Prosperity Fund

GLOBAL FUTURE CITIES PROGRAMME

BANDUNG

CITY CONTEXT REPORT

Foreign & Commonwealth Office

UN HABITAT
FOR A BETTER URBAN FUTURE

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Global Future Cities Programme
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City Context Report

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GLOBAL FUTURE CITIES PROGRAMME

Introduction

ABOUT THE GLOBAL FUTURE CITIES PROGRAMME

In 2015, the UK government created a new Cross-Government Prosperity Fund worth £1.3 billion from 2016-2021, in order to help promote economic growth in emerging economies. Its broad priorities include improving the business climate, competitiveness and operation of markets, energy and financial sector reform, and increasing the ability of governments to tackle corruption.

Emerging Economies still face considerable challenges such as uncontrolled urbanisation, climate change and high and persistent inequality which can lower long-term growth prospects. The Prosperity Fund supports the broad-based and inclusive growth needed to build prosperity and reduce poverty, but also make development overall more sustainable through the strengthening of Institutions and Improvement of the global business environment.

The Global Future Cities Programme (GFCP) is a specific component of the Prosperity Fund which aims to carry out targeted interventions to encourage sustainable urban development and increase prosperity whilst alleviating high levels of urban poverty. The programme will also create significant short and long-term business opportunities in growing markets, forecast to be regional growth hubs, including for UK exporters who are world recognised leaders in urban innovation.

The overall strategy of the Global Future Cities Programme is to deliver the Programme in two phases; a strategic development phase (2018), followed by an implementation phase (2019-2021). UN-Habitat, in collaboration with the International Growth Centre (IGC) and the UK Built Environment Advisory Group (UKBEAG), has been mandated by the UK Foreign and Commonwealth Office (UK FCO) to develop and undertake the strategic development phase. This in turn, will inform and shape the implementation phase, and collectively provide further evidence for the overall programme.

The Programme builds upon a coherent series of targeted interventions in 19 cities across 10 countries, to support and encourage the adoption of a more sustainable approach to urban development. In general, the proposed interventions aim to challenge urban sprawl and slum developments, thereby promoting more dense, connected and inclusive cities that in combination contribute to prosperity, achieving the Sustainable Development Goals (SDGs) and implementing the New Urban Agenda (NUA).

The Global Future Cities Programme builds upon three integrated pillars, that will address key barriers to prosperity, in selected cities:

- **Urban planning** – technical assistance for spatial restructuring (Public space, Heritage and urban renewal, Urban strategies and plans, Data systems for integrated urban planning);
- **Transportation** – technical assistance to support cities to develop integrated transport systems (Multi-modal mobility strategies and plans, Data systems for multi-modal mobility);
- **Resilience** – technical assistance to develop strategies to address the impact of climate change and ensure development is sustainable (Flood management plans and systems).

In order to capitalize on the proposed interventions and to ensure sustainability and impact in a longer-term perspective, the programme has a strong focus on technical support and institutional capacity development.

In many of the interventions, there is a particular focus on the potential of embedding smart/digital technology and data analysis platforms in urban governance and management processes. Integrating smart technologies is recognized as an instrumental area that significantly can improve the efficiency in the provision of key infrastructure services, enhance urban resilience, support evidence-based plans and strategies and promote integrated planning approaches across sectors.

INTERVENTION DEVELOPMENT AND VALIDATION

Based on initial scoping studies and government-to-government engagement carried out by UK FCO, the UN-Habitat team worked with partner local authorities and wider stakeholders to corroborate their city development strategies, and to confirm, enhance and develop the intervention proposals.

In each city, a Local City Specialist, supported by the national and regional country offices of UN-Habitat

and in liaison with the FCO local posts, took the lead in identifying stakeholders in a series of bilateral meetings, interviews and focal group discussions. This has collectively gathered information and provided more detailed knowledge and information on the City's visions and goals.

Based on this initial phase, a Charrette (planning workshop) involved high-level decision-makers from the public and private sectors together with civil society representatives. This facilitated discussion on the proposed and possible alternative interventions, related individual interests, technical opportunities and constraints, as well as political objectives. The outcome of the Charrette provided clarity on where stakeholders stand in relation to the strategic potential of the discussed projects and it allowed for the mobilisation of support.

At the same time, the Charrette allowed for the technical teams to proceed with the development of a Terms of Reference, outlining the specific scope and activities of each intervention. A final Validation Workshop assured consensus on the proposed projects and document's endorsement by the authorities.

Parallel to preparing the Terms of Reference, an evaluation of the interventions was initiated, aiming to address its feasibility within the local strategic context, identify potential impact on prosperity barriers and to explore the optimal delivery models. This process resulted in a set of City Context Reports as well as an analysis of the technical viability of the interventions. The analysis aimed at both informing the development of the Terms of Reference and the future implementation phase of the Programme.

THE CITY CONTEXT REPORT

Objectives

A City Context Report is provided for each city of the Global Future Cities Programme. It serves as a tool to frame the proposed Programme interventions within the characteristics and pre-conditions of each city.

The Report targets a variety of stakeholders in the Programme: administrators, city managers, policy makers, legislators, private sector actors, donors, and local as well as international researchers and knowledge generators. The Reports also provide UKFCO the contextual setting of each proposed intervention, and can in addition, be used by the Service Providers as an entry point for the implementation phase.

By addressing the specific challenges facing each city, the Report illustrates how the interventions can work towards inclusive prosperity and sustainable urban development. The benefits of each intervention, however, cannot be achieved without certain enabling conditions to ensure its success. Therefore, critical aspects for the delivery of the proposed interventions and its success from a long-term perspective are outlined. Using thematic

best practices and evidence from global learnings and research, contextualised recommendations are provided on the conditions necessary for the intervention to be viable and to reach a maximum impact.

Essentially, the City Context Report serves to ensure that all actors within the Global Futures Cities Programme are aware of the specific conditions to be considered in the delivery of the proposed interventions, on a case-by-case basis.

Set-up and Scope

The first part of the City Context Report (General Overview) provides an overview of the Global Future Cities Programme and introduces the city from the perspective of the urban challenge which the proposed intervention intends to address.

The second part of the Report (Urban Analysis) more critically and technically analyses a selection of factors which need to be considered or to be in place for the intervention to succeed, addressing its feasibility, potential impact on prosperity barriers from a long-term perspective.

The third part of the Report (International Alignment and Technical Recommendations) presents short–and mid-term expected outcomes as well as long-term potential impacts. It further elaborates the contribution of the intervention to the achievement of the SDGs and the implementation of the New Urban Agenda as well as the programme objectives of the Prosperity Fund.

As the City Context Report is tailored directly to the Programme interventions, the analysis does not aim to comprehensively present all aspects of urban development. It does not elaborate on long term planning and transformation strategies, the effectiveness of policy or urban legislation, nor the entire municipal financial system. As such, it also excludes urban policy recommendations.

However, the Report has the scope to illustrate the general capacity of the city for project delivery, and in this regard, make recommendations to support implementation of the interventions and reaching set goals. The City Context Reports will be part of knowledge management for the Programme to generate local information and data on the cities as well as identify gaps in knowledge, systems or governance.

Methodology

Urban Analysis

The City Context Report provides a general analysis of the spatial, financial and legal conditions in the city that can either facilitate or hinder the implementation and the long-term sustainability of the proposed interventions in transport, resilience and urban planning.

This framework follows UN-Habitat's three-pronged approach, recognising the three essential components for a successful and sustainable urbanisation: 1. urban planning and design; 2. urban economy and municipal finance; 3. urban legislation, rules and regulations.

Firstly, the spatial analysis describes the existing urban context specific to the intervention. Urban mobility systems, vulnerability of the built environment, spatial form and trends are considered as possible challenges in urban management that the intervention can address.

Secondly, the financial analysis aims to identify the mechanisms in place by which the intervention could be sustainably financed in the long-run. This section outlines the city's municipal capacity, existing regional, national and international financial ecosystem and existing financing mechanisms at the municipal level.

Thirdly, from a legal perspective, the Report critically analyses how the intervention could be facilitated or challenged by the vision of the city and its governance hierarchy. Enablers and obstacles resulting from any relevant legislation, as well as sectoral frameworks (e.g. strategies, policies, planning frameworks and development plans, detailed plans of relevance) are also described.

This approach aims to offer implementing partners, stakeholders and donors a general context of the city and, with it, demonstrate the appropriateness of the intervention from a spatial, financial and legal point of view, while at the same time informing about potential barriers and enablers for its implementation.

Potential Impact to the Program Objectives and the SDGs

The Report also outlines the potential impact of the interventions, based on the specific activities and outputs proposed. Impact can arise from a complex interaction of context-specific factors, rather than as result of a single action, which makes it difficult to empirically quantify longer-run effects that go beyond the identification of program outputs. An empirical, comprehensive impact assessment is therefore not part of the scope of this report.

Nevertheless, the report outlines potential benefits that are only achievable under certain preconditions and activities. Thereby, short-, medium- and long-term outcomes are defined with reference to a project-cycle approach, which considers all the project phases from

Planning and Design through *Building*, to *Operating and Maintaining.*

Short-term outcomes are directly achieved through the implementation of the technical assistance support, within the 2-3 years scope of the Global Future Cities Program.

Mid-term outcomes are only realised once the intervention is executed through either capital investment, implementation of pilot projects or the actual enactment of legal documents, plans or masterplans, within a possible timeframe of 3 to 7 years.

The broader long-term impact of the interventions is linked to the sustainability of the interventions in a 7-15 years timeframe and relates to the operation and maintenance phase of the project cycle.

