60th ISOCARP
1965 WORLD PLANNING CONGRESS
2024 DIAMOND ANNIVERSARY

ISOCARP

# CONFERENCE PROCEEDINGS

## 1st INTERNATIONAL CONFERENCE FOR NEW CITIES

## PLANNING NEW REGENERATIVE CITIES

10-13 SEPTEMBER | NEW CLARK CITY TARLAC | PHILIPPINES

**ISOCARP's 60th World Planning Congress**
**Diamond Anniversary Series**

**Proceedings of the**
**1st International Conference for New Cities**

1st International Conference for New Cities
**Planning New Regenerative Cities**
New Clark City, The Philippines, 10-13 September 2024

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#ISOCARP

ISOCARP - International Society of City and Regional Planners

1st International Conference for New Cities Proceedings

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# ABOUT THE CONFERENCE

## Introduction to the 1st International Conference for New Cities: Planning New Regenerative Cities

In a rapidly digitalizing world with a growing focus on the circular economy, expectations for sustainably humanised and healthy cities and environments are increasing. For urban and regional planners, there is an opportunity and professional responsibility to take a more robust approach to cities through new settlements or redevelopment strategies. Although coined 14 years ago by the World Future Council, a German non-profit foundation, regenerative cities are now more relevant to discuss or revisit, especially we are facing the triple planetary crisis and undergoing fast digital transformation. By reflecting on past, ongoing, and near-future city development efforts, we can enrich the collective knowledge and provide insights for navigating the future of urban planning.

In New Clark City, about 100km northwest of Manila's megalopolis in the Philippine Province of Tarlac, ISOCARP and the Local Organising Committee engaged the international planning community to explore the challenges and opportunities of planning for sustainable new cities. These cities exemplify health, inclusivity, compactness, regeneration, and integration with circular economies, carbon-neutral energy systems, and nature-based solutions. The discussions fostered a deeper understanding of sustainable connectivity and complementarity with existing cities in the region, particularly Metro Manila.

A particular focus was to explore New Clark City as inspiring example of regenerating a former military base – aspiring to new concepts of brownfield development. The conference will also explore climate adaptive resilience planning approaches for new (and existing) cities vulnerable to climate change – from drought to floods – and natural risks such as volcanic and seismic activity. Lastly, the conference will highlight the cultural diversity of the host region, inspiring a blend of past traditions, present practices and future innovations into smart new city planning and development. This includes honoring the indigenous Aeta population, who historically stewarded areas now part of New Clark City's development zone.

While the conference location is hinting to a regional focus on new city development in the fast-urbanising Asian part of the Global South, ISOCARP's 60th World Planning Congress Diamond Anniversary Series ensured a historical perspective by connecting New Clark City with well-known historic city planning concepts such as Ebenezer Howard's Garden City (1902). Additionally, it reflected on the latest planning developments in and around the medieval town of Siena, hosting the grand finale of the 60th World Planning Congress Diamond Anniversary Series.

## ABOUT THE TRACKS

### Track 1: New City Planning & Development: Navigating the Future

With the projection of a rapid increase in urban population, the expansion of cities will become inevitable, and metropolitan management will be key to sustainability. One of the major challenges will be ensuring that cities work collaboratively and coordinate effectively to implement creative financing strategies, land management, infrastructure finance, and incentive policies amidst the converging challenges of climate change, technological disruptions, and demographic shifts. This track explores papers and presentations that highlight cases of strong collaboration between cities and municipalities, enabling private sector strategic investments, and demonstrating effective metropolitan action. These examples can serve as lessons for other cities and metropolises to emulate and replicate.


### Track 2: Brownfield Urban Planning & Development: Vibrant New City Density

The changes in urban property trends due to the COVID-19 pandemic and the decarbonization strategy are crucial for shaping future urban development. Developing energy-efficient infrastructure and sustainable buildings is a critical priority for new cities. Is high-rise development still relevant to planning new townships? Are carbon-neutral cities manageable? How can seamless integration between new and existing cities be achieved? These are the key questions for this track.




### Track 3: Climate Adaptive and Resilient (New) Cities: Advancing Adaptive Resource Reutilization

Integrating nature into the planning of new cities is both essential and urgent. The Kunming-Montreal Global Biodiversity Framework underscores this urgency. Alongside nature-based solutions, topics such as circular and regenerative energy systems, effective waste management, and sustainable practices are gaining prominence. Key issues for this track also include food security, human security—particularly addressing the potential displacement of populations—and innovative approaches to recycling and waste management.

## Track 4: New Cities and Digital Economy: Smart Circular Cities and Neighbourhoods

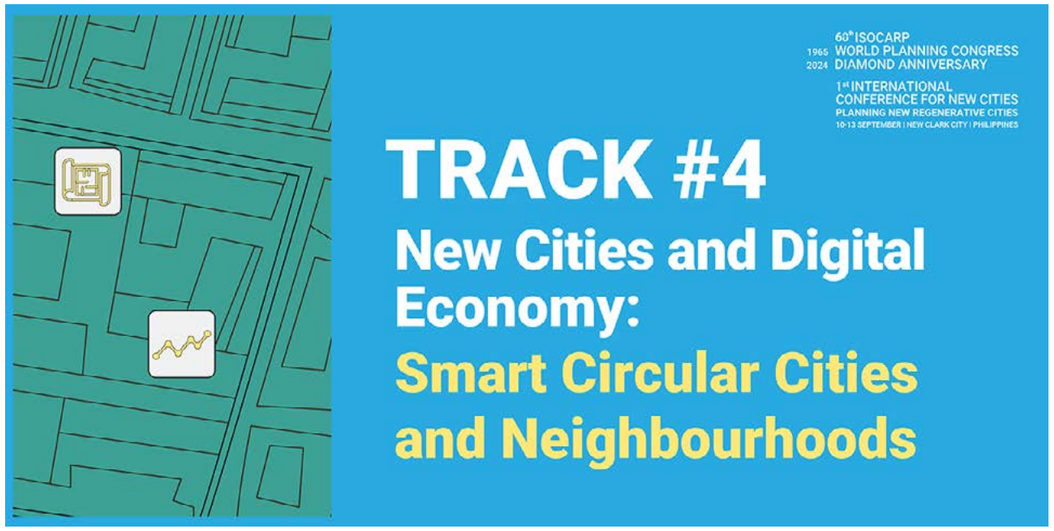
The fourth track aimed to explore the digital economy as the backbone of new city development due to expansive digital infrastructures and the new dominance of Generation Z, who are more exposed to and comfortable with digital technologies. In reality though, the session (singular) focused more on the impact of using digital technologies in urban planning process – both in the planner's office and at street level.

It must be noted that the fact that this Track only attracted enough quality abstracts for one session, suggests that some work is needed to be better integrate digital technologies into the planning process. Planners must be more emphatic in our embrace of new technologies (or risk being overshadowed by sister disciplines) even as we remain committed to human-centred approaches.

**Findings of the session at New Clark City highlight the following conclusions:**

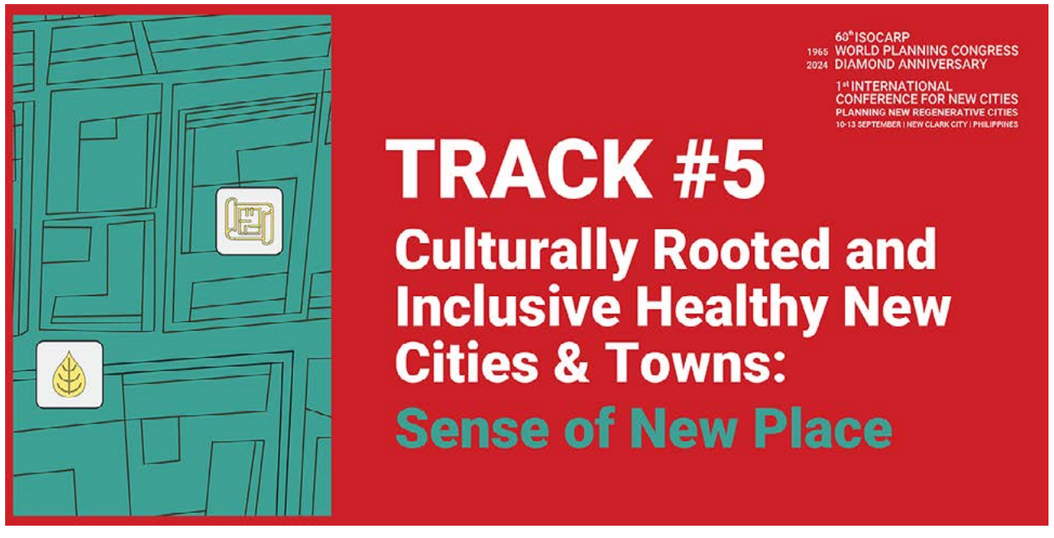
- **A truly regenerative (and therefore resilient) city must be able to withstand different invisible challenges.** It should be able to adapt to shifting land use and movement patterns brought on by the introduction of new technologies (e.g., e-hailing) and/or tech-induced phenomena (e.g., mass working from home). Planners should consider the implications of edge scenarios when testing the resilience of land use patterns and mobility networks.
- **Technology in general, and e-governance in particular, are key contributors promoting accountability and thus positive outcomes in planning interventions.** For example, its use can lead to more equitable municipal healthcare outcomes and facilitate greater accountability through improved transparency, efficiency and citizen participation. However, technology is not a panacea, and planners must be strategic in its use.
- **Implementing technology-driven approaches in urban planning processes can be cost effective and impactful.** The application of a Smart Digital City Model is one approach which can be implemented at a relatively modest cost for scenario development and assessment.
- **(re)generative AI is your friend but hardly a replacement for real-human connection:** Tech-driven approaches must be balanced with more traditional tools to promote economically vibrant, socially inclusive and environmentally friendly cities. Technology should be used as a tool in planning that liberates planners to focus on human-centred approaches and designs. The learning curve can be steep, but payoff in efficiency and efficacy is equally so.






