every agricultural group must pocket a registration – can be earned via a decree (*Surat Keputusan*) issued by the head of the subdistrict – and submit predetermined documents to Simluhtan (*Sistem Informasi Manajemen Penyuluhan Pertanian, Kementerian Pertanian*, or Agricultural Management Information System, Ministry of Agriculture) prior to conducting their affairs as agricultural groups.

The city government, that is, the departments of environment (*Dinas Lingkungan Hidup)*, food security (*Dinas Ketahanan Pangan*), and fisheries as well as agriculture (*Dinas Perikanan dan Pertanian*), support this program by providing agricultural groups and SMEs with seedlings (i.e., chili seeds), polybags, hydroponics, planting media (e.g., husk charcoal, compost), plant racks, shovels, and other prerequisites deemed necessary for alley farming. Of course, the number of tools and instruments provided is contingent upon the availability of land, and both groups are subject to initial government support until they are financially self-sufficient. Additionally, the city government also provides socialization to agricultural groups –the socialization acts to provide the groups with know-how information to govern the end-to-end process of alley farming (i.e., from planting the seed to marketing it) – along with the provision of appointed instructors (*penyuluh*) to aid the said groups with the necessary technical expertise in carrying out the initiative on a daily basis.

The approach adopted by agricultural groups differs from that of SMEs. In this context, the former places a higher priority on community subsistence, while the latter is focused on maximizing profit. Agricultural groups aim to meet the community's demand first and only sell any surplus to external parties. They can sell the produce as-is or enhance its value by processing it into goods, such as turning bok choy into a flavorful juice or even ice cream. Conversely, SMEs prioritize transforming the produce into processed goods and selling it directly to external parties seeking the final product.

Groups from both approaches are equipped with a third-party digital platform to promote and distribute their yield. The city government has also facilitated various deals between these groups, a bunch of restaurants, and supermarkets to solidify the longevity and certainty of income flow – although participants under this program are also free to engage with other sellers that are not endorsed by the city government so long as the produce is available (i.e., mobile vegetable sellers). The financial gains from the trade will be recirculated into the SMEs and agricultural groups – be it to refinance the process, distributed to the group members, or both.

Recently, the initiative has incorporated machine learning and Artificial Intelligence (AI). These new additions develop the best-fitting innovative urban farming system and improve the system's viability to promote better air quality. It utilizes multiple sensors to observe the degree of air pollution (i.e., humidity temperature, carbon dioxide, sulfur dioxide, PM 2,5, PM 10) and the conditions of the plants in the area (e.g., mineral and PH composition). The data will then be fed to the city's central server and analyzed using machine-learning techniques. From there, the data crunched via the above method will garner practical information (i.e., the best type of vegetation to act as the pollution filter within a particular area and the most suitable type to be grown within a domain of settlement) on the best conditions to satisfy the objectives above.

This program has also integrated a smart irrigation system to enhance the success rate of harvests. The system operates through two primary methods: firstly, utilizing a digital application named Sirang Irong, and secondly, employing automatic sensors. The digital application can be activated through voice commands or scheduled routines, typically twice a day, allowing users to control the frequency and volume of water intake. The calculation of water intake can either be derived from the aforementioned AI system or conducted manually. On the other hand, the automatic sensors activate when certain thresholds are reached. For example, if the sensor detects a drop in humidity below a predesignated threshold, it will initiate watering without requiring a specific command. Once activated, both methods are administered: drip and capillary irrigation, as well as pest spray and liquid fertilizer if needed. The irrigation methods and the application of pest spray and liquid fertilizer can be adjusted according to the operator's needs. For instance, during rainy seasons, capillary irrigation may be turned off, as it has been identified as a contributing factor to plant fatalities during such periods.

Challenge(s)

Environmental

Like any other garden, Alley Farming is affected by pests. Pests damage the yields and make the alley's produce untradeable and unfit for residential use. However, pesticide use in urban areas is different and ought to be used more delicately than in rural areas, creating a unique challenge to the initiative. In response to this challenge, the program has tried to control the use of pesticides and rest the land for a given time (one to two weeks) before conducting another implantation.

Water quality is also known as another variable that troubles the implementation of the initiative. Makassar is a city that borders the sea. Due to its location, the city has varying water quality: the more a garden is placed closer to the sea, the more brackish the water becomes. This type of water is unsuitable for the vegetation planted in these gardens and, instead, may cause more harm than good to the plants. The city has tried to educate and socialize the participants involved about the type of water eligible for agricultural purposes.

Water intake is another issue faced by the program. Plantations have been documented to die due to a lack of uniformity in irrigation frequency and volume

(i.e., too frequent, too much volume, or too little volume and frequency). The city government introduced a smart irrigation system to respond to this danger. The introduction of the said system has helped the groups secure higher average yields and, consequently, elevate the amount of produce consumed per participant and the profit received from selling the produce and its consequent by-products. However, the scale of its implementation remains limited.

Weather is an external factor important to the program. High variability in weather affects the vegetation in the alley. The smart irrigation system also comes in handy for this challenge. Sensors detect any fluctuations in variables and are, therefore, useful in adapting and maintaining the balance needed to produce quality yield.

Community Participation

Participation is a challenge that is faced disproportionately throughout the city. In this sense, gardens closer to business centers are plagued with sub-optimal participation levels from the agricultural groups, whilst those farther from them are more active. This is because the inhabitants closer to business centers are preoccupied with their jobs and unable to participate in the program intensively. This affects the number of active agricultural groups in the aforementioned area. In counteracting the issue, the city government tries to propel the number of SMEs to fill the holes left by the absence of agricultural groups.

Administrative

The structure of an alley poses an additional challenge. First, it is a prerequisite from the city government that alleys must possess at least three to four meters in width for them to be deemed eligible for the program, and alleys that fit this criterion are not necessarily easy to find. And efforts to verify the widths of these alleys might become a nuisance for government officials. Second, the height of buildings in an alley affects the garden's productivity. Suppose buildings surrounding the alley are tall and block a good amount of sunlight to the vegetation. This reduces the program's efficacy because plants need sunlight to produce energy and eventually grow.

Assessment

Results

Relevance

Urbanization has compelled the city to allocate open spaces for urban necessities, reducing available green areas. Furthermore, the city frequently grapples with fluctuations in food prices due to shifts in regional supply, placing additional burdens on residents when prices surge. The program addresses these challenges by repurposing alleyways and unused land into green spaces suitable for urban farming. In this vein, the program provides an avenue for the city government to enlarge the coverage of urban green spaces while, at the same time, strengthening food security within the area.

Performance

Lorong Garden, under its umbrella program Tourism Alley, won the Indonesia Awards in 2023 under the category of Outstanding Award for Integrated Initiative by MNC Group (Hamid, 2023; Putri, 2023).

Impact on The Economy

The program yields multiple advantages for the city's economy. Firstly, it diminishes the necessity to purchase vegetables, thereby reducing the financial burden on members of agricultural groups who would otherwise spend on market-bought vegetables for personal consumption. This is achieved by allocating a portion of the harvest for the group's sustenance. However, the amount received per kilogram depends on the number of individuals in the participant's household and the overall harvest. On average, members of agricultural groups save approximately 10,000 IDR per person per harvest, equivalent to roughly USD 0.6 per person per harvest.

Secondly, the program contributes to the regional market by introducing additional agricultural produce. An average agricultural group may yield between 10 to 40 kg of produce per harvest, and approximately half of this output is designated for commercial purposes. Given the existence of around nine hundred active agricultural groups in the program, this influx of produce can enhance food security in the region and mitigate price fluctuations resulting from shifts in regional supply.

Thirdly, processing goods from the harvest creates opportunities for further growth. Processed goods offer agricultural groups prolonged viability, particularly during periods of low agricultural commodity prices, and offer opportunities to scale up production. For instance, when the price of chili is 25,000 IDR per kg, an agricultural group transforms some of its chilies into stir-fried shredded chilies, priced at 20,000 IDR per bottle (or USD 1.3 per bottle). It requires only 1.5 kg of chili, incurring a total expense of 90,000 IDR (USD 6) (including the bottle, seal, printing, salt, onions, and other materials), and can yield between 8 to 10 bottles per batch. By processing the chili, the group earns approximately 110,000 IDR per batch (or USD 6.4 per batch) – comparably more than selling the chili as is. The generated revenue is reinvested to scale up production (e.g., purchasing more seedlings), potentially reducing expenses associated with buying vegetables from the market and increasing the program's contribution towards regional food supply. Similar logic applies to SMEs, as proceeds from selling processed goods can be utilized for expansion (i.e., job creation).

Social Impacts

The program facilitates women's involvement and even places them at the forefront of decision-making. A pivotal aspect of this initiative is the deliberate inclusion of women by establishing a special post known as the women-led agricultural group. Apart from the instructor and advisor, the group exclusively comprises women (mostly stay-at-home moms). Women-led agricultural groups are prevalent, constituting about 95 percent of the total nine hundred agricultural groups, surpassing other forms of agricultural groups (i.e., general and youth-led agricultural groups) by a landslide.

Empowered by the guidance and technical expertise of the instructor and advisor, women-led agricultural groups collaboratively make decisions. These decisions encompass various aspects, including selecting seedlings for purchase and choosing vegetation to be processed. By fostering an environment where women actively contribute to decision-making, the program recognizes their valuable insights and strengthens their role in shaping the program's outcomes. This commitment to inclusivity ensures that women, as key stakeholders, play a central and influential role in the success and direction of the program.

The program also strengthens social cohesion amongst residents within the neighborhood, especially between women. The program brings residents closer together as they are working intensively side by side as members of agricultural groups almost every day of the week. On top of that, agricultural groups often go on trips, conduct social gatherings, and make uniforms as a symbol of unity. These activities are made possible by setting aside some of the profit retrieved from the harvest.

The initiative is also a poverty reduction tool, although the effect is relatively small. By consuming some of the harvest, members of agricultural groups lessen their expenses that would otherwise be utilized to buy vegetables at the market. A member of the agricultural group usually saves about 10,000 IDR (or USD 0.64) per harvest.

Impacts on the Environment

Garden Alley also promotes the increase of urban green spaces in the city. From 2021 to 2023, it contributed to an increase of almost 2.5 percent in urban green spaces coverage (see Figure 8). Given the method to calculate UGS in the city, it is impossible to distinguish or isolate the impact of green spaces addition derived from the program alone.

Figure 8. Urban Green Spaces Coverage 2021-2023 (Makassar City Government, 2023)

Sustainability

Alignment with National and Subnational Plans and Policies

At the national level, the program is aligned with Law No. 26 Year 2007 concerning Spatial Planning. The law dictates that urban green spaces must comprise at least 30 percent of the city's area, of which 20 percent must be situated in the public area.

The program is aligned with the city's RPJMD 2021-2026 at the local level. The planning document mentioned above aims to, among other things, enhance UGS coverage throughout the city, guarantee food security while also fostering economic resilience, and encourage higher income for the vulnerable population through job creation.

By increasing the amount of green coverage in alleyways, amplifying the city-wide supply of food production generated from the garden alleys, and generating (additional) income by selling these edibles to third parties, Garden Alley contributes to the advancement of these goals.

The Level of Community Participation

The pandemic has been a huge push for this program. Given strict mobility restrictions during lockdowns, residents of Makassar were left with limited options for activities. With declining activity options, *Lorong Garden* became a lucrative opportunity for stress relief, subsistence, and income accumulation (for SMEs). The integration of Garden Alley with Tourism Alley is also another factor driving community participation forward. Local communities and tourists get to experience local delicacies and the joy of farming all in one go. From 2021 to 2023, the program has cultivated about 900 agricultural groups and consequently involves 10,000 people, including government officials. Data on the number of SMEs is unavailable.

Subnational Budget and Regulatory Support

The program is underpinned by various regulations, including Mayoral Regulation No. 94 of 2022, which focuses on establishing Tourism Alleys and encompasses the *Lorong Garden* within the Tourism Alley framework. This regulation delineates the specifics of implementing the *Lorong Garden*, outlines technical details, and defines eligible funding sources to support program execution. On the other hand, the 2021-2026 RPJMD, also known as Local Regulation No. 5 Year 2021, outlines program targets to be achieved by 2026. Additionally, it allocates government funding for food diversification programs, including the *Lorong* Garden, with an annual budget of approximately 5 billion IDR (or USD 320,000) until 2026.

Replicability

Stakeholder Involvement

The stakeholders play an extensive role in this initiative. The citizens are co-deliverers of this initiative, meaning they are key in the smooth running of this program. Without the active involvement of citizens, there would be no one to cater to and look after the plants. There would also be a lack of management for the community fund, which is crucial for acquiring seedlings and covering other operational expenses.

Bank Sulselbar, the Indonesian Central Bank, the National Science Foundation, Penn State University, the University of Colorado Boulders, and Virginia Tech provided a large knowledge base and abundant technical and financial assistance to support the use of machine learning and AI.

In this case, the advisor is the head of the subdistrict (*lurah*), and the instructor (*penyuluh*) is the appointed government official. Both are ancillary to the agricultural groups. They provide support, advice, and technical guidance, helping agricultural groups make everyday decisions. The city government introduces a new set of regulations to govern the program under its flagship program, *Lorong Wisata*. It provides financial and technical support for certain program implementation aspects. The said support encompasses training sessions, socialization programs, initial financial support until new agricultural groups and SMEs are finally financially self-sufficient, and the initial financial backing for the development of the smart irrigation system – the rest of the funding is drawn from the respective community fund.

The Extent of Regulatory Changes

Several regulatory products were instilled to smoothen the implementation of the program. Details encompassing the targets and the program's expected budget are governed by the 2021-2026 RPJMD, also known as Local Regulation No. 5 Year 2021. Additionally, a Mayoral Regulation No. 37 Year 2021 on The Implementation of *Lorong Garden* Improvement and The Fulfillment of 5,000 Tourism Alleys was issued and used to be the extension of the city's *RPJMD*. However, the year after, the aforementioned Mayoral Regulation was replaced by Mayoral Regulation No. 94 Year 2022 on The Creation of Tourism Alley. Tourism Alley is a flagship program that subsumes *Lorong Garden*, aiming for a more integrated approach to alleys within the city (details on the said regulation can be viewed under this practice's subnational and regulatory support subsection).

