



GREEN CITIES DEVELOPMENT

A TRAINING MANUAL



ACKNOWLEDGEMENT

The Green Cities Development Training Course provides a comprehensive set of development training materials, in order to share knowledge and experiences of the Global Green Growth Institute's (GGGI) urban priority areas through its global/regional/national capacity building programs. The training course consist of two parts – eight modules and the manual. The manual gives an overview of training-related content and serves as a guidebook for trainers. The manual includes course overviews, thematic backgrounds, and terminologies, as well as the framework and instructions for preparatory work. The manual also consists of group exercise templates, which can be directly borrowed and used at the training.

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INTRODUCTION

GGGI's Green Cities thematic portfolio covers 17 member countries in Asia and the Pacific, Africa, Middle-East and Latin America and the Caribbean, providing technical advisory services to national and local governments in achieving sustainable urban development. GGGI's thematic priority on Green Cities supports an integrated, cross-sectoral, inclusive, and scalable approach that responds to global and national agendas including the Sustainable Development Goals (SDGs) and Nationally Determined Contributions (NDCs) in support of the Paris Agreement.

GGGI has been particularly developing its urban projects in five thematic priority areas: i) mainstreaming and localizing green growth into urban planning and management; ii) supporting low-carbon, smart and resilient cities; iii) developing sustainable solid waste management systems, based on waste-to-resource approaches and circular economy principles; iv) supporting decentralized wastewater and sanitation solutions; and v) promoting green mobility and non-motorized transport. These thematic priorities have direct relevance to achieving GGGI's Strategic Outcomes (SOs):



One of the delivery approaches the GGGI Green Cities unit adopts is to design and conduct capacity building programs targeted at local government officials to support member country governments to independently develop and implement green cities policy and projects. In 2017, GGGI launched a Training of Trainers (ToT) Program in collaboration with the Ministry of Infrastructure (MININFRA) in Rwanda and trained local government officials from six secondary cities. GGGI has delivered a series of capacity building programs on green cities development covering a wide range of topics from green cities development framework to green cities project financing in Cambodia, China, Lao PDR, Morocco, Nepal, Rwanda, Senegal, and Uganda.

This training course, designed as a four to five day course, consists of eight modules. It starts with a brief introduction to urban opportunities and challenges; offers tools and methodologies for identifying priority sectors in sustainable urban development; narrows down into sub-sectors of green cities with policy guidance and case studies on sectoral project implementation; presents an overarching/logical framework for the design, monitoring, and evaluation of the urban project; and finally provides a landscape of climate financing for urban projects.

This training course has been built upon knowledge products and case studies discussed at the training series delivered by GGGI. The Green Cities Training module and manual are developed with an aim to make GGGI's knowledge and practices more accessible and applicable to a wider audience. The training manual provides guidelines and an overall introduction to the learning objectives of each module, instructions on group exercises, and templates to be freely used by urban practitioners across the region. It is mainly developed for GGGI's country teams, government agencies, and thematic experts in green cities development whose aim is to develop and conduct related training. It may also be useful for researchers and individual practitioners from related fields seeking a useful set of guidelines, tools and cases for cross-sectoral green urban solutions in a developing country context.

COURSE OBJECTIVES

The course is designed to enhance the capacity of key urban leaders including urban planners, technical and senior level city officials, and environmental officers engaged in sustainable urban development. The course is targeted for low and lower-middle income countries in Asia and the Pacific, and Africa, therefore, the case studies included in the course are relevant to the context of the targeted regions. It primarily serves to deepen the understanding of green city development based on GGGI's urban thematic strategy, and to inspire city leaders to catalyze innovative solutions for urban challenges. The course consists of informative presentations, participatory group exercises, and case studies. Course materials and group exercises can be customized depending on the target audiences and local context.



The primary objectives of the course are as follows:

- Introduce the global trend of urbanization and the associated opportunities and challenges;
- Increase the understanding of GGGI's urban thematic priorities and the linkage between green cities development and the global agenda such as the SDGs and the Paris Agreement;
- Provide analytical tools, methodologies, and frameworks for sectoral prioritization, program tree analysis and need assessment for Green Cities Development;
- Deepen the understanding on conceptual ideas of low-carbon and resource efficient cities with case studies on green buildings and green public spaces;
- Increase the understanding of designing sustainable solid waste management in promotion of waste-to-resource opportunities;
- Present the concept of circular economy and sustainable business models for decentralized wastewater treatment systems;
- Present the concept of green business and enterprises which create jobs and increase access to basic services for urban marginalized groups;
- Enable participants to create a logical framework in SMART indicators in urban project proposals;
- Provide a landscape of urban climate finance and financing mechanisms for green urban infrastructure projects;
- Enable participants to independently design and implement green cities development policy and projects.



OVERVIEW

The course consists of eight modules, which are delivered over a period of four to five days. Training programs can be designed in full, using all eight modules, or a selection of a few modules. This may be more relevant when targeting the needs and expectations of specific audiences. The sequence of the modules is based on GGGI's urban thematic priority areas, however, this can also be customized based on the primary learning expected outcomes of the training programs. The module is developed in English but largely in a non-technical manner which can be translated into the local language of a target audience by a local partner. The short descriptions and chapter titles of the eight modules are illustrated below.

Module 1.

An introduction to urban opportunity and challenges

This module provides an overview of global and regional urbanization coupled with a snapshot of the major sustainability challenges currently faced by urban areas around the world i.e. infrastructure and service gaps, inefficient use of resources, air pollution, employment, vulnerability to climate change and social inequality. It reviews social and economic opportunities triggered by urbanization with how to harness these opportunities for sustainable urban development. In line with this, Module 1 introduces GGGI's priority sectors in green cities development by featuring examples from GGGI's existing policy and investment projects. As part of this module, it is recommended that national strategies/policy on sustainable urban development be presented to participants by a local expert/government focal point. Module 1 consists of the following chapters:



- Chapter 1.1. Global trends in urbanization and the opportunities/challenges in urban areas
- Chapter 1.2. GGGI's priority sectors in green cities development
- Chapter 1.3. Linking green cities development to SDGs, Paris Agreement and other relevant global and regional agendas and priorities
- Chapter 1.4. National Urban Policies (NUPs) and strategies on urban development (optional by local trainer)

Module 2.

Understanding Green Cities and the Green Cities Development Framework

This module begins by throwing a question “How do you define a green city?”. By opening with this question, this module aims to engender discussions between the participants regarding how they conceptualize green cities and its relationship to local urbanization trends and processes. Through this activity-centered approach, participants will be prepared to conduct an assessment in three areas:

i)

Sector prioritization for green cities development;

ii)

Problem tree analysis in priority sectors;

iii)

Need assessment in governance, project implementation, and financial resources for green city development.

This assessment exercise will require a pre-assignment on developing a city profile of which a template will be provided. Based on the results of the assessment, participants will develop green cities visions with social, environmental, and economic targets for their own cities using an impact diagram. Module 2 entails the following chapters:



Chapter 2.1. Understanding green cities and the green cities development framework

Chapter 2.2. Activities on sector prioritization, problem tree analysis, and the need assessment matrix

Chapter 2.3. Green cities vision exercise

Module 3.

Low-carbon and resource-efficient cities

This module covers two complementary approaches to green cities - “low-carbon” and “resource efficiency” - in order to help participants understand both environmental and material sustainability of cities, which decouples economic growth from resource exploitation. Chapter 3.1 of this Module explores the key concepts and strategies for reducing carbon dependence and improving resource efficiency. The environmental and economic cases for transitioning from the current developmental pathway towards a low-carbon pathway is presented. The transition provides an opportunity for a holistic rethinking of urban metabolism through the concept of circular economy.

The following two chapters focus on specific aspects of cities: buildings and public spaces. In Chapter 3.2, the features of green buildings are discussed. An extended case study of GGGI’s work in Rwanda provides an in-depth exploration of the process undertaken to establish the regulatory environment for green buildings. Using common criteria for measuring building performance, this chapter introduces the framework for management of green buildings, which results in environmental and economic efficiencies.

Chapter 3.3 discusses the function of green public spaces in sustainable urbanization. The varied functions and broad values of green public spaces in urban centers are also discussed, with global examples illustrating the ways in which such spaces fulfil the economic, environmental and social needs of cities, supporting sustainable development. The chapter closes with a discussion of GGGI’s work in supporting the government of Rwanda in developing Green Public Spaces in Secondary Cities

across the country. The case study will help participants plan to achieve SDG 11.7 on universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities. Module 3 consists of the following chapters:



Chapter 3.1. Understanding of resource efficiency and low-carbon cities

Chapter 3.2. Resource-efficient buildings for low-carbon cities – Green buildings & building materials

Chapter 3.3. Case study on sustainable infrastructure – Green Public Spaces

Module 4.

Designing sustainable solid waste management: waste-to-resources

This sector-specific module helps participants shift their thinking from a conventional approach of municipal waste management to a more sustainable system, particularly relevant and adaptable to emerging cities in the developing world. It covers the waste management hierarchy and offers opportunities to identify waste-to-resource initiatives that are aligned with the principles of Reduce, Reuse, and Recycle (3R). It also highlights global cases where policy initiatives and community practices address the issues of:

- i) Increasing waste collection rates;
- ii) Minimizing waste generation;
- iii) Maximizing waste-to-resource/energy opportunities;
- iv) Diversion from landfill sites (e.g., increasing recycling rates);
- v) Building a better financing model for waste management.

By examining the waste value chain, this module helps participants understand the waste management cycle and identify the opportunities for potential intervention, in areas categorized by waste type, which promote waste-to-resource initiatives. Specific examples of scalable projects on separation at source, recycling, waste-to-energy technology and informal sector/SME engagement that are adaptable to low and middle-income countries will be provided for group discussion. Module 4 includes the following chapters:



Chapter 4.1. Conceptual understanding of the global agenda for waste management and the waste value chain

Chapter 4.2. Policy mechanisms and community practices for waste-to-resource initiatives

Chapter 4.3. Waste Management Financing

Module 5.