## Track 5: Culturally Rooted and Inclusive Healthy New Cities & Towns: Sense of New Place

One strategy is to bring everyone closer together into the new city planning. Culturally rooted wellbeing and livability can be considered as the key performance indicators for new cities. Promoting healthier lifestyles through the new structure of cities—including more sports and fitness facilities, active and non-motorised mobility, and adequate open spaces and natural areas—is a critical priority for new towns.



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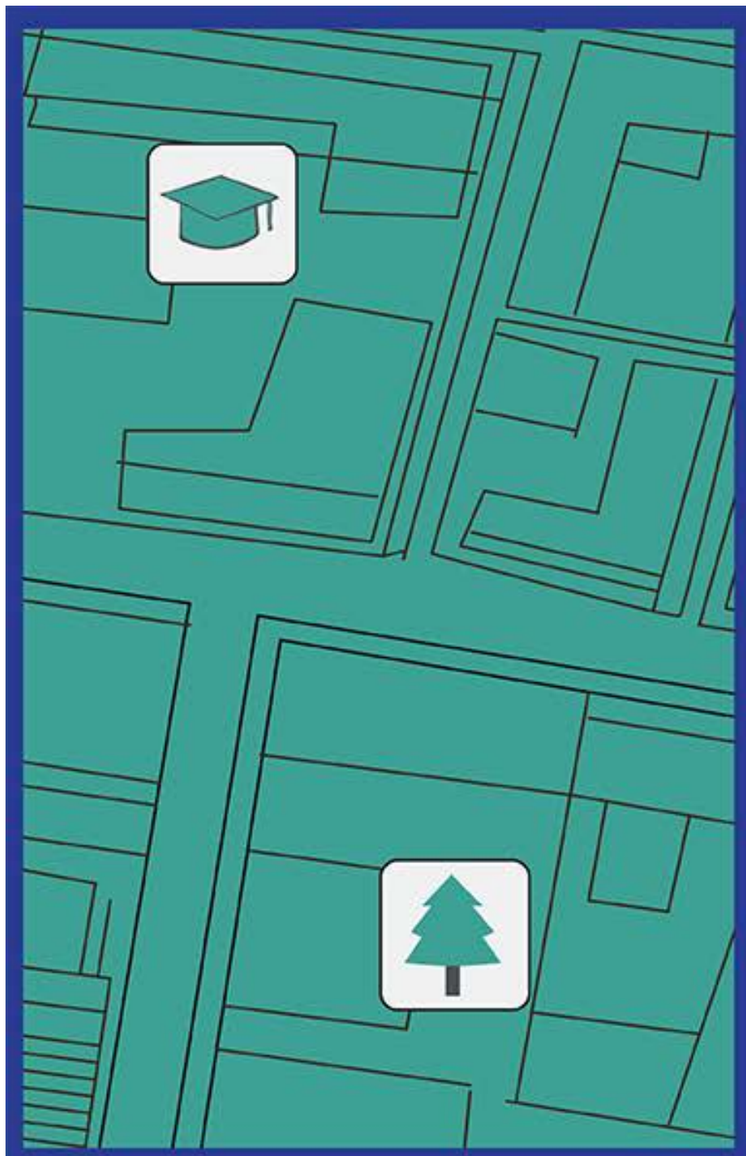

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# TRACK #1
# New City Planning & Development:
# Navigating the Future

# TRACK 1 PAPERS

## TRACK 1: New City Planning & Development: Navigating the Future

### 1.1 Hacking Metros and Cities Towards Sustainability



### 1.2 Sustainable Buildings and Transport



### 1.3 Sustainable Transport and Mega Projects

*Research Paper*

# Role of Stakeholders in Applying Policies for Creating Regenerative Cities

## Indonesia's Study Case

Azka Gunawan HANIFA, Indonesia

**Abstract**

*Cities now face the immense challenge of becoming truly regenerative. This involves not only being resource-efficient and low-carbon-emitting but also actively enhancing, rather than degrading, the ecosystem services they depend on beyond their boundaries. However, the decentralization process, though aimed at empowering local governments, has sometimes led to fragmented and uncoordinated urban planning, complicating efforts to implement regenerative city strategies. Metropolitan areas in Indonesia, particularly the Jakarta Metropolitan Area, grapple with significant challenges due to complex institutional structures and governance issues. This study will identify the key stakeholders and clarify their roles and responsibilities within the Jakarta Metropolitan Area, the largest in Indonesia. Current regulations are known to lack substantive integration of regenerative city concepts into roles and mechanisms. Establishing a new working group focused on regenerative cities and raising stakeholder awareness of this concept are critical steps. The author aims to contribute to the growing knowledge on regenerative cities and offer practical insights for policymakers, urban planners, and stakeholders engaged in urban development in Indonesia.*

**Keywords**

*Regenerative Cities Policies, Metropolitan Area, Indonesia, Jakarta*

## 1. Introduction

### 1.1. Background Research

The current challenge in developing modern cities extends beyond merely creating sustainable cities to creating truly regenerative ones. Cities should actively enhance rather than degrade the ecosystem services they rely on from outside their boundaries, not only ensuring that it become resource-efficient and low carbon-emitting. The concept of regenerative cities takes a step further by addressing the relationship between urban areas and their hinterlands, as well as with distant territories that provide essential resources like water, food, and other vital materials. It emphasizes the need to rejuvenate the landscapes that cities depend on, incorporating measures to enhance their capacity to absorb carbon emissions.

Metropolitan regions in Indonesia has a contrasty, where local egocentrism caused by decentralization has brought negative consequences for institutions of governance. The decentralization process that intended to empower local governments, has led to fragmented and uncoordinated efforts of urban planning. This fragmentation as well as other institutional problems, complicates the implementation of comprehensive and integrated strategies necessary for developing cities, especially the truly regenerative one. The Jakarta





Metropolitan Area (JMA), as the biggest metropolitan area in Indonesia, is also face significant challenges due to these complex institutional structures and governance issues.

It is essential to identify and engage a wide range stakeholder in metropolitan area to implement the concept of regenerative cities effectively. Each stakeholder has a unique role in contribute and support the positive transition towards regenerative cities development. This study will emphasis to identify the stakeholders involved and define their roles and responsibilities to actualize the regenerative cities concept in JMA.

In the first part, the study will explain the context of JMA as the case study and the policies that occurs related to the regenerative cities concept, as well as research objectives and methodologies. The second part will explain the result of the study by breaking one objective into one sub-part to clarify the result. And finally, author will also explain the critical review, proposed future studies, and broader project impact after this study.

### 1.2. Introduction to Case Study

The former capital city of Indonesia as well as the business hub, Jakarta, is the core city of the largest metropolitan area in the country, known as Jakarta Metropolitan Area (JMA). The city has the largest population and economic activity, making it appointed as a part of the National Strategic Area (*Kawasan Strategis Nasional*) which includes other cities and regions that collectively referred to as Jabodetabek-Punjur that consisted of Jakarta, Bogor, Depok, Tangerang, Bekasi, Puncak and Cianjur. After years, Jakarta has faced various development challenges for example socio-economic, environmental, and other issues.