The Depth of Infrastructural Changes

Together with the city government, the Pennsylvania State University, the University of Colorado Boulder, and Virginia Tech place various sensors across the garden alleys to monitor their conditions and utilize machine learning and big data to develop a sound urban agriculture system design. The smart irrigation system entails the development of a device capable of regulating irrigation frequency and volume. This device can be activated and managed through a digital application called Sirang Irong, requiring Wi-Fi for command completion. Upon activation, the device utilizes capillary and drip irrigation systems and, if necessary, applies fertilizers and pesticides. Another integral component of the program's smart irrigation system is using sensors. Distinguishing themselves from Sirang Irong, these sensors operate autonomously, triggering immediately when they detect a decrease beyond the pre-designated threshold without human intervention. Entities (i.e., agricultural groups and SMEs) may use either or both systems.

Financial Arrangement and Expenditure

The source of funding for this program can be differentiated into three: local government budget, community fund, and grants. The local government budget is

employed to cover the initial development phase of the smart irrigation system. It provides initial backing for the early implementation stages of the agricultural groups and SMEs. In this sense, the said revenue provides the aforementioned entities with the tools, equipment, and training programs required to facilitate the program's daily tasks. Once the entity is deemed financially self-sufficient, the entity will then finance their operation via the community fund. The fund is utilized to finance the purchase of seedlings, tools, water usage, electricity, and Wi-Fi, and can also be used as capital for processing the raw harvest. In this program, grants are utilized to cover the cost of procuring and installing sensors. These external grants were derived from the National Science Foundation (NSF) via several universities (i.e., the University of Colorado Boulder, the Pennsylvania State University, and Virginia Tech). These universities act as intermediaries of the NSF, providing guidance and technical support for the city government. The University of Colorado Boulder received USD 209,998, whereas the Pennsylvania State University was given a total of USD 175,000 and Virginia Tech received USD 75,000 (NSF, 2020, 2022, 2023). Altogether, these grants amounted to approximately USD 460,000. On top of that, grants are also utilized for the occasional improvements of the gardens and alleyways.

Source: www.makassar.rakyat.news

2.2 Quezon City

Population:
3,238,343
Inhabitant
(C40, 2022b)

GDRP:
$93.8 billion
(C40, 2022b)

Area:
160 km2
(C40, 2022b)

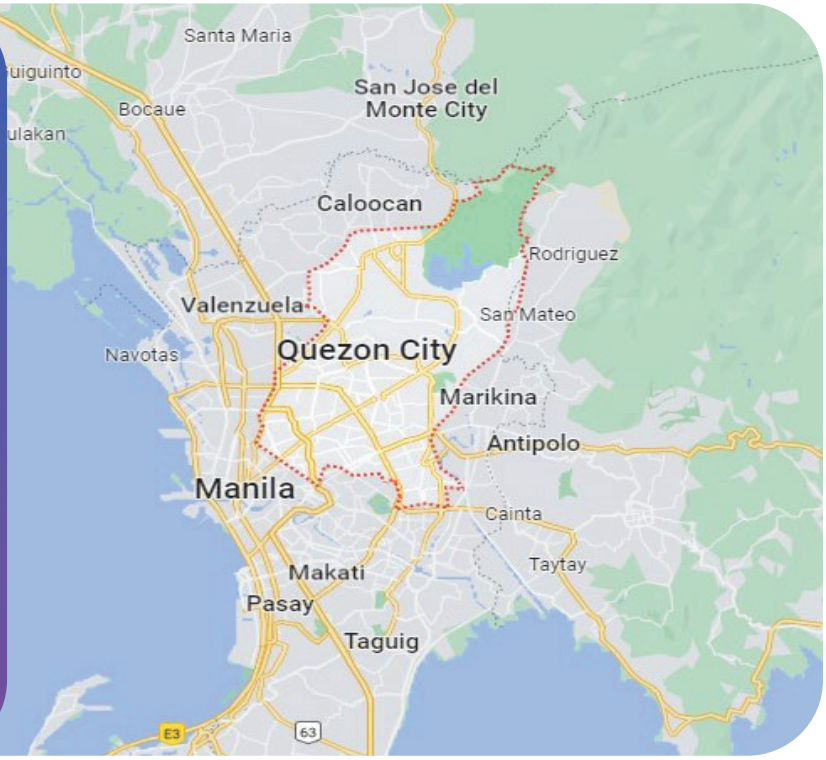


Figure 9. Quezon City

Quezon City is a vast and teeming city in the northeast portion of Metro Manila. Previously the capital of the Philippines, Quezon City is the largest city in the National Capital Region (also known as the Metropolitan Manila Region), comprising almost one-third of the region's total size. In 2023, the city's population is estimated at around 3,250,000 and constitutes roughly one-fourth (22.1 percent) of Metro Manila's aggregate population of 14,667,000. Additionally, the city is deemed the most urbanized city in the Philippines as it earns the first spot among the 33 highly urbanized cities with the largest population in the country. The city is also a hub where economic growth and opportunities burgeon. As a center for finance, retailing, entertainment, and healthcare in the Philippines, the city was regarded as the most competitive city from 2015 to 2019, according to the Cities and Municipalities Competitiveness Index (CMCI).

As the most urbanized city in the country, Quezon City faces a myriad of adversities often associated with urban areas. The city needs more urban open green spaces and requires help to accommodate the mounting waste in its territory. It is also vulnerable to the impacts of climate change. The following subsections will explore these issues in depth and provide readers with the best practices the city has managed to develop in recent years.

2.2.1 Climate-Smart and Sustainable Infrastructure

Program Overview

The Quezon City Government's operation relies on electricity (electricity generation in the city remains highly dependent on non-renewable energy). In doing so, the city government contributes to a massive amount of Greenhouse Gases (GHG) emissions per year. To address this situation, the city has installed solar PV systems on 50 public school rooftops to shift its consumption pattern to a more sustainable one.

Problems

The growing economic activity in Quezon City has raised the demand for electricity to power city-wide infrastructures, and government operation is no exception to this rule. According to a 2011 Environment Policy Management Council (EPMC) assessment, the city consumes a significant amount of electricity to support government operations (Quezon City Government, 2018). This includes everything from government buildings and public transportation to streetlights and waste management. When measured in terms of carbon emissions, these sectors of operation contribute to 39,000,857.99 TcO2e (kg) (62 percent); 6,289,050.28 TcO2e (kg) (10 percent); 14,922,134.77 TcO2e (kg) (24 percent); and 2,268,847.17 TcO2e (kg) (4 percent), respectively (Quezon City Government, 2018). The sum of these elements amounted to 62,480,890.21 TcO2e (kg). Thus, it is evident that government buildings imparted the most emissions.

If left to its own devices, massive electricity used to run government buildings might wreak even more havoc on the environment. Hence, immediate measures must be incorporated into the city's inner workings to lessen the impact of unsustainable electricity use on the environment. Such measures can begin by shifting the source of electricity in government buildings.

Solutions

In the coming decades, the Quezon City Government hopes to develop the city into a low-carbon, sustainable city. The city has been installing solar energy systems on government-owned facilities, beginning with public schools. This project has installed grid-tied solar PV systems in 50 of Quezon City's 146 public schools. The solar PV system features intelligent power prioritization, whereby the energy generated from the solar panels is utilized to automatically satisfy the school's demand. Should there be a surplus of energy, it will be stored in batteries until fully charged. The batteries will then be supplied to the national grid, earning incentives through electricity credits.

Solar PV systems will also reduce the schools' electricity expenditures as they only need to procure power from the grid when the system's energy is inadequate to fulfill power demands. This project is subject to a city-wide expansion, with 5,000 government-owned buildings as the primary expansion target.

Challenge(s)

Finance

The only challenge to this project lies in the future. Solar PV systems are tremendously beneficial in the long run but require significant capital expenditure in the early phases. Adding the fact that the city wishes to scale this project to 5,000 government buildings, it would require a ton of political commitment and, of course, a lot of financial resources to convert this ambition into reality. Approximately 100 times as much money is needed for the expansion plan's initial investment and operational expenditure as it did for the installation project in 50 public schools.

Assessment

Results

Relevance

Government buildings emit the largest emissions compared to other government operations. The installation of solar PV panels will undoubtedly help reduce the number of emissions from government operations and save the environment.

Performance

The project has yet to receive an award.

Impacts on the Economy

The project is predicted to save the city government USD 750,266 annually. Actual data on this matter is unavailable (C40, n.d.). These savings result from no longer relying on power from the national grid, eliminating associated electricity consumption costs. Additionally, the project allows the city government to sell the electricity generated from solar panels, stored in batteries, back to the national grid, contributing to the overall financial benefits.

Social Impacts

Currently, this initiative has no direct impact on gender equality and social inclusion. In the long run, however, it could provide better opportunities for students of lower economic backgrounds. For example, the money the school saves from converting to solar energy can be allocated towards programs that empower these students, such as free educational books, tutoring, or transportation.

Impacts on the Environment

The installation of solar PV systems in 50 public schools in Quezon City is predicted to reduce 1691 TcO2e of GHG emissions per year (or 50,723 TcO2e in the span of 30 years) and produce 3,880 MWh of clean energy per annum. Actual data on this matter is unavailable (C40, n.d.).

Sustainability

Alignment with National and Subnational Policies and Plans

The project is coherent with the national regulations and ambitions. In the country's first Nationally Determined Contribution (NDC), the country commits to a projected 75 percent reduction in GHG emissions for the agriculture, waste, industry, transportation, and energy sectors. In greater depth, the utilization of solar energy is also highlighted within the Philippine Energy Plan 2018-2040 as one of the prioritized efforts in GHG emissions reduction.

At the local level, the Quezon City Enhanced Local Climate Change Action Plan 2021-2050 underlines the need to curb GHG emissions by 30 percent in 2030. Two of the many strategies include (i) "secure clean and affordable renewable energy access by solarizing government-owned buildings" and (ii) "mainstreaming energy efficiency and conservation in government-owned facilities." The solarization program aligns with two of the identified climate mitigation strategies in the action plan.

The Level of Community Participation

The community is not involved in both the planning and implementation stages of this program.

Subnational Budget and Regulatory Support

Several local regulations facilitate the project, such as Executive Order No. 22 Year 2019, concerning the creation of a Technical Working Group for this project, and Ordinance No. SP-2336, S-2014, also known as the Quezon City Public-Private Partnership (PPP) Code, which devises a plethora of mechanisms regarding PPP. Under the joint venture scheme, the city government funds its share directly from its local government budget, albeit the exact amount of expenses is unknown.

Replicability

Stakeholder Involvement

Various partners are involved in administering the project. Private entities, in this case businesses and financial institutions, are the city government's counterpart in the joint venture scheme. Businesses share the risks and profits together with the city government, while financial institutions such as banks provide loans to said businesses.

Furthermore, C40 is also a partner for this project, providing technical assistance grants to prepare the program. They are responsible for deploying a technical adviser to support the program, accountable for financing the feasibility studies required to ensure the project's bankability, entitled to train government officials concerning solar PV design and installation, and responsible for aiding the city government in conducting a legal study pertaining to the project.

The city government, via the technical working group, is responsible for overseeing the implementation and establishing clear deadlines according to the project schedule and work plan; creating guidelines/criteria as basis for the assessment and identification of pilot schools for the project; coordinating with national government agencies and with all other stakeholders in the implementation of the project; conducting legal and institutional study to develop tender documents, financing strategies, and contract models for PPP investments; monitoring project delivery and progress; and evaluating the project's performance and impact to the stakeholders.

The city government is also responsible for financing the project's share of the local government budget.

The Extent of Regulatory Changes

This program entails much regulation-making. The city government introduced two regulations in support of the project, namely Executive Order No. 22 Year 2019 concerning the creation of a Technical Working Group for this project – the aforementioned technical working group was later placed under the supervision of the Quezon City Environment Policy Management Council, per Executive Order No. 54 S-2019. Ordinance No. SP-2336, S-2014, also known as the Quezon City PPP Code, which devises a plethora of mechanisms regarding PPP green procurement efforts, was also issued to govern the implementation of this program.

The Depth of Infrastructural Changes

The installation of solar PV systems is a form of infrastructure modification carried out in 50 different public schools.

Financial Arrangement and Expenditure

The project is made possible by a PPP mechanism between the city government and the private sector in the form of a joint venture. This mechanism will be financed by the private sector – partly through loans obtained from financial institutions – and the city government, derived from the local government budget, to procure, install, and operate solar panels. Each party involved will be entitled to dividends, income, and revenues. Conversely, the parties will also bear the corresponding losses and obligations in proportion to their share. As a minor equity or shareholder, the city will eventually transfer ownership of the investment activity to the private sector. The program is projected to incur a capital expenditure of USD 2.7 million and an operational expenditure of USD 65,000 annually. This projection excludes that of the expansion plan (C40, n.d.).

Prior to the implementation of the program, a technical assistance grant was also received from C40. Among other things, C40 is responsible for the deployment of a technical adviser to support the program; accountable for financing the feasibility studies required to ensure the bankability of the project; entitled to the training of government officials concerning solar PV design and installation; and responsible for aiding the city government in conducting a legal study about the project. Unfortunately, the total cost of carrying out the activities above is unknown.

2.2.2 Waste Management

Program Overview

The Trash to Cashback program requires participants to segregate their waste and exchange their recyclables at predetermined trading booths. In return, the participants receive a designated amount of remuneration that varies from one recyclable item to another.