Decentralized wastewater and urban sanitation solutions

This module provides an overview of urban wastewater and sanitation solutions, particularly for slums and peri-urban communities. By the end of the module, participants will gain an understanding of the basic definitions of sanitation, the sanitation value chain and the distinctive features of centralized, decentralized and partially decentralized wastewater treatment systems. Participants will also learn the concept of a circular economy approach and identify opportunities for wastewater reuse and valorization. Relevant case studies will be presented to demonstrate the different designs of business models for sustainable management and operations of decentralized wastewater treatment systems. Module 5 entails the following chapters:



Chapter 5.1. Basic definitions and concepts of wastewater, sewerage and sanitation, and the sanitation value chain

Chapter 5.2. Key features of centralized, decentralized and partially decentralized sanitation and wastewater treatment systems

Chapter 5.3. The Circular Economy Approach and opportunities for the reuse and valorization of wastewater

Chapter 5.4. Designing sustainable models for decentralized wastewater treatment systems

Module 6.

Inclusive Green Business in the context of sustainable urban development

This module aims to introduce the concept of inclusive green business and the enterprises that are committed to creating, supporting, realizing, and achieving social and environmental values. This module draws on cases of social enterprises that address urban issues including increasing access to sustainable urban services for: electricity; water; wastewater systems; recycling and reuse of waste; and deployment of appropriate technologies. In reviewing the phenomenon of inclusive green business (e.g. Grameen Shakti, WasteConcern, Smartlife), it also examines how these social enterprises create decent jobs and increase access to urban services especially for marginalized groups of the urban population. Furthermore, the module explores countries with the policy mechanisms or legal framework to promote inclusive green business. This enables a systematic analysis of the pros and cons of the respective policy schemes, measured against the important quantitative and qualitative growth of these enterprises aimed at tackling urban challenges. Module 6 consists of the following three chapters:



Chapter 6.1. What are inclusive green enterprises?

Chapter 6.2. Case study on green enterprise/ventures that address urban challenges

Chapter 6.3. What are the most effective enabling conditions for quantitative and qualitative growth in and sustainability of social enterprises?

Module 7.

Preparing Project Proposals for a Green City Development

This module provides practical guidance to participants on how to develop effective project proposals using the logical framework. The first part of the module features a “Theory of Change” map and explains the structure of the logical framework, as well as definitions of inputs, outputs, activities, and outcomes, which are typically used in project proposals. The second part of the module focuses on selecting SMART indicators in order to effectively measure the success of the projects. It also touches on the commonly used appraisal criteria including environmental and social safeguards. Module 7 includes the following chapters:



Chapter 7.1. Theory of Change – Result framework

Chapter 7.2. Designing SMART indicators for green cities development projects

Chapter 7.3. An exercise on developing a local framework for a green city project (optional)

Module 8.

Accessing Finance for Green City Development

This module begins by presenting a snapshot of the climate finance landscape and the various sources of climate finance that municipal and national governments can tap into. The module helps participants understand different types of financing sources including multilateral funding sources, national funds, grants and private sector investments. Subsequently, the module also helps to understand what types of urban infrastructure and technology, i.e. green building, sustainable transportation, waste-to-energy technology projects, that each financing source is most appropriate for. This module also discusses how different types of financing sources can be blended for risk-mitigation and attracting private sector investment. This module is case study based and discusses the challenges and issues of concern that exist within the context of the following areas:

i)

Reducing market barriers;

ii)

Stakeholder/investor engagement from the onset;

iii)

Identifying and capturing own-source municipal revenue;

iv)

Designing financially viable business models, drawing on real project examples including GGGI's investment projects across the world.

Finally, the module highlights the policy mechanisms and enabling conditions that promote market-driven approaches to help fill the resource gaps facing many municipal governments. Module 8 entails the following chapters:

Chapter 8.1. Climate finance landscape and financing mechanisms for green urban infrastructure projects

Chapter 8.2. Green Urban Financing

Chapter 8.3. Innovative Financing Mechanisms

Chapter 8.4. Identifying and capturing own-source municipal revenue

Estimated time required for each module

The overall training time required for all of the modules is four to five days. However, the actual time of the training will vary depending upon the selected modules, group exercises delivery, and modifications made by trainers and facilitators.



The list below presents the estimated time for each module.

Module 1. 2 hours

Module 2. 4-5 hours

Module 3. 3-4 hours

Module 4. 2 hours + 2 hours (group exercise)

Module 5. 3-4 hours + 1 hour (group exercise)

Module 6. 1.5 hour + 1 hour (group exercise)

Module 7. 1.5 hour + 2 hours (group exercise)

Module 8. 3-4 hours + 1-2 hours (group exercise)

Module owners and contributors

The training module is developed by GGGI's in-house thematic experts. Each chapter owner and their contact information are indicated in the chapter slide of each module.



The list below presents the module owners and contributors for each module.

| | |
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COURSE THEORY AND TERMINOLOGY ON GREEN CITIES DEVELOPMENT

This training manual has been developed from a wide literature review and analysis of case studies in the areas of green cities development including sub-thematic areas of waste management, wastewater and sanitation, green buildings, green public spaces, sustainable transportation, and inclusive green business. It also draws upon the extensive experience of urban experts throughout Asia and the Pacific, and Africa, as well as the technical know-how from multiple resources and projects including GGGI's ongoing projects. In this section, we summarize the key terminologies, theories, and framework upon which this course was built.

Module 1.

Climate change vulnerability is the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change.¹

Nationally Determined Contributions (NDCs) are at the heart of the Paris Agreement and the achievement of its long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.²

Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity for all, as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years³. These 17 Goals build on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.⁴

Secondary city is a term most commonly used to describe the second tier, or level, in the hierarchy of cities below the primary level.⁵

Circular economy refers to a system of reducing waste, reusing materials and redesigning how we create value from products and services.⁶

Ecosystem-based Adaptation (EbA) involves a wide range of ecosystem management activities to increase the resilience and reduce the vulnerability of people and the environment to climate change.⁷

Bus Rapid Transit (BRT) is a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services at metro-level capacities. It does this through the provision of dedicated lanes, with busways and iconic stations typically aligned to the center of the road, off-board fare collection, and fast and frequent operations.⁸

¹ https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch19s19-1-2.html

² <https://unfccc.int/process/the-paris-agreement/nationally-determined-contributions/ndc-registry#eq-4>

³ <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

⁴ <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>

⁵ http://www.citiesalliance.org/sites/citiesalliance.org/files/CIVIS%20SECONDARY%20CITIES_Final.pdf

⁶ <https://www.unenvironment.org/news-and-stories/story/closing-loop-how-circular-economy-helps-us-beatpollution>

⁷ <https://www.iucn.org/theme/ecosystem-management/our-work/ecosystem-based-approaches-climate-change-adaptation>

⁸ <https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/what-is-brt/>

Module 2.

Green Cities Development Framework provides the steps that will guide a user through a logical and analytical process to determine where a city currently is on the green development curve and what interventions could be made to improve green and sustainable outcomes in a city or cities.⁹

Problem tree analysis is a pictorial representation of a problem, its causes and its consequences. This analysis tool helps the project team get a quick glance of how a range of complex issues contribute toward a problem and how this problem branches out into a set of consequences. Both causes and consequences are fitted into the diagram on a hierarchical preference basis¹⁰.

Needs assessment is an organized and systematic process to identify, determine and address the gaps between the current status and the future desired condition¹¹.

Module 3.

Resource efficiency delivers more value with less environmental inputs. It is the maximization of the supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function efficiently, with minimum wasted (natural) resource expenses. It means using the Earth's limited resources in a sustainable manner while minimising the environmental impact.

Business As Usual (BAU) in the environmental context refers to the conventional economic development pathways of countries that are heavily reliant on natural resources, in particular fossil fuels. In these scenarios, economic growth is achieved at significant environmental costs, including global warming.

Decouple is used in this context to indicate separation of economic growth from a proportionate increase in environmental costs or demands.

Material/Resource loop is the cycle from extraction through transportation, production, consumption and reuse/recycle/disposal. A closed material loop involves recycling and reusing a significant volume of materials, reducing the demand for raw materials and landfill services.

Low-carbon city refers to the reduced carbon content in both the city's input and output. Low-carbon cities are less dependent on carbon-based fuels and produce less GHG emissions and solid waste. Low-carbon cities are sometimes discussed as "green cities" and "sustainable cities", but the term has a more specific quantifiable meaning.

Green building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on the climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life. Different countries and regions have a variety of characteristics such as distinctive climatic conditions, unique cultures and traditions, diverse building types and ages, or wide-ranging environmental, economic and social priorities – all of which shape their approach to green buildings.¹²

⁹ ADB (2015) Green city development toolkit

¹⁰ <https://www.brighthubpm.com/project-planning/118441-problem-tree-a-comprehensive-analysis-tool/>

¹¹ <http://www.adprima.com/needs.htm>

¹² <https://www.worldgbc.org/what-green-building>

Indoor Environmental Quality (IEQ) refers to the quality of a building's environment in relation to the health and wellbeing of those who occupy space within it. IEQ is determined by many factors, including lighting, air quality, damp conditions, noise levels, to name a few.¹³

Upland climate refers to areas at altitudes between about 1500 and 2000 m, mainly mountains and plateaus. The average annual precipitation is more than 1200 mm. Some of the representative locations for this zone are: Nairobi (Kenya), Arusha (Tanzania) and Kigali (Rwanda).¹⁴

Building envelope is the physical separator between the conditioned and unconditioned environment of a building including the resistance to air, water, heat, light, and noise transfer. The building envelope includes the materials that comprise the foundation, flooring, wall assembly, roofing systems, glazing, doors, and any other penetrations.

Ozone Depletion Potential (ODP) is a number that refers to the amount of ozone depletion caused by a substance. The ODP is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of chlorofluorocarbon (CFC)-11. Thus, the ODP of CFC-11 is 1.0.¹⁵

Global Warming Potential (GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale that compares the gas in question to that of the same mass of carbon dioxide, whose GWP is 1.0.¹⁶

Heat island are the increased temperatures, relative to surrounding space, found in city centres and areas of high development density. Heat islands are caused by concentrations of heat sources, decreased vegetation cover, increased massive and dark surfaces, decreased wind flows, and narrow sky view angles.¹⁷

Outdoor fresh air supply refers to fresh air ventilation, which may be provided either naturally or by a mechanical system. The rate of required ventilation varies with the use of the space and the number of occupants.