Indonesian government officially released Presidential Regulation No. 60 of 2020 to clarify urban planning method in the Jabodetabek-Punjur Metropolitan Area, that also emphasizes the role of the Urban Planning Coordinating Team (*Tim Koordinasi Penataan Ruang*) as detailed in Ministry of Agrarian Affairs and Spatial Planning Regulation No. 22 of 2020 that released at the same year.

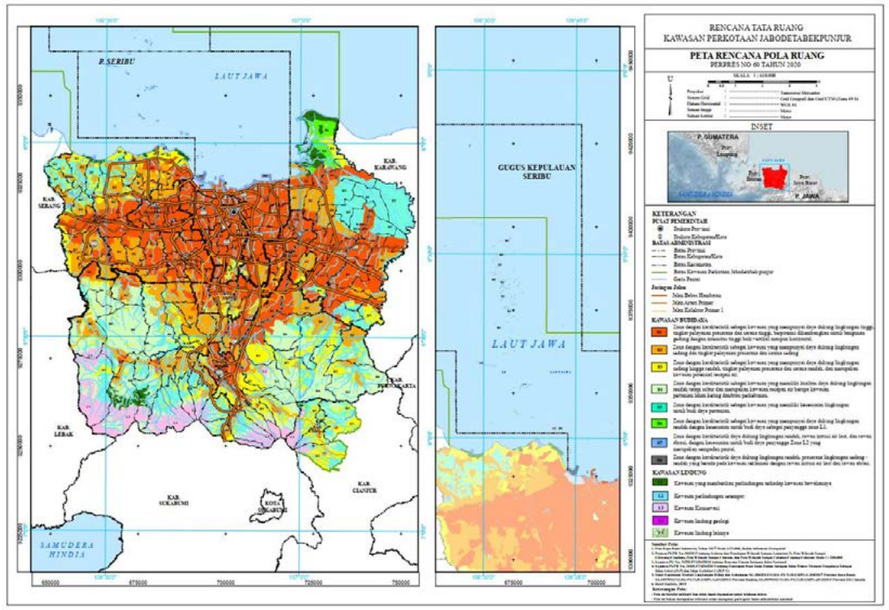


**Figure 1. Jakarta Metropolitan Area's Spatial Map. Source: Presidential Regulation No. 60 of 2020**

Presidential Regulation No. 60 of 2020 consists of Core Urban Area and the Surrounding Urban Area that form the Metropolitan Area. This regulation, which serves as the JMA Urban Area Spatial Plan, functions as a tool for operationalizing the National Spatial Plan and coordinating the implementation of development in the JMA. It provides a comprehensive guideline for various aspects of development and spatial management, including the preparation of development plans, the utilization and control of space. To ensure harmony between sectors and area, the regulation is also promoting the integration, interconnectedness, and balanced development across Regency/City regions. In addition, it guides the determination of locations and functions of space for investment and offers direction for spatial planning at both the provincial and regency/city levels. Furthermore, the regulation also focuses on the integration of its development plans with surrounding areas to address the management of the JMA. It highlights the importance of aligning development with the region's environmental carrying capacity while also ensure the control of pollution and environmental damage.

The comprehensive goal of spatial planning in the JMA is to establish it as an Urban Area that serves as an economic hub on an international, national, and regional scale, with integration based on environmental sustainability and coordinated area management across different areas. To support this goal, the government released the Ministry of Agrarian Affairs and Spatial Planning Regulation No. 22 of 2020, which emphasizes the role of the Urban Planning Coordinating Team (*Tim Koordinasi Penataan Ruang*) as an effort to implement JMA's spatial plan as a National Strategic Area. Related to the purpose, the institution's coordination mechanism carried out by the Minister of Planning, relevant ministers and heads of institutions, Governors, and Regents/Mayors, with full support from the Coordination Team.

### 1.3. Regenerative Cities Policies

As previously stated, the truly regenerative concept is to ensure that cities not only become resource-efficient and low-carbon, but also actively improve rather than degrade the ecosystem services they rely on from their surrounding regions. Various technical and management solutions for this goal already exist, but progress in implementation for this concept has been steady and ineffective.

The idea of regenerative cities goes even further by addressing the connections between cities and areas beyond their borders, and more distant areas that supply essential resources like water, food, and timber to the cities. It is important to restore and keep the landscapes in the areas which cities depend on, including enhancing their ability to absorb carbon emissions. Building a restorative relationship between cities, their surrounding areas, and the wider world requires exploring new opportunities in various sector such as finance, technology, policy, and business practices.

In the context of metropolitan areas, the concept is extremely important as it emphasizes the mutuality between different regions and making it highly relevant to this study's main idea. Adopting regenerative cities as a core principle for urban development, will open significant opportunities to enhance both social and economic well-being of the local people.






**Figure 2. Regenerative Cities Policies. Source: Girardet, 2010**

Several key policies acting as a support for the implementation of the regenerative cities concept. As seen in the figure, policies mostly focusing on sustainability across different sectors. First, energy sufficiency is addressed through the adoption of the 2000 Watt Society concept that promoting resource-efficient building practices via modified building codes. In 'solar city' development as the second policy, should emphasized through national policy that mandate prioritizes feed-in legislation for renewable energy systems by also allowing electricity sales at advantageous rates while supporting renewable energy as a new manufacturing industry, and by enabling policies for energy development in urban hinterlands. Water security policy as the third policy, is aim to balance urban, agricultural, and commercial water uses, promoting water efficiency, rainwater collection, and recycling wastewater.

The fourth policy highlighting zero waste initiatives implementation to encourage enterprises to process organic waste into soil-enhancing materials, make nutrient capture central to waste management, and create new green businesses around cost-effective waste reprocessing. The local food policy supports peri-urban agriculture, community-supported farming, and the use of composted bio-waste for urban farming. The sixth policy is sustainable transport policy that include the creation of pedestrian zones, a dedicated cycle network, improved public transport, and the promotion of electric vehicles and car-sharing systems. Nature conservation efforts focus on tree planting for biodiversity, carbon sequestration, and the restoration of forests and wetlands. Green business policy's growth is driven by government procurement, resource-efficient business practices, the creation of green business incubators, and an emphasis on environmental resilience. The last policy foster a culture of restorative urbanization, using various involvement of global networks, local expertise, education, media reporting, and public to promote eco-restoration and ensure the development of regenerative cities.

### 1.4. Research Objectives

Building on the background previously discussed, this research aims to achieve two key objectives.

1. Identify the key stakeholders involved in metropolitan urban development in Indonesia, using Jakarta Metropolitan Area (JMA) as a case study
2. Analyze the roles of stakeholders identified in the first objective, in fostering the creation of regenerative cities

### 1.5. Research and Data Collection Methods

To achieve the research objectives, a combination of literature review and document analysis will be used for data collection, followed by qualitative analysis techniques, specifically content analysis and

stakeholder analysis to enhance the findings. The literature review, conducted as a systematic examination of existing academic literature, policy papers, and reports, will provide a theoretical foundation and help identify key themes and gaps in the current research landscape. Meanwhile document analysis will focus on examining relevant policy documents and government reports to unveil references to stakeholder roles, interactions, and their impacts on urban development. This comprehensive approach will ensure a thorough understanding of both the theoretical and practical dimensions of the topic.

## 2. Project Result

### 2.1. Objective One: Identify The Key Stakeholders Involved in Metropolitan Urban Planning in Indonesia

In order to address the first objective, Ministry Regulation No. 22 of 2020 has been analyzed to categorize the stakeholders involved in metropolitan urban planning and development in the Jabodetabek Metropolitan Area (JMA) into four groups: the Coordination Team, the Implementation Team, the Project Management Officer, and the Working Groups. The coordination team is led by Minister of Agrarian Affairs and Spatial Planning, with Minister of National Development Planning and Minister of Home Affairs serving as deputy chairs. This team includes representatives from every level of government, encompassing both Central and Local Government. The Central Government comprises nine ministries and institutions focusing on finance, public works and housing, transportation, and national security. While the Local Government is represented by the three provincial-level governments. These provinces represented by the Person in Charge of each administrative area, led by the Governor of Banten, Governor of Jakarta, and Governor of West Java, with nine regent/city-level relevant Regents/Mayors as the members.

The implementation team is chaired by the Director General of Spatial Planning, Ministry of Agrarian Affairs and Spatial Planning as the chair with the Regional Secretary as the deputy chair. Its members include officials from various ministries and institutions concerned with economic affairs, national development planning, cabinet secretariat, home affairs, finance, public housing, and national disaster management. Unlike the Coordination Team, which is led by the top leaders of each government institution, the Implementation Team is headed by officials one level below the highest level leader of the institution, often called as director generals and deputies.