The City Context Reports further connect potential impacts to the Programme's objectives, taking into account also the Cross-cutting issues at the core of UN-Habitat's mandate from the UN General Assembly. Consequently, the Programme's objectives are summarized into five principles:

- Climate Change;
- Gender Equality;
- Human Rights;
- Youth;
- Sustainable and Inclusive Economic Growth.

Cross-cutting issues are addressed with explicit reference to the 2030 Sustainable Development Goals (SDGs) and the New Urban Agenda, in an attempt to ensure that the proposed interventions are in line with the design, implementation, review and success of the 2030 Agenda for Sustainable Development. Consistent with UN-Habitat's mandate, the SDG 11 Sustainable Cities and Communities is linked with the urban dimension of the other 16 goals as an essential part of the localisation of the SDGs. In this way, interventions can support localisation processes, to support local ownership and ensure SDG integration in sub-national strategies and plans.

Technical Recommendations and International Best Practices

The interventions proposed in the various cities of the Global Future Cities Programme were grouped into clusters according to their thematic entry-point, as an elaboration of the thematic pillars of Urban Planning, Transport and Resilience.

These clusters are:

- Public space
- Heritage and urban renewal
- Urban strategies and plans
- Data systems for integrated urban planning
- Multi-modal mobility strategies and plans
- Data systems for multi-modal mobility
- Flood management plans and systems

Combining the international experience in urban policy and project implementation of UN-Habitat and the leading academic research of IGC, each cluster was analysed to offer evidence-based recommendations for a successful Implementation and a maximised impact of the intervention. Specific reference was given to implemented plans and international best practices.

The recommendations inform the Planning and Design phase which coincides with the timeframe of the Global Future Cities Programme, and always aim for long-term sustainability of the interventions.

Fig. 1. View of Bandung (Source: UN Women, Flickr)

Bandung

GENERAL OVERVIEW

Bandung is the capital of West Java Province and is the fourth-largest city in Indonesia after Jakarta, Surabaya and Medan with 2.5 million inhabitants. Its metropolitan area, Greater Bandung (Bandung Raya), also known as Bandung Basin (Cekungan Bandung), the Municipalities of Bandung and Cimahi and three regencies.[1] (Bandung, West Bandung and Sumedang), is the third-largest metropolitan area in the country with a population of more than 8.5 million inhabitants.[2]

Trends show that approximately 60 per cent of the population of Indonesia will live in urban areas by 2025 as a result of continuous rural-urban migration. Although Bandung and its metropolitan region experience relatively low population growth rates (around 1.16 and 1.98 per cent respectively, compared to other cities in West Java located near the capital city of Jakarta, with rates reaching 7-8 per cent[3]) the city is still subject to a rapid growth expansion of its urban built up area.

The total area of Bandung Municipality is 167 km^2 and is divided into 30 districts covering 151 sub-districts[4].

In 2016, the city's economy grew by 7.79 per cent[5] one of Indonesia's top performers – driven by its thriving creative, tourism, manufacturing and education industries. Examples include aviation technology, telecommunications, vehicle manufacturing and heavy industry. Bandung is also part of the world airplane and helicopter industrial cluster and hosts three major state-owned companies in defense, railways and aviation.

Bandung annually attracts many visitors from the capital Jakarta and surrounding areas due to Bandung's climate and its touristic and commercial attractiveness. This, together with the constant population growth, has caused severe problems to the mobility system due to the lack of adequate public transport and traffic management system. This problem will worsen in the next three years once the Jakarta-Bandung high speed train project is finished, which will potentially increase the visitors coming to the city.

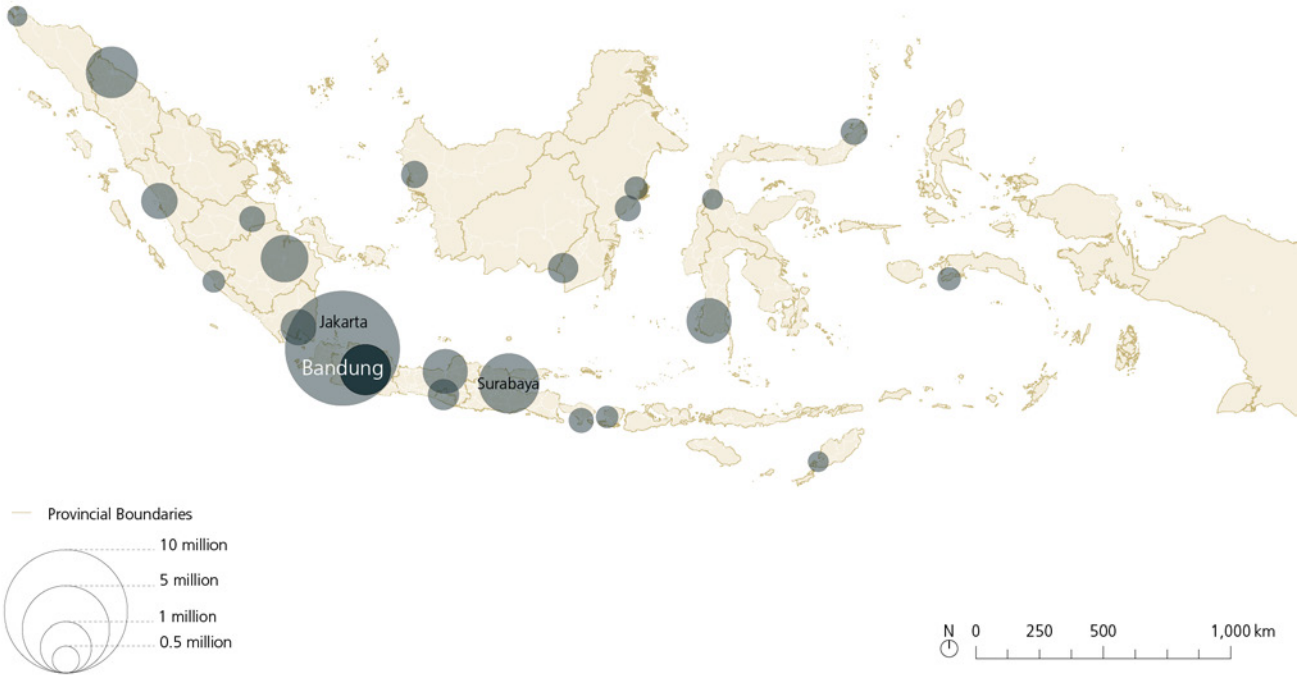

Fig. 2. Indonesia State and main Province Capitals by population

PROBLEM STATEMENT

The expansion of urban areas and the rapid economic growth significantly increases the mobility needs and transportation demand. The traffic congestion, the high growth rate of the private vehicle fleet and the high level of air pollution and greenhouse gases are the main indicators of the challenges of the public transport in providing an adequate and sustainable service to a thriving city such as Bandung.

Nowadays, the regulated public system is mainly based on the Trans Metro Bandung (TMB), a government-subsidized bus system, and the local public transport known as angkot (angkutan kota), the favourable public transport for local commuters due to its affordable rates and its wider coverage area compared to the other available public transports in the city.

However, the infrequent service, small coverage, low speed and slow boarding strongly reduce the ability of the TMB to contribute to the public transport system. The angkot represents an outdated service with a low level of comfort and organization. The angkot fleet is mainly old vehicles, owned directly by private individuals, and is based on an informal management system that difficult to control in terms of comfort and safety and integration with the rest of the transport modes.

The awareness of the municipality in regard of this issue clearly emerges in the Bandung Transport Masterplan. The masterplan aims to increase the quality of public transport through the implementation of the existing public fleet, the development of a feeder system based not only on motorized vehicles (taxis and angkot) but also on bike-sharing, supporting tourism-related routes and setting the principle for an integrated transport system.

These intentions can also be found in the Bandung Urban Mobility Project (BUMP), which defines a broad list of interventions to improve the quality of mobility system. The range of proposed solutions is broad and includes the introduction of various transport modes (LRT, monorail, TMB, school bus, tourism bus, cable car and bike sharing), road pricing, smart payment system and pedestrian-friendly solutions.

Despite the strong political will of the municipality to address the mobility issues, the technical limits of the public agencies and a general lack of collaboration between different actors hinders adequate improvement of the existing system's conditions. The weak procurement system and the lack of a robust business model plan in place stand out as clear gaps that cause concern for those advocating the use of municipal funds and mixed procurement methods such as Public Private Partnerships (PPPs). Moreover, most of the proposed strategies and interventions has no clear and effective technical action plan for the actual implementation.

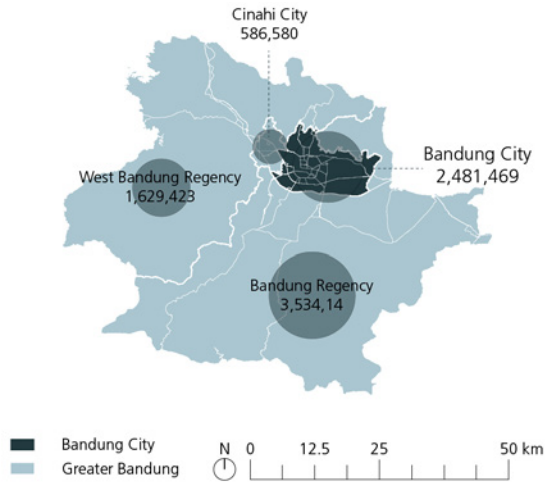

Fig. 3. Bandung Metropolitan region and its towns by population

The discrepancy between the planning and the implementation phases represents one of the main barriers to the improvement of the system. The commitment of the municipality, the abundant solution proposal and the tendency to promote more sustainable and innovative transport modes need to be managed through a more integrated system that could allow an effective monitoring of the existing structure, a coherent prioritisation of the interventions and a solid financial plan for the implementation.