Thermal comfort of a person in an environment is influenced by six parameters: physical activity, clothing, air temperature and humidity, relative air speed and temperatures of surfaces enclosing the space (walls, ceilings, floors, windows). Time spent in that environment and seasonal average temperatures are also influential.¹⁸

Volatile Organic Compounds (VOCs) are chemicals that are released into the air from numerous materials—some of them natural, human-made, plant-based, and from animals, including people. Prolonged exposure to high concentrations of some VOCs has been linked to a wide range of chronic health problems such as asthma, chronic obstructive pulmonary disease, and cancer. Short-term exposure to VOCs can also cause acute reactions, such as eye, nose, and throat irritation. Some VOCs are present in the natural environment, however, higher concentrations of VOCs are typically found indoors, where reduced air ventilation and numerous sources of VOCs may exist.¹⁹

Public spaces²⁰ are all places publicly owned or of public use, accessible and enjoyable by all for free and without profit motive. This includes streets, open spaces and public facilities.

¹³ <https://www.cdc.gov/niosh/topics/indoorenv/default>.

¹⁴ Butera et al. (2014). Sustainable Building Design for Tropical Climates, Principles and Applications for Eastern Africa. Nairobi, UN-Habitat

¹⁵ https://www.conservapedia.com/Ozone_Depletion_Potential

¹⁶ <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>

¹⁷ <https://www.epa.gov/sites/production/files/2014-06/documents/basicscompodium.pdf>

¹⁸ <https://www.ecophon.com/za/about-ecophon/functional-demands/thermal-comfort/>

¹⁹ <https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality>

²⁰ Clarifications of terms related to green and public spaces used in the Manual are developed by United Nations Task Team on Habitat III, a task force of UN agencies and programmes that worked together towards the elaboration of the New Urban Agenda. http://habitat3.org/wp-content/uploads/Habitat-III-Issue-Paper-11_Public-Space-2.0.compressed.pdf Further proposed explanations for urban related terms are available in the Glossary of the Habitat III developed by the UN: <http://habitat3.org/wp-content/uploads/Habitat-III-Glossary.pdf>

Urban commons are elements of the environment: forests, atmosphere, rivers, fisheries or grazing land, that are shared, used and enjoyed by all. The commons also include public goods, such as public spaces, marketplaces, public education, health and infrastructure that allow society to function.

Placemaking is a collaborative process of shaping the public realm in order to maximize shared value. This is a people-centered approach to the planning, design and management of public spaces.

Walkability is the extent to which the built environment is friendly to people moving on foot in an area. Factors affecting walkability include, but are not limited to: street connectivity; land-use mix; residential density; presence of trees and vegetation; frequency and variety of buildings, entrances, and safety and adequate public infrastructure such as sidewalks along street fronts.

Equality involves systematic (re)distribution of the benefits of growth or development, with legal frameworks ensuring a 'level playing field' and institutions protecting the rights of the poor, minorities and vulnerable groups.

Module 4.

Waste-to-resources means to transform solid waste management towards sustainable materials management, where actions at the top of the management chain are prioritised through waste reduction, increased resource recovery and disposal reduction²¹.

Waste-To-Energy (WTE) is a term used to describe various technologies that convert non-recyclable waste into usable forms of energy including heat, fuels and electricity.²²

Source separation is the action of sorting various materials at the point of generation (e.g. segregating as paper, wood, plastic, etc.) to make recycling simpler and more efficient, and with added value as a source material.²³

Material Recovery Facilities (MRF) is a facility that receives commingled materials and then uses a combination of equipment and manual labour to separate and densify materials in preparation for shipment downstream to recyclers of the particular materials recovered. Material recovery facilities are alternately known as material reclamation facilities or multi re-use facilities.²⁴

Anaerobic Digestion (AD) is the simple and natural breakdown of organic matter into carbon dioxide, methane and water, by two groups of microorganisms, bacteria and archaea. Since many of these are intolerant to oxygen, this process is known as anaerobic.²⁵

Clean Development Mechanism (CDM) allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO₂. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets.²⁶

²¹ <https://www.c40.org/networks/waste-to-resources>

²² <http://www.epa.gov/solidwaste/nonhaz/municipal/wte/index.html>

²³ Lee, C. (2005). *Environmental Engineering Dictionary*. Government Institute. Lanham, Maryland: The Scarecrow Press, Inc.

²⁴ <https://www.thebalancesmb.com/what-is-material-recovery-center-2877733>

²⁵ <http://adbioresources.org/about-ad/what-is-ad/>

²⁶ <https://cdm.unfccc.int/about/index.html>

Waste management value chain presents the entire cycle of waste management streams from waste generation, waste collection and transport, handling and treatment, to disposal.

Waste management hierarchy is a concept that promotes waste avoidance ahead of recycling and disposal. The shortened version of the hierarchy, 'reduce reuse recycle' (3R) is frequently used in community education campaigns and has become a well-recognised slogan for waste reduction and resource recovery.²⁷

3R (Reduce, Reuse, Recycle) is the principle of reducing waste, reusing and recycling resources and products. Reducing means choosing to use things with care to reduce the amount of waste generated. Reusing involves the repeated use of items or parts of items which still have usable aspects. Recycling means the use of waste itself as resources. Waste minimization can be achieved in an efficient way by focusing primarily on the first of the 3Rs, "reduce," followed by "reuse" and then "recycle."²⁸

Decentralized waste collection services is a collection system to create a clean condition and healthy environment by having several small waste recycling centers in localities which are less resource heavy, with each managing the waste collection and recycling service of the corresponding communities.

Waste bank is a business owned by people who consider waste as a valuable economic commodity and savings, has instruments that involve the community in waste management. Bank customers bring all recyclables to the banks where they are exchanged with a direct or in-direct cash bonus.²⁹

Home composting is to conduct the process of breaking down organic waste (such as food scraps, grass clippings, and dried leaves) into a rich soil amendment at the household level.³⁰

Module 5.

Aerobic wastewater treatment is an oxygen dependent wastewater treatment requiring the presence of oxygen for aerobic bacterial breakdown of waste.

Anaerobic wastewater treatment is the wastewater treatment in the absence of oxygen, anaerobic bacteria to breakdown waste.

Blackwater is used to describe wastewater from toilets, which contains pathogens. Blackwater can contain feces, urine, water and toilet paper from flush toilets.

Greywater is the rest of the wastewater that comes from toilers, from washing food, clothing, dishes, as well as from showering or bathing.

Combined sewers are systems combining the municipal sewer systems with stormwater drainage.

Cost recovery is the degree to which the costs of services including initial investment cost and the continuous cost of operation and maintenance are paid by the users.

²⁷ http://www.helenlewisresearch.com.au/wp-content/uploads/2014/05/TZW_Sustainability_and_the_Waste_Hierarchy_2003.pdf

²⁸ <https://www.env.go.jp/recycle/3r/en/outline.html>

²⁹ <https://www.sciencedirect.com/science/article/pii/S1877042815033261>

³⁰ <https://www.saskatoon.ca/services-residents/waste-recycling/composting>

Dewatering means removing water from sludge or other solids.

Effluent is the final output flow of a wastewater treatment plant.

Facultative ponds are wastewater ponds with some form of aeration for oxygen replenishment. Can also use algae and other plants for oxygen replenishment.

Influent is the untreated wastewater or raw sewage coming into a wastewater treatment plant.

Onsite system is a system where the wastewater is treated at the point of production or source. On-site systems are typically associated with residential systems such as septic tanks.

Offsite System is a system wherein the wastewater is treated at a location away from the point of production. These systems are typically associated with larger centralized systems.

Pit latrines are trenches in the ground used to collect sanitation waste and then either pumped or covered over with dirt. These are a form of on-site systems.

Primary treatment is the first process usually associated with municipal wastewater treatment to remove the large inorganic solids and settle out sand and grit.

Reclaimed water is the reusable wastewater from wastewater treatment such as tertiary treatment of wastewater in biological and other systems.

Sanitation refers to the entire system used for management of wastewater and excreta, including treatment. This includes on-site sanitation (where production, collection and treatment take place at the same site) and off-site sanitation (where waste is taken off-site for treatment).

Sanitation value chain presents the entire cycle of wastewater and faecal sludge management from generation, containment, collection and transport, to treatment and disposal or reuse.

Secondary treatment is the next stage of treatment, which includes biological processes of digestion with bacteria.

Septic tank systems are on-site systems that collect the wastewater in underground chambers made of concrete, fiberglass or plastic through which domestic wastewater (sewage) flows for basic treatment. They can be used in areas that are not connected to a sewerage system, such as rural areas. The treated liquid effluent is commonly disposed in a septic drain field which provides further treatment.

Sewage is the used water and added waste of a community which is carried away by drains and sewers.

Sewerage system is the pipe networks that convey the sewage from the point of production to the point of treatment or discharge.

Sludge is the solid waste material which settles out in the wastewater treatment process, sometimes biosolids. Can be dewatered and reused or disposed.

Wastewater is any water that has been used and negatively impacted by human use. This includes municipal, domestic and industrial wastewater.

Wastewater valorization is the process of reusing, recycling or composting wastewater materials and converting them into more useful products including materials, chemicals, fuels or other sources of energy.

WSS is an acronym commonly used in many organizations to refer to water supply and sanitation. WSS activities tend to focus on improving water supply and sanitation service provision to achieve a number of health and environmental outcomes, among others.

WASH is an acronym commonly used in many organizations to refer to water supply, sanitation and hygiene. WASH activities are focused on improving health outcomes generally.

Module 6.

Inclusive green business is a business that creates positive social and environment impacts while generating profit through their business activities.

Impact investment is an investment made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return. Impact investments can be made in both emerging and developed markets, and target a range of returns from below market to market rate, depending on investors' strategic goals.³¹

Sachet marketing strategy is a package strategy designed to cater to the economic underclass in emerging economies by micro-selling, as they represent a significant fraction of the population.³²

Social enterprise are purpose-driven enterprises that deliver positive social and environmental impact.³³

Solar Home System (SHS) are stand-alone photovoltaic systems that offer a cost-effective mode of supplying amenity power for lighting and appliances to remote off-grid households. In rural areas, that are not connected to the grid, SHS can be used to meet a household's energy demand fulfilling basic electric needs.³⁴

Human Centered Design (HCD) is a creative approach to problem-solving and the backbone of work. It's a process that starts with the people whom new solutions are designed for. The ideas are generated from observing people and building a deep empathy with people.³⁵

Module 7.