Problems

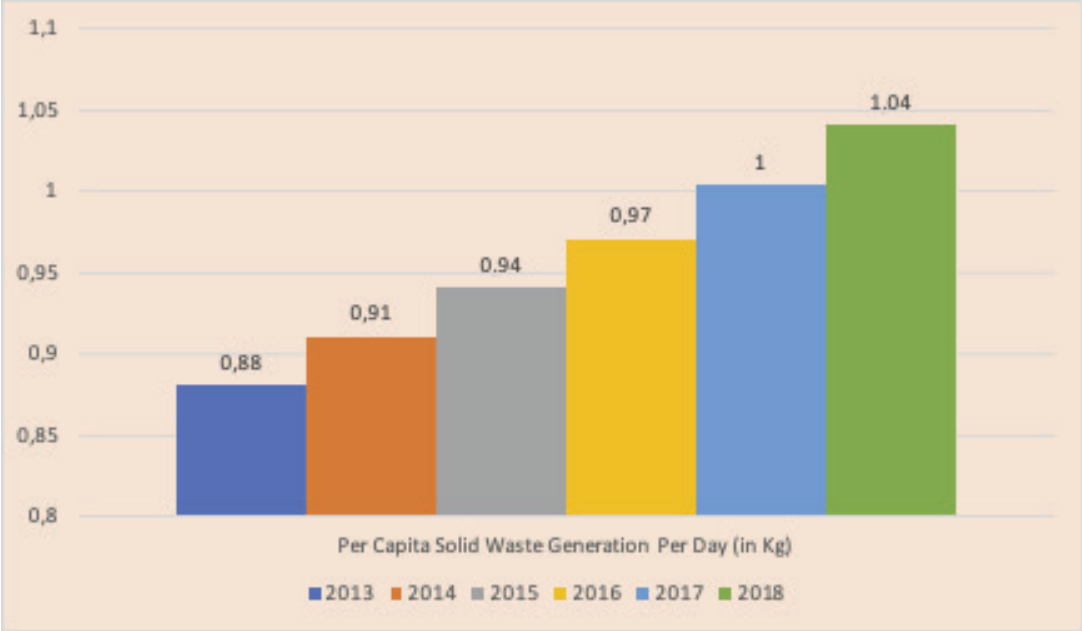


Figure 10. Quezon City per Capita Waste Generation per Day (in kg)

Source: Author's own Interpretation of Quezon City Ecological Profile (2018)

Waste management has been one of the many issues faced by Quezon City in recent years. Quezon City produces the most considerable volume of garbage daily compared to other cities and municipalities within the National Capital Region. According to the city's 2018 estimates, each Quezon City inhabitant generated approximately 1.04 kg of solid waste per day or a city-wide total of 3,169,220 kg per day. It is important to note that the amount of solid waste generated per capita is way beyond the national average of 0.4 kg per day and the urban area average of 0.7 kg per capita per day (Quezon City Government, 2018). Alarmingly, the previous number of per capita solid waste production has consistently surged for the past couple of years (see Figure 10), with most of the increase being attributed to domestic use.

Recyclable waste constitutes a significant portion of waste composition in Quezon City. A Waste Analysis and Characterization Study (WACS) carried out by the Quezon City Environmental Protection and Waste Management Department (EPWMD) in 2013 revealed that waste generation is composed of biodegradable wastes (53.95

percent), recyclables (20.30 percent), residuals (18.75 percent), and special wastes (7 percent) (Quezon City Government, 2018). However, recycling has not been the go-to method for Quezon City inhabitants as the citizen's attitude towards recycling has been suboptimal.

Unfortunately, the progression of solid waste per capita and the generation of recyclable wastes is expected to rise due to the hard-hitting impacts of COVID-19. A study by Sarkodie and Owusu (2021) found that COVID-19 prevention measures (i.e., lockdowns) have intensified the quantity of waste, mainly residential. Another study even posits that COVID-19, along with its strict measures, has caused a surge in demand for single-use plastics (i.e., plastic packaging) and a substantial increase in recyclable waste (Apostol et al., 2022). If not anticipated, the city will face fatal consequences ranging from public health concerns to climate change. Consequently, additional measures to address solid waste management in Quezon City are imperative.

Solutions

Faced with the ever-increasing amount of solid waste and recyclables and the lack of residents' interest in recycling, the Quezon City Government launched the Trash to Cashback program in March 2021. Among other things, this program aims to

1. Reduce the city's urban waste impact on the environment and ecosystems.
2. Encourage Quezon City residents to practice a more sustainable lifestyle through incentivized recycling.
3. Provide an opportunity for additional financial support, especially for those affected by the pandemic.
4. Mobilize citizens, groups, communities, and the private sector to work towards a circular economy, prioritizing organic, paper, and plastic waste recovery.

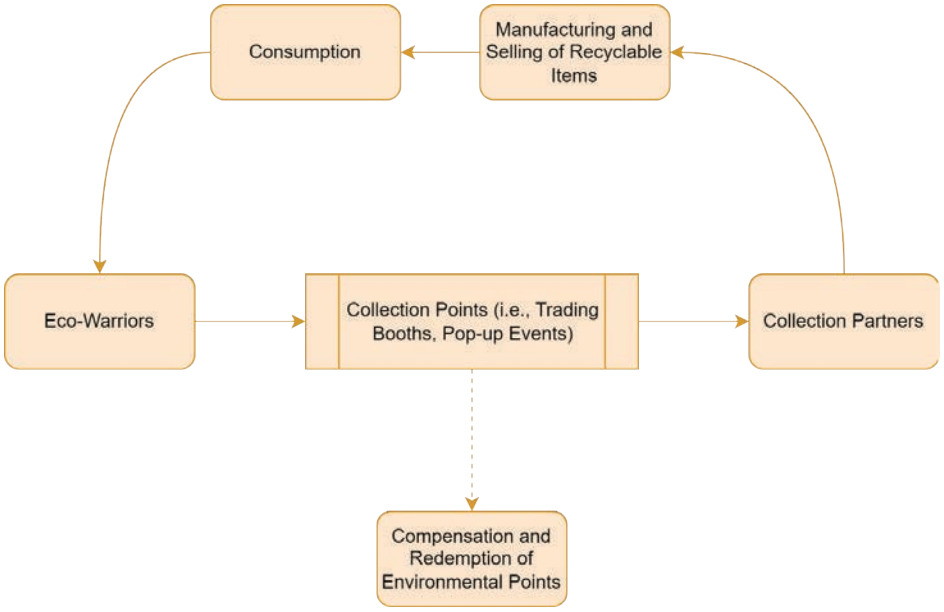


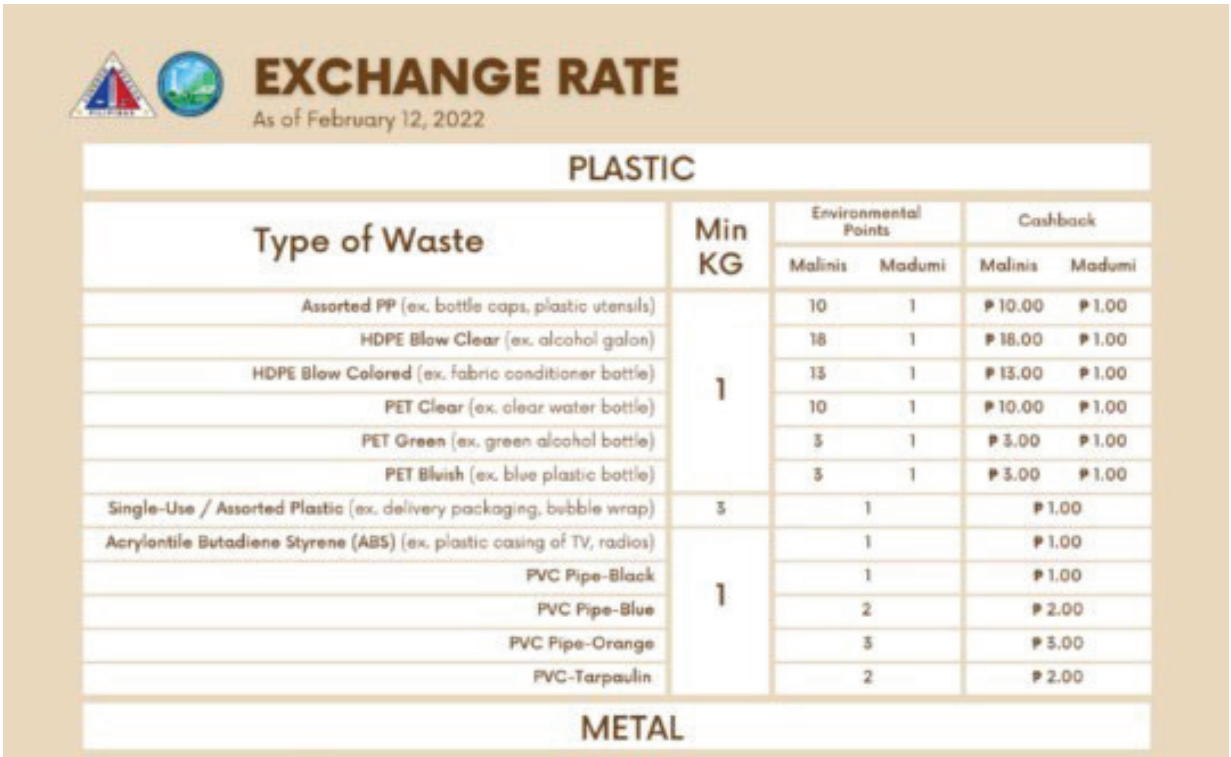
Figure 11. Simplistic View of the Trash to Cashback Program

Source: Author's own Interpretation of the Trash to Cashback Program

This program ultimately tackles the most common issue associated with recycling, which is high levels of contamination, by nudging the behavior of its residents towards a better waste segregation practice via incentive. Contamination often occurs in occasions where segregation practices are suboptimal: it is often the case that inhabitants mix non-recyclable materials with recyclable items or place recyclable items in the wrong bins. These practices are especially prevalent in unsupervised environments, such as the case with the city's conventional method of curbside collection, where citizens are left on their own to dispose of their wastes.

The Trash to Cashback program calls upon its citizens to segregate their wastes and exchange their recyclables at predetermined trading booths. By incorporating the program into the mix, the city is now able to appraise the waste it receives (i.e., verify both the quality and appropriateness of waste given to them) and sort the recyclable items by their subcategories, thwarting contamination levels and reducing the number of wastes disposed into landfills. In return, the program's participants will be rewarded in exchange for the waste they provided beforehand and learn what recycling entails.

Before participants can reap the benefits yielded by the program, they must first be enrolled. It is vital to highlight that the program is not exclusive to Quezon City inhabitants alone but extends to other residents outside the city's territory. To do so, they must first download the bXTRA digital application and register. They can then bring recyclable materials to the trading booths, spread across ten locations in Quezon City (and occasionally more where pop-up trading events are held). One is located at the Quezon City Hall, three are at Meralco Business Centers, and six trading booths are at the six District Offices of Quezon City (one trading booth for each District Office), where they will be verified and weighed. The trading booths accept plastic and paper wastes, metal scraps, and, recently, glass materials. If the material is deemed unfit under the prevailing criteria (i.e., contaminated or falling short of the required weight), the items may be donated or kept until they reach the minimum required weight.



EXCHANGE RATE

As of February 12, 2022

PLASTIC

Type of Waste	Min KG	Environmental Points		Cashback	
		Malinis	Madumi	Malinis	Madumi
Assorted PP (ex. bottle caps, plastic utensils)	1	10	1	₱ 10.00	₱ 1.00
HDPE Blow Clear (ex. alcohol galon)		18	1	₱ 18.00	₱ 1.00
HDPE Blow Colored (ex. fabric conditioner bottle)		13	1	₱ 13.00	₱ 1.00
PET Clear (ex. clear water bottle)		10	1	₱ 10.00	₱ 1.00
PET Green (ex. green alcohol bottle)		3	1	₱ 3.00	₱ 1.00
PET Bluish (ex. blue plastic bottle)		3	1	₱ 3.00	₱ 1.00
Single-Use / Assorted Plastic (ex. delivery packaging, bubble wrap)	3	1		₱ 1.00	
Acrylontile Butadiene Styrene (ABS) (ex. plastic casing of TV, radios)	1	1		₱ 1.00	
PVC Pipe-Black		1		₱ 1.00	
PVC Pipe-Blue		2		₱ 2.00	
PVC Pipe-Orange		3		₱ 3.00	
PVC-Tarpaulin		2		₱ 2.00	

METAL

Type of Waste	Min KG	Environmental Points	Cashback
Solid A (ex. haligi, bakal mula sa construction)	1	8	₱ 8.00
Solid B (Pundido) (ex. lumang kaserola, kawali)		7	₱ 7.00
Assorted Metal		6	₱ 6.00
Bi / Tapa (ex. system unit casing)		8	₱ 8.00
Lata		5	₱ 5.00
Tansan		5	₱ 5.00
Big Lata		5	₱ 5.00
Yero / Galvanized		7	₱ 7.00
Empty Aerosol Can (ex. empty cans of air freshener, disinfectant)		1	₱ 1.00
Aluminum Can (ex. empty soda can)		20	₱ 20.00

PAPER

Type of Waste	Min KG	Environmental Points	Cashback
Plain White Paper	1	2	₱ 2.00
Corrugated Cartons (ex. balikbayan box)		5	₱ 5.00
Chipboard / Claycoated / Packaging Boards (ex. cereal box)		1	₱ 1.00
Assorted / Colored Receipts		1	₱ 1.00
Office Wastes / White with Print		2	₱ 2.00
Beverage Cartons (Tetra Paks)		1	₱ 1.00
Paper wastes with heavy plastic lamination of foil (ex. paper plates)		0.25	₱ 0.25
Newsprint (w/o print)		5	₱ 5.00
Newsprint (w/ print)		5	₱ 5.00

Figure 12. Environmental Points for Recyclable Items

Source: Quezon City Government (2022)

For every kilogram of recyclable material the city receives (or 3 kg for the specific case of single-use plastics), traders (also known as eco-warriors) will be given a cashback or environmental points, for which a single environmental point is equivalent to one Philippines peso – the amount of cashback or environmental points received by the participants may vary according to the types of recyclables they provide the city with (see Figure 8 for details). The payable amount will then be transferred to the trader's bXTRA account, where they can keep tabs on their balances and redeem them. Additionally, traders will receive a physical card as an alternative transaction method (i.e., offline transactions) similar to debit cards. The cashback or environmental points received by the traders can be used to pay for:

1. Utility bills (i.e., electricity, water, and internet services) through the proxy of the Bayad digital application.
2. Order online food deliveries and groceries from bXTRA's partner merchants.
3. Buy grocery items directly through the Trash to Cashback Mart.