The Coordination Team addresses six key issues that considered important and urgent within the JMA, and each issues is managed by specific working group (WG). These groups focus on Flood Management, Clean Water Provision, Sanitation and Waste Management, Incentives and Disincentives, Transportation, Spatial Planning and Land Control, and Coastal Area and North Coast Development. Each WG is led by officials one level below the highest level leader of the institution, similar to the structure of the Implementation Team, with director generals and deputies serving as leaders of these working groups. Composition of the Spatial Planning Coordination Team is presented on the figure below.

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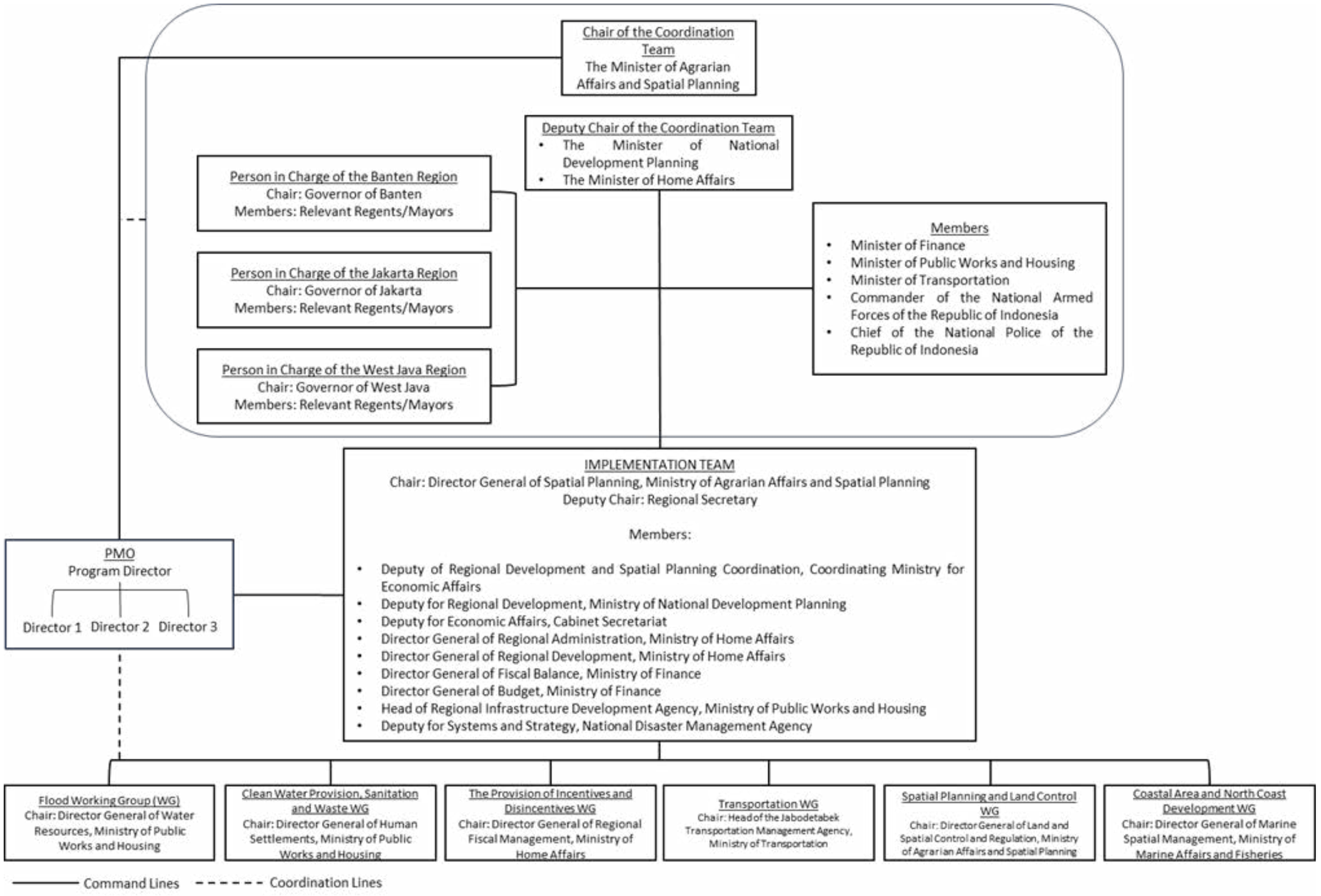


**Figure 3. Composition of The Spatial Planning Coordination Team. Source: Ministry Regulation of Agrarian Affairs and Spatial Planning No. 22/2020, Translated by Author**



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The author defines the Coordination Team, highlighted with an orange box in the figure, as the head of the entire planning and implementation structure. This team plays a role in supervise the coordination of metropolitan planning efforts, solving critical issues, and establishing a strong monitoring and evaluation system. As the guiding body, the Coordination Team ensures that the various aspects of urban planning, such as sectoral integration and cross-regional cooperation, function smoothly. Their responsibilities span from developing strategies to ensuring that the broader goals of spatial planning are met efficiently. Additionally, they work to synchronize policies, budgets, and action plans across different governmental levels and institutions to ensure cohesive progress toward urban development goals. Their full set of responsibilities includes the following:

1. Coordinating the implementation of spatial planning across sectors, regions, and stakeholders.
2. Leading the resolution of strategic issues such as flooding, raw water availability, sanitation, waste management, coastal and northern coastline management, transportation, and the relocation of the national capital.
3. Coordinating the creation of action plans and aligning the programs and budgets of relevant ministries, agencies, and local governments.
4. Establishing incentive and disincentive mechanisms for monitoring and ensuring compliance with spatial planning.
5. Overseeing the evaluation of programs and recommending adjustments to resource allocations and budgets.

The second team which is the Implementation Team highlighted with a green box, while more technical in its approach, primarily operates at the policy level. It translates the strategies and policies developed by the Coordination Team into actionable tasks and monitors their effectiveness. Although their focus is on policy, they are also responsible for ensuring that action plans are executed, making them a bridge between strategic planning and practical implementation. Their roles include:

1. Implementing strategies and general policies for spatial planning.
2. Monitoring and evaluating the effectiveness of these strategies, including program and budget alignment.
3. Executing the established action plans.
4. Providing recommendations for resolving key strategic issues.
5. Performing other related tasks to support urban development efforts.
6. Enhancing the capacity of personnel involved in spatial planning and implementation.

The Project Management Officer (PMO) that highlighted with a yellow box, serving as the daily manager of the team, is responsible for overseeing the alignment of programs and budgets with policy directives, ensuring smooth operation and problem-solving on a day-to-day basis. Their tasks include:

1. Ensuring program and budget alignment by identifying and recommending necessary adjustments and consolidating work plans with policy directives.
2. Addressing bottlenecks and resolving problems by tracking work plan fulfillment, assisting in issue identification, supporting problem resolution, and developing Standard Operating Procedures (SOPs).
3. Providing innovative recommendations related to governance, regulations, funding sources, and the use of incentives or disincentives to encourage better policy implementation.





Lastly, the Working Groups (WGs) highlighted with a purple box, are tasked with handling technical aspects of the action plans. They provide the expertise needed to carry out specific initiatives, as well as handle issue resolution at the technical level. Their roles are included:

1. Coordinating the implementation of action plans and resolving technical issues.
2. Preparing proposals related to regulations, policies, financing, management, development, technical facilities, and carrying out evaluation and reporting.

Each of these groups plays a vital role in ensuring that the planning, implementation, and evaluation processes for metropolitan urban development in the JMA are conducted efficiently and effectively. The visual of grouping is presented on the figure below.