Theory of Change is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context.³⁶

Logical framework is a strategic planning and project management methodology with wide application. It comprises an integrated package of tools for analysing and solving planning problems and for designing and managing their solutions (the approach). The product of this analytical approach is the logframe (the matrix), which summarises what the project intends to do and how, what the key assumptions are, and how outputs and outcomes will be monitored and evaluated.³⁷

³¹ <https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing>

³² <https://www.futuremarketinsights.com/reports/sachet-packaging-market>

³³ <http://akina.org.nz/about/our-story/what-is-social-enterprise/>

³⁴ <http://www.mtu.edu/peacecorps/programs/civil/pdfs/jack-chow-thesis-final.pdf>

³⁵ <http://www.designkit.org/human-centered-design>

³⁶ <http://www.theoryofchange.org/what-is-theory-of-change/>

³⁷ <https://www.sswm.info/planning-and-programming/decision-making/planning-community/logical-framework-approach>

Environmental and Social Safeguards (ESS) is used by development institutions, international treaties and agencies to refer to policies, standards and operational procedures designed to first identify and then try to avoid, mitigate and minimize adverse environmental and social impacts that may arise in the implementation of development projects. ESS also have a pro-active dimension to try to increase chances that development projects deliver better outcomes for people and the environment.³⁸

Environmental and Social Impact Assessment (ESIA) is defined as a process for predicting and assessing the potential environmental and social impacts of a proposed project, evaluating alternatives and designing appropriate mitigation, management and monitoring measures.³⁹

Social co-benefit refers to both development and social benefits in a single policy or measure.⁴⁰

Gender equality means that women and men have equal conditions for realizing their full human rights and for contributing to, and benefiting from economic, social, cultural and political development. Gender equality is therefore the equal valuing by society of the similarities and the differences of men and women, and the roles they play. It is based on women and men being full partners in their home, their community and their society.⁴¹

Gender analysis is the collection and analysis of sex-disaggregated information. Men and women both perform different roles. This leads to women and men having different experience, knowledge, talents and needs. Gender analysis explores these differences so policies, programmes and projects can identify and meet the different needs of men and women. Gender analysis also facilitates the strategic use of distinct knowledge and skills possessed by women and men.⁴²

Gender-mainstreaming is a process rather than a goal. Efforts to integrate gender into existing institutions of the mainstream have little value for their own sake. We mainstream gender concerns to achieve gender equality and improve the relevance of development agendas. Such an approach shows that the costs of women's marginalization and gender inequalities are born by all.⁴³ Articulating gender-responsive objectives in our interventions is key to gender-mainstream. These objectives should be underpinned by gender-responsive indicators and use of sex-disaggregated data.

Gender-responsive objectives are programme and project objectives that are non-discriminatory, equally benefit women and men and aim at correcting gender imbalances.⁴⁴

³⁸ <http://assets.worldwildlife.org/publications/844/files/original/SafeguardsonepagerFINAL.pdf?1449687332>

³⁹ <http://www.biodiversitya-z.org/content/environmental-and-social-impact-assessment-esia>

⁴⁰ https://pub.iges.or.jp/system/files/publication_documents/pub/nonpeer/2393/acp_factsheet_1_what_co-benefits.pdf

⁴¹ <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/BSP/GENDER/PDF/1.%20Baseline%20Definitions%20of%20key%20gender-related%20concepts.pdf>

⁴² Ibid., 1

⁴³ Ibid., 2

⁴⁴ Ibid., 3

Module 8.

Public Private Partnership (PPP) is often defined as a long-term contract between a private party and a government agency for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.⁴⁵

Merit goods are the type of goods which are not provided sufficiently by the market mechanism and, therefore, government intervention is required.

Feasibility study is an analysis of a proposed action, plans or projects to determine technical feasibility, cost estimation and financial viability.

Municipal finance refers to the revenue and expenditure decisions of municipal governments, which covers the sources of revenue used by municipal governments – taxes (property, income, sales, excise taxes), user fees, and intergovernmental transfers – and the ways of financing infrastructure through the use of operating revenues and borrowing as well as charges on developers and public-private partnerships.⁴⁶

Fiscal decentralization is the transfer of expenditure responsibilities and revenue assignments to lower levels of government.⁴⁷

Land value capture, in the context of this module, is a potential source of municipal revenue whereby the government “captures” a portion of the anticipated increase in land/property value (as a result of a municipal project) through a special tax. For example, the government may finance the construction of a park by imposing a one-time tax to owners of property surrounding the park, the rationale being that the park would increase the value of those properties.

⁴⁵ <https://ppp.worldbank.org/public-private-partnership/overview/what-are-public-private-partnership>

⁴⁶ https://www.citiesalliance.org/sites/citiesalliance.org/files/UNH_Guide_Municipal_Finance.pdf

⁴⁷ http://web.worldbank.org/archive/website01061/WEB/0_CO-11.HTM



INSTRUCTIONS FOR GROUP EXERCISE/LOCALIZING PRESENTATIONS

This session provides instructions for trainers on how to facilitate group exercises and where relevant templates can be found. This section also explains points and areas where local trainers should prepare/modify the materials prior to delivering the training.

Module 1.

Localization of Chapter 1.4: National Strategy on sustainable urban development

The final section of Module 1, Chapter 1.4, is designed to be presented by a local expert whose expertise is on national strategy and policy framework for sustainable urban development. It is highly recommended that a government official who was or is involved in designing the national sustainable urban development strategy delivers this presentation. The primary learning objective of this chapter is to familiarize local government officials with the national strategic directions for sustainable urban development and, thus, local governments can design local action plans in line with the national strategy, if it exists.



The following points can be included in this chapter:

- National priority and strategic directions for sustainable urban development
 - Understanding the Country's Nationally Determined Contributions (NDGs) in the urban sector (e.g., Energy, Waste, Transportation)
 - National goals/targets to achieve sustainable urban development
 - Priority sectors identified for sustainable urban development
-

Module 2.

Group exercise - City Profile

A City Profile serves as a reference point for baseline assessment of green cities development planning. This exercise requires a pre-assignment for training participants, therefore the city profile guidelines (Annex 1.1) and templates (Annex 1.2) will be sent to all participants via email for their preparation. It is advised that the guidelines and the templates are sent three weeks prior to the training.

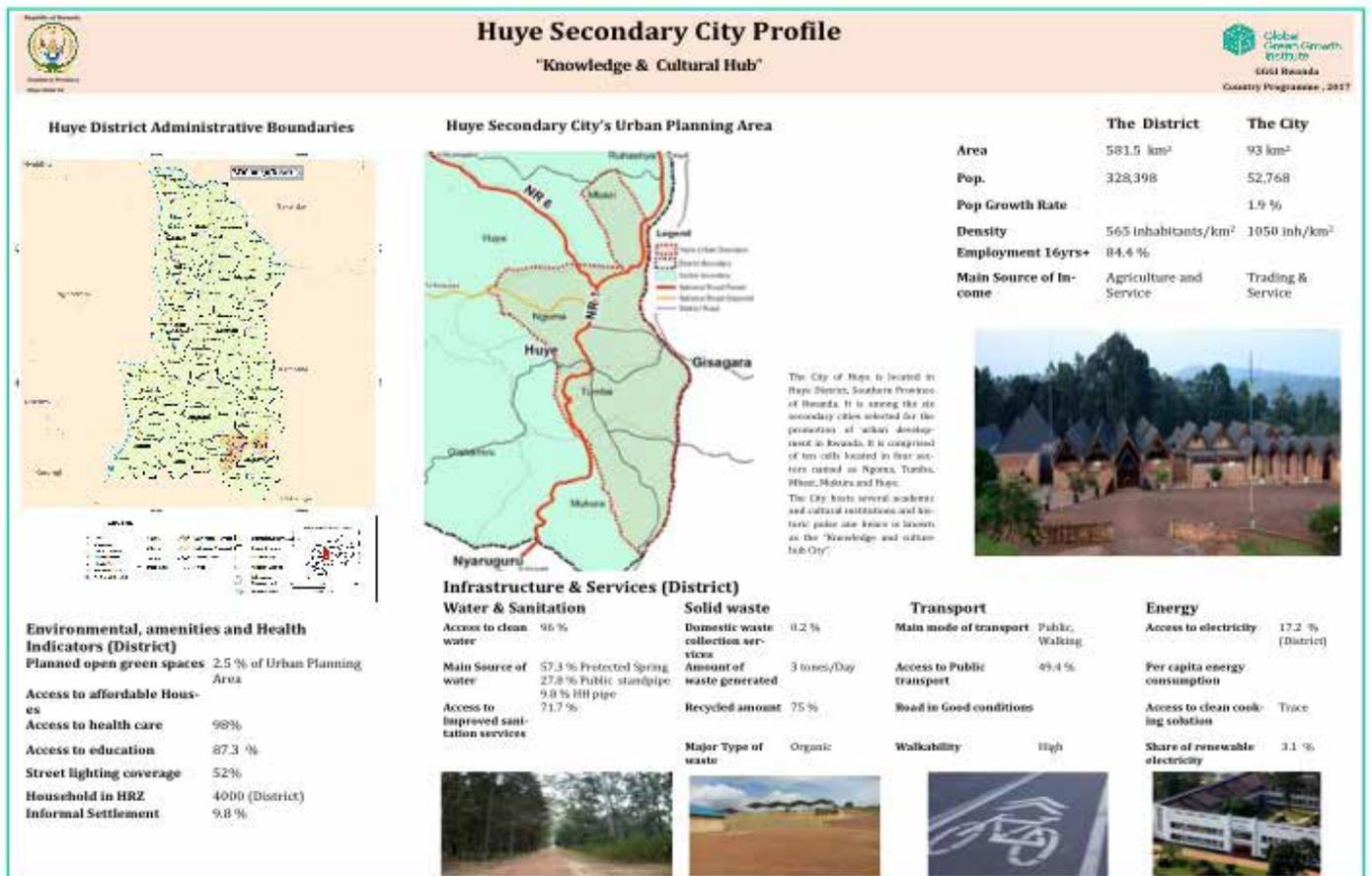
The city profile poster should be prepared in A0 or A1 size paper. The posters could be hung at the workshop venue and can act as a point of reference throughout baseline assessment discussions. You may invite participants to deliver a short presentation (5 min) on key indicators from their city profiles.