INTEGRATED PUBLIC TRANSPORT SYSTEM IN BANDUNG

The intervention consists of the development of an Integrated Public Transport System for the whole city of Bandung, with the overall aim of providing a better public service: a safe, affordable and sustainable mobility system.

The worsening traffic congestion and the growing use of private vehicles are clear indicators in the need of a better quality of collective transport system, reaffirming the importance of the public service role as a driver through a sustainable urban development.

This intervention will be based on a keen analysis of the existing and planned transport modes and demand, in an attempt to promote an optimised prioritization of the future actions. It will outline a clear design of the Integrated Public Transport Network, including the infrastructure and fleet scheme and the costing of the identified operations.

In order to give the local agencies the tools to manage the new systems and to overcome the existing technical and financial limits, the intervention will focus on detailing a new management structure. It will provide a regulatory framework, with emphasis on the relations with private operators, and it will delineate a business, financial and operational model for concessions, fares and subsidy, general procurement and partnership options.

A capacity-building programme will be organized to ensure the effectiveness of the intervention and to ensure the involvement and collaboration of the government and relevant stakeholders such as bus operators, drivers and council members.

The starting phase of the intervention will focus on the integration of the Trans Metro Bandung (TMB) and the existing paratransit (angkot),as the key starting point toward an integrated mobility system and on a more sustainable, accessible and safe service for all.

In summary the Integrated public transport system has the potential to:

- Improve the quality and accessibility of the infrastructure and service in all public transport system in Bandung
- Reduce the use of private vehicle, and improve safety, reduce cost of travel, especially for low-income users
- Guarantee a better accountability in the provision of public transport infrastructure and service from the government and better allocation of funding into more sustainable modes of transport
- Improved business opportunities for informal bus industry stakeholders and more equal job opportunities are created for both men and women in the public transport industry
- More inclusive, safer and better-accessible public transport for the vulnerable group, mobility-impaired users, women, children and the elderly

The intervention is in line with the principles and projects of the Bandung Transport Masterplan and acts as strong driver of city ambitions to provide high standard services and to become a recognized smart city by 2031, as outlined in the Bandung Urban Mobility Project (BUMP).

Main Stakeholder

- Bandung Planning Agency (BappeLitbang);
- Bandung Land Transport Authority (Dishub)
- Bandung Public Works Agency (Dinas PU)

Possible project partners

- PT SMI;
- World Bank;
- Ministry of Transportation;
- GIZ

Thematic Cluster

Multi-modal mobility strategies and plans.

Key words

Integrated transport system, informal transport, participatory planning.

URBAN ANALYSIS

Spatial Analysis

EXISTING CONDITION OF THE MOBILITY SYSTEM

Main Roads

The road network of Bandung consists of a complex system that connects the Municipality with the Greater Bandung Metropolitan Area (BMA). The main roads are served by the east-west artery road and complemented by a national ring road and an outer toll corridor which connect the east,,the central and the west part of the city.

Most of the Bandung radial streets are served by secondary roads, which connect the heavily-populated south area with commercial and business sections in the centre. Local residential roads, often used by the angkot as shortcuts during peak hour, also connect small alleys in dense neighbourhoods.

The central and the north part of the city were built on during the Dutch era, prior to the start of motorised mobility, and have smaller and more pedestrian-friendly grid and block size compare to the more modern southern part, where clustered and auto-oriented development make walking an inconvenient mode choice even for short distances. However, due to heavy motorisation in Bandung, streets conceived for slow mobility become easily congested. In the past decade, efforts to ease the bottlenecks have been limited to the construction of additional infrastructure, such as the Pasupati and Antapani flyovers.

Angkot

The most used public transport mode in Bandung is the microbuses of 9-12 seats known as the angkot (angkutan kota). The wide coverage and the low prices provided by this paratransit service have made this service become a favourable mode for commuters.

The organisation of this system is based on a cooperative type of institution. This type of organisation maintains

Fig. 4. Angkot stop (Source: Wikimedia Commons)

the relationship with the public authorities and acts as intermediaries in case of accidents or traffic offences. In the city, many cooperative groups manage these angkot industries, All the vehicle owners or drivers need to be a member of one of these cooperatives and pay a membership fee.

The business model is partially informal. Dishub (Transportation Agency Bandung City Government) issues route licenses and permits to each vehicle owned by private individuals. The owner can drive his or her own angkot or rent an angkot to a driver who will daily operate it, keep the fares and collected by cash without any receipt.

This system works as a feeder system to the other transport modes. Despite the low capacity of the vehicles, the high frequency of the service (every three to five minutes along the main routes) guarantees a certain reliability of the system. However, the routes are not predetermined and the stops are flexible and decided according to the commuters' needs along the lines.

The coordination between different drivers is limited and they usually wait until the vehicle fills up before leaving. Consequently, the travel time is irregular and the congestion moments frequent. For these reasons the service results are unorganised and often inconvenient, forcing the users to make transfers and pay the fare several times.

Every six months these buses must pass safety and roadworthy inspections; nevertheless, the general condition in terms of comfort (small seats and no air conditioning) and level of maintenance tend to be really poor.

No precise and up to date data exist about the service and the fleet. A survey conducted in 2009 showed that

angkot accounted for about 570,000 passenger trips per day and 31 per cent of all motorised trips[6].

Angkots represent not only the most popular choice for low-income groups but also an important source of employment with an estimate of 20,000 direct jobs (2010)[7]. However, their poor service and the growing traffic congestion are fostering a preference towards private transport modes, most of all motorcycles.

Ojeks

Motorcycle taxi, called ojek, represents another informal city-wide transport and an important component of Bandung's mobility system. They also provide an accessible means of livelihood for young people, which provide an alternative to unemployment.

The main advantages and the reasons of the success of this service is its time- and cost-saving potential. The ability to manoeuvre in the congested traffic, the flexibility on origin and destination of the trip and avoiding the irregular service of the buses together make this one of the most used.

Similar to the angkot, the owner of the ojek motorcycle can drive it or rent it to a driver. The owners form groups of ojeks of different size and focus on different areas. These groups are conceived as an organisation which manages the number of motorcycles, arranges the sequence of service as passengers turn up and deals with local authorities.

Although ojek is not formally recognised by the city as an official public transport type, this service is being tolerated and the available statistic data show an average annual rate of 15 per cent that make ojeks the fastest-growing mode of public transport in the city[8].

In 2010, the ojek based system was conceived and established by Jakarta Go-jek, a successful start-up that improving the ojek service by establishing an IT based regulation and innovation that transformed ojek into a new smart mobility solutions. The service has grown at an impressive pace and now has more than 1 million drivers and 18 app-based on-demand services all over Indonesia.

Fig. 5. Traffic and different transport modes in Bandung (Source: Wikimedia Commons)

Average Daily Public Transport Mode Split			
Mode	2017	2020	2030
Angkot	92.3%	89.1%	87.3%
Damri	0.7%	0.5%	0.6%
TMB	2.0%	1.8%	1.2%
Train	5.0%	8.6%	10.9%
TOTAL	100%	100%	100%

Fig. 6. Public transport information. (Source: Bandung Low Carbon Mobility Plan)

Average Passenger per Day for each Public Transport Mode			
Mode	2017	2020	2030
Angkot	363,167	507,709	614,079
Damri	2,771	2,909	4,096
TMB	7,797	10,069	8,606
Train	9,759	49,208	76,489
TOTAL	93,494	570,895	703,270

Fig. 7. Public transport information. (Source: Bandung Low Carbon Mobility Plan)

Damri

DAMRI stands for Djawatan Angkoetan Motor Repoeblik Indonesia, a state-owned company which runs nine bus routes in Bandung. It is the city's main bus operator. As a nationally-owned bus company, DAMRI also runs intercity and inter-province routes. In Bandung, DAMRI's routes are longer than angkot ones, and connect the outskirt of Bandung to the centre.

The service of DAMRI in Bandung began on 1978 based on the Decree of Mayor of Bandung No. 10/85/1978, with the aim of removing the minibus from mass transit. At that time DAMRI operated 70 units. Due to the increasing population and the demand of the people of Bandung, the fleet was renovated and enlarged between 1978 and 1988. With 230 buses serving 15 routes in Bandung Raya and two intercity routes, the service represents a consolidated reality of the Bandung mobility system. At present, DAMRI Corporation is exploring plans to open new intercity routes in the province (AKDP) and inter-provincial inter-provinces (AKAP).

"BRT" Bus (Trans metro Bandung)

Trans metro Bandung is a bus system service with four routes that is provided by the city since 2004. The ticketing system is still based on conventional paper tickets paid for by cash. The fares are IDR 3,000 (USD

Fig. 8. Main existing infrastructure and transport modes

0.21) for adults and IDR 1,500 for students, subsidised from the government. In fact, the service was conceived as key step towards a more efficient and sustainable transport system based on the model of the Bus Rapid Transit System.

However, the efficiency of TMB is low since the buses do not have exclusive lanes, running on mixed-traffic lanes that cause delay and a general worsening of the congestion. This gives wide uncertainty for the TMB schedule, which make the service unattractive not only for current public transport users but also for private vehicle ones. The lack of control and monitoring on service quality by the government also leads to a poor operational service on the TMB system. Some TMB shelters are broken and unmaintained and no universal access is available at many stations to board the high-floor bus.

A study commissioned by AFD on the Bandung Mobility System[9] states that TMB's performance is low. The limited number of routes, smaller coverage and much lower frequency than angkot, make the paratransit systems an unachievable competitor.

The ticketing system, as mentioned, is based on conventional cash payment and paper tickets. This prevents the operators and the municipality from efficiently collecting the service revenues and any type of data regarding the users.