If environmental points alone cannot attract possible participants, Quezon City also implements other means to entice potential traders to participate in this program and for current traders to remain enrolled. For the past years, the city has been known to come up with novel ideas to drum up the number of items being recycled in Quezon, which include additional bonuses (e.g., 5 kg of rice, cheese spreads, juices, and Alaska milk sachets that can be obtained once the conditions have been met),

pop-up stores, and special events (i.e., collecting the remains of campaign-related materials such as posters). Additional bonuses may vary in terms of validity period – the bonus is only eligible up to a predesignated duration and can be anywhere between a mere day or even months – and the form of bonus received by the traders, depending upon the agreement between the city and the partner.

After the items have been verified and sorted and the traders have received their respective compensation, the respective partners collect the recyclable items. The city has different partners for every type of recycled material, so each partner's purposes might differ. However, it usually comes down to two main purposes: (i) the recyclable materials are recycled in-house to support the partner's business endeavors (i.e., manufacturing) or (ii) sold to another entity (i.e., the city's very own recycling plants) to be recycled.

Administrative

Although the program has been rather smooth sailing, it is not without its challenges. For one, access to the Trash to Cashback program is noticeably limited. Even though Quezon City is a sizable city with 142 *barangays*, there are only ten trading booths located throughout the city. Furthermore, these trading booths are not always open. For example, the Meralco Business Centers at Kamuning, Commonwealth, and Novaliches only have trading booths available on Tuesdays and Thursdays from 8:00 a.m. to 3:30 p.m. local time (Urban SDG Platform, n.d.). Although the local government has tried to reconcile this lack of trading booths through bonuses, special events, and pop-up stores, this may serve as a barrier to unleashing the program's full potential.

Results

Relevance

Waste management has been one of the many issues faced by Quezon City in recent years. A Waste Analysis and Characterization Study (WACS) carried out by the Quezon City (QC) Environmental Protection and Waste Management Department (EPWMD) in 2013 revealed that waste generation is composed of biodegradable wastes (53.95 percent), recyclables (20.30 percent), residuals (18.75 percent), and special wastes (7 percent). Alarmingly, waste production has surged in the past years, reaching a new high of 1.04 kg/day, beyond the country's average. If left to its own devices, the mounting waste production could lead to landfill overcapacity and consequently a myriad of issues, such as health and environmental issues, for the city government. The introduction of the Trash to Cashback program aims to reduce the said 20 percent from going into landfills and, therefore, curb the overall waste to a manageable level.

Performance

In 2023, the Trash to Cashback program was conferred with the Best Practice of Innovative Technology award from the International Climate Development Institute (ICDI) and ICLEI (Pineda, 2023).

Impacts on the Economy

From the program's inception until late 2022, traders received approximately 252,000 environmental points – an ascribed value equal to 252,000 Philippine pesos (or approximately USD 4,500) – with 246,000 environmental points retrieved from trading booths, 6,300 points derived from pop-up events, and 300 points gained from special events (Urban SDG Platform, n.d.). Unfortunately, we could not ascertain the value or quantity of additional bonuses retrieved by the traders from the program.

Social Impacts

Of all the citizens involved, about 80 percent of the total participants are women with little to no income.

Impacts on the Environment

From 2021 to 2022, approximately 80 tons of recyclable materials were collected from trading booths, pop-up events (held in local *barangays* and schools), and other events. The most results were obtained via trading booths, with almost 73,955 kg of recyclables traded, followed by pop-up events with 4,500 kg of recyclable items, and special events with at least 800 kg (Urban SDG Platform, n.d.).

Most, if not all, of the meticulously sorted recyclable items undergo processing and serve as input for the partners' manufacturing processes. For example, San Miguel Yamamura Corporation, a prominent packaging company, incorporates glass collected from traders to craft new glass bottles for consumer use. This promotes a circular economy and lessens the damages it would otherwise inflict on the environment (i.e., disruption of landscape and habitat, lessening the use of natural resources).

Alignment with National and Subnational Plans and Policies

At the national level, the initiative adheres to Republic Act No. 9003, also known as the Ecological Solid Waste Management Act of 2000, which highlights segregation practices, proper disposal, recycling, and waste diversion.

At the local level, the program is aligned with the Quezon City Enhanced Local Climate Change Action Plan 2021-2050. In this vein, the city has set its sights on reducing GHG emissions by 30 percent by 2030. In doing so, it devised a set of mitigation strategies, which includes "striving towards a circular economy, prioritizing organic, paper, and plastic waste." The Trash to Cashback Program can be viewed as the embodiment of the said strategy and, therefore, aligns perfectly with the city's goal to reduce GHG emissions.

The Level of Community Participation

The program anticipates significant growth as community support continues to thrive. Enthusiasm for the program remains steadfast, as evidenced by consistently robust enrollment trends and the increased amount of recyclables collected and traded by the community. In the initial five months of 2021, a modest 7,000 kg of recyclables were traded, averaging nearly 1,800 kg collected monthly. However, in 2022, this volume has surged to an average of 4,000 to 5,000 kg per month (Urban SDG Platform, n.d.). This substantial increase signals the program's continuous momentum, which is attributable to ongoing initiatives, such as additional bonuses through partnerships, pop-up stores, and special events orchestrated by the city. The role of incentives emerges as crucial, acting as the primary driver for new citizens to enroll and actively participate, thereby sustaining the program.

Moreover, numerous private entities have expressed interest in participating in the program. One contributing factor to this trend is the supervised segregation and appraisal process, which significantly reduces the risk of contamination and processing costs. This makes partnering with the program an attractive choice for these entities. San Miguel Yamamura Corporation's involvement in mid-2022 is a testament to this traction, allowing the city to expand its accepted materials to include glass.

Subnational Budget and Regulatory Support

There is no specific city regulation that governs the implementation of the program. Additionally, the city has incurred 1,038,200 Philippine pesos, or about USD 18,500, as of late 2022. However, the overall expenses incurred by the program are unknown, as most of the costs are borne by the partners.

Stakeholder Involvement

Various private entities were involved in the initiative's development and implementation. In fact, this program is heavily reliant on its partners' ability to administer their duties accordingly. One can even posit that partnership with the private sector is the bedrock of this program.

The program involves various partners, including, but not limited to:

1. Basic Environmental Systems and Technologies Inc. (BEST) is the primary partner in implementing the program and plays a pivotal role in its execution.
2. bXTRA Philippines is a cashback platform provider that offers both online and offline food and grocery delivery services through the bXTRA app and the Trash to Cashback Mart.
3. Corporate Information Solutions (CIS) Bayad Center Inc. is a subsidiary of Meralco. CIS Bayad Center aids with utility bill payments via a digital application, covering various services such as insurance, electricity, water charges, remittance, electronic toll collection, and airline booking.
4. Alaska is responsible for the collection of single-use plastics and provides additional bonuses.

5. Meralco Inc. provides trading booths.
6. San Miguel Yamamura Packaging Corporation is the latest partner supporting the city in the collection of glass bottles.

These partnerships play a crucial role in the success and multifaceted support of the program, highlighting the diverse range of services and expertise contributed by each entity. Apart from partnerships with the private sector, participants' involvement is one of the most critical pieces of the puzzle. In this sense, the participants ultimately determine the efficacy and, consequently, the program's outcome. The quantity of recyclable items depends entirely on the traders' participation. The program tries to stimulate (and retain) involvement by simply nudging potential participants with various incentives (i.e., financial and necessities) and guidelines to reduce confusion often associated with recycling.

The city government is responsible for steering the program's path. This includes managing its direction and engaging with private entities to add partners, be it for a one-time partnership or a more institutionalized form of collaboration.

The Extent of Regulatory Changes

There were no requirements for modifying or initiating legal regulations apart from the contracts and agreements the partners entered into to carry out their responsibilities.

The Depth of Infrastructural Changes

This program requires an online application to track the number of recyclables and points and facilitate transactions using the points traders received beforehand. In doing so, the city utilizes a plethora of digital applications, such as the bXTRA and Bayad digital applications, to keep track of the number of recyclables and environmental points and facilitate the transaction of food, groceries, and the payment of bills. On top of that, trading booths are also required to segregate waste and convert the value of said waste into environmental points. Subsequently, it also requires processing technologies from partners to transform recyclables.

Financial Arrangement and Expenditure

Multi-stakeholder collaboration allows the program to leverage most of the cost to be borne by partners. In this sense, the local government leverages its local government budget while partners incorporate their finances to implement the program. The local government budget is utilized mostly for campaigns and socialization. At the same time, partners' expenses go to the creation of digital applications (or at the very least, the addition of trash-to-cashback-related features into the application), provision of bonuses as well as trading booths, transporting the recyclables, and processing said recyclables. From the launch of the program in March 2021 to late 2022, the city spent only 1,038,200 Philippine pesos, or about USD 18,500, primarily for campaigns and socialization, while the expenses incurred by the partners are unknown (Urban SDG Platform, n.d.).

2.2.3 Urban Green Spaces and Biodiversity

Program Overview

Urbanization sacrifices green spaces to accommodate the needs of the ever-growing inhabitants. Quezon City tries to address this issue by introducing GrowQC to stimulate the growth of green spaces in the city. The city utilizes tax abatement to borrow idle land from landowners. The land is then converted into productive Urban Green Spaces (UGS). Economically displaced citizens were encouraged to participate as farmers in this program. They will receive a stipend (the stipend was discontinued and administered solely at the beginning of the program), the produce from the land, and additional income from selling the said produce.

Problems

UGS is defined as the sum of open spaces in the public or private domains that is wholly or partly covered with grass, trees, shrubs, or other vegetation (De Haas et al., 2021; Jabbar et al., 2022; Yessoufou et al., 2020). UGS has been known to impart various benefits to the public at large: (i) UGS mitigates air pollution (Dadvand et al., 2015), (ii) reduces the risks of urban flooding (De Haas et al., 2021), (iii) promotes biodiversity (Haase et al., 2014), (iv) serves as a cooling instrument in the summer (Yessoufou et al., 2020), (v) provides a sense of individuality and belongings (Jabbar et al., 2022), (vi) contributes to the overall well-being of its residents (Hartig et al., 2014; Yessoufou et al., 2020), and (vii) promotes social cohesion (Lee et al., 2015).

As one of the most urbanized cities in the Philippines, the city is constantly pressed with the urgent need to accommodate all urban activities. This usually comes at the cost of sacrificing protected land for urban green spaces. For instance, Saloma and Akpedonu (2021) posited that the dedicated green and leisure space in the Quezon City Quadrangle has receded from the abundant 400 hectares to about 19 hectares, citing vast urban growth as one of the culprits for this loss. Now, most UGS in the city predominantly comprises golf courses, cemeteries, and, most notably, access-controlled private parks accessible solely to subdivision homeowners (Saloma & Akpedonu, 2021). Without any proper countermeasure to ameliorate the above condition, potential danger lingers and is bound to surface.

On top of that, a survey conducted by the Philippines Food and Nutrition Research Institute in 2018 revealed that an estimated 20 percent of the city's households are moderately food insecure, while 15 percent suffer from severe food insecurity (Oyuela, n.d.). Further, many cities have fallen prey to the impacts of COVID-19, and Quezon City is no exception to this unfortunate occurrence. During the height of the pandemic, strict prevention measures have hampered the ability of food to move around the city, especially entering it. And given the city's overreliance on the ability of the northern provinces to provide them with sustenance, it severely weakens the city's food security, especially for the most vulnerable groups. Coupled with the lack of UGS (i.e., farmland), the city faced a horrible challenge in devising a sufficient yet viable recourse to strengthen food security quickly.

Solutions

The city is aware of the aforementioned issues, as daunting as they are. Instead, they launched the GrowQC program amid COVID-19, a two-birds-in-one-stone solution that converts idle land into productive, green urban farms. Specifically, the program aims to increase the availability of healthy and nutritious food to all citizens, primarily for the least fortunate, and impart an additional source of income for citizens with zero or low income by repurposing idle land into UGS.

The program is not new by any means. Instead, it was an improved program of the past. Urban farming has always been one of the city's prioritized programs, but due to the unforgiving impacts caused by the pandemic, it was transformed into the GrowQC program, which upscales backyard farming into a large-scale urban agricultural system that incorporates idle and underutilized land in the city. However, how does the city provide its citizens with additional pocket money and nutritious sustenance?

To do so, the city must first access additional land and obtain the necessary (human) resources to carry out the program. The city levies an annual *ad valorem tax* based on the assessed value of a property that remains unimproved or uncultivated by the owner. As part of the effort to obtain the necessary land for the program, the landowners of the idle land will be exempt from paying the Idle Land Tax should they be willing to give up their land for the program's purposes for three years. The local *barangay* officials organize citizen recruitment and training (primarily targeting those with minimum income), while the city provides seeds and other starter kits. The training program and seeds are part of a collaboration between the city and the national government, namely the Department of Agriculture. The city also transformed some of the newly acquired land into model farms (or feeder farms), allowing the city to provide other urban gardens with seedlings and other agricultural inputs at a lower cost. It negates any additional expenses incurred by procuring seedlings from external parties and the city itself.

Plenty of options exist to disperse the produce yielded by urban farms. In this sense, the product can be bought by the government, sold to restaurants, placed at the food market, or consumed directly by urban farmers. In return, the profits from selling these products are given to the urban farmers. At the beginning of the program, the newly enrolled urban farmers received a stipend of 12,000 Philippine pesos for the first 16 days. The financial incentive, however, has been discontinued and was replaced by government-accommodated opportunities to sell the products, such as food fairs and food markets.

Challenge(s)

Environment

Weather emerges as a challenge in the implementation of this program. At times, the city may experience sharp variability in temperature, where, at the extreme, it could reach a scorching 38 degrees Celsius. The unbelievably high temperature delimits water availability and consequently stifles the program's implementation. The city has tried to overcome this challenge by increasing the water supply via the introduction of rainwater harvesting and retention ponds.

Assessment

Results

Relevance

Quezon City's urban green spaces have continuously been sacrificed to satisfy urban demands. A survey conducted by the Philippines Food and Nutrition Research Institute in 2018 revealed that an estimated 20 percent of the city's households are moderately food insecure, while 15 percent suffer from severe food insecurity. GrowQC is a two-birds-in-one-stone solution that converts idle land into productive, green urban farms. This way, the city can expand the availability of urban green spaces while improving the conditions of food security in the area.