The following image below is an example of the city profile from Huye, a secondary city in Rwanda:

Figure 1:

The city profile guideline and templates can be found in Annex 1.1 & 1.2



Group exercise – Sector prioritization

This exercise is to help participants identify priority sectors in green cities development in their respective countries using a four-quadrant graph. **The exercise should pursue the following sequence:**

1. Draw a four-quadrant graph (X axis: strategic focus, Y axis: green cities challenges) on a A0 size paper.
2. Distribute the 7 pillars of green cities (Annex 2) - *Built Environment, Sustainable Energy, Sustainable Transportation, Water Production and Distribution, Wastewater Sanitation, Waste Management, and Job & Social Inclusion* to each group.
3. Guide participants to stick each pillar to the corresponding quadrant based on the group discussions. (e.g. if sustainable energy is a sector that is defined as a 'high challenge' but with 'high strategic focus', it should be placed in Quadrant 1).
4. Make sure to guide participants to think from **green growth perspectives** rather than business as usual (BAU) scenarios during the group discussions (e.g. provision of electricity vs provision of electricity from cleaner and/ or renewable sources; and increasing waste collection and disposal at the landfill vs increasing waste recycling rates and landfill diversion).
5. Once all the green cities pillars are placed on the four-quadrant graph, guide them to identify the sectors that appear in Quadrant 1 & 2. The aim of this exercise is to identify the sectors that have high green city challenges.



Below are examples of exercise outcomes:

Figure 2:

Sectoral Prioritization outcome (The green cities pillars template can be found in Annex 2)

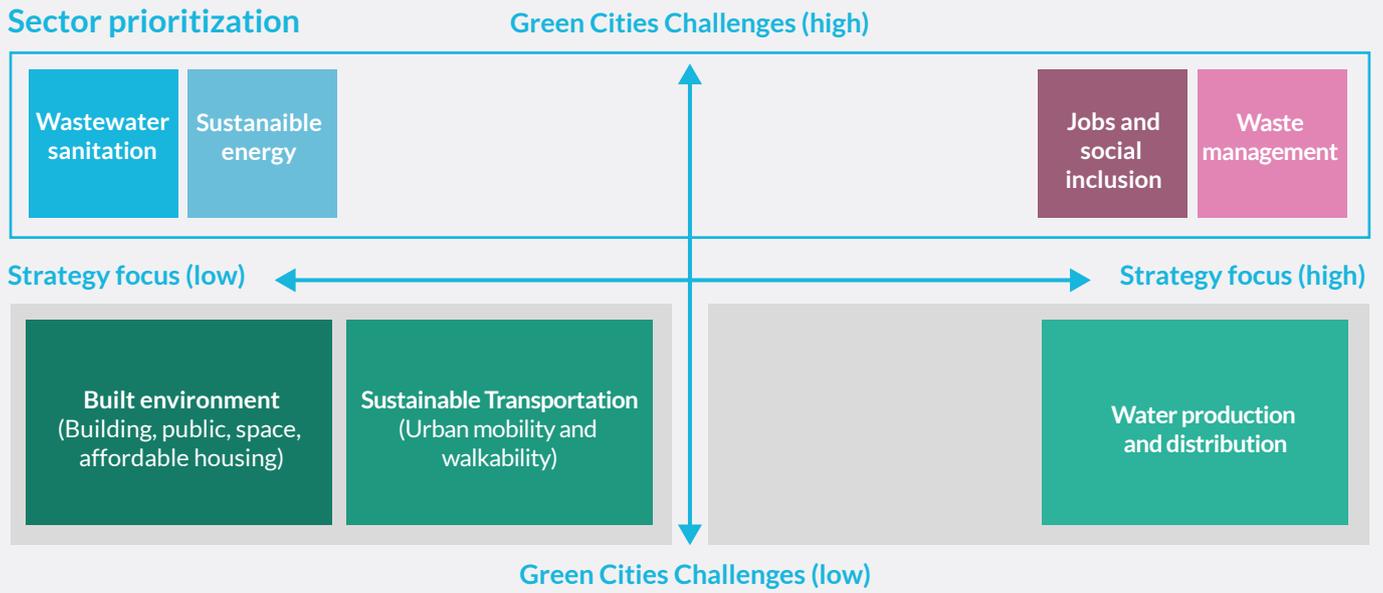
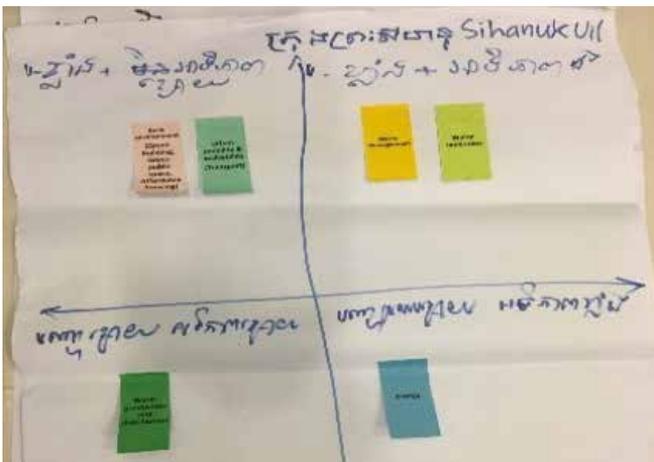


Figure 3:

Sectoral Prioritization outcome at the Green Urban Development Program Inception Workshop in Cambodia



Group exercise – Problem tree analysis

This exercise aims at finding solutions by mapping out causes and effects around urban sectoral challenges, which leads participants to identify the root causes of the problem we want to tackle. Prior to the exercise, assign a group discussion facilitator within a group whose role is to help participants stretch their thinking in relation to problem identification by continuously asking questions such as: “How do you understand the problem and what are alternative approaches? Why are you suggesting those solutions? What alternative solutions supporting a green city outcome could be considered? Who needs to lead and be party to that solution for it to work? Where do you see the necessary resources coming from? How might proposed solutions generate additional resources, or lower costs?”. **The exercise should pursue the following sequence:**

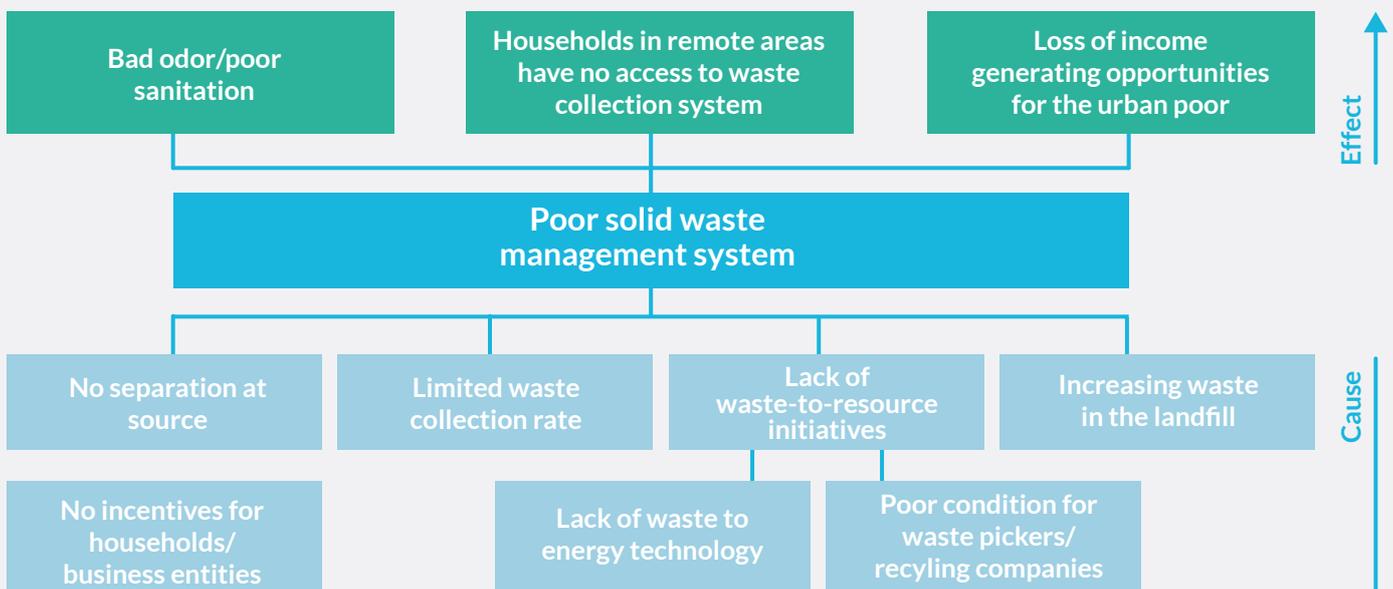
1. Write down the statement in a priority sector.
2. Discuss immediate/mid-term effects of the problem statement.
3. List up the cause(s) of the problem in growth perspectives.
4. Group facilitator guides participants to identify causes of the causal problem by continuously asking a question of “Why?”.



The image below is an example of the exercise outcome in a solid waste management sector:

Figure 4:

Problem Tree Analysis outcome



Group exercise – Green cities vision setting

This exercise will build a shared vision which comes with associated targets and objectives through a participatory design process. This co-creation methodology will contribute to necessary transitions by providing ownership of stakeholders and incentivizing their participations. The impact diagram will serve as a tool to guide participants step-by-step in identifying objectives and targets according to three dimensions of green growth – environmental, economic, and social. Guide participants to draw the impact diagram shown below on A0 or A1 paper. **Below is a proposed sequence of the exercise:**

1. Discuss the impact they would like to create through green cities development.
2. Write down the vision statement in the center of the circle.
3. Develop objectives (what are the needs to be achieved), and targets (how much will be achieved and by when) in three dimensions – economic, environmental, and social.

Figure 5:

Impact diagram for Green Cities Vision Setting



Module 4.

Case study – Solid Waste Management in Vientiane

This case study is designed to provide an opportunity to develop a sustainable solid waste management system based on a real project case that GGGI is leading in Vientiane, Lao PDR. The case study review presents the scenarios where participants are invited to analyse the complexity of the waste sector situations and discuss potential solutions on how to design waste-to-resource projects and new waste collection fee charging mechanisms. A hard copy of the case study review (Annex 3) should be distributed to each group for discussions. Trainers can invite groups to present the result of their discussions.

Module 5.