Area Traffic Control System

The city of Bandung counts on an IT system called ATCS (Area Traffic Control System). It aims to optimise the road network performances through the control and coordination of traffic light setting at selected intersections on the main corridors. However, the system would require an expansion to all parts of the city as well as a constant maintenance.

Specific functions:

- Time the traffic light signal in a coordinated way
- In certain circumstances, give green time to vehicles that have priority such as first responders
- Deliver information on traffic conditions and alternative trajectories
- Provide records of traffic data, accidents and other events at the intersection

Main benefits:

- Road network performance optimisation
- Safe, efficient and environmentally-friendly traffic system
- Reduced number of traffic control officers at the intersection[10]

UNSUSTAINABLE TRENDS

The complex transport system of the city and the ambitious plans demonstrate a strong commitment of the municipality to guaranteeing an efficient service. Nevertheless, the general conditions of the mobility system present several issues and the future trends indicate the necessity of alternative and integrated solutions.

Traffic Congestion

Traffic congestion is the most evident symptom of the mobility system issues in Bandung. The inability of the municipality to meet the increased travel demand is shown by the number of congestion points in the city. In 2009 the surveys counted 32 primary traffic congestion locations but in 2013 this number increased to 44[11]. The main causes are the presence of economic activities (e.g., street vendors, market places), the progressive increase of motorised, mostly private transport and the informal management of the angkot system. The last survey conducted in 2013 registered in Bandung an average traffic speed of only 11.8 km/h – against an ideal speed of more than 20 km/h[12]. In 2017, 80 per cent of the local road network capacity in Greater Bandung had reached saturation[13].

Fig. 9. Traffic congestion 10:30 am. (Source: Google maps -Typical traffic)

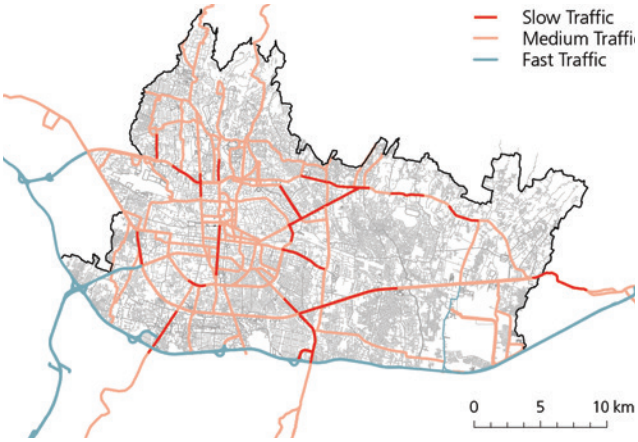

Fig. 10. Traffic congestion 5:30 pm. (Source: Google maps -Typical traffic)

Private Traffic Growth

The most up to date public survey states that 95.5 per cent of transport users in Bandung are not satisfied with the security, safety and convenience of the public service[14]. The direct consequence of these clear difficulties of the collective transport modes is the growing motorisation rate. This trend is mostly related to private car and motorcycle ownership, preferred to the public system for accessibility, comfort and reliability.

The size of this unsustainable trend is clear through the comparison with the 1.23 per cent increase of the road extension in the city per year and not the 9.34 per cent increase of vehicle numbers. This rapid growth is also a direct effect of the management of the parking system. The municipality declared that 37.5 per cent of road-lane capacity has been consumed by space dedicated to parking.

The consequences affect in several ways the urban quality of life in Bandung:

- Growth of traffic congestion
- Growth of pollution levels
- Staggering 22,37 per cent increase in traffic accidents per year[15]

Fig. 12. Traffic congestion in Bandung (Source: Flickr)

Environmental Impact

Indonesia as a country has committed to reducing greenhouse gas (GHG) emissions by 29 per cent by the year 2030. However, the pace and the modality of Bandung's urban growth lead to a progressive worsening of the environmental conditions and air quality of the city. The constant increase of private mobility, together with an unregulated and uncontrolled emission levels and performances system for motorised vehicles strongly increase the level of pollution of the city. Moreover, the progressive urbanisation causes the gradual reduction of green public spaces. In Bandung, green spaces only represent 7.86 per cent of the whole city area, far from the legally-binding target of 30 per cent. As a result, of the dynamic of the level of local air pollution shows an increasing growing rate that varies from ten to 15 per cent per year.

As the charts below show, the transport system is responsible for producing 93 per cent[16] of the GHG emission in Bandung City (2013), together with industrial plants and building-related emissions. Considering these three categories, transportation produces 60 per cent of this total of 93 per cent of the city's overall emissions. It is important to underline that transport system contributes 66 per cent of the CO2 equivalent in Bandung city (motorised fuel consumption: 627 million litres/year[17]).

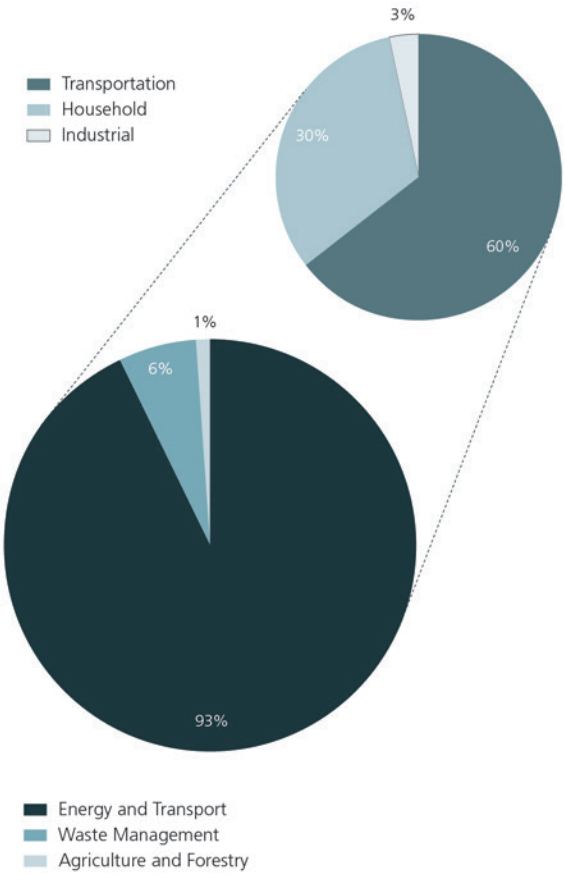

Fig. 11. Transport mode use (Source: see endnote 10)

ALIGNMENT WITH THE CITY FUTURE PLANS

Bandung Transport Master Plan

The Bandung Transport Master Plan, effective from 2015, has been specifically developed with the aim to reach the goal of increasing the public transport market share by 40 per cent.

The Plan supports the creation of an effective transport service composed by different modes. A rail-based mass trans system is proposed through the implementation of LRT and Monorail routes, in order to offer an alternative to the Trans Metro Bandung. Moreover, there is a call for increasing the existing bus fleet to improve frequency and coverage of the service and the creation of a dedicate touristic transportation service.

The Plan also suggests the application of smart technology to the mobility system of the city, with the aim of improving the quality of the service. The document considers other transport modes, motorised and non-motorized, such as angkot and bike sharing, to develop a diffused and effective feeder system.

Bandung Urban Mobility Project (BUMP)[18]

The Bandung Urban Mobility Project has been published by the city before the Master Plan. It represents a list of projects that the Municipality should implement for a sustainable urban development. Aiming to cover all the main components of an innovative transport system, the Plan include a wide range of proposals, starting from LRT, monorail, TMB and cable car and taking into consideration solutions for non-motorised transport, for example, through elevated pedestrian walkways and a bike-sharing system.

Furthermore, the document explores managerial and innovative development aspects of the mobility system, regarding solutions for the parking management, the implementation of an electronic road pricing and the application of the Transit Oriented Development (TOD) principles.

Some of the projects have already been implemented form 2013 and 2018, in particular a new school bus system of eight routes and a tourist service composed of 12 vehicles on five routes.