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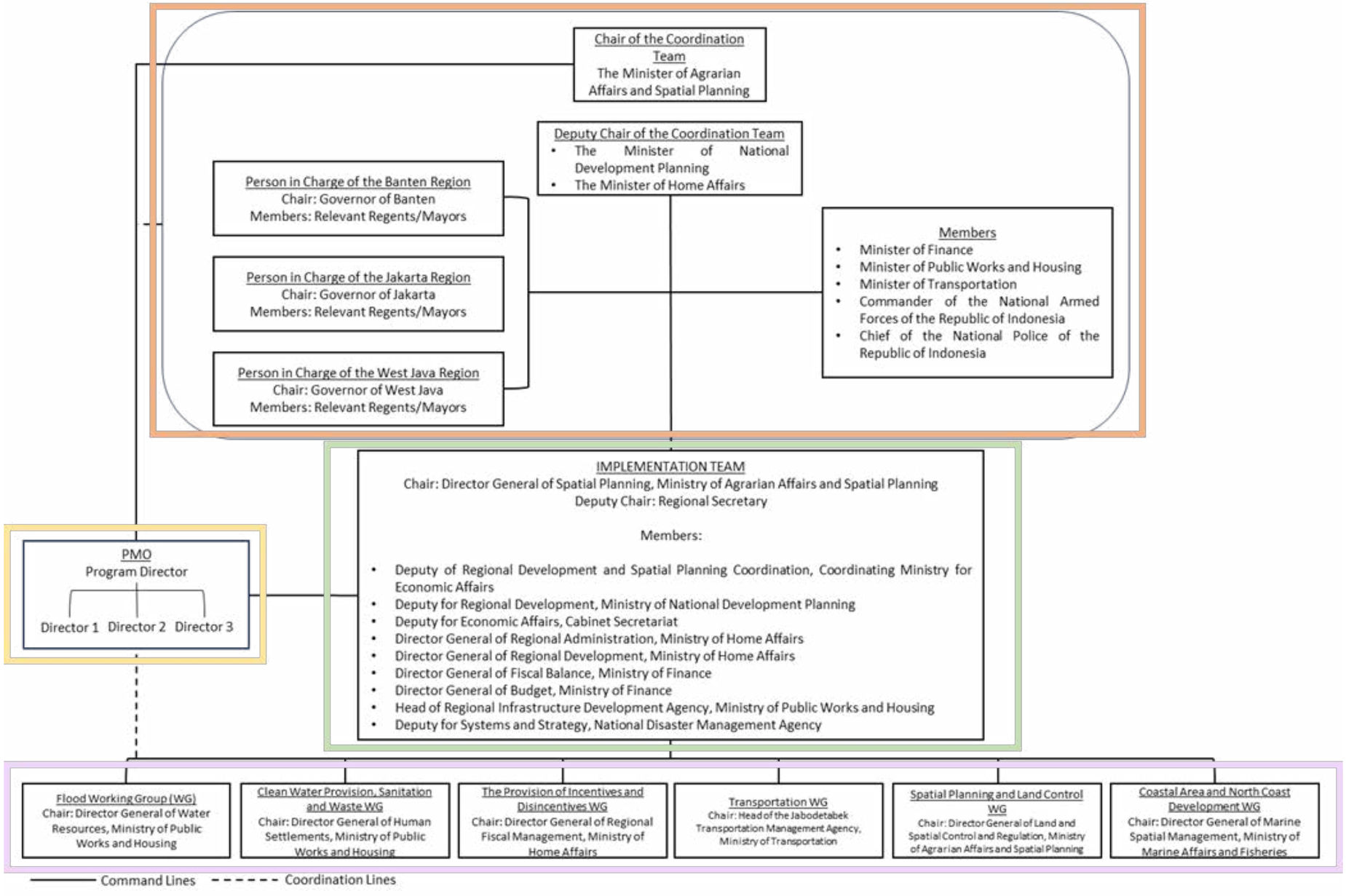


**Figure 4. Groups of The Spatial Planning Coordination Team. Source: Analysis Result, 2024**



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## 2.2. Objective Two: Analyze The Roles of These Stakeholders In Fostering The Creation of Regenerative Cities

For the second objective, the author successfully combined the stakeholder analysis results from the first objective with the regenerative cities concept outlined in Section 1.3 to define the roles for implementing this concept within JMA's governance system, as detailed in the attachment. The method involved integrating the managerial tasks of each team with the substantive principles of regenerative cities. The results are explained in the Table 1.

**Table 1. Roles of Stakeholders in Fostering The Creation of Regenerative CIties**

| No. | Group | Roles |
|---|---|---|
| 1. | Coordination team | 1. Coordinate the alignment of the regenerative cities concept as a strategic and priority policy in spatial planning for the JMA.<br>2. Coordinate the resolution of strategic issues related to programs associated with regenerative cities.<br>3. Coordinate the integration of the regenerative cities concept into action plans.<br>4. Coordinate the synchronization of programs across relevant entities concerning regenerative cities.<br>5. Coordinate the evaluation of programs, reallocation of resources, and budget recommendations related to regenerative cities initiatives.<br>6. Coordinate the formulation and establishment of incentive and disincentive mechanisms for monitoring spatial planning related to regenerative cities programs. |
| 2. | Implementation Team | 1. Implement strategies and general policies related to the regenerative cities.<br>2. Provide recommendations for resolving strategic issues related to the regenerative cities.<br>3. Develop and execute action plans related to the regenerative cities.<br>4. Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization.<br>5. Enhance the capacity of personnel in understanding and applying methods.<br>6. Implement incentive and disincentive measures. |
| 3. | Project Management Officer | 1. Align programs and budgets by identifying and recommending alignment needs, consolidating work plans with policy directives related to regenerative cities.<br>2. Address bottlenecks by tracking the fulfillment of work plans, inventorying issues, providing support for |





| No. | Group | Roles |
|---|---|---|
| | | problem resolution, assisting in study preparation, and developing SOPs related to regenerative cities.<br>3. Foster innovation by providing recommendations on governance, regulations, funding sources, and incentives and disincentives related to regenerative cities. |

**Source: Analysis Results, 2024**

The involvement of each WG is detailed in the Table 2. The Provision of Incentives and Disincentives WG, along with the Spatial Planning and Land Control WG, show the strongest alignment with the policies outlined in the regenerative cities concept, as they are closely tied to multiple policy areas. In contrast, the Flood Control WG, Transportation WG, and Coastal Area and North Coast Development WG have a weaker connection to the concept, with each supporting only one related policy.

**Table 2. Involvement of Working Group Related to Regenerative Cities Policies**

| Regenerative Cities Concept | Flood Control WG | Clean Water Provision, Sanitation and Waste WG | The Provision of Incentives and Disincentives WG | Transportation WG | Spatial Planning and Land Control WG | Coastal Area and North Coast Development WG |
|---|---|---|---|---|---|---|
| Energy Sufficiency | | | ✓ | | ✓ | |
| Solar City Development | | | | | | |
| Water Security | | ✓ | | | | |
| Implementing Zero Waste | | ✓ | | | | |
| Local Food | | | | | | |
| Sustainable Transport | | | | ✓ | | |
| Nature and The City | ✓ | | | | | ✓ |
| Green Business | | | | | | |
| A Culture of Restorative Urbanisation | | | | | | |

**Source: Analysis Results, 2024**

The roles for each WG is the most technical one, explained in the table 3.

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Table 3. Roles of Working Groups

| No. | Stakeholders | Working Group (WG) | | | | | |
|---|---|---|---|---|---|---|---|
| | Main Function | Implementation Team's Support Unit | | | | | |
| | Regenerative Cities Concept | Flood Control WG | Clean Water Provision, Sanitation and Waste WG | The Provision of Incentives and Disincentives WG | Transportation WG | Spatial Planning and Land Control WG | Coastal Area and North Coast Development WG |
| 1 | **Energy Sufficiency** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the operationalization of the 2000 Watt Society concept and resource-efficient building. | | Coordinate spatial planning control in the implementation of the 2000 Watt Society concept and resource-efficient building within the action plan and resolution of issues at the technical level. | |
| 2 | **Solar City' Development** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the development of solar city concept. | | Coordinate spatial planning control in the implementation of solar city development within the action plan and resolution of issues at the technical level. | |


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| No. | Stakeholders | Working Group (WG) | | | | | |
|---|---|---|---|---|---|---|---|
| | **Main Function** | Implementation Team's Support Unit | | | | | |
| | **Regenerative Cities Concept** | Flood Control WG | Clean Water Provision, Sanitation and Waste WG | The Provision of Incentives and Disincentives WG | Transportation WG | Spatial Planning and Land Control WG | Coastal Area and North Coast Development WG |
| 3 | **Water Security** | | Coordinate, evaluate, and report on encouraging water efficiency and rainwater collection in households and businesses within the action plan. | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs related to water security. | | Coordinate spatial planning control in the implementation of programs to secure water within the action plan and resolution of issues at the technical level. | |
| 4 | **Implementing Zero Waste** | | Coordinate, evaluate, and report on the implementation of encouraging the zero waste concept within the action plan. | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs related to zero waste concept. | | Coordinate spatial planning control in the implementation of programs to secure water within the action plan and resolution of issues at the technical level. | |