Localizing the module

Chapter 5.1 is about broader definitions and concepts of sanitation, which do not require significant contextualization. These are seen to be universal concepts which inform an integrated understanding of sanitation. However, a modification is needed to make this part of the module more locally relevant, such as to include information about national-level sanitation and wastewater laws and regulations, and a sector overview. Moreover, when explaining the sanitation value chain, it would be good to show where key bottlenecks in the sanitation value chain occur within the respective country/context, and whether the challenges take place in storage, containment, transport, treatment and/or discharge.

Chapter 5.2 of the module presents examples of decentralized and partially decentralized wastewater treatment systems, and the applicability of different systems in different contexts. Given that definitions and examples are provided already, no further modification is required. However, if there are decentralized models or intermediate models that exist in the respective country/context, it would be good to add a slide to demonstrate how they operate in such countries.

Chapter 5.3 deals with concepts of circular economy and examples of wastewater reuse around the world. Depending on the country, it would be good to demonstrate examples of wastewater reuse and see if there is literature or concepts already existent in developing business opportunities from wastewater reuse.

Chapter 5.4 of the module includes case studies to demonstrate business models that can be made sustainable. To further strengthen this section, examples of in-country business models and tariff structures would be useful, that is if such examples exist. Even better, would be to invite local operators that can describe the business model for sanitation in their respective country/context.

Group exercise – Selecting appropriate solutions

Chapter 4, the last chapter of Module 5, also includes a group exercise. Looking at the city of Phnom Penh, participants will discuss what kind of wastewater treatment system would be most appropriate for different parts of Phnom Penh based on the population density. Participants will be asked to use the calculations shown in the table on CAPEX costs to justify this decision.

Participants can be divided into teams to facilitate discussions. Moreover, each team will be provided with a hard copy map of the population density of Phnom Penh (Annex 4A), as well as the table that estimates the costs of different systems (Annex 4B). These will form the basis for the group discussions.

The objective of this exercise is to provide an opportunity to develop sustainable wastewater collection and treatment systems, based on population density and financial viability.

To further strengthen this study, it would be good to include an example from the country the participants are in. Trainers can invite groups to present on the result of their discussions.

Module 7.

Group exercise – Project proposal exercise

This group exercise would provide a hands-on experience for participants in drafting project proposals using Logical Framework and SMART indicators. A full proposal template includes five components: i) Project outline; ii) Logical Framework; iii) SMART indicators; iv) Time frame/workplan; and v) Budget and Project financing mechanisms.

For the full project proposal development, participants may require 1.5 hours, while the logical framework development may require 30 minutes. Once the logical framework is complete, participants can send their work to a trainer via email by the end of the session to ensure completion of the work by each group. To effectively run the project proposal development session, it is advised that the session is split into two parts – logical framework development and full project proposal development, also preferably on two separate days to give participants sufficient time for both exercises.

Module 8.



This group exercise requires at least five persons in each group, and each person would represent one of the following positions:

Municipal government: Must expand the city's water supply by 10% with emphasis on certain parts of the city. Willing to provide equity investment and concession contract.

Multilateral development bank: Willing to provide loans at concessional rate.

Local commercial bank: Willing to provide loans at a market rate.

Private contractor: Willing to enter into the concession contract and implement infrastructure expansion.

Regulatory agency: Willing to consider adjusting water tariffs subject to certain conditions.

City residents: Willing to provide support when certain needs are met.

In each group, there will be 1-2 facilitators who will have specific demands reflecting the perspective of whichever entity they are representing. For example, a group could have one facilitator roleplaying as a regulatory agency that refuses to increase tariffs (which in turn reduces the bankability of the project), the reason being that the head of the agency is a political appointee, subject to political pressure from the mayor not to do anything that might turn voters away.

The person representing the municipal government will serve as a group leader. By the end of the session, each group should have a diagram depicting a project structure that satisfies the needs of all stakeholders.



Each group will be given a scenario where one or more stakeholders make a specific demand. It is up to each group – led by the person roleplaying as the municipal government – to negotiate and come up with a creative solution.

Group 1. There is a private contractor who demands an ironclad provision allowing them to raise tariffs if needed.

Group 2. The local commercial bank demands that their loan be secured by the water utility's assets.

(two facilitators)

Group 3.

- City resident demands that the expansion takes place at the initial stage of the concession period.
- Private contractor wants to implement the expansion at a later period after ensuring that the utility demonstrates a steady cash-flow.

(two facilitators)

Group 4.

- Multilateral development bank requires that the private contractor enter into a joint venture with an experienced water utility company (from a developed country).
- Private contractor prefers to do it alone to increase profit margins.

Post-Training evaluation

At the end of the training, the post-training evaluation survey forms will be distributed to all participants to access their feedback on the training. A sample evaluation survey can be found in Annex 5.



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The following is a list of materials referred to in the course. It is arranged based on the order of the modules.

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ADDITIONAL RESOURCES AND LINKS TO VIDEO RESOURCES

The following is a list of additional materials that participants can be greatly benefited from reading/watching prior to the training. It includes guides, policy briefs, case studies, reports and videos to further enrich the learning experiences. These materials are free to access and are provided for the user's convenience.

Module 1.

Asian Development Bank (2012). *Green Growth, Resources and Resilience Environmental Sustainability in Asia and the Pacific*. ADB Reports RPT124260. Asian Development Bank (ADB), revised 07 May 2013.

Global Green Growth Institute (2017). *Green City Development Guidelines*. Seoul, South Korea. Retrieved from http://gggi.org/site/assets/uploads/2018/03/greencity_guide_WEB2.pdf

Intergovernmental Panel on Climate Change (2018). *Summary for Urban Policy Maker: What the IPCC Special Report on Global Warming of 1.5°C means for cities*.

Module 2.

Global Green Growth Institute (2016, September). *Cambodia: Country Planning Framework 2016-2020*. Seoul: Global Green Growth Institute. Retrieved from <http://gggi.org/report/cambodia-country-planning-framework-2016-2020/>

Module 3.

Future of Places Forum is a collaboration between UN-Habitat, Ax:son Johnson foundation and Project for Public Spaces with the purpose to advocate for the importance of public space and placemaking in city planning: <http://futureofplaces.com/>

Toolkits and other resources developed by Gehl Institute: <https://gehl.institute.org>

United Nations Human Settlements Programme (2017, July). *Luisa Bravo: City Space Architecture – Stand up for public space*. Retrieved from <https://www.youtube.com/watch?v=aO1SMZADeKI>

United Nations Human Settlements Programme (2018, July). *Energy Efficient and Sustainable Design Principles for East Africa. Nairobi, Kenya*. Retrieved from <https://www.youtube.com/watch?v=kXmq-ulCmTM>

U.S. Green Building Council (2015, October). *What is Green Building?* Retrieved from <https://www.youtube.com/watch?v=MyI0tsx3wDs>

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SEED (2018). *Meet the SEED Winners*. Retrieved from <https://www.seed.uno/awards/all.html>

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Module 8.

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ANNEXES

Templates and Tools for Group Exercises and Case Studies

Annex 1-1:

City Profile Guidelines

The city profile poster should be prepared in A0 or A1 size paper.

Have the poster in a good condition and ready on the first day of the workshop.

The posters will be hung on the venue walls and they will be a continual point of reference throughout the workshop discussions and baseline assessment.

Please prepare a short presentation (5 min) on the city profile.

The poster should contain the following information about your city.

Guidelines - City Profile Poster

I. Demography and socioeconomic conditions

Map - Location and main infrastructure services (waste supply, wastewater, solid waste, transport and energy)

Size (in sq. km)

Total Population (city)

- Population below a poverty line (if available)
- Urban population density

Economic growth rate (if available)

Population growth rate (if possible)

Employment rate (total, by gender and age)

Main Sources of income and employment

II. Infrastructure Services

Water supply and wastewater

Access to clean drinking water supply (% of population)

Main water supply sources (river, groundwater etc.)

Access to improved sanitation services (% of population)

Solid Waste

Access to domestic waste collection services (% of population)

Amount of waste generated (total, and per capita per day)

Amount of municipal waste recycled or reused (%)

Major municipal waste type and share (e.g. organic and X %)

Major waste disposal/processing method (e.g. open dumpsite, sanitary landfill, and incineration)

Transport

Modal split (% of total inland passenger-km, public: private: cycle: pedestrian)

Share of population with access to public transport (%)

Average congestion delay (days per year)

Roadways in good condition (% of km)

Walkability/bikeability index (if possible)

Energy

Access to electricity (% of city population)

Electricity consumption per capita

Access to clean cooking solutions (% of population)

Share of renewable electricity (%)

Power supply reliability (outages in number of days in a year)

Imported power from outside of city boundary (% of consumption) – if possible

III. Environmental, amenity and health indicators

Air pollution (number of pollution days above AQI 'orange' index)

Planned open green spaces/public spaces (% of urban land area or area per capita)

Access to social/affordable housing (% of population)

Access to health care (and education) (% of population)

Availability of street lights (% of main roads covered by street lights)

Population/Households located in High Risk Zones

Share of informal settlement

Annex 1-2:

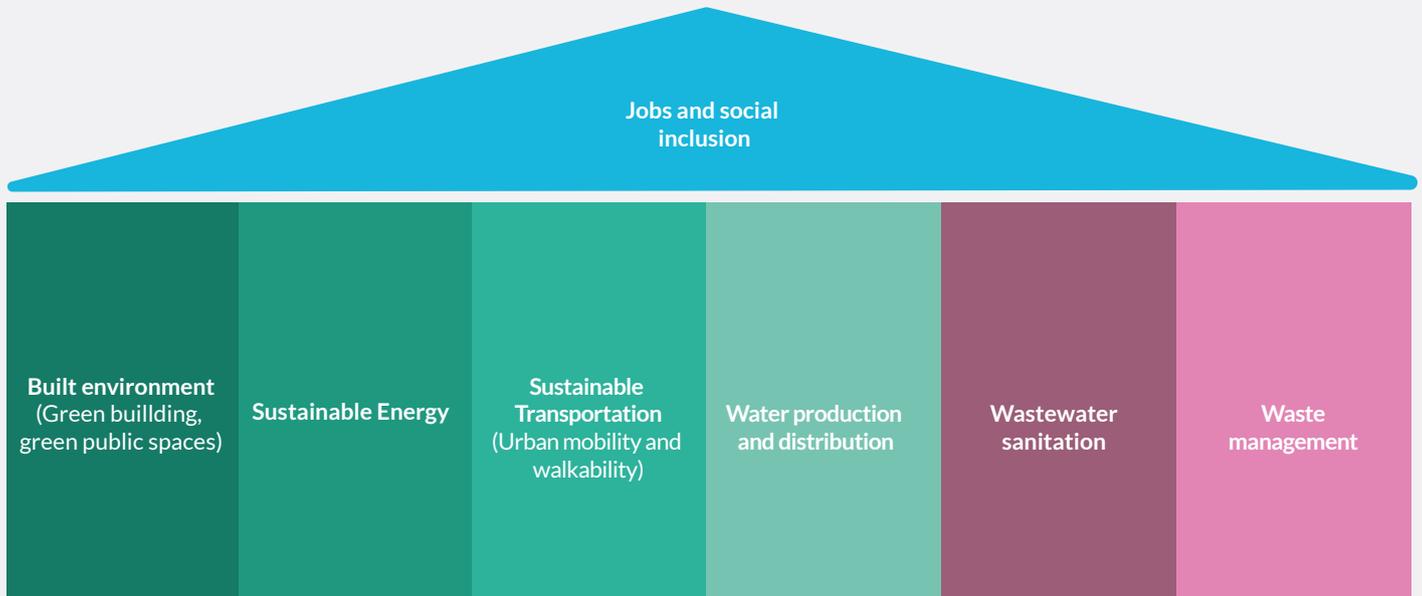
City Profile Template

XXXXXX Secondary City Profile

| Demographic and Socio-economic conditions | | The District | The City |
|--|---|--|----------------------------|
| City Location map <ul style="list-style-type: none"> Sector administrative boundaries Roads National and District class 1 Electrical line Dumping site (if available) Schools Health centres Car park Market Etc.. | | Area Pop. Pop Growth Rate Density Employment Main Source of Income | City branding picture |
| Infrastructure & Services | | | |
| Water & Sanitation | | Solid Waste | Transport |
| Access to clean water | % | Domestic waste collection services | Main mode of transport |
| Main source of water | (river, ground, public water kiosk, HH connection to national grid) | Amount of waste generated | Access to public transport |
| Access to improved sanitation services | % | Recycled amount | Road in good conditions |
| | | Major type of waste | Walkability |
| | | Major disposal method | High, medium, low |
| | | City picture | City picture |
| Environmental, amenities and Health indicators | | Energy | |
| Air pollution | | Access to electricity | % |
| Planned open green spaces | % of Urban planning area | Per capita energy consumption | |
| Access to affordable houses | % | Access to clean cooking solution | |
| Access to health care | % | Share of renewable electricity | |
| Access to education | % | | |
| Street lighting coverage | % | | |
| Household in HRZ | Number | | |
| Informal settlement | % | | |

Annex 2:

Green Cities Pillars



Annex 3:

Case Study – Solid waste Management in Vientiane, Lao PDR

Background

- In Vientiane, Lao PDR, the main goal of the Vientiane City Office for Management and Services (VCOMS) is increasing the waste collection rate from 40% to 100% by 2020. The collection fee mechanism is direct charging of fixed rate of 40,000 Kip (5 USD) for the collection service of once a week. The collection fees are collected by the local authority appointee who gets 5,000 kip per contract for collecting fees.
- There are 8 private companies contracted by VCOMS. The VOCOM owned collection companies collect 40-50% of the total waste collected while the remaining is collected by the private companies.
- Private companies are allowed to charge collection fees directly to their customers while paying 5,000 kip per contract to VCOMS as commissions. Private companies also have to pay 40,000 Kip/ton for disposing the waste at the landfill site. VCOMS owned trucks do not pay these fee.
- According to focus group interviews conducted by GGGI, it reveals that households who generate small volume of waste are not willing to use the collection service. Those who stopped using the waste collection services claim that dissatisfaction with the service was the main reason since trucks do not collect waste when it is mixed with glass bottles. In Vientiane, glass bottles are not picked up by waste pickers nor junkshops since they are not valued. Currently waste pickers buy recyclables (plastic bottles, metal, cardboard) from households and sell them to junkshops.

Question

Based on the current situation of Vientiane, what are the mechanisms you suggest in order to increase the collection coverage and to promote waste separation at source? What mechanisms promote waste-to-resource without killing the markets for existing players? *(Write down your answer here)*

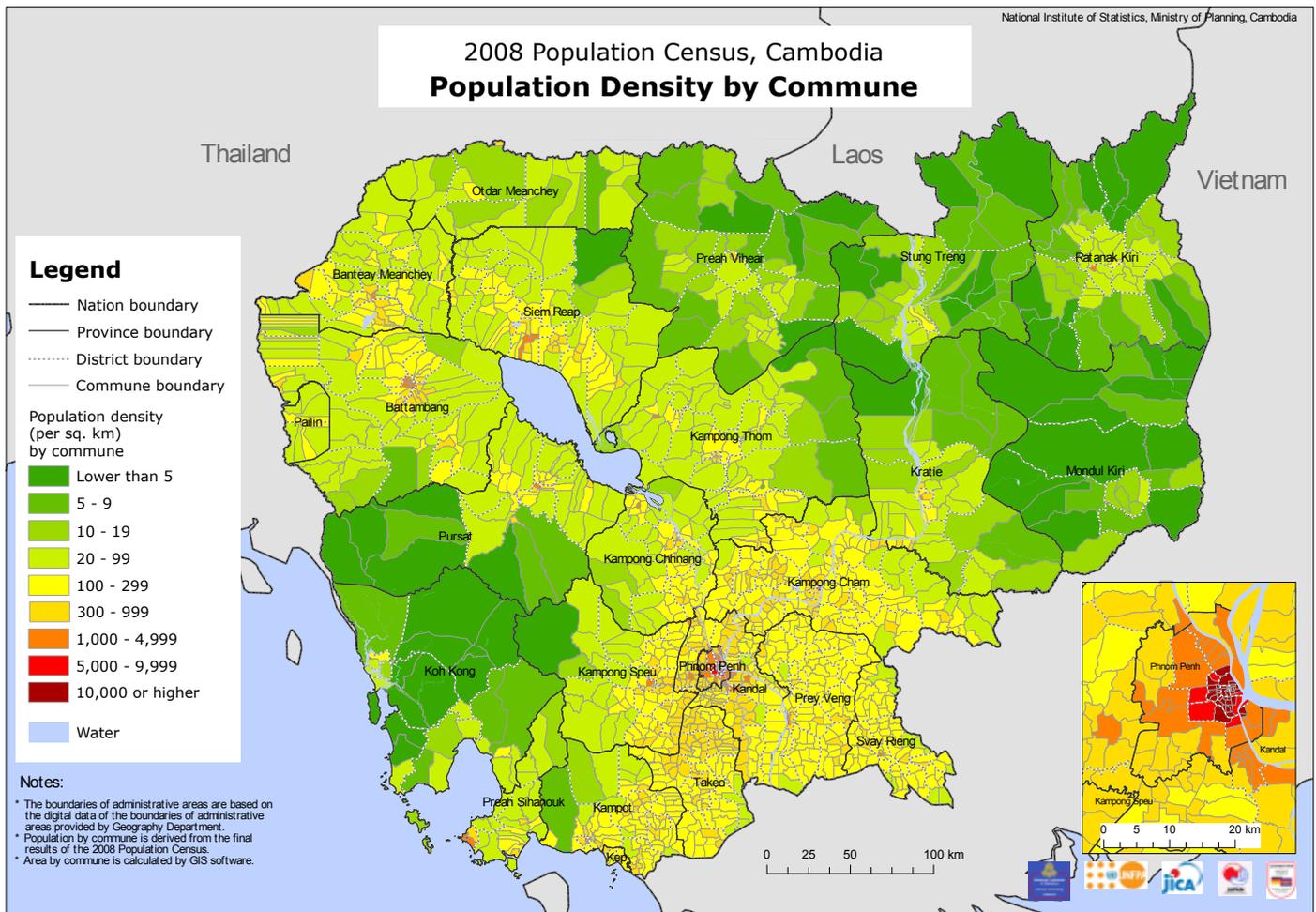
Reference

Global Green Growth Institute, (2018). Solid Waste Management in Vientiane, Lao P.D.R Situation assessment and opportunities for waste-to-resource. Seoul: Global Green Growth Institute.

Annex 4A:

Population Density Map of Phnom Penh within Cambodia⁴⁹

High Resolution Map available at: http://www.stat.go.jp/info/meetings/cambodia/pdf/c8n_mp02.pdf



⁴⁹ High Res Map available at: http://www.stat.go.jp/info/meetings/cambodia/pdf/c8n_mp02.pdf

Annex 4B:

Costs of different systems and estimations

| | Capacity [equivalent person (capita)] | Land required [m ² /cap] | CAPEX per capita [USD/cap] | OPEX per capita [USD/cap] |
|--|---------------------------------------|-------------------------------------|----------------------------|---------------------------|
| Centralized system ¹ | > 500,000 | 0.15 – 2.9 | 390 – 500 | 2.0 – 17.8 |
| Centralized system ¹ | < 500,000 | 0.3 – 3.3 | 1,450 – 1,800 | 6.5 – 22.2 |
| DEWATS Cluster ² | 2,000 – 10,000 | 0.3 – 1.5 | 350 – 550 | 4.0 – 9.0 |
| DEWATS Cluster ² | 100 – 2,000 | 0.3 – 1.5 | 450 – 850 | 9.0 – 15.0 |
| On-site plants (Jahkasou) ¹ | 6 - 300 | 0.5 – 0.6 | 800 – 1,200* | 35.0 – 45.0* |

¹ JICA 2016 (JICA Study of Drainage Phnom Penh 2016, http://open_jicareport.jica.go.jp/pdf/12270294_01.pdf)

² IAPWT 2017 (Investment Action Plan for Peri-Urban Phnom Penh, BORDA)

Annex 5:

Green Cities Development Training Evaluation Survey Template

Training of Trainers (TOT) on Green Secondary City Project Development & Financing, Rwanda

Evaluation Survey

*Please consider your experience at this training workshop and complete this survey openly and honestly. All answers will remain confidential and will have no bearing on your participation in future GGGI's event. **Please return this form to GGGI staffs after you have completed it.***

A. Profile

1. Gender: Male Female

B. Participant Expectation

2. What was your **main** reason(s) for attending this program? (select **no more** than two)

- To enhance my understanding on thematic knowledge on green city development (Waste management and sustainable mobility/transport)
- To enhance my capacity in designing project proposals and results framework
- To access the best practices and cases of green city development from other countries
- To enhance my understanding on urban project financing and resource mobilization
- To seek collaboration with GGGI and other development agencies for green city project implementation.
- Other (please specify):

C. Overall Evaluation

Please mark the appropriate section in the following table based on your understanding.

| No. | Criteria | Strongly Agree | Agree | Neither Agree nor Disagree | Disagree | Strongly Disagree |
|-----|----------|----------------|-------|----------------------------|----------|-------------------|
|-----|----------|----------------|-------|----------------------------|----------|-------------------|

Goals & Objectives

3. The objective of improving knowledge on green city project development and financing was clear.

Learning

4. I have learned new knowledge, which I can apply in my work/project.
5. The program had a good combination of presentations and interactive sessions.
6. The facilitators/presenters properly demonstrated knowledge of contents.