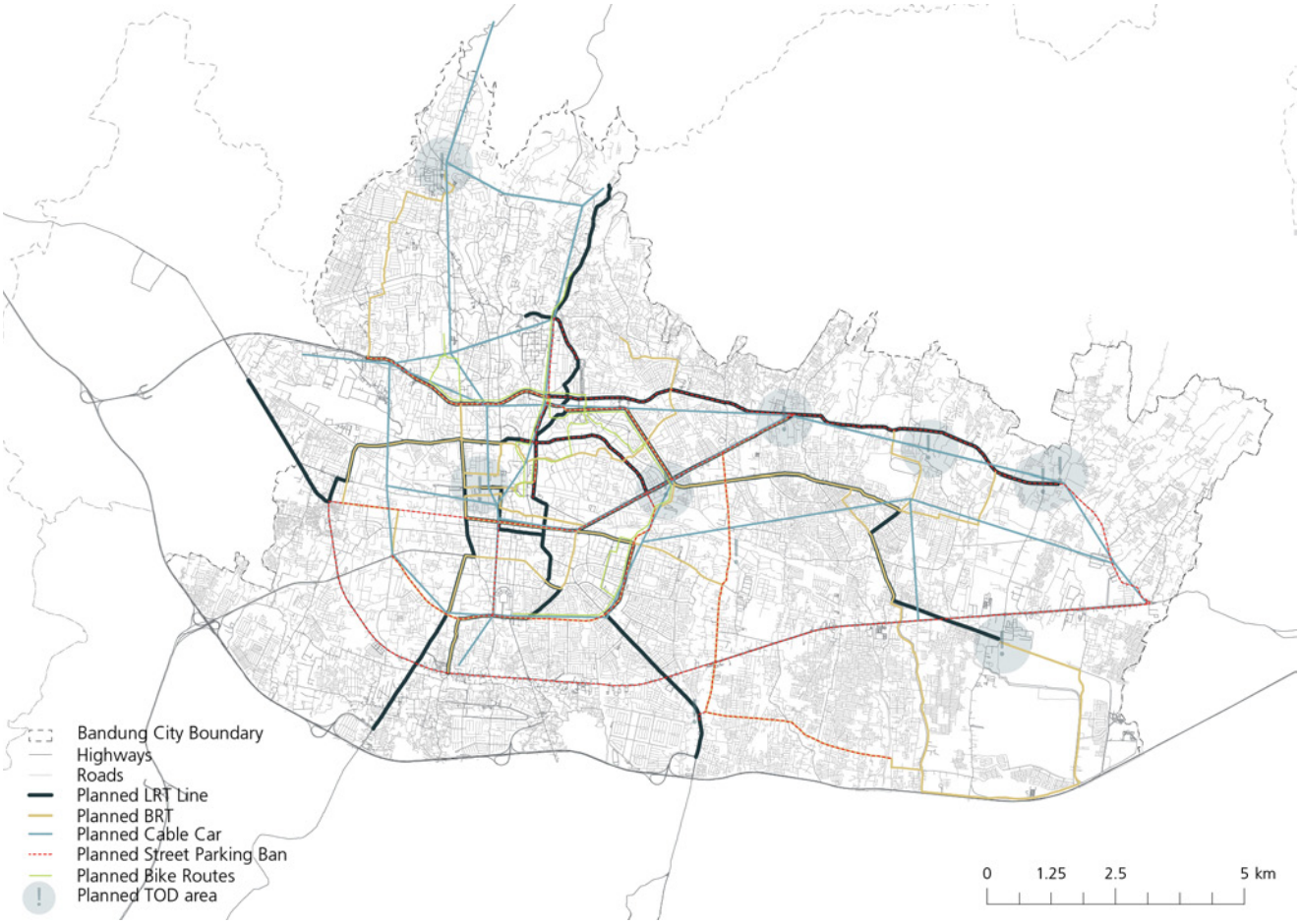

Fig. 13. Main planned transport modes and mobility solutions

Financial Analysis

MUNICIPAL CAPACITY

The total 2017 city revenue stood at IDR 6,503,784,628,502 (about USD 450 million) or approximately USD 174 per capita[19]. This is moderate considering other cities in the region such as Melaka (USD 103) or Bangkok (USD272) or Surabaya (USD 107). However, it is low compared to other cities in the region such as Cape Town (USD 761).

Central government transfers make up a significant percentage of the city's revenues. The pie-chart below provides the breakdown of revenue sources. Approximately 40 per cent comes from transfers from the central government while own source revenues only represent 13 per cent. This shows a dependency from the national state for investment and a lack of internal revenue capacity of the city for investments in new projects and maintenance.

Capital expenditure is low in most Indonesian cities. Aggregated data from 2013 shows that local governments spend, on average, 28 per cent on capital expenditure and 72 per cent on routine expenditure[20]

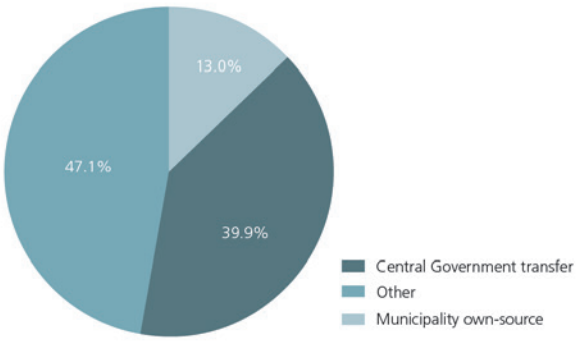

Fig. 15. Breakdown of Bandung's Revenue

TAX[24]	Tax Based and Tax Rate (as of 2017)
Hotel tax	10% of the annual turnover
Restaurant tax	10% of the annual turnover
Entertainment tax	35% of the annual turnover (consisting only of admission price)
Street lighting tax	10% of electricity consumption (retail price, excluding VAT)
Parking tax	20% of parking fees.
Land and Building Tax	0.3% of the assessed value of the property[25]

Fig. 14. Taxes levied at the city level

such as operation and maintenance. This means that cities are still dependent on the national government for financing new infrastructure projects.

In terms of expenditure, however, cities have been allocated with extensive responsibilities by Law 22/1999. While the central government retains the competences of national security, foreign and monetary policy, justice, governance and planning and religious affairs, cities have competencies that include municipal services, education, health care, housing and transport. Nevertheless, these responsibilities have not been accompanied by the same degree of fiscal autonomy. Regions and municipalities are only given a low tax base and no power to collect major taxes[21].

MUNICIPAL FINANCING MECHANISM

Law No. 28 of 2009 details the fiscal revenues allocated to sub-national governments with local taxes including those for hotel and restaurant, advertisement, public lighting, non-metal and stone minerals, parking, land and building, a land and building acquisition and many others. The Table below shows the breakdown of the tax revenue that Bandung city government takes in by source with the most important sources being the entertainment and parking. The maximum tax rates are set by the central government and provincial and/or local governments can only collect those taxes established by law by the national government.

Local governments have only been able to collect property taxes (land and building tax, land and building acquisition tax) since 2014. As shown in the Table, land and building tax represents only 0.3 per cent of the assessed value and property. This indicates that city has some capacity to raise land-based finance revenues, although tax collection is

low. For the integrated public transport plan to be most effective, these mechanisms can be of especial relevance. If transport projects are adequately linked to land use and density, it can lead to increases in land values in specific areas of Bandung and land-value capture instruments become a viable option for financing and funding necessary transport interventions.

Bandung has also entered PPPs in the past. For example, in 2011 it signed a 20-year build-transfer-operate PPP for a solid waste disposal plant. However, as a result of not having a dedicated unit, there may be capacity issues that need to be addressed to ensure that PPPs are undertaken to the benefit of the city.

With PPPs it is important that the city has a clear funding stream linked to pay back the initial upfront capital investment from the private sector. In transportation systems, part of this may be through revenues generated by ticketing, or fare box recovery. While in some Asian and Latin American cities, operations of transportation systems are fully covered by the user fees. Evidence from other cities shows that, mostly, user fees only cover 35 to 65 per cent of the operations of any system.

Regarding the city's capacity for borrowing, the Law No. 17/2003 provides the city with the legal ability to do so from both domestic and foreign debt markets. However, it requires permission from the Ministry of Finance[22]. The Law also establishes the ratio of debt to GDP for the city at a maximum of 60 per cent.

MUNICIPAL AND NATIONAL TRANSPORT INVESTMENT

The municipal spending on transport by the city forms a small part of the total. The expenditure breakdown is provided below. The municipal spending on transport stands at IDR 215,129,137,058 (approx. USD 14.3 million). The per capita transport spending comes to USD 5.50. In terms of the percentage, as shown in the pie chart it represents 3.1 per cent over the total municipal expenditure compared to 1.7 per cent for urban planning.

From the national sector side, transportation is one of the sectors in which the government of Indonesia spends the most. In 2018, the planned national budget allocation for transportation was IDR 48.2. trillion or USD 3.3 billion[23], being one of the main sectors in which the national government is allocating budget priorities.

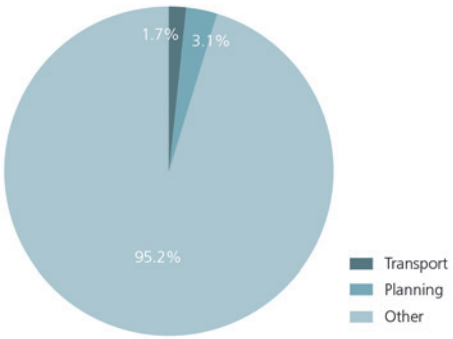

Fig. 16. Spending in Urban Planning and Transport in reference total spending

Legal Analysis

TRANSPORT GOVERNANCE STRUCTURE

The Bandung Municipal Government (BMG) has significant legal mandate to implement transport projects within the city[26]. However, the West Java Provincial Government also has the mandate over transport projects that go beyond city limits[27], resulting in issues of coordination. IIneffective coordination also comes from a mismatch between the jurisdiction of BMG and the Greater Bandung Metropolitan Area (BMA), where many of the city's commuters live. This mismatch is evidenced by the proposed West Java LRT which covers three of the BMA's four municipalities, including Bandung[28].

This has led to fragmented metropolitan transport governance, with coordination restricted mostly to investment projects managed by national ministries.[29] his mismatch also limits the potential for effective integrated planning without proactive coordination between city and provincial government.

The institutional structure concerning, but not limited to, the transport system in Bandung is summarised below:

LEGAL FRAMEWORK FOR PUBLIC-PRIVATE PARTNERSHIP

Bandung has a dedicated public-private partnerships (PPPs) unit under Bappelitbangda but it is soon to be dissolved into city procurement and investment agency. However, it can and has entered into PPP agreements.[30] At the national level the central government has promoted the use of PPPs by setting up a joint secretariat to provide ad hoc assistance to municipalities. The National Medium-Term Development Plan 2015–2019 encourages municipal PPPs[31]. Legally, cities can hold PPP bids, as mandated by the Indonesian Benchmarking PPP Procurement 2018, and amended by RA 7718[32].

To this end, BMG has set precedents of entering into PPP agreements. For example, in 2011, BMG entered into a Build-Operate-Transfer (BOT) PPP for a 20-year period to establish a solid waste disposal plant[33]. However, there is limited procurement capacity and precedent-based knowledge at the city level. In 2016, the city provided a concession agreement to build, operate and maintain a light rail transit in the city to the SMRT Corporation. However, the agreement was withdrawn due to a disagreement regarding the amount of government's financial support and viability gap funding requirement for the project.