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| No. | Stakeholders | Working Group (WG) | | | | | |
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| | **Regenerative Cities Concept** | Flood Control WG | Clean Water Provision, Sanitation and Waste WG | The Provision of Incentives and Disincentives WG | Transportation WG | Spatial Planning and Land Control WG | Coastal Area and North Coast Development WG |
| 5 | **Local Food** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that encourage people to consume local food. | | Coordinate spatial planning control in the implementation of programs to encourage people to consume local food within the action plan and resolution of issues at the technical level. | |
| 6 | **Sustainable Transport** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that implement sustainable transport. | Coordinate, evaluate, and report on efforts to make pedestrian zones widespread, create a comprehensive network of dedicated cycle lanes, encourage public transport through its attractiveness, frequency, and flexibility, as well as promote new electric and fuel cell vehicle technology, and car-sharing within the action plan. | Coordinate spatial planning control in the implementation of programs related to sustainable transport within the action plan and resolution of issues at the technical level. | |



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| 7 | **Nature and The City** | Coordinate, evaluate, and report on the implementation of encouraging tree planting and encouraging people to help restore forests and wetlands in remote areas within the action plan. | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that preserving urban-nature. | | Coordinate spatial planning control in the implementation of programs to preserve urban nature within the action plan and resolution of issues at the technical level. | Coordinate, evaluate, and report on the implementation of encouraging tree planting and encouraging people to help restore forests and wetlands in remote areas within the action plan. |
| 8 | **Green Business** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting,in implementing green business concept. | | Coordinate spatial planning control in the implementation of programs related to the green business concept within the action plan and resolution of issues at the technical level. | |



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| 9 | **A Culture of Restorative Urbanisation** | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting in developing restorative urbanisation. | | Coordinate spatial planning control in the implementation of programs related to developing restorative urbanization within the action plan and resolution of issues at the technical level. | |

**Source: Analysis Results, 2024**



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## 3. Conclusion

### 3.1. Critical Review

In this part, author will explain some critical review related to the result of the study. As claimed by the Ministry of Agrarian Affairs and Spatial Planning Regulation No. 22 of 2020, each working group is required to pointed a chief and a vice chief (Article 9, paragraph 1). Unfortunately, the regulation does not specify the composition of the members within these working groups and make it difficult to implement by the user. Furthermore, several key derivative regulations mandated by the regulation have yet to be established. These include the working procedures of the implementation team (Article 7, paragraph 4), the organizational structure and standard operating procedures of the Project Management Officer (PMO) (Article 8, paragraph 3), and the organizational structure and standard operating procedures of the working groups (Article 9, paragraph 4). Additionally, Regulation No. 22 of 2020 specify that other spatial planning coordination institutions must align their activities with the provisions explained in this regulation (Article 13). Another important key to address it is required to clarify the cooperation mechanisms with another metropolitan institutions in JMA, which is the Development Cooperation Agency (*Badan Kerja Sama Pembangunan*/BKSP). It is important to formulate derivative regulations that clearly define coordination mechanisms with existing institutions related to urban planning and other relevant agencies.

While the regulation primarily outlines the roles and mechanisms of key stakeholders, substantive issues such as the concept of regenerative cities have not yet been implemented into these roles and frameworks. The author has identified the necessity of establishing new working groups specifically focused on renewable energy, in alignment with Policy 1 on Energy Sufficiency and Policy 2 on Solar City Development stated by the concept. Additionally, another working group should be created to address agricultural and food-related issues, particularly in relation to Policy 5 on Local Food. In general, the JMA coordination team needs to enhance its understanding of the regenerative cities concept and integrate these policies into their action plans more concretely.

### 3.2. Proposed Future Studies

Future studies should focus on evaluating the effectiveness of the Coordination Team's performance in implementing metropolitan planning and development strategies. This evaluation would provide insights into the team's ability to coordinate across multiple levels of government, address key urban challenges, and execute spatial planning goals. Moreover, the regenerative concept should be implented into the evaluation’s substance to enrich the result. Additionally, future research should examine the coordination mechanisms with institutions beyond the government, such as private sectors, civil society, and non-governmental organizations. By understanding how these external actors interact with government-led efforts will help identify opportunities for improved collaboration and more comprehensive urban governance approaches in the future.

### 3.2. Broader Project Impact

The author hope that this study will contribute to enhancing stakeholder engagement in the formulation of policies related to regenerative cities. Strengthening stakeholder involvement can result in more effective coordination between public and private institutions, fostering a more cohesive and integrated approach to urban planning and development. Furthermore, the study aims to enrich the growing body of knowledge on regenerative cities in metropolitan study especially Jakarta Metropolitan Area, offering practical insights for policymakers, urban planners, and stakeholders involved in urban development in Indonesia. By bridging theoretical concepts with real-world applications, this research could serve as a valuable resource for shaping sustainable urban futures.





## 4. References

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## ATTACHMENT 1.

## Complete Analysis Result

| No. | Stakeholders | Coordination Team | Implementation Team | Project Management Officer | Working Group (WG) | | | | | |
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| | Main Function | Decision Makers | Technical Direction | Daily Operations Manager | Implementation Team's Support Unit | | | | | |
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| 1 | **Energy Sufficiency** | (1) Coordinate the alignment of the regenerative cities concept as a strategic and priority policy in spatial planning for the Jabodetabekpunjur metropolitan area.<br>(2) Coordinate the resolution of strategic issues related to programs associated with regenerative cities.<br>(3) Coordinate the integration of the regenerative cities concept into action plans.<br>(4) Coordinate the synchronization of programs across relevant entities concerning regenerative cities.<br>(5) Coordinate the evaluation of programs, reallocation of resources, and budget recommendations related to regenerative cities initiatives.<br>(6) Coordinate the formulation and establishment of incentive and disincentive mechanisms for monitoring spatial planning related to regenerative cities programs. | (1) Implement strategies and general policies related to the operationalization of the 2000 Watt Society concept and Resource-Efficient Building.<br>(2) Provide recommendations for resolving strategic issues in the operationalization of the 2000 Watt Society concept and Resource-Efficient Building.<br>(3) Develop and execute action plans for the operationalization of the 2000 Watt Society concept and Resource-Efficient Building.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in the operationalization of the 2000 Watt Society concept and Resource-Efficient Building.<br>(5) Enhance the capacity of personnel in understanding and applying methods for the operationalization of the 2000 Watt Society concept and Resource-Efficient Building.<br>(6) Implement incentive and disincentive measures in the operationalization of the 2000 Watt Society concept and Resource-Efficient Building. | (1) Align programs and budgets by identifying and recommending alignment needs, consolidating work plans with policy directives related to regenerative cities.<br>(2) Address bottlenecks by tracking the fulfillment of work plans, inventorying issues, providing support for problem resolution, assisting in study preparation, and developing SOPs related to regenerative cities.<br>(3) Foster innovation by providing recommendations on governance, regulations, funding sources, and incentives and disincentives related to regenerative cities. | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the operationalization of the 2000 Watt Society concept and resource-efficient building. | | Coordinate spatial planning control in the implementation of the 2000 Watt Society concept and resource-efficient building within the action plan and resolution of issues at the technical level. | |
| 2 | **Solar City' Development** | | (1) Implement strategies and general policies related to the development of solar cities.<br>(2) Provide recommendations for resolving strategic issues in the development of solar cities.<br>(3) Develop and implement action plans for the "feed-in-legislation" method at the metropolitan level, including action plans to allow producers (such as homeowners, businesses, or community groups) to sell the electricity they generate from renewable sources (like solar panels, wind turbines, or hydroelectric systems) back to the grid.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in the development of solar cities..<br>(5) Enhance the capacity of personnel in understanding and applying methods for development of solar cities.<br>(6) Implement incentive and disincentive measures to the development of solar cities. | | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the development of solar city concept. | | Coordinate spatial planning control in the implementation of solar city development within the action plan and resolution of issues at the technical level. | |