Management & Logistics

7. The total length and time allocation of each session were appropriate.
8. The logistics were well organized (venue, meals).

| No. | Criteria | Strongly Agree | Agree | Neither Agree nor Disagree | Disagree | Strongly Disagree |
|-----|----------|----------------|-------|----------------------------|----------|-------------------|
|-----|----------|----------------|-------|----------------------------|----------|-------------------|

Goals & Objectives

9. Comments:

D. Session Evaluation

| No. | Session names | Very Satisfied | Satisfied | Moderately Satisfied | Slightly Unsatisfied | Unsatisfied |
|-----|---------------|----------------|-----------|----------------------|----------------------|-------------|
|-----|---------------|----------------|-----------|----------------------|----------------------|-------------|

10. Session 1: Moving from Business-As-Usual approaches to Green City Development

11. Session 2: Poster presentation session of green city development project concepts

12. Session 3: Theory of Change and Result Framework

13. Session 4: Green urban project financing

14. Session 5 & 6: Refinement of project proposals & Presentation of project proposals

15. Comments:

E. Application

16. How will you apply what you have learnt during the workshop in your department/organization?

E. Application

18. How would you rate the improvement of your knowledge in the topic (Green Secondary City Project Development & Financing) in comparison to “before you participated in the program” on a scale of 1 to 10.

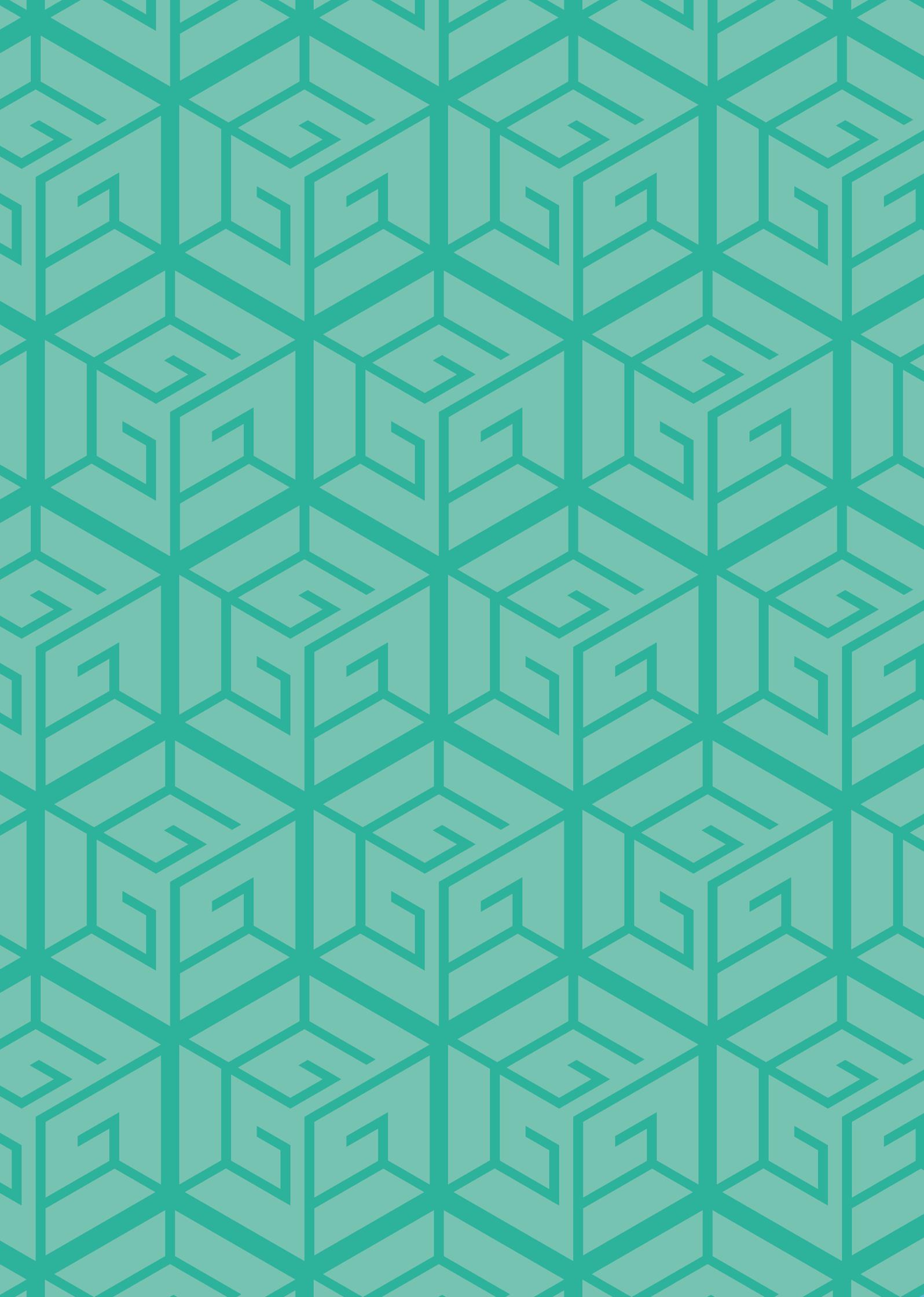
| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|----|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

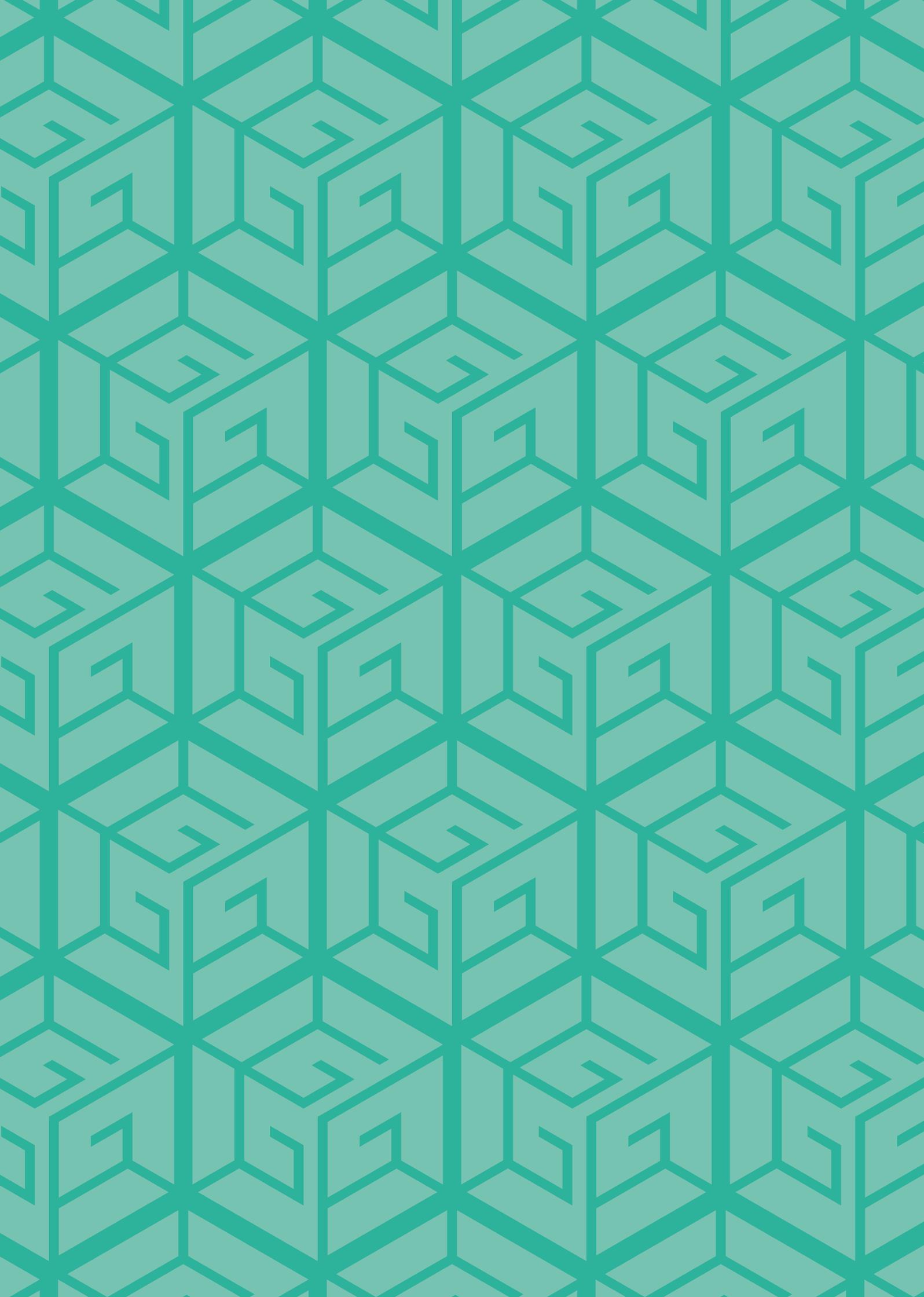
(10: Strongly improved, 1: Not improved)

17. How could this program improve?

19. Please choose topics you would like to learn more in the follow up training. (Choose all that apply)

- a. Community engagement and multi-stakeholder consultations in green city development
- b. In-depth case studies on thematic areas of green city development (Solid waste management, wastewater and sanitation, low-carbon cities, sustainable transportation/mobility)
- c. Best practices on green infrastructure projects and urban projects financing
- d. Guidelines for pre-feasibility, feasibility study and market assessment for urban project implementation
- e. Social safeguard and gender equality in green city development projects
- f. Other:





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