AGENCY	What does it run?
Dinas Perhubungan Kota Bandung (Dishub)	It is the BMG's local transportation agency, responsible for running and managing public transport service within city boundaries except the BRT.
Transmetro Bandung	It operates the BRT system. It is operated by the TMB agency, a technical agency controlled and funded by the city of Bandung.
West Java Provincial Government	Manages the transport project which go beyond the jurisdiction of the Bandung municipality.
Bappelitbangda	It is the city planning agency which is responsible for developing long term spatial plan, transport masterplan, the five-year mid-term plan, and annual budget and program.
Provincial Transportation Agency	The key agency which manages the provincial transport network.

Fig. 17. Bandung institutional structure

INTERNATIONAL ALIGNMENT AND TECHNICAL RECOMMENDATIONS

Potential Impact

The potential impact analysis outlines the main benefits that can be potentially attained through the Global Future Cities Programme in each city under the assumption of three moments: short, medium and long term. Nevertheless, as impact can arise from a complex interaction of context-specific factors, rather than as result of a single action, an empirical impact assessment is out of the scope of this report.

Short-term outcomes refer to those that can be achieved through the implementation of the technical assistance support within the 2-3 year scope of the Global Future Cities Programme. Mid-term outcomes are only achievable once the intervention is executed at the city level either through capital investments or the legal validation of key polices and plans. Long-term impact of the interventions is linked to the sustainability of the interventions in a 7-15 year timeframe and is related to the project cycle phase of operation and maintained.

SHORT-TERM OUTCOME

One of the main challenges of the city is the lack of coordination and integration of statutory and non-statutory plans. In the short-term future, the Integrated Public Transport System in Bandung, through its capacity-building component, will positively impact the municipal technical and managerial capacity whilst increasing citizens' inclusion in plans development and decision-making processes.

The Integrated public transport system will restructure the organisation of the current public mobility and it will include specific short-term actions to provide the city with integrated plans, frameworks and approaches to promote more sustainable, resilient, and socially inclusive cities.

Moreover, the integration between different transport modes at the city-wide scale will allow an improvement of the mobility system's governance and will promote a better coordination and cooperation between different levels of government and with different public departments.

The intervention will include economic viability analysis and prioritize projects within an implementation plan, that will increase Bandung Municipality ability to better plan a sustainable investment framework and to promote an inclusive economic growth in a social and environmental smart manner.

MEDIUM-TERM OUTCOME

In the mid-term timeline of 3-7 years, the potential impact of the Programme in the city will depend on the legal effectiveness of the Integrated public transport system as a statutory framework, the successful implementation of the strategic projects in integrating the existing paratransit transport (angkot) and the Trans Metro Bandung (TMB), and the success of the capacity-building programme for the public administration and for the transport system operator.

In the mid-term the implementation of the intervention could lead to a progressive and general improvement of the city mobility system in terms of efficiency, quality and reliability. The prioritization of the integration between a paratransit and semi-informal system as the angkot with the main public bus network is based exactly on the will to reach the high potential impact in a relative short term. In fact, the angkot represent the most used transport mode and often the only alternative to the lower-income groups.

For this reason, it is expected to be a more secure accessible public transport system, particularly for women and disadvantaged groups. Consequently, the new system will lead to and increased ability to access employment and services.

These impacts will be not limited only to the user but also to the provider (operators) of the services. The public assistance and inclusion in a wider mobility system through a process of direct engagement and participatory planning will guarantee their permanence in the market, with more organised and stable financial revenues.

LONG-TERM POTENTIAL IMPACT

In the long-term, strengthened capacities of civil servants are expected to connect mobility planning to a sustainable urban transformation and resilience.

The intervention will impact the city-wide scale and improve spatial planning at different levels. In particular, the integration of different transport modes and their alignment with the city land-use has the potential to improve accessibility to jobs, commerce and services. Moreover, the support to city proposal as the implementation programme of a Transit Oriented development, in alignment to the Bandung Urban Mobility Plan, would enhance more connected, accessible and financially and environmentally sustainable urban development.

This will contribute in the effective implementation of comprehensive urban plan that enhance linkages between the spatial, economic and social development.

The progressive implementation of the governance and regulatory framework, the development and application of well-structured business, financial and operational models and the physical realisation of planned and designed projects will allow a gradual improvement of the public service.

First, an increased accessibility and mobility through the public system will be extended to all parts of the city, including to the peri-urban area and to the settlements area where many marginalized groups live. Second, the better transport service has a potential to reduce private transport use and, as a result, will reduce the traffic congestion. In the long-term, all these achievements will lead not only to a more lively and accessible public space but also to a reduction of energy consumption, of air pollution and greenhouse gas emissions and to a development of healthier urban environment for the citizens.

Contribution to Sustainable Urban Development

2030 SUSTAINABLE DEVELOPMENTS GOALS

The Global Future Cities Programme aims to contribute the implementation of the 2030 Agenda for Sustainable Development, mobilising efforts to tackle poverty, fight inequalities and combat climate change.

SAFE AND INCLUSIVE PUBLIC TRANSPORT

The Integrated Public Transport System in Bandung is strongly aligned with the SDG 11 as it contributes to the adoption and implementation of integrated policies and plans towards the provision of "*access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons*" (target 11.2).

RELIABLE INFRASTRUCTURE

Additionally, the intervention can have a potential impact on the SDG 9 with the development of quality, reliable, sustainable and resilient infrastructure, improving the performance of the public transport. That can have a specific effect on reducing the traffic congestion and air pollution emission exposure (SDG 3.6, 13.3).

INCREASED ACCESS TO EMPLOYMENT

The restructuring of the transport organisation toward an integrated system can promote economic growth and contribute to decent job creation, especially to people employed in the current informal market (SDG 8). Youth and women will be prioritised in the whole process (SDG 5) especially when promoting more safe, peaceful and inclusive societies (SDG 11, SDG 16).

PARTICIPATORY DECISION MAKING-PROCESS

The Programme implementation methodology directly contributes to ensure responsive, inclusive, participatory and representative decision making at all levels (SDGs 16), as well as to enhance capacity for participatory, integrated and sustainable human settlement planning and management (SDG 11.3).

CAPACITY BUILDING

Moreover, it has a direct effect on enhancing multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology and financial resources to support the achievement of the Sustainable Development Goals (SDG 17).

NEW URBAN AGENDA ALIGNMENT

The United Nations Conference on Housing and Sustainable Urban Development (Habitat III) held in Quito, Ecuador, in 2016 adopted the New Urban Agenda, a new framework that lays out how cities should be planned and managed to best promote sustainable urbanisation.

The New Urban Agenda encourages UN-Habitat and others "*to generate evidence-based and practical guidance for the implementation and the urban dimension of the SDGs in close collaboration with Member States, local authorities, major groups and other relevant stakeholders, as well as through the mobilization of experts*".

The intervention in Bandung Programme is directly related with the UN-Habitat's draft Action Framework for Implementation of the New Urban Agenda (AFINUA). This framework is organized under five categories: (1) national urban policies, (2) urban legislation, rules and regulations, (3) urban planning and design, (4) urban economy and municipal finance and (5) local implementation.

The defined interventions in Bandung have a direct relation to the five AFINUA categories, especially the ones related with urban planning, urban economy and local implementation, with emphasis on social and professional inclusion in the public transport service.

The integrated system will be based in the assumption that roads, streets and intersections and corridors need to be conceived as public spaces, and the quality of their services is central to liveability, efficiency and equity in urban areas (AFINUA key item 2.3). It aims to promote a multimodal transport integrated with walking and cycling options that lower the time cost and environmental impact of travel and promotes compactness and accessibility, social cohesion and economic productivity and can help balance public and private domain (AFINUA key item 3.4).

Additionally, the integrated system will ensure that transport, as one of the main urban services, will be delivered as an integrated service go to underserviced and marginalised groups (AFINUA key item 5.4).

Finally, the intervention will strongly focus on the financial sustainability of the system, considering *"the entire budgetary cycle including income, expenditures, current capital, capital investment plans, etc, link to the local financial management system and be anchored in local economic development potential including the role of local government to provide and distribute public goods and services and enhance local economic productivity"* (AFINUA key item 4.2). Moreover, the identified strategy includes capital planning, including the public transport infrastructure assessment, that can help to guarantee efficient basic services and networks and their maintenance and meet backlogs and anticipated demands (AFINUA key item 4.5).

ALIGNMENT WITH CROSS-CUTTING ISSUES AND THE PROSPERITY FUND

The Global Future Cities Programme seeks to achieve higher rates of sustainable and inclusive growth while increasing long-term investments in sustainable urban projects. Moreover, it will provide greater awareness, capability and confidence, while establishing regulatory frameworks resulting in higher incentives for partnerships and financial mechanisms.

The four Cross-Cutting Issues of UN-Habitat, as identified in the Strategic Plan 2014-2019, are mainstreamed to ensure that all UN-Habitat work targets those with the most need and promotes socially and environmentally sustainable cities34. In this regard, the interventions detailed for Bandung are shaped under the mainstreaming of environmental safeguards, youth, gender equality and human rights.

The interventions' overall objective is to provide a sustainable service to the citizens. Its optimisation aims to guarantee a more efficient transport management that will allow a mitigation of the environmental impact and an improvement of the accessibility of all mobility systems.

In particular, the Programme's intervention is structured to enhance the quality and inclusivity of the mobility system toward the integration and the strengthening of the current informal transport modes that provide services and employment to the poorest and the youngest part of the society.