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| 3 | **Water Security** | | (1) Implement strategies and general policies for balancing urban, agricultural, and commercial uses of water.<br>(2) Provide recommendations for resolving strategic issues related to securing water resources.<br>(3) Develop and implement action plans to encourage water efficiency and rainwater collection in households and businesses.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in order to secure water resources.<br>(5) Enhance the capacity of personnel in understanding and implementing initiatives to secure water resources.<br>(6) Implement incentive and disincentive measures related to programs in order to securing water resources. | | | Coordinate, evaluate, and report on encouraging water efficiency and rainwater collection in households and businesses within the action plan. | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs related to water security. | | Coordinate spatial planning control in the implementation of programs to secure water within the action plan and resolution of issues at the technical level. | |
| 4 | **Implementing Zero Waste** | | (1) Implement strategies and general policies for achieving zero waste by establishing cost-effective reprocessing of all technical wastes and creating new green businesses and jobs.<br>(2) Provide recommendations for resolving strategic issues related to achieving zero waste.<br>(3) Develop and implement action plans to encourage new enterprises for processing organic waste into soil-enhancing materials, and to make sewage reprocessing and nutrient capture central to waste management.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in order to achieve zero waste.<br>(5) Enhance the capacity of personnel in understanding and implementing the zero waste concept.<br>(6) Implement incentive and disincentive measures related to programs aimed at achieving zero waste | | | Coordinate, evaluate, and report on the implementation of encouraging the zero waste concept within the action plan. | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs related to zero waste concept. | | Coordinate spatial planning control in the implementation of programs to secure water within the action plan and resolution of issues at the technical level. | |



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| 5 | **Local Food** | | (1) Implement strategies and general policies to encourage people to consume local food.<br>(2) Provide recommendations for resolving strategic issues related to the local food consumption concept.<br>(3) Develop and implement action plans to promote local peri-urban food production for local markets, support agriculture and farmers' markets, and ensure the use of composted city-derived bio-waste for urban farming.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in efforts related to the local food consumption concept.<br>(5) Enhance the capacity of personnel in understanding and implementing the local food consumption concept.<br>(6) Implement incentive and disincentive measures related to programs that encourage people to consume local food. | | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that encourage people to consume local food. | | Coordinate spatial planning control in the implementation of programs to encourage people to consume local food within the action plan and resolution of issues at the technical level. | |
| 6 | **Sustainable Transport** | | (1) Implement strategies and general policies to support the implementation of sustainable transport policies by focusing on pedestrian zones, public transport, and zero-emissions vehicle policies.<br>(2) Provide recommendations for resolving strategic issues related to the implementation of sustainable transport in metropolitan areas.<br>(3) Develop and implement action plans to expand pedestrian zones, create a comprehensive network of dedicated cycle lanes, enhance public transport through improved attractiveness, frequency, and flexibility, promote new electric and fuel cell vehicle technologies, and support car-sharing initiatives.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in supporting the implementation of sustainable transport.<br>(5) Enhance the capacity of personnel in understanding and implementing sustainable transport initiatives.<br>(6) Implement incentive and disincentive measures related to the implementation of sustainable transport. | | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that implement sustainable transport. | Coordinate, evaluate, and report on efforts to make pedestrian zones widespread, create a comprehensive network of dedicated cycle lanes, encourage public transport through its attractiveness, frequency, and flexibility, as well as promote new electric and fuel cell vehicle technology, and car-sharing within the action plan. | Coordinate spatial planning control in the implementation of programs related to sustainable transport within the action plan and resolution of issues at the technical level. | |



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| 7 | **Nature and The City** | | (1) Implement strategies and general policies to preserve urban-nature initiatives by focusing on biodiversity, soil erosion control, carbon sequestration, and the development of related initiatives.<br>(2) Provide recommendations for resolving strategic issues related to efforts to preserve urban-nature environments.<br>(3) Develop and implement action plans to encourage tree planting and to motivate people to assist in restoring forests and wetlands in remote areas.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in preserving urban-nature environments.<br>(5) Enhance the capacity of personnel in understanding and implementing initiatives to preserve urban-nature environments.<br>(6) Implement incentive and disincentive measures related to the preservation of urban-nature environments. | | Coordinate, evaluate, and report on the implementation of encouraging tree planting and encouraging people to help restore forests and wetlands in remote areas within the action plan. | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting, for the programs that preserving urban-nature. | | Coordinate spatial planning control in the implementation of programs to preserve urban nature within the action plan and resolution of issues at the technical level. | Coordinate, evaluate, and report on the implementation of encouraging tree planting and encouraging people to help restore forests and wetlands in remote areas within the action plan. |
| 8 | **Green Business** | | (1) Implement strategies and general policies for the green business concept in both the public and private sectors.<br>(2) Provide recommendations for resolving strategic issues related to improving green business methods.<br>(3) Develop and implement action plans for government green procurement, resource efficiency, green business incubators, and enhancing environmental resiliency for new businesses and job creation.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in the operationalization of the green business concept.<br>(5) Enhance the capacity of personnel in understanding and implementing initiatives of the green business concept.<br>(6) Implement incentive and disincentive measures related to the green business concept. | | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting,in implementing green business concept. | | Coordinate spatial planning control in the implementation of programs related to the green business concept within the action plan and resolution of issues at the technical level. | |



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| 9 | **A Culture of Restorative Urbanisation** | | (1) Implement strategies and general policies for developing restorative urbanization across all aspects.<br>(2) Provide recommendations for resolving strategic issues related to the development of restorative urbanization.<br>(3) Develop and implement action plans to utilize global and local experts in integrating this concept into education systems, media, and community engagement for restorative urbanization through meetings, events, news, and practices.<br>(4) Monitor and evaluate program alignment and budgeting, as well as the effectiveness of budget utilization in programs related to restorative urbanization.<br>(5) Enhance the capacity of personnel in understanding and implementing the restorative urbanization concept.<br>(6) Implement incentive and disincentive measures related to the development of restorative urbanization. | | | | (1) Coordinate the implementation of incentives and disincentives in action plans and the resolution of issues at the technical level.<br>(2) Prepare proposals related to incentives and disincentives, as well as evaluations and reporting in developing restorative urbanisation. | | Coordinate spatial planning control in the implementation of programs related to developing restorative urbanization within the action plan and resolution of issues at the technical level. | |

**Source: Analysis Result, 2024**



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*Case Study Report*

# Unlocking Financial Scheme for New Regenerative City

## (A Case Study: Blok M, Jakarta)

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Tina STEPHANIE, Bandung Institute of Technology, Indonesia
Annisa Diah ASTARINI, Bandung Institute of Technology, Indonesia
Nabil Rizki Mulya WIDODO, Bandung Institute of Technology, Indonesia
Novita RATNASARI, Bandung Institute of Technology, Indonesia
Muhammad Ganendra WIJAKSANA, Bandung Institute of Technology, Indonesia

**Abstract**

*Jakarta has undergone a significant transition from Special Capital Region (Indonesian: Daerah Khusus Ibukota) to Special Region of Jakarta (Indonesian: Daerah Khusus Jakarta) following the replacement of Indonesia's new capital. Many areas tend to be less appealing as it no longer draws in new visitors. An appropriate example is the once-popular commercial block and TOD area, Blok M, in South Jakarta. This study proposes an effective and captivating financial scheme to generate new development within Blok M areas.*

*Multidimensional approaches are used to create a suitable financial scheme for development and land management of Blok M, as well as to make it regenerative in the next 20 years. The scheme aims to bring land owners and investors to build Blok M together, obtaining financial benefits of the development supported by visually appealing and human-centered urban design to ensure a livable and healthy environment for all.*

*This contribution provides a new initiative for the government to bring out the potential outcome for the private sector and investors. In the current global context, this collaborative investment not only generates the Blok M development but also encourages the making of more innovative and sustainable solutions for future regenerative cities in Indonesia.*

**Keywords**

*Collaborative investment, financial scheme, regenerative city*



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Unlocking Financial Scheme for New Regenerative City (Case Study : Blok M, Jakarta)

## 1. Introduction

The latest legal basis for the designation of the DKI Jakarta Province as the capital of the Republic of Indonesia is stipulated in Indonesia's Law No. 29 in 2007 (Presiden Republik Indonesia, 2007). However, with the recent enactment of Law No. 3 in 2022 (Presiden Republik Indonesia, 2022), plans are underway to relocate the capital city to Nusantara which is situated in Penajam Paser Utara and Kutai Kartanegara regencies of East Kalimantan Province. This resulted in the change of Jakarta's status from Special Capital Region (Indonesian: Daerah Khusus Ibukota) to Special Region of Jakarta (Indonesian: Daerah Khusus Jakarta).

The relocation of Indonesia's capital city is undertaken with the aim to alleviate the burdens faced by Jakarta, grappling with issues such as traffic congestion, overpopulation, and excessive infrastructure strain. Furthermore, it is also intended to promote development and economic growth in East Kalimantan, as well as to ensure equitable development across Indonesia as a whole. Following the transition to the Special Region of Jakarta (DKJ) after the relocation of the Capital City, DKJ will enhance its role as the national economic hub and a global city. Its development is now focusing to encompass trade, service industries, financial services, and a diverse array of rapidly growing business activities (Toana *et al.*, 2023).