Performance

GrowQC was placed among the Top 10 Galing Pook awardees in 2021 (Quezon City Government, 2021) and the finalists of the C40 Cities Bloomberg Philanthropies Award for Innovative Climate Solutions in 2022 (C40, 2022a).

Impacts on the Economy

From the start of the pandemic in 2020 to early 2022, GrowQC has established a total of 337 urban gardens and ten model farms, creating livelihoods for 4,119 urban farmers, 258 displaced workers, and 298 vendors and jeepney drivers (C40, 2022a). Private landowners were exempt from paying Idle Land Tax if they allowed their land to be utilized in the project for three years, effectively increasing the city's access to land. A total of 381,650 m2 of land was converted for urban agriculture (C40, 2022a).

During the city's most intense lockdown in 2021, GrowQC ensured that 1.7 million healthy and nutritious meals were served to 325,600 families. Around 3,600 residents, previously on low or zero incomes, have been trained as city farmers to produce food and boost their income (C40, 2022a). Direct access to fresh and affordable food has benefited the health and well-being of communities that experienced food insecurity. The project also promotes a circular economy by exemplifying the farm-to-table cycle, serving as an integrated food system that is sustainable and replicable to other cities.

Social Impacts

The program has provided benefits to less favored groups, targeting citizens from lower economic backgrounds, displaced workers, and women (roughly 80 percent of total urban farmers are women with little to no income) in the form of nutritious edibles and additional income. The attainment of nutritious edibles provides the newly transitioned farmers an opportunity to reduce the expenses that would otherwise be incurred by purchasing vegetables at the market. Further, adding income provides a cushion for those who have suffered economically during the pandemic and are displaced. However, the extent of this impact remains unknown and unexplored (i.e., how much money the average citizen, or farmers in this case, earned per cycle and how it prevents or alleviates participants from poverty).

Impacts on the Environment

The conversion of underutilized land into urban gardens has also led to the rise of urban green spaces in the city, with 381,650 m2 of idle land being converted for urban agriculture. It has consequently substantiated the city's ability to prov

ide greater carbon sinks, reduce urban emissions via the implementation of the farm-to-table concept, provide healthier food to residents (malanga leaves, onions, lettuces, tomatoes, chili, and various fruit-bearing trees are planted in these farms), and prevent flooding. Similarly, due to the absence of relevant data, this study cannot measure the extent of previously mentioned impacts.

Alignment with National and Subnational Plans and Policies

At the national level, the advancement of urban green spaces is mandated by Republic Act No. 5752, which commands the need to expand the coverage of green spaces within cities throughout the nation.

At the local level, the Quezon City Enhanced Local Climate Change Action Plan 2021-2050 underlines the need for progressive action to build on and strengthen the resilience of its ecosystems and communities against risks and threats from the changing climate. In doing so, it devised a set of climate adaptation strategies, including (i) promoting "urban farming and localized food production"; (ii) enhancing "water security through robust demand-side management (e.g., rainwater harvesting)"; (iii) advancing "nature-based solutions to flood mitigation measures (e.g., water-retention basins)"; and (iv) ensuring the use of "nature-based solutions to reduce heat and drought pressures." In this vein, GrowQC excellently complies with the tactics mentioned above by using vacant spaces for urban, along with rainwater harvesting and retention ponds to control the water supply.

The Level of Community Participation

The initiative continues to attract participation from citizens throughout the region, such as urban farmers and displaced workers, showcasing an upward trend in involvement. As of November 2022, the program has identified 15,875 urban farmers (Tzu Chi Philippines, 2023).

Subnational Budget and Regulatory Support

Several regulations support the initiative and have secured a consistent flow of funds from the city government. However, the specific allocation of budget incorporated into the program per annum is unknown. As for regulatory support, the program is supported by Executive Order No. 16 S-2021 and City Ordinance SP-2972 S-2020 (details about the regulation will be provided under The Extent of Regulatory Changes section).

Replicability

Stakeholder Involvement

The city enlists the help of several other organizations to implement the program. For instance, the city partnered with the Department of Agriculture, particularly the Bureau of Plant Industry and Agricultural Training Institute, to provide seeds and guidance on the training program for farms and urban farmers. The program also calls upon the Diocese of Novaliches, a civil society organization, to develop a model farm.

Furthermore, the city also utilizes the local community as co-deliverers of this program. Due to its implementation design, GrowQC relies on the community's active participation. It is important to note that (potential) participants might not be familiar with this line of work and will require training sessions to hone their skills before their involvement.

The city government enables this program through partnerships and the invention of rules. The former is carried out to gather additional resources (i.e., seedlings), while the latter aids the program in acquiring the necessary land to kickstart the program.

The Extent of Regulatory Changes

The program also requires several modifications to the existing regulations. In this light, the city introduced Executive Order No. 16 S-2021: Establishing the City Healthy Food Procurement Policy to promote better nutrition standards in government bodies and ensure the longevity of the GrowQC initiative via the promotion of urban agriculture and local procurement mechanism (i.e., this makes sure that the produce generated by the initiative is purchased by at least one entity). Most importantly, the city had revised its City Ordinance No. SP-91, S-93, and replaced it with City Ordinance SP-2972 S-2020. The latter Ordinance has amended Section 11 of the Quezon City Revenue Code of 1993 to extend the Idle Land Tax exemption for landowners who will utilize their uncultivated and unimproved property for urban gardening for at least three years. The last regulatory revision is particularly vital as it is the sole regulation that enables the basic framework of this initiative to work.

The Depth of Infrastructural Changes

The city repurposes idle or otherwise unutilized land into UGS. Financial Arrangement and Expenditure

Grants were provided by the national government, combined with the city's local budget, to aid the program in supplying seeds, tools, and training programs for the farms and urban farmers. The local government budget, together with funds from NGOs via partnerships, is also utilized to run the model farms. Tax abatement, however, is utilized to acquire the land needed to kickstart the program, although the duration of land use is temporary.

Source www.trashtocashback.com

Source joshua-kyle-wwr4R1k9_cg-unsplash

3. Lessons Learned, Possible Improvements, Concerns, and Financing Options

3.1 Lessons Learned

3.1.1 Adaptability

From these practices, this study reckons an emerging pattern of innovative green practices in both Makassar and Quezon City. This study realizes that almost and, if not all, the practices contain a high degree of adaptability properties – in some cases, these practices manifest adaptability itself – that arose from the ever-changing conditions of the urban area or significant events. Drawing from Makassar's experience in administering waste banks, the study observes that the city has tried to introduce novel interventions, such as the use of maggots, eco-enzymes, and the admission of waste cooking into the mix of accepted materials, to sustain the level of community involvement that had been plummeting for the past years. These interventions show that the city and the program can adjust to new conditions. On another occasion, the hard-hitting impacts of COVID-19 and food security issues forced the city government of Quezon to introduce the GrowQC and Trash to Cashback programs at around the same time. Again, this reinforces the belief that adaptability is inherent within these programs and can surface from significant events and the constantly changing surroundings.

3.1.2 Co-Benefits

Moreover, this study unraveled that most practices instill co-benefit features in their program design. For example, Garden Alley allows communities to reap food security benefits and contribute to improving the levels of UGS and carbon sequestration along the way.

3.1.3 Cost-Saving

We also found that most of these programs tried to implement a certain degree of cost-saving efforts. In the case of GrowQC, it uses one of the city's tax instruments, Idle Land Tax, as an incentive for landowners to loan their land. This creative utilization allows the city to have more land in its arsenal and enables it to do so at a relatively cheaper price than buying the entire land.

Through collaborations with economic and socio-economic enterprises in its area, the Quezon City government leans on the preexisting recycling ecosystem (i.e., business entities specializing in processing waste) to further the city's cause in battling mounting waste, doing so with little to no financial resources.

3.1.4 Collaboration

Additionally, these practices do not utilize collaboration for the sole purpose of cutting implementation costs. Instead, collaborations with private entities (i.e., businesses) and the third sector (i.e., NGOs) are considered an underpinning trait of the program's design. In many cases, cooperative arrangements are utilized to promote program longevity (i.e., waste banks) and cultivate the skills and expertise (i.e., solarization of Quezon City) necessary for the smooth sailing of the initiatives.

3.1.5 Community Participation

Community participation is also deemed pivotal in at least four of the six programs discussed within the report. Practices such as *Lorong Garden*, Waste Bank, GrowQC, and Trash to Cashback place the community at the forefront of change. In this vein, the outcomes intended by the governing authorities depend entirely on the community's willingness to participate in the program. Without the active participation of the community, they would easily fall apart. Additionally, most programs tried to implement incentives (or compensation) – both financial and non-financial – to entice and retain the level of community involvement through the implementation of programs.

3.2 Possible Improvements

The previously discussed practices possess undeniable merits that undoubtedly benefit the public. However, several aspects can be improved to better actualize their potential. The following subsections will discuss all the possible improvements for each practice discussed earlier in the report.

3.2.1 Aparong

Aparong is one of the most innovative ideas in disaster management (i.e., shelter). However, the practice leaves several gaps within its design due to its novelty. These gaps need to be filled to elevate the robustness of its outcomes. One of the most apparent voids left by the initiative is its cost-effectivity. As a project that requires approximately 20 percent of the entire department's budget, *Aparong* can only fulfill the needs of a few. Out of the 18 rooms the building provided, it could provide just seven rooms in times of distress.

On top of that, the building's ability to withstand disastrous events is also subject to improvement. Because a significant portion of the money had been put into purchasing the property, adjustments were made to lower the construction cost. In doing so, it replaced the usual materials with less expensive but similarly sturdy materials that are ill-equipped to withstand earthquakes. This decision could be problematic because one of the program's most significant objectives is to provide displaced citizens with a shelter in which they can temporarily reside. Should the building be destroyed by a disaster, initiating this project would be futile.

Consequently, there is a need to reinforce the durability of the building and increase its maximum capacity to hold more occupants. Therefore, this assessment suggests that the implementing authority increase the number of rooms available in the building and strengthen the building by any means possible. If improvements cannot be administered in this *Aparong,* they can consider this suggestion for the next one. In doing so, however, the governing authority will run the risk of bloating costs. Nevertheless, plenty of financing solutions can be utilized to cover the rising expenses and lessen the costs borne by the city government (see Possible Financing Options below).

3.2.2 Waste Bank

Waste bank units provide compensation, primarily cash, for the recyclable materials traded in by the citizens. Although enticing, the forms of compensation are monotonous. The Trash to Cashback program unearthed that the degree of community involvement is affected by the versatility of compensation schemes. In this case, the Trash to Cashback program invites collaborators (i.e., business entities) to help diversify the range of incentives received from the program. The compensation varies not only in terms of forms but also its validity period. Thereby, there is merit in adopting the latter to draw more interest from the community.

3.2.3 Lorong Garden

While the city's attention to empowering alleyways is highly appreciated, *Lorong Garden* may benefit from expanding the program to the residents' backyards or idle land. This is because using the citizens' own gardens and idle land could amplify the quantity of produce, bolstering the city's ability to battle fluctuating agricultural commodity prices and GHG emissions.

3.2.4 Solarization of Public Schools

In expanding the coverage of solarization in government-owned buildings, the city should consider adding several financial arrangements (e.g., credit financing, ESCO) to ensure the viability of the expansion plan. The program plans to expand to over 5,000 government-operated buildings soon. However, the expansion plan could be more costly. Consequently, actualizing such ambitions can be challenging as it would require a huge chunk of resources that are often too big to be carried out by the city government alone.

3.2.5 Trash to Cashback

Trading booths are the bedrock of the implementation scheme. However, given their importance, the amount available in the city remains limited. On top of that, some of them do not have regular working days and hours. These factors may stifle the city's effort to promote recycling as citizens may find it hard to do so with trading booths being closed on certain days and located far away. With these factors in mind, the report suggests that the Trash to Cashback program should increase the availability of trading booths and coax the city government to establish working days and hours throughout trading booths in the city.

3.2.6 GrowQC

GrowQC utilizes a rare yet creative method of acquiring land. Instead of purchasing land, the program temporarily acquires idle land from willing landowners in exchange for tax abatement. In so doing, the city binds them with contracts lasting at least three years. While a heightened sense of urgency may have driven this decision due to the pandemic, this report posits that the preceding criterion is insufficient to ensure project longevity. When the contract for the land has lapsed, the progress the city has made to that land is now at risk of outcome reversal. Therefore, this report recommends that the local government raise the minimum loan term and introduce the possibility of converting idle land into public land within the program.

3.3 Potential Concerns and Ways to Counteract it

Several aspects of the above practices may deter local governments from replicating the previously discussed initiatives. These include funding (and its durability), community participation (and its fluctuation), and political transition.

Funding is one of the prominent issues when replicating some of the practices discussed above. This is because practices like *Lorong Garden* can be expensive and complicated to finance by mere local governments. However, plenty of innovative financing solutions exist and may have been adopted by the national government within its regulatory framework (see the last section for details). These instruments can be a reference point for local authorities wishing to adopt similar programs.

Moreover, community participation and capacity may also be a hindrance to replication. This is because community participation is often context-bound and filled with uncertainties (i.e., it may be hard to predict what would work best under different circumstances). On top of that, the community may have differing degrees of capacity that may affect the running of the program and, consequently, its intended outcomes. Learning from one of the practices mentioned in the former section, the versatility of incentives can help garner and retain community support: the trash to cashback program diversified its range of incentives (i.e., by including basic needs, among other things, into the mix of incentives) and had managed to draw more attention to the program. A program can also benefit from co-production schemes other than co-implementation. In this sense, introducing co-design schemes for the community may help to streamline the community's perception and willingness to be part of the program.

Political transition can be perceived as another threat to the sustainability of programs. Subsequently, this may affect the willingness of adopters to incorporate such initiatives into their plethora of programs. This issue can be counteracted by safeguarding the initiative with concrete local regulation (i.e., instilling the very program into the local strategic plan as is the case with *Lorong Garden*), the institutionalization of the program within a particular administrative structure to ensure routinization (i.e., central waste bank), obtain recognition from the central government, and, if possible, transfer the whole or parts of the program to the community (e.g., similar to the use of waste bank units).