The intervention respects the fact that lack of adequate infrastructure affects all genders as one of the main principles. However, this aforementioned lacking has a greater negative impact on women since they rely more on public transportation through having more complex commuting patterns than men on daily basis. A special focus will be given to issues of personal safety and security regarding transportation as a major step towards gender equality. Moreover, the intervention will promote professional empowerment for women, both reducing the time for travel and supporting female inclusion in a male-dominate work environment.

Potential Benefit	Short term	Medium Term	Long term	SDG Alignment		New Urban Agenda	Programme Objectives and Cross-cutting issues
				GOALS	TARGETS	AFINUA KEY ITEM	1. Climate change; 2. Gender equality; 3. Human Rights; 4. Youth; 5. Sustainable and inclusive economic growth
Increased capacity to prioritize strategies and improved tools for decision making based on informed demographic, economic, cultural, environmental and other holistic projections.				11, 17	11.a; 17.18	1.1, 3.1	Climate change; Gender equality; Human Rights; Youth; Sustainable and inclusive economic growth
Integrated plans, frameworks and approaches to promote more sustainable, resilient, and socially inclusive cities				11, 13, 16	11.3; 13.2; 16.7	2.1, 2.3, 5.1, 5.3, 5.4	Climate change; Gender equality; Human Rights; Youth
Better Governance & Integrated Management of cities including better coordination and cooperation between different levels of government.				17	17.14; 17.15	1.4, 1.6, 2.5	Climate change; Human Rights; Sustainable and inclusive economic growth
Encouraged and/or promoted effective public, public-private and civil society partnerships				17	17.17	5.6	Sustainable and inclusive economic growth
Sustainable financing models for urban developed, that enable the city to finance provision of basic services and local infrastructure.				16	16.6	4.2, 4.6	Gender equality; Human Rights; Youth; Sustainable and inclusive economic growth
More secure, safe, and accessible public transport, particularly for women and elder.				3, 11	3.6; 11.7	3.3, 5.4	Gender equality; Human Rights; Youth
Lower costs of transporting goods and increased efficiency of the transportation system				9, 12	9.1; 12.2	3.3, 4.5, 5.1	Climate change; Sustainable and inclusive economic growth
Increased ability to access employment and services, particularly for women and lower income groups				8	8.3	3.4, 3.8, 4.4, 4.5	Gender equality; Human Rights; Youth; Sustainable and inclusive economic growth
Increased efficiency, quality, and reliability of public infrastructure and basic services.				9, 12	9.1; 12.2; 12.c	2.3, 4.2, 4.5, 5.4	Climate change; Human Rights; Sustainable and inclusive economic growth
Increased mobility and accessibility for poor women and men and other marginalised groups.				9, 11	9.1; 11.2	3.3, 5.4	Gender equality; Human Rights; Youth
Improved access to basic services in peri-urban areas				9, 11, 16	9.1; 11.2; 16.6	4.5, 5.4	Climate change; Gender equality; Human Rights
Reduction in traffic congestion and in air pollutant emissions				3, 13	3.9; 13.2;	3.5	Climate change
Higher rates of sustainable and inclusive economic growth, greater investments flows & greater trade flows				9, 17	9.a; 17.3; 17.9	4.1, 4.2, 4.3, 4.4, 4.5	Human Rights

Fig. 18. Potential Impact and Programme Objectives Alignment

Success Factors

The following statements are considered as evidenced success factors based on international best practices that should be considered for the intervention in Bandung in order to achieve the maximum impact on the Goals and the Programme Objectives, as well as to ensure the whole project-cycle sustainability.

SPATIAL CONSIDERATIONS

Linking Transport and Land-Use Planning

In Bandung, transport and land-use planning are carried out by different institutions. As a result, they have generally been detached from each other. Infrastructure has been retrofitted to fit the needs of commuters and other travelers settled without considering the implication of planning on mobility and vice versa where populations have already settled. This is both inefficient as it often results in urban sprawl. It is also not cost effective as estimates show that retrofitting infrastructure, including for transport, where cities have already been built can be up to 3 times more expensive35. Planning proactively for transport can determine where urbanisation will happen and thus ensure the city grows efficiently. More specifically, transport and land-use planning complement each other in two ways:

- Together, land-use and transport determine accessibility to jobs, commerce and services
- Intensive land-use facilitates high population density which, in turn, makes transport systems more cost effective

The integrated public transport system should be based on a rigorous spatial analysis to understand past, current and future land-use configuration. This process should in particular focus on the Bandung Area and Spatial Plan (RTRW) and Detailed Spatial Plan (RDTR), which are currently under revision.
A sustainable urban development should also be promoted through transit-oriented development (ToD) corridors, a system also promoted in the Bandung Urban Mobility Project (BUMP). These are development corridors that are specifically planned around transport nodes, with a mix of housing and commerce as well as employment opportunities. Governments can facilitate these types of developments through permissible zoning and other regulatory instruments as well as providing anchor infrastructure investments. Locating these amenities close to public transport improves connectivity, as people can access their residences and jobs more easily, and thus may lower transport costs for household because they will have less spending for long-distance travels. ToD can also reduce congestion, incentivising public transport in connection with non-motorized modes to cover first/last mile access.

Integration of Non-Motorised Transport

A Sustainable Mobility Urban Plan should encourage non-motorised transport (NMT) elements integrated with motorised forms of transport in an accessible and safe way. This has particular benefits for female users of public transport.

Additional benefits of encouraging NMT lie in the decreased congestion. Proper sidewalks, bicycle lanes and other similar networks can work as a proper feeder system to the main public modes for short and medium distances allowing the avoidance of needing motorised means. However, research has shown that walking is always perceived as more onerous, both in time taken and safety for the individuals and an attractive design and so a proper promotion is needed to trigger a cultural change.

Information as key enablers of efficient individual travel decisions

The transport system of large metropolitan areas offers a wide variety of travel options for daily commuting as well as ad hoc business trips. This is especially the case in Bandung where several types of transport are operated in the city by different companies in a disconnected way.

Reliable information available for commuters can therefore significantly improve the efficiency of individual travel decisions and consequently the transport system as a whole. Additionally, real-time travel information can reduce uncertainty in large transport networks facing challenges in service reliability.

An integrated transport system could allow a better evidence-based decision making, so to improve the management and optimize the service in terms of time and reduction of the perceived user costs of urban mobility.

Improved data[34] for realistic designs and assessing impact of investments[35]

In order to design and implement a realistic evidence integrated multimodal transport plan, cities will require data. Data can be costly to collect on a regular basis. However, with new technologies, such as mobile phone and smart ticketing systems, data can be generated relative easily. Regular data will also allow for continuous monitoring and the evaluation of the plan and its implementation, allowing for evidence-based improvements to be made to the system. For example, integration may lead to changes in how people travel which, in turn, should be reflected in the operation and design of the transport system. This will require an iterative process to achieve optimisation but also needs data analysis capacities.

Plans require major investments; therefore, it is also important that the city understands the overall impact once these have been made. For example, impacts of investments can include direct effects on travel time as well as indirect effects on employment, land and property values or commuting responses. Impact assessments are needed to outline where further improvements need to be made to unleash the previously outlined benefits, as well as to inform future investment.

Assessing impact, however, requires rigorous methodologies to isolate the actual part of the outcome that can be attributed to the intervention itself. In order to be able to prepare the aforementioned condition, it requires, amongst other factors, the availability of high-quality historical and future data. Therefore, as part of integrated transport planning exercise, understanding what data is available, what will need to be collected as well as having a detailed strategy for collecting this data is critical in ultimately understanding whether the intended outcomes and benefits have been achieved.

FINANCIAL CONSIDERATIONS

Realistic Financing and Funding Strategy for Anticipated Investments, Programmes and Projects

Public transport is an economic system that, if well integrated, can provide larger efficiency gains and other benefits than if each system operates individually. Improvements in connectivity in a city is one of the main ways that urbanisation can support economic growth in the long run.

Consistently, one of the major barriers to the implementation of transportation plans is that they include financially-unsustainable projects38 or the lack of a proper long-term strategy. This barrier is one of the most evident issue for the Bandung. This can then result to the stalling of the implementation of overall plan, as the integrated nature may mean one investment is dependent on the other. Therefore, if the integrated multimodal transport plan sees the need for new, particularly large-scale investments, a critical assessment of their financial feasibility will be key. The cost-benefit analyses of each individual investment should be used to decide what to include in the plan. The aforementioned analyses should also be accompanied with the affordability studies to understand how high fares can be set as well as to understand the likelihood and the scale of funding from this source.

Financing large-scale transport investments will require a mix of sources. It will most likely involve borrowing, either at a national or international level. This is particularly the case at the initial capital investment phases of infrastructure investments. However, where borrowing is involved, a clear funding stream should be determined from the outset, to ensure that the city can pay back the loan. For example, for transportation, fares collected from tickets could provide funds, although these alone are usually not a sufficient source.

Administratively, land is relatively easier to tax than more other mobile factors. Furthermore, given that the investments in the integrated multimodal public transport plan will likely be done by the government, it is fair that the land values that arise as a result should not accrue to private individuals.

Available funding mechanism

The city of Bandung has employed the PPP mechanism in the past. However, it was proceeded with lacking of expertise and cost estimation mistakes that led to a problematic management process. With PPPs it is important that the city has a clear funding stream linked to pay back the initial upfront capital investment from the private sector. In transportation systems, part of this may be through revenues generated by ticketing such as farebox recovery.

In some Asian and Latin American cities operations of transportation systems are fully covered by the user fees. However, this condition requires high ridership, which developing the risk of making the system unaffordable and therefore discourage use. For these reasons, a close collaboration with the involved stakeholders and the operator is required to achieve the most sustainable solution.

Moreover, evidence from other cities shows that, mostly, user fees only cover 35 to 65 per cent of the operations of any system. This is an important consideration for Bandung as it has previously considered farebox

recovery as a funding stream for PPPs. For example, in 2016 when the city was trying to undertake a PPP for the light-rail transit system, some of the finance was meant to be paid back through farebox recovery. However, the PPP failed as the associated recovery ratios could not be agreed between the public and private sectors.

The city should also strongly consider other financing mechanisms since the suitability of PPPs will vary on a project-to-project basis. However, all projects will require an associated financing and funding strategy to be implemented and sustained. Therefore, in making the decision on the form of contracting, the city government should evaluate the potential cost and benefits from each mode and select the one that maximises the benefits compared to the costs.

In terms of procurement, these are other modes that can be considered:

- Direct public provision – the city would take on all the aspects of financing and managing the project
- Contracting out – the city would pay a private company to design and build a project; the final project would then be transferred back to the city, which would have responsibility to run it

Strengthen Municipal Capacity for Land Value Capture and Financing Mechanisms

Evidence shows that transport investments can raise land values in surrounding areas; for example, estimates from Bogotá indicate a 15 to 20 per cent increase in nearby land values in response to BRT extensions.

Land value capture is an efficient instrument as land is in fixed supply and therefore taxing it should not have adverse effects on investments.

This land-value uplift can be taxed to fund the transport investments which created it in various ways, including:

- Imposing development fees to nearby landowners to fund the infrastructure built[36]
- Charging developers for additional density allowances near the transport link, which works particularly well for a ToD approach[37]
- Using tax increment financing to enable property taxes to recoup revenues from increasing property values, although evidence shows this has in general only had limited success[38]
- Buying up land around transport nodes in anticipation of land-value increase, to later sell off and fund the project

For land value capture to provide a potential financing and funding stream, enabling legislation and sufficient data needs to be available before the plans are in place before the investment has been made.

Cost-Benefit Analyses for Modal Choices, to Ensure Investments Reflect Value for Money

To ensure the investments required represent value for money for a city, cost-benefit analyses, which compare the monetised benefits and costs of a project, need to be undertaken. In this context, value for money aims to achieve a favourable balance between costs and quality (economy), outputs and inputs (efficiency) as well as ensuring the anticipated outcomes (effectiveness)[39].

This is particularly important for the integrated public system definition. Furthermore, it is important to note that cost-benefit analyses are also where aspects of sustainability as well as social justice should be weighed up. The anticipated benefits to consider include, for example, time and cost savings with respect to the commuter as well as wider impacts on the environment and health, through reduction on pollution or road accidents.

LEGAL CONSIDERATIONS

Integration Across all Relevant Government Institutions

Multiple levels of government have different authorities over various parts of transport planning, which often triggers overlapping jurisdiction and unclear mandates, making it difficult to coordinate. This complexity potentially generates major challenges for designing and implementing an integrated public transport system in Bandung. Therefore, effective coordination mechanisms, such as joint planning authorities, need to be set up.

Adequate Compensation for Compulsory Land Acquisition

Land acquisition by governments is sometimes necessary to be taken in an attempt to increase resilience capacity and create safer environments, or to improve land use efficiency through vital infrastructure projects or placement of large job-creating industries. Where possible, this land acquisition should be facilitated through voluntary market exchange; however, compulsory land acquisition shall also be justified if adequate compensation is given to those displaced.

The capacity-building programme should consider the necessary strategies for the inclusion of affected residents in nearby areas when compulsory land acquisition happens. If this option is not viable, adequate compensation mechanisms that ensure social integration and provision of livelihoods for displaced communities are needed.

Adequate compensation includes payment according to the land market value (before redevelopment projects are announced) as well as an amount to compensate the loss of social networks and disruption of livelihoods due to relocation.

Investment in legal and administrative capacity to run a smooth appeals process is also necessary to limit social unrest and to ensure land ownership rights are observed. Relocation areas should be well connected to avoid socio economic exclusion and incentivising informal settlement.

Participatory Planning can Help Understand the Different Requirements From a Diverse Consumer Group

The transport system of a city must provide service to the multiple needs from diverse sectors of the society. In order to do this, it is key to understand the specific needs of the potential stakeholders, including their income levels, where they will travel and at what times of the day this is likely to occur.

The provision of the aforementioned service can be done by involving as many of the relevant stakeholders as possible in a participatory planning process to ensure that the resulting plan addresses the stakeholders' requirements. A more participatory process from the outset will also have the additional benefit of ultimately generating support for the implementation of the plan.

Incorporating existing informal private operators

Integrated transport plans are more likely to succeed if the plans incorporate existing informal operators. On the other hand, failing to incorporate these existing informal operators can be a costly mistake – turning what could be a useful partner into a powerful opposition group.

Many cities that have ignored the integration of the existing operators have faced numerous challenges in implementing transport reform. For example, in Dar es Salaam, Tanzania, the resistance to a new BRT from informal transport operators contributed to a seven-year delay between design completion and the start of construction. This is because operators were concerned about lost profitability on key transport routes and the loss of employment of their drivers [40].

In Quito, Ecuador, informal operators were not included in the first BRT line in 1995, but difficulties in co-ordinating the new routes with feeder services led the government to include informal operators in the third line in 2005.

The integrated public transport system for Bandung should include a multi-stakeholder engagement process during its design and implementation. The ability to effectively incorporate informal transport operators depends not only on political will within government but also on the internal organisation of transport operators themselves. Where governments can collaborate with clearly defined and well-organised collectives, this can help to facilitate the co-ordinated shift in current practices required from current operators – for example redirecting current routes towards feeder routes or agreeing to trade in low-capacity minibuses for higher capacity buses.

Where existing operations are fragmented and competitive, such co-ordinated shifts of practice can be challenging. Therefore, understanding the incentives for how these cooperatives can be formed will also need to be considered as part of transport reform[41].

ENDNOTES

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27 As per Road Transport Law No. 22/2009.
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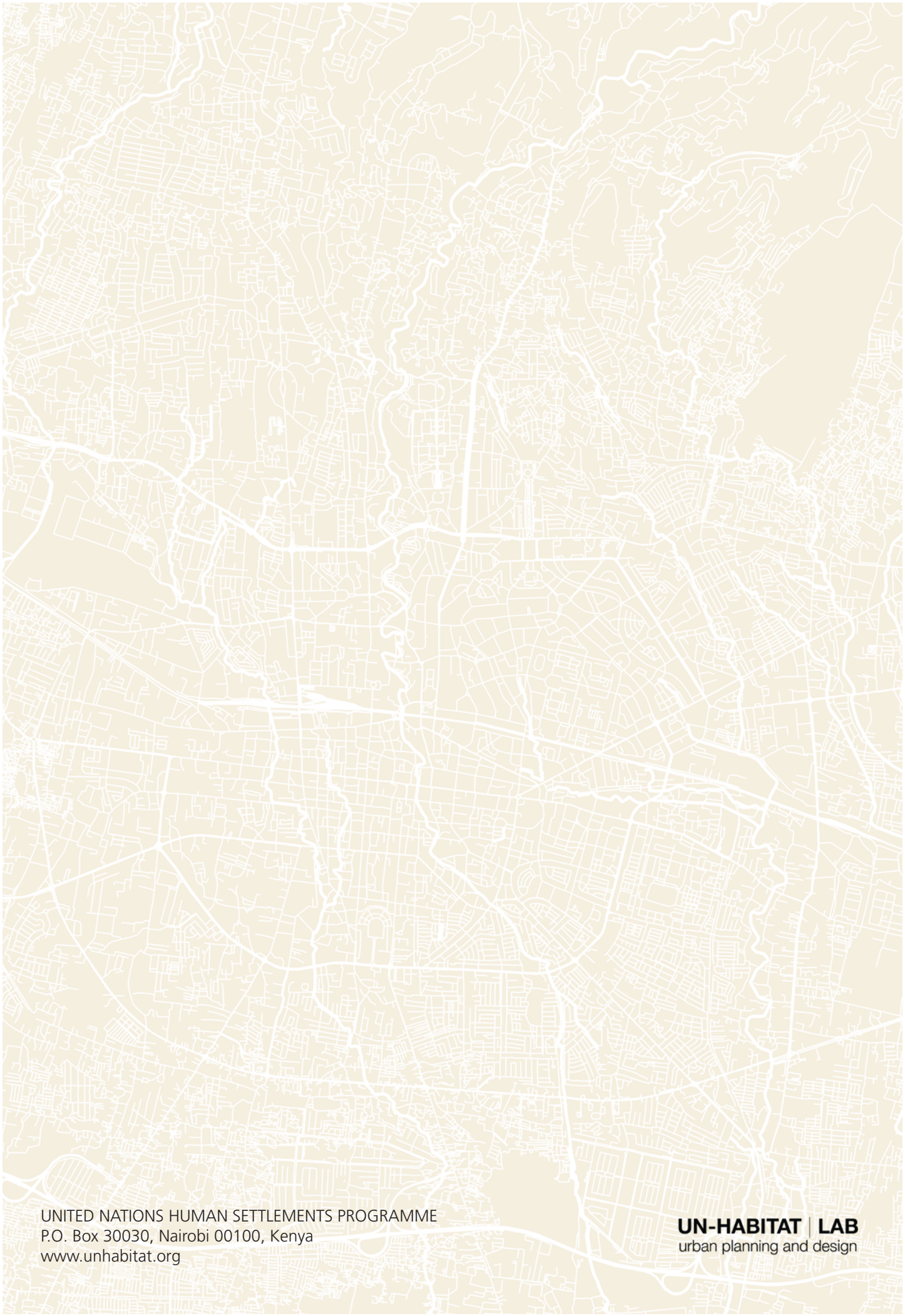

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