3.4 Possible Financing Options

Before discussing the possible financing options, it may be necessary to revisit the financing methods utilized by the respective practices so readers can compare, contrast, and eventually find the best financing option (or a combination of options) to fund programs similar to the above.

In Makassar, the *Smart Aparong* is planned to be carried out entirely via the city's own-source revenue. *Lorong Garden* relies on a combination of financing means, such as grants, the local government budget, and community funds. Similarly, waste banks derive their funding from the city's local budget, community funding, and grants (to replace the broken technology utilized to process organic waste).

In Quezon City, Trash to Cashback incorporates partnerships and the city's budget. Partnerships are the cornerstone of this initiative. GrowQC uses tax abatement to acquire idle land from landowners throughout the city. It also partners with several organizations to run model farms and utilizes the local government's budget to provide farmers with training, tools, and seedlings. Solarization of the city utilizes joint ventures to finance the initial capital expenses and maintain the program's operation along with the local government budget.

Apart from these methods used by city governments, there are several other financing options that cities across ASEAN may use to finance local government programs, be it for the program's entirety or as a complementary funding source. Utilizing desk research, the following subsections will detail these options in-depth, substantiating other possible financing methods that may substitute the financial means utilized by the practices observed. While these options are primarily tailored to local governments in Indonesia and the Philippines, we contend that these financing instruments may also be appropriate for other countries. This report will distinguish the financing means into public, private, and blended finance.

3.4.1 Indonesia 

Indonesia has several laws and regulations and is suitable to adopt several practices regarding financing tools, including:

Public Finance

Grants

Grants can take various forms, encompassing monetary support, goods, and services. Grants received by local governments prioritize public services and can be forwarded to regional-owned enterprises (*Badan Usaha Milik Daerah*).

Local governments often receive grants from the national government (fiscal transfer) or domestic organizations, specifically civil society organizations. This report will exclusively focus on grants from the national government. Grants from the national government are drawn from the national budget, which includes domestic income, international grants, and international loans. The national government administers international grants and loans designated for local governments.

Foreign Grants

To secure international grants, such as grants sourced from international loans and international grants, a ministry or non-ministerial government institution must submit a request detailing the activities to be funded through these sources to the planning ministry. After the minister's approval, the activities are incorporated into the *Daftar Rencana Pinjaman Luar Negeri Jangka Menengah* for international loans and *Daftar Rencana Kegiatan Hibah* for international grants. Following this, a request for financing must be submitted to the Ministry of Finance, which determines the total allocation amount for Foreign Loans granted and foreign grants awarded

even before negotiations are carried out with prospective foreign lenders or foreign grant providers.

Then, a ministry or head of a non-ministerial government agency proposes the grant amount and a list of local governments proposed as grant recipients to the Minister of Finance based on the Minister of Finance's determination of the allocation for foreign loans and foreign grants.

The Minister of Finance issues a letter of determination to grant grants to each local government after the Foreign Loan Agreement is signed. The ceiling is determined in the APBN based on the previously stipulated allocation amount. The Regional Grant agreement is signed based on the letter of determination of grant provision.

After the Foreign Grant Agreement is signed, the Minister issues a letter of approval for the continuation of the grant to each local government. Following the issuance of the said letter, a grant forwarding agreement is signed.

Grants sourced from international loans must be utilized to carry out local government activities linked to the achievement of national goals and priorities. As for international grants, the activity received for funding must be a local government's responsibility, an activity that supports the achievement of national government goals and priorities, or to be utilized for financing that is mandated by the grant provider.

Domestic Grants

Ministers/heads of non-ministerial government institutions can propose the number of grants and a list of names of local governments proposed as grant recipients to the Minister of Finance based on the national government's determination of grants to local governments sourced from domestic revenues.

The Minister of Finance issues a letter of determination to provide grants to each local government after the government determines the basis for grant awards originating from domestic revenues. The ceiling is determined in the APBN. The Regional Grant agreement is signed based on the letter of determination of grant provision.

For grants sourced from domestic income, the received grant must be utilized for local government activities that improve the functions of the local government, essential services, and the empowerment of local officials. This form of grant can also be utilized for other activities linked to national policies that can cause financial strains on the local government budget, other activities linked to the implementation of national and international programs, or prespecified activities determined by the national government.

It is important to note that in both forms of grant provision, the appointment of local governments as grant recipients must consider local fiscal capacity, the local governments selected by the grant provider, local governments meeting the conditions set by the national government and specific local governments appointed by the national government. Both foreign and domestic grants are governed under National Government Regulation No. 2 Year 2012 concerning Regional Grants.

Concessional Finance

Concessional finance is financial products provided at below-market rates. They are usually used to finance projects or programs that can contribute significantly to development objectives beyond the investor's returns.

Kredit Usaha Rakyat (KUR, or People's Business Credit) is a concessional microfinance product in Indonesia. This financing instrument fits perfectly with local government programs that require the identification of the local community.

KUR is financed by financial institutions (i.e., banks) and cooperatives (*koperasi*), divided into several categories as follows:

1 Super Micro KUR: beneficiaries of the Super Micro KUR are entitled to receive up to 10 million IDR (equivalent to USD 632) at a modest interest rate of 3 percent per annum. The maximum tenure is three years for capital financing and five years for investment purposes.

2 Micro KUR: recipients of the Micro KUR can access a range of funding from 10 million IDR to 100 million IDR (approximately USD 632 to USD 6,320) with annual interest rates ranging from 6 percent to 9 percent based on certain conditions. Maximum term of three years for capital financing and an extended five-year duration for investment purposes.

3 Small KUR: beneficiaries of the Small KUR will receive upwards of 100 million IDR to 500 million IDR (or between USD 6,320 and USD 31,600). Annual interest rates range from 6 percent to 9 percent, with a maximum term of four years for capital financing and an extended five-year duration for investment purposes.

4 KUR for the placement of Indonesian migrant workers: this KUR has a maximum loan ceiling of 100 million IDR (or USD 6,320) and an interest rate of 6 percent per annum. Its duration must not exceed three years. Recipients of this KUR must also possess a tax ID number for loans beyond 50 million IDR (or USD 3,160). This KUR receives a subsidy of 13.5 percent.

5 Special KUR: Special KUR is a working capital or investment loan specifically intended for groups that are managed together in the form of clusters using business partners for commodities such as smallholder plantations, smallholder livestock, smallholder fisheries, micro, small and medium enterprises or other productive sector commodities that can be developed into special KUR. This KUR has a maximum ceiling of 500 million IDR (or USD 31,600) per group, with an interest rate of 6 percent annually. This KUR offers a maximum term of four years for capital financing and an extended five-year duration for investment purposes. The provision of interest rate subsidy varies according to the loan amount and follows the interest rate subsidy brackets from Super Micro KUR, Micro KUR, and Small KUR. For example, a loan amount of 125 million IDR under this KUR will follow the interest rate subsidy of Small KUR.

Various sectors can be financed by KUR, including (i) agriculture, hunting, and forestry sectors; (ii) marine and fisheries sector; (iii) processing industry sector; (iv) construction sector; (v) smallholder salt mining sector; (vi) tourism sector; (vii) production services sector; and (viii) other production sectors.

As of writing, KUR is governed by, among other things, Regulation of the Coordinating Minister for Economic Affairs No. 1 Year 2023 about Amendment to the Regulation of the Coordinating Minister for Economic Affairs Republic of Indonesia No. 1 Year 2022 concerning the Implementation Guidelines of KUR and the Minister of Finance Decision No. 317 Year 2023 concerning KUR's Interest Rate/Margin Subsidy. It is important to note that the interest rate subsidy may change periodically, and such change is usually introduced via the Minister of Finance Decision.

Own Source Revenue

Regional Budget Revenue (*Pendapatan Asli Daerah*, PAD)

The Regional Budget Revenue (PAD) in Indonesia refers to the revenue generated by regional governments at the provincial level. This revenue comes from various sources, including regional taxes and levies, provincial financial assistance, and other legal regional income. The PAD is managed by the governor, regent, or mayor, who is responsible for submitting a draft regional regulation on the APBD (Regional Revenue and Expenditure Budget).

The Regional Revenue, as regulated in Law No. 33 Year 2004 on Financial Balancing between the Central Government and Regional Governments, constitutes an entitlement of the Regional Government. It is acknowledged as an addition to the net asset value within the relevant year period.

According to Mardiasmo (2011:12), Regional Tax is a compulsory payment imposed by local authorities to enhance the welfare of the populace. In Law No. 34 Year 2004, Retribution – defined as a local charge for specific services or permits – is enacted by the government in response to services provided by the regional government. It includes the General Services Levy, the Business Services Levy, and the Specific Licensing Levy.

Regional autonomy allows regions to maximize local resource management, enabling the government to establish Regional-Owned Enterprises (BUMD) and the private sector to contribute to increasing Regional Original Income (PAD). Other legitimate income is used to finance regional expenditures, including loans to the central government, community loans, and regional bonds.

Tax Abatement

Tax abatement is a reduction or exemption in the amount of tax an individual or a company may owe to the governing authority. It can be utilized as an incentive tool to promote developmental objectives or positive environmental action in general.

In Indonesia, tax abatement is governed under Law No. 1 Year 2022 about Financial Relations Between Central and Local Governments and Government Regulation No. 35 Year 2023 concerning General Provisions for Regional Taxes and Levies. Under these regulatory products, a local government is given the power to introduce tax abatements, including reductions, exemptions, and payment delays on principal taxes, principal retributions, and their sanctions.

This tool can be utilized to (i) support and protect micro- and super micro-businesses, (ii) aid local government policies in achieving their respective goals, and (iii) propel prioritized national programs. A local government must issue a Regional Head Regulation (Perkada) and inform the local house representative.

Sovereign Wealth Fund (*Dana Abadi Daerah,* DAD)

DAD is a perpetual fund sourced from local government budgets. They are used for local government expenditures without reducing the budget's principal for that fiscal year. They aim to manage local finance for intergenerational sustainability and improve regional finance management. A local government must have a high fiscal capacity to develop a DAD and fulfill mandatory government affairs related to essential public services. A DAD must undergo three phases: preparation, assessment, and declaration. The preparation phase involves drafting a Regional Regulation, including funds for DAD management and preparing facilities and infrastructure. The assessment phase involves submitting a proposed issuance plan to the Ministry of Home Affairs, aligning funded activities with local priorities and budget documents, and assessing the readiness of governing units to manage DAD. The final phase involves issuing a local regulation and allocating DAD as an expenditure within the local budget. A DAD is used to enhance and expand public services of regional priorities, obtaining economic, social, and intergenerational benefits. The use of DAD is governed by Law No. 1 Year 2022 about Financial Relations Between Central and Local Governments and National Government Regulation No. 1 Year 2024 about Harmonization of National Fiscal Policy.

Lend-Use *(Pinjam Pakai)*

Lend-Use is the lending (as well as usage) of goods (e.g., vehicles, offices) between the central government and regional governments or between regional governments for a certain period (maximum five years with the possibility of extension) without receiving compensation. After the period ends, the particular asset is returned to the respective head of the region (i.e., mayor or governor). This method is stipulated under the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property, Central Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 Year 2020), and Ministry of Finance Regulation No. 164 Year 2014 concerning Procedures for Implementing the Utilization of State Property in the Framework of Infrastructure Provision.

Ecological Fiscal Transfer (EFT)

Ecological Fiscal Transfer (EFT) distributes a portion of intergovernmental fiscal transfers to finance efforts to address environmental issues at different government scales. It is a monitoring tool for the central government to assess local governments' performance in dealing with environmental issues, fosters better collaboration across scales, and adds resources to governing entities. EFT can be differentiated according to levels of operation, such as the Ecology-Based National Budget Transfer (TANE), a financial transfer scheme from the central government to provincial/regency/city governments based on their environmental management and protection performance. Ecology-Based Provincial Budget Transfer (TAPE) is a financial transfer

scheme from the provincial government to the district/city government based on their environmental management and protection performance, administered using Provincial Financial Aid. Lastly, the Ecology-Based Municipal Budget Transfer (TAKE) is a financial transfer scheme from city/regency regional governments to encourage village government performance improvement in environmental management and protection. TAKE is facilitated by Article 96 of Government Regulation No. 47 Year 2015 and used in various municipalities.

Private Finance

Commercial Loans

Commercial loans are provided by private banks and other financial institutions to municipalities in exchange for future repayment of the loan value amount and interest at market rate or other financial charges. Such loans may be an open-ended line of credit up to a predesignated limit or a specific, one-time amount. The use of commercial loans for municipalities is governed by National Government Regulation No. 1 Year 2024 about Harmonization of National Fiscal Policy.

In Indonesia, a state-owned enterprise, PT SMI (Sarana Multi Infrastruktur), was established to fulfill this duty. The entity is governed by Minister of Finance Regulation No. 174 Year 2016. PT SMI offers loans designated for subnational governments as one of its various products.

In acquiring the said loan, subnational governments must issue a request to PT SMI and provide supporting documents, such as:

1 The approval of the local house representative to undertake a loan.

2 A copy of the minutes from the inauguration of the governor, regent, or mayor.

3 A statement by the regional head that the regional government has no arrears on loan repayments originating from the government and other parties.

4 A feasibility study.

5 Audit Result Report (*Laporan Hasil Pemeriksaan*) on Regional Government Financial Reports (*Laporan Keuangan Daerah*) for the last three years, which received a minimum opinion of Fair with Exceptions *(Wajar Dengan Pengecualian*, WDP).

6 The subnational government's Medium-Term Local Development Plan.

7 The local government's budget for the current fiscal year.

8 Other requirements that may be required by PT SMI (i.e., Integrity Pact [format from PT SMI], Letter of Consideration from the Minister of Home Affairs, and Letter of Permit to Exceed the Maximum APBD Deficit Limit from the Minister of Finance).

After PT SMI receives the request and the supporting documents, it will undergo an appraisal process that will take at most 40 working days. Then, PT SMI will issue an offering letter to the subnational government, followed by the signing of the agreement by both PT SMI and the subnational government.

Loans retrieved from PT SMI can be utilized for the construction of (i) roads and bridges, (ii) hospitals, (iii) markets, (iv) electricity infrastructure, (v) transportation, (vi) water infrastructure, (vii) telecommunication, (viii) waste management, (ix) irrigation, and (x) tourism, among others.

The interest rate on loans from PT SMI is fixed and effective based on the yield rate of government securities (*Surat Berharga Negara*, SBN) with an equivalent tenor plus 0.75 percent. The tenor or term of the loan varies from three to eight years.

It is important to note that under Government Regulation No. 1 Year 2024, subnational governments that wish to seek a loan must fulfill several eligibility requirements: prudent loan amount (i.e., the loan drawn must not exceed 75 percent of the previous year's subnational revenue); demonstrating the ability to repay debts (i.e., local governments must maintain a minimum Debt Service Coverage Ratio (DSCR) of 2.5 in order to access loans); no existing arrears; and does not exceed the maximum limit of APBD deficit originating from regional debt financing. In cases where it does, the subnational government must acquire a permit from the Ministry of Finance to apply for a loan (i.e., *Surat Izin Pelampuan Batas Maksimal Defisit APBD*).

Blended Finance

Municipal Bonds

Municipal bonds, by definition, are issued by regional governments and are loans sourced from the public (Wijaya, Siagian, et al., 2021).

Revenue Bonds

Revenue bonds are a type of municipal bond used to finance income-inducing projects in Indonesia. These bonds can be used for various activities, such as highway construction, bridge maintenance, water, sanitation, energy, and waste management. Under Indonesian regulations, subnational governments must meet four eligibility requirements: a prudent loan amount, demonstrating the ability to repay debts, having no existing arrears, and passing the latest financial audit.

To issue a revenue bond, subnational governments must follow several processes, including planning for the issuance, submitting the bond issuance plan to the Ministries of Finance and Home Affairs, evaluating the documents, and assessing the government's financial ability. If approved, the government may involve capital market-supporting professionals/institutions, such as underwriters, notaries, public accountants, and trustees, and issue a regional head regulation (Perkada) of the bond issuance.

Suppose a municipal bond exceeds the term of the regional head. In that case, the government must undergo these steps to attain approval from the ministries before submitting the documents to the Financial Services Authority. The Ministry of National Development Planning will assess the bond's alignment with development planning by considering strategic, technical, institutional, economic, social, and environmental impacts, financing, and risk mitigation.

The funds obtained from the bond issuance are strictly allocated for the purposes specified in the bond issuance. In instances where a surplus of funds is identified, the local government has the authority to transfer the excess funds to the regional general cash account (*Rekening Kas Umum Daerah*) for use in activities or programs that align with the designated purposes of the bond issuance. If the funds from the bond are insufficient, the subnational government must cover the difference.

Following Minister of Finance Regulation No. 111/PMK.07/2012 concerning Procedures for Issuing and Accountability of Regional Bonds, subnational governments are obliged to pay the interest and principal of each Regional Bond at maturity. Funds to pay interest and principal are provided in the local government budget (APBD) every year until the end of these obligations. The local government must allocate Reserve Funds (*Dana Cadangan*) in the APBD according to the regional financial capacity to pay the principal of Regional Bonds.

This bond must always use the Indonesian rupiah as its currency and can only be traded within the domestic market.

Green Bonds

Green bonds are instruments that finance eligible green projects with a positive environmental impact. Under various regulations, subnational governments can issue green bonds under certain conditions. These include a prudent loan amount, demonstrating the ability to repay debts, no existing arrears, and passing the latest financial audit.

Green bonds can finance renewable energy, energy efficiency, pollution prevention and control, biological natural resource management, biodiversity conservation, sustainable transportation, sustainable water and wastewater management, climate change adaptation, environmentally sound buildings, and business activities. The procedures and eligibility criteria for issuing a municipal green bond are similar to those for conventional municipal revenue bonds but with additional caveats.

The subnational government must submit a statement letter of commitment to use the proceeds from the green bond on green activities, opinions or assessment results from relevant environmental experts, proof of the environmental expert's competence in providing opinions or assessments, and a description of the green activities funded by the proceeds. The proceeds retrieved from the issuance of green bonds must be allocated to finance green activities, with a minimum requirement of 70 percent.

In summary, green bonds are a promising investment option for governments looking to finance environmentally friendly projects. However, they require specific documents and evidence of their sustainability and environmental impacts.

Regional Sukuk

Sukuk are certificates of equal value representing undivided ownership shares in tangible assets, usufruct, and services. Under Government Regulation No. 1 Year 2024, regional *sukuk* can take various forms, such as *ijarah*, *mudharabah*, *musyarakah*, *istishna*, *wakalah*, and combinations of these forms. Subnational governments must

meet eligibility requirements, including a prudent loan amount, demonstrating the ability to repay debts, and the maximum limit of APBD deficit originating from regional debt financing.

The issuance of regional *sukuk* is governed by Government Regulation No. 1 Year 2024 and Financial Services Authority Regulation No. 61/POJK.04/2017. The issuance procedures resemble revenue bonds, with the subnational government submitting the plan to the Ministries of Finance and Home Affairs, both of which must issue proof of receipt. The Ministry of Home Affairs evaluates the documents, focusing on their compatibility with local government responsibilities, planning documents, and budgeting documents. The Ministry of Finance assesses the subnational government's financial ability before issuing the final approval.

If approved, the subnational government may involve capital market-supporting professionals/institutions and issue a regional head regulation (Perkada) regarding the issuance of the *sukuk*. The subnational government is also responsible for submitting the regulation along with a cover letter for a registration statement, a prospectus, and an abridged prospectus as part of its regional *sukuk* public offering registration statement to the Financial Services Authority.

In cases where a municipal *sukuk* exceeds the term of the regional head, the subnational government must undergo steps to attain approval from the ministries before submitting the documents to the Financial Services Authority.

Guarantee

Guarantees are powerful de-risking instruments that can allow investors to leverage more capital to address social and environmental challenges. Guarantees can address several financing issues faced by city governments. This includes lessening the risk profile of investment to decrease the cost of project finance, providing access to long-term funding due to improved risk profile, and addressing the security gap in small projects involving small developers with insufficient balance sheets. Different organizations provide credit enhancement and guarantee instruments.

For instance, PT PII (Penjaminan Infrastruktur Indonesia), a state-owned enterprise, guarantees Public-Private Partnership (PPP) infrastructure projects to protect private investors from various political risks derived from national or local governments (PT PII, n.d.).

UNCDF, under the Guarantee Facility for Sustainable Cities program, offers guarantees (as well as other financing tools) with a budget amounting to EUR 154 million to support transactions that will pilot and test innovative development solutions that can be taken to scale, specifically in Africa and South-East Asia (UNCDF, 2022).

Insurance

The national government, via its state-owned company Jasindo (Jasa Indonesia) Insurance, has rolled out insurance programs to protect farmers, cattlemen, and fishers against adversities.

1. The Rice Farming Business Insurance (*Asuransi Usaha Tani Padi*, AUTP): AUTP is an insurance program designed to safeguard farmers from the risks of crop failure caused by floods, droughts, or diseases. Farmers participating in this program must typically pay a 180,000 IDR (or USD 11) insurance premium per harvest period. However, thanks to the support of the national government, farmers benefit from a significant reduction. They are only charged a 36,000 IDR (or USD 2) premium per harvest period, representing an 80 percent discount the national government provides. This program welcomes sharecroppers and landowning farmers to enroll under the condition of cultivating either irrigation or rain-fed land near a water source. In the event of any of the disasters above, farmers are entitled to a payout of 6 million IDR per hectare.
2. Cattle Business Insurance (*Asuransi Usaha Ternak Sapi*, AUTS): AUTS offers protection to cattle breeders against risks such as death from calving, diseases, accidents, and losses due to theft. Breeders must pay a 40,000 IDR (or USD 2.5) insurance premium per cow annually, significantly discounted from the original 200,000 IDR (or USD 13), courtesy of government support. This program is open to various breeders, including small-scale ones. However, enrolled cows must be female, have a minimum productive age of one year, be healthy, and possess clear identification (such as a distinct tag, stamp, or livestock card). In a catastrophe, breeders are eligible for a payout of 10 million IDR (or USD 633) per cow. It is important to note that in cases where a forced culling has been implemented, the payout may be subject to reduction.
3. Fishers Insurance: Fishers Insurance protects fishers from the risk of death, whether from conducting fisheries-related activities or others. Fishers are supposedly subject to an insurance premium of 175,000 IDR (or USD 11) per person. However, government support has rendered the insurance free by covering the entirety of the insurance premium. The insurance payout becomes applicable in the unfortunate event of an accident or death occurring during or outside the fisher's time at work. To qualify for this program, fishers must hold a valid fisher identity, possess a savings account, or provide a letter indicating their ability to open one. They must be at most the age of 65.

Public-Private Partnership

Build-Operate-Transfer (BOT)

BOT is a contractual arrangement where an entity carries out the construction (i.e., financing) of a given infrastructure facility and the operation and maintenance thereof. The entity is allowed to charge users specific fees over a fixed term to cover the costs (as well as to obtain a reasonable return) required to conduct the previously mentioned activities. Moreover, the entity must also pay contributions to the regional general treasury account annually according to a predetermined amount. After the agreed period (i.e., the maximum period is 30 years), the land, building, or facility will be returned to the relevant governing agency.

This method is facilitated by the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property and Central

Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 Year 2020).

Build-Transfer-Operate (BTO)

The particular approach of contractual arrangement allows the relevant governing body to enable entities outside of the organization to build an infrastructure or a facility. This entity will then build the facility on a turn-key basis, assuming overran costs, delays, and specified performance risks. Once the facility is commissioned satisfactorily, the property is transferred to the implementing agency. The private entity, however, operates the facility on behalf of the implementing agency under a specified agreement, with a maximum period of 30 years. Throughout the operation period, the entity also has to provide the relevant governing agency with yearly contributions. Similar to BOT, this method is facilitated by the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property and Central Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 Year 2020).

Cooperation of Infrastructure Provision *(Kerja Sama Penyediaan Infrastruktur* [KSPI])

KSPI is the cooperation between the government and business entities for infrastructure provision activities following statutory provisions. Several considerations must be taken into account prior to implementing KSPI, which include (i) the project's ability to pursue the common good (or to support tasks and functions of the government agency in question); (ii) the availability of local financial resources; (iii) and whether the proposed project falls among the prioritized infrastructure programs stipulated by the central government. KSPI of a regional property can be carried out for up to 50 years with one possibility of an extension. In return, the government can enjoy the addition of an infrastructure within its jurisdiction and clawback returns (if any). This method is encapsulated under the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property, Central Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 Year 2020), and Ministry of Finance Regulation No. 164 Year 2014 concerning Procedures for Implementing the Utilization of State Property in the Framework of Infrastructure Provision.

Asset Utilization Cooperation *(Kerja Sama Pemanfaatan*, KSP)

KSP is the utilization of regional property by an appointed party(ies) within a certain period to increase non-tax state revenues and other sources of financing. This cooperative arrangement lasts up to 30 years with the possibility of extensions. Asset utilization in this scheme is administered by developing the asset in question into an income-productive asset. There are two recognizable paths toward asset utilization. The first one involves constructing a new building or an infrastructure facility that is entirely new, whilst the second rehabilitates or renovates existing assets.

Throughout the construction (or rehabilitation phase), the appointed entity will bear any expenses related to the development of assets. The appointed entity is also responsible for operating the asset for an agreed-upon length of time. Within the previously mentioned period, the appointed entity must provide the relevant

governing authority with an annual contribution and a portion of its revenue, as per the agreed-upon arrangement. When the agreed-upon time has elapsed, the improved asset is handed back to the relevant government agency.

This mechanism is facilitated by various laws and regulations, such as that of the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property, Central Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 of 2020), and Ministry of Finance Regulation No. 164 Year 2014 concerning Procedures for Implementing the Utilization of State Property in the Framework of Infrastructure Provision.

Rent

Rent is another party's use of regional property for a certain period (maximum five years with the possibility of an extension). The lending entity will receive cash as a form of compensation. This method is encapsulated under the Ministry of Home Affairs Regulation No. 19 Year 2016 concerning Guidelines for Management of Regional Property, Central Government Regulation No. 27 Year 2014 concerning Management of State/Regional Property (as amended by Central Government Regulation No. 28 Year 2020), and Ministry of Finance Regulation No. 164 Year 2014 concerning Procedures for Implementing the Utilization of State Property in the Framework of Infrastructure Provision.

Viability Gap Fund (*Dukungan Kelayakan,* VGF)

Viability Gap Fund is a fiscal contribution from the central or state governments to render a PPP project financially viable and bankable. VGF can only be served if no other possible alternatives can be utilized to ensure the project's feasibility. This instrument is facilitated by Minister of Finance Regulation No. 170 Year 2018 concerning Amendments to Minister of Finance Regulation No. 223/PMK.011/2012 concerning Provision of Feasibility Support for Part of Construction Costs in Government Cooperation Projects with Business Entities in Infrastructure Provision.

3.4.2 The Philippines

The Philippines possesses several laws (i.e., the Republic Act No. 7160, also known as the Local Government Code of 1991, and the Republic Act No. 6957, amended by the Republic Act No. 7718) and regulations, and it is possible to adopt several practices regarding the use of financing tools:

Public Finance

Own Source Revenue

Grants

The People's Survival Fund (PSF) is a financial grant of 1 billion Philippine pesos (USD 17,829,920) made available to local government units to fight climate change. The fund was created under Republic Act No. 10174.

The fund may finance climate change adaptation projects, including adaptation activities in water resources and land management, agriculture and fisheries, health, infrastructure development, and natural and coastal ecosystems. This fund can also be used to improve monitoring, prevention, and control of vector-borne diseases triggered by climate change. Additionally, forecasting and early warning systems for climate change preparedness, risk transfer insurance, and community adaptation support programs also fall under the purview of the grant.

LGUs are eligible to access this grant, albeit priority is given to LGUs with a high presence of multiple climate-related hazards, high poverty incidence, and with present key biodiversity areas. Other than local governments, local and community organizations can access the fund. These organizations must conform to several accreditation guidelines to be considered for funding (i.e., DILG Memorandum Circular 2013 – 70, DSWD-DBM-COA Joint Resolution 2014-01, and CCC Accreditation Guidelines for Local/Community Organizations).

To be eligible for funding, projects funded by this grant must adhere to the National Climate Change Action Plan (NCCAP) and several climate-proofed development plans, such as the enhanced climate change adaptation and disaster risk reduction Comprehensive Land Use Plans (CLUPs).

As for the requirements and procedures, funding submission must include a letter of intent, an accomplished project proposal template, adaptation references (i.e., climate risk and vulnerability assessments, CLUPs, and Local Climate Change Action Plan), and an annual investment plan for local governments. For local/community organizations, a letter of intent, accomplished project proposal template, adaptation references, and organizational/board resolution affirming interest in accessing the fund, as well as proof of communication with the LGU covering their proposed beneficiaries, will be required upon funding request.

After submitting the required documents, the PSF Secretariat, among others, will review and process them. Next, the CCC Commissioners will administer concurrence and endorsement, and the PSF Board will approve them.

Tax Abatement

Tax abatement is a reduction or exemption in the amount of tax an individual or a company may owe to the governing authority. It can be used as an incentive to promote developmental objectives or positive environmental action.

The Republic Act No. 7160, also known as the Local Government Code of 1991, allows LGUs to grant tax exemptions, incentives, or reliefs through ordinances as necessary. Tax abatement has been used to promote environmental activities, such as the GrowQC Program. This program utilizes tax abatement to promote greater UGS coverage in the city while strengthening food security.

Public-Private Partnership

Build-Operate-and-Transfer (BOT)

BOT is a contractual arrangement where an entity carries out the construction (i.e., financing) of a given infrastructure facility and the operation and maintenance thereof. The entity is allowed to charge users with specific fees over a fixed term to cover the costs (as well as to obtain a reasonable return) required to conduct the previously mentioned activities. After the agreed term length has been reached, the entity transfers the facility to the government agency concerned. The term must be at most 50 years in the Philippines.

Build-and-Transfer

Like BOT, build-and-transfer utilizes an entity to finance and construct the previously agreed-upon facility. After its completion, it is turned over to the government agency concerned. The government agency is obligated to pay the entity the total costs accrued throughout the project (as well as a reasonable return) on an agreed basis.

Build-Own-and-Operate

This arrangement allows an entity to finance, construct, own, operate, and maintain a project after receiving authorization from the relevant governing authority(ies). The entity can charge fees to users who wish to reap the benefits from the project. This is done so that the entity can recover the costs required to build, operate, and maintain the facility and enjoy a reasonable return.

Build-Lease-and-Transfer

This is a contractual arrangement in which an entity is authorized to finance and construct an infrastructure or development facility and, upon its completion, turns it over to the government agency or local government unit concerned on a lease arrangement for a fixed period. Ownership of the facility is automatically transferred to the government agency or local government unit concerned afterward.

Build-Transfer-and-Operate

This particular method of contractual arrangement allows the relevant governing body to contract out the building of an infrastructure facility to a private entity such that the contractor builds the facility on a turn-key basis, assuming overran costs, delays, and specified performance risks. Once the facility is commissioned satisfactorily, the title is transferred to the implementing agency. The private entity operates the facility on behalf of the implementing agency under a specified agreement.

Contract-Add-and-Operate

This is a contractual agreement whereby the private entity adds to an existing infrastructure facility it rents from the government. It operates the expanded project over an agreed-upon franchise period. There may or may not be a transfer arrangement regarding the facility.

Develop-Operate-and-Transfer

A contractual arrangement whereby favorable conditions external to a new infrastructure project to be built by a private entity are integrated into the arrangement by giving that entity the right to develop adjoining property. Thus, the entity can enjoy some benefits the investment creates, such as higher property or rent values.

Rehabilitate-Operate-and-Transfer

This is a contractual arrangement whereby an existing facility is turned over to the private sector to refurbish, operate, and maintain for a franchise period. Upon expiry, the legal title to the facility is turned over to the government. The term also describes the purchase of an existing facility from abroad and its import, refurbishment, construction, and consumption within the host country.

Develop-Own-Operate

A contractual arrangement whereby an existing facility is turned over to the private sector to refurbish and operate without a time limitation on its ownership. If the operator does not violate its franchise, it can continue operating the facility perpetually.

Joint Venture

A contractual arrangement whereby entities, on the one hand, and the city, on the other, contribute capital, services, assets (including equipment, land, intellectual property, or anything of value), or a combination of any or all preceding. Each party shall be entitled to dividends, income, and revenues and bear the corresponding losses and obligations in proportion to its share. This is similar to the method used by the Quezon City Government to implement the Trash to Cashback program.

Private Finance

The Local Government Code of 1991 allows local governments to, among other things, commit to loans, credits, and other forms of indebtedness (Alvina, 2019).

Commercial Loans

Commercial loans are provided by private banks and other financial institutions to municipalities in exchange for future repayment of the loan value amount and interest at market rate or other financial charges. Such loans may be an open-ended line of credit up to a predesignated limit or a specific, one-time amount.

In the Philippines, the government-owned Land Bank has consistently provided loans for subnational governments. Recently, it introduced the RISE UP LGUs Lending Program, which allows municipal, city, and provincial Local Government Units (LGUs) to apply. This loan offers two forms of credit facility: permanent working capital and term loan. They can be utilized to finance a permanent working capital, acquisition of equipment, and construction of facilities for linking products to the market, such as the market infrastructure development; and other programs

or projects that provide essential and support services, social welfare, healthcare, and other infrastructure that can spur the local economy. The fund for this lending program amounts to 10 billion Philippine pesos (or USD 178,221,400).

LGUs interested in the RISE UP LGUs Lending Program must meet certain criteria. They are required to submit a Sangguniang Resolution authorizing the Local Chief Executive (LCE) to borrow funds, negotiate, and enter into a loan agreement with the bank. This resolution should also approve the financing of the projects, aligning them with the approved local development plan and public investment program.

LGUs must follow a comprehensive set of pre-processing, pre-release, and post-release requirements to apply for the loan.

1. Pre-Processing: LGUs must submit several documents, including COA-audited Financial Statements, the current year's approved/supplemental budget, and ordinances approving the local development plan. Depending on the specific project, the bank may request additional documents.
2. Pre-Release Requirements: before the loan release, LGUs must pass an ordinance approving all representations, acts, warranties, and loan terms. They must also authorize the assignment of the Internal Revenue Allotment (IRA) and other income as collateral or security for the loan. Various certifications, including those from the Budget Officer, Accountant, and Treasurer, and a joint certification by the Bids and Awards Committee (BAC) chair and the LCE is also required.
3. Post-Release Requirement: after the loan is released, LGUs must submit an annual certification confirming the availability of sources for repayment and appropriation in their respective budgets.

The lending program offers a competitive interest rate fixed at 4.5 percent per annum for the first year, subject to annual repricing afterward. The loan tenure or repayment period varies based on the purpose of the loan. In this sense, permanent working capital must be paid within three years (with repayment options ranging from monthly, quarterly, semi-annually, or annually), and a term loan can be repaid for up to ten years. Repayment options vary from monthly, quarterly, semi-annually, or annually.

Energy Service Companies (ESCOs)

Energy service companies (ESCOs) deliver energy efficiency projects financed based on energy savings. ESCO provides the customer with energy savings and, consequently, a reliable source of revenue (Wijaya, Zeki, et al., 2021).

The use of ESCO has been acknowledged under Republic Act No. 11285 and strengthened through guidelines, a certification system, and accreditation via various Department Circulars (i.e., Department Circular No. DC2020-09-0018).

There are various ESCO schemes: shared savings business model and guaranteed savings model (Wijaya, Zeki, et al., 2021). The former is where the ESCO borrows money from a bank and uses the loan to buy and install energy-efficient devices at the client's facility. The installation can offer the client some energy savings that lead to monetary savings. The client will then share some of the monetary

savings with the ESCO as payment for the device installation. The ESCO will use this revenue to repay the bank loan.

Under the guaranteed savings business model, the client, instead of the ESCO, borrows money from the bank, assumes the financial risk, and purchases the energy-efficient device from an ESCO. The device enables the client to gain energy savings and, consequently, monetary savings. The client will utilize the money saved to repay the bank loan. Should the guaranteed amount of savings be left unachieved, the ESCO will provide a warranty to the client by paying the monetary difference between promised and actual energy savings if the actual is less than the promised amount. The warranty is valid throughout the contract arrangement.

Insurance

The national government, via its state-owned company, Philippine Crop Insurance Corporation (PCIC), has rolled out insurance programs to farmers, fishers, and other agricultural workers (or business owners) to protect them against disasters (Philippine Crop Insurance Corporation, n.d.)

1 Rice Insurance

The provision of rice insurance applies to all rice varieties accredited for production by the National Seed Industry Council or endorsed by the Municipal Agriculturist.

The insurance covers the cost of production inputs per farm plan and budget. The farmer can also choose to have an additional amount of cover of up to 20 percent of the farm plan and budget to cover a portion of the value of the expected yield.

This insurance covers two types of risk: multi-risk cover and natural disaster cover. The former provides comprehensive coverage against crop loss caused by natural disasters, as well as plant diseases and infestations. The latter covers crop losses caused by natural disasters (e.g., earthquakes, tornados).

The insurance cover kicks in from direct seeding or upon transplanting up to harvesting. Additionally, the premium rate for this insurance product varies per region, season, and risk classification.

2 Corn Insurance

Corn insurance applies to all corn varieties accredited for production by the National Seed Industry Council or endorsed by the Municipal Agriculturist.

The insurance covers the cost of production inputs per farm plan and budget. The farmer can also choose to have an additional amount of cover of up to 20 percent of the farm plan and budget to cover a portion of the value of the expected yield.

This insurance covers two types of risk: multi-risk cover and natural disaster cover. The former provides comprehensive coverage against crop loss caused by natural disasters, plant diseases, and infestations. The latter covers crop losses caused by natural disasters (i.e., earthquakes and tornados).

The insurance cover kicks in from direct seeding or upon transplanting up to harvesting. Additionally, the premium rate for this insurance product varies per region, season, and risk classification.

3 Fisheries Insurance

The object of this insurance product is the unharvested stock in fisheries farms specified in the insurance application.

The insurance has to cover production input costs, the value of the fish farmer/fisherfolk/grower's labor, and the relevant members thereof, including the labor of hired workers per fisheries farm plan and budget.

The coverage period will be from stocking up to harvest, as indicated in the fisheries farm plan and budget duly certified by an accredited fishery technologist.

This insurance product provides limited coverage for stock losses due to natural disasters and extended coverage against loss of stock and other eligible properties due to fortuitous events and force majeure. Excluded risks include insects, pests, diseases, intentional killing, neglect, theft, war, and invasion.

The premium rate for this insurance product varies from 2 percent to 12 percent, contingent upon several factors such as the evaluation of risk, agroclimatic conditions, terrain, production, and loss records.

Blended Finance

Guarantees

Guarantees are powerful de-risking instruments that can allow investors to leverage more capital to address social and environmental challenges. Guarantees can address several financing issues faced by city governments. This includes lessening the risk profile of investment to decrease the cost of project finance, providing access to long-term funding due to improved risk profile, and addressing the security gap in small projects involving small developers with insufficient balance sheets. Organizations provide credit enhancement and guarantee instruments (Rakhmadi & Sudirman, 2019).

UNCDF, under the Guarantee Facility for Sustainable Cities program, offers guarantees (as well as other financing tools) with a budget amounting to EUR 154 million (or USD 166,051,270) to support transactions that will pilot and test innovative development solutions that can be taken to scale, specifically in Africa and South-East Asia (UNCDF, 2022).

Municipal Bonds

Under Republic Act No. 7160 and Presidential Decree No. 752, provinces and cities can issue bonds, debentures, securities, collaterals, and other obligations to finance self-liquidating and income-producing activities.

Local government bonds shall be issued under the following conditions:

1. They shall be registered and transferable to the Central Bank of the Philippines.
2. They shall not be sold at less than face value.
3. They shall be redeemable ten years or more from the date of issue, as may be determined by the Secretary of Finance before their issuance. The local

government may redeem them earlier upon approval by a majority of all the members of the local board council.

4. Before issuance of the bonds, the Secretary of Finance, after consulting with the Monetary Board of the Central Bank of the Philippines, shall fix the annual rate of interest payable on the bonds and the mode of payment of the interest accruals thereon.
5. The principal and interest on the bonds shall be payable in legal tender of the Republic of the Philippines.

Local government bonds are exempt from all taxes levied by the central government, and the relevant local board and council must establish a sinking fund to redeem the bond at maturity. The sinking fund shall fully cover the principal and interest due on the bonds issued.

The national government guarantees the payment by the provincial or city government of both the principal and the interest of the bonds issued by said provincial or city government and must pay such principal and interest in case the provincial or city government fails to do so. However, the local government in question must repay the payment made by the national government.

Source: www.energytransitionpartnership.org

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5. Annex

Annex 1. Interview Guide

Description of the Initiative	How did this program originate? How would you describe the program? What are the aims of this program?
Challenges	Are there any challenges in the design or implementation stages of the program?
Results	Is this program relevant to the problems faced by the city government? How does this program perform? What results has this program produced? How does the program help the city in solving environmental issues? How does the program help the city in solving economic issues? Is therespecific attention given to the vulnerable community? How does the program empower vulnerable communities?
Sustainability	How does the program comply with the national government's mandate or policy? How are the relevant stakeholders involved in this program? Is there a specific budget allocation for this program? If yes, how much? Is there a specific regulation governing the implementation of this program?

Replicability	Are stakeholders and the public involved in this program's formulation and implementation stages? How many stakeholders are involved in the program? Are there any changes within the regulatory framework to accommodate the introduction of this program? If yes, how does the regulation accommodate the program? Similarly, are there any changes to pre-existing infrastructure to accommodate the implementation of this program? If yes, how does the modification/addition accommodate the program? How does the city government finance this program? How much money has been incorporated into the program? Are there any breakthroughs used to finance this program?
Lessons Learned	What lessons can be learned or shared by the city government regarding this program?

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