Amidst the global economic slowdown and the decline in prices of key export commodities, Indonesia's economy grew by 5.04 percent (year-on-year) and 5.05 percent (quarter-on-quarter) in the fourth quarter of 2023. The trend of Jakarta's Gross Regional Domestic Product (GRDP) has also shown an upward trajectory from 2021 to 2023. In 2022, the administrative region of South Jakarta emerged as the second-largest contributor to Jakarta's GRDP (Badan Pusat Statistik, 2024).


**Figure 1. GRDP by Business Fields at Current Prices and Constant Prices 2010 DKI Jakarta Province (trillion rupiah). Source: Badan Pusat Statistik, 2024**

Jakarta is also a province that has achieved a degree of autonomy in its development and possesses significant capacity to execute governmental functions as well as to attract investment. The third-largest investment sector in DKI Jakarta consists of rental offices, residential properties, and industrial sectors, (Tobing, 2023) presenting substantial opportunities for further growth and development.

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### Site Context

Geographically, the DKI Jakarta area covers approximately 661.5 km². Data released by the Central Statistics Agency (BPS) in 2020 (Badan Pusat Statistik DKI Jakarta, 2020) recorded the population of DKI Jakarta at approximately 10.5 million people. Blok M is located in the Kebayoran Baru district of South Jakarta. Referring to the City Design Guidelines (GUBERNUR DAERAH KHUSUS .IBUKOTA JAKARTA, 2020) approved by the Governor of DKI Jakarta Province, the designated area lies within Blok M - Sisingamangaraja TOD Corridor and Blok M Terminal, making this site strategic and accessible by public transportation.

**Figure 2. Commercial District in Blok M-Sisingamangaraja TOD Corridor. Source: www.plazablokm.com.**

Following Jakarta's brand new vision to be "Jakarta Global City", Blok M is projected to become the central hub for trade, services, and business, with enhanced connectivity both within and between its commercial district (Pemerintah Pusat Indonesia, 2023). Over the past decades, Blok M has been living up to its reputation as a vibrant commercial district. In the 2010s, Blok M started becoming part of Jakarta's vital areas after the establishment of numerous vital buildings for government, business, and other new commercial centers, along with the construction of BRT (Transjakarta) network in 2015 followed by MRT in 2017. Blok M's strategic proximity to the CBD and various public facilities also makes it an ideal location for housing, particularly for workers in the CBD and other commercial areas.

Blok M has a vision to enhance mixed-use development where this area has the potential to become a transit-oriented development (Pemerintah DKI Jakarta, 2022) and mixed-use area due to its strategic location in the heart of Kebayoran Baru, a district with garden city concept in South Jakarta (Jakarta Investment Centre, 2024), making it very prospective for property investment. Based on our initial studies, residential property is a potential sector to be developed in this area due to its location close to Jakarta's Central Business District (CBD) and easy access to public facilities, ideal for workers in the CBD or any other commercial districts. There are several green open spaces around the area including Martha Tiahahu Literacy Park. In addition, this area also holds a high historical value as it belongs to Kebayoran Baru Cultural Heritage Area according to Jakarta's Spatial and Regional Plan (Gubernur Provinsi DKI



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Jakarta, 2012). The development of Blok M will also reflect Jakarta's transformation towards a thriving global city.

On the other hand, Blok M faces various problems as a commercial district. The relocation of Indonesia's capital city could potentially threaten the vitality of Blok M, as visitor attraction could decline, and historic buildings that previously served as offices risk abandonment (Dirgantara, 2021). In addition, economic activity in the area may decline as the focus of business and investment shifts, which could ultimately reduce the vibrancy of the city and lead to underutilization of existing infrastructure. Transit points such as the MRT Station and Blok M Terminal are also still not well connected, indicating a significant gap in connectivity in the Blok M area.

The direction of Blok M development as a strategic area in the heart of Jakarta requires an effective development scheme to attract potential investors. Based on its challenging circumstances, **this report aims to plan a financially efficient scheme that will draw more investors in the development of the Blok M area.**

## 2. Approach

In this study, we use financial pencil-out to formulate the most efficient financial scheme that can be profitable for Blok M future developments and long-term investment within the area. Pencil-out is a term that developers use to refer to whether a deal makes financial sense or not (Carsey School of Public Policy, 2024). In the context of urban design, pencil-out approach is used to analyse whether the proposed building and its intended functions can generate sufficient revenue, thereby making it financially feasible (Poerbo, 2024).

The development scheme would be assessed through financial feasibility studies. Financial feasibility analysis is a systematic evaluation process used to determine the viability of a project or investment by assessing its financial aspects (Islam and Prasetyo, 2020; Naisabur, Rahadi and Naisabur, 2024). One of the main components of financial feasibility analysis is cash flow analysis, which involves projecting the inflows and outflows of cash over the project's lifespan (Irwanto and Anggono, 2019; Mayulu *et al.*, 2024). It typically includes several key metrics such as:

a. Net Present Value (NPV): NPV is the difference between the present value of cash inflows and outflows. A positive NPV indicates the investment is likely to be profitable (Shou, 2022).

b. Internal Rate of Return (IRR): IRR is the discount rate at which the net present value of all cash flows equals zero. A project is acceptable if its IRR exceeds the required rate of return or cost of capital (Ashta and Otto, 2011).

c. Payback Period (PP): PP is the time needed for an investment to generate income equal to its cost. A shorter payback period is preferred for quicker recovery and reduced risk (Anderson and Newell, 2004).

In our cash flow analysis, we consider costs and revenue as the main components. Costs include development costs (pre-construction and construction), operational costs, and marketing costs. Revenue consists of operational and rent revenue. These components are organized in a timeline framework influenced by inflation. Finally, we calculate the net cash flow by factoring in taxes and building depreciation.

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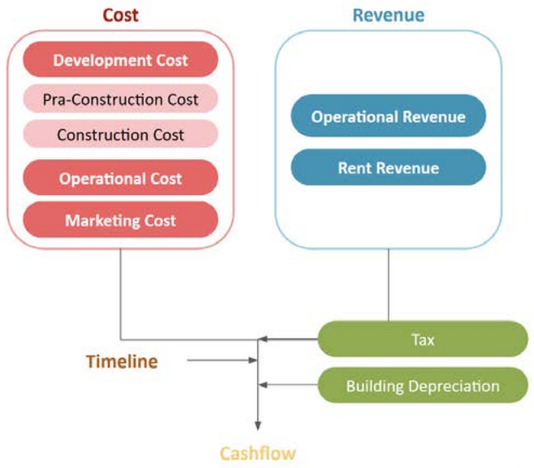


**Figure 3. Cash Flow Component. Source: Author's Analysis.**

# 3. Project Result

## 3.1. Land Consolidation

The proposed development is carried out with a land consolidation scheme to increase the productivity and value of land in the study area. In addition, land consolidation schemes can also improve the quality of life and economy of an area (Sayılan, 2014). The land consolidation scheme we propose is the result of combining 151 existing building parcels with each parcel having an area of under 0.5 Ha into 11 more compact building blocks. By consolidating the land, the productive floor area increased by 23% plus the creation of new open spaces. This merger not only aims to optimise land use, but also to create more efficient clusters of activities. The blocks have building functions consisting of Residential, Commercial, Hotel, open space, office, and MICE (Meetings, Incentives, Conventions, and Exhibitions).

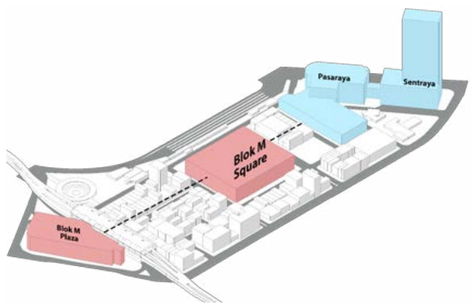


**Figure 4. Existing Building Mass. Source: Author's Analysis.**

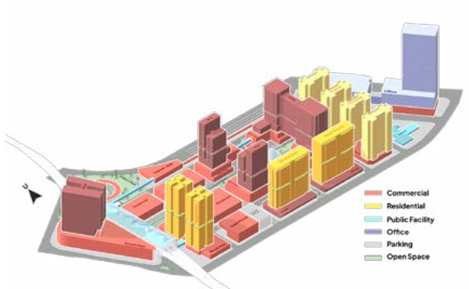


**Figure 5. Building Mass after Consolidation. Source: Author's Analysis.**



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## 3.2. Staging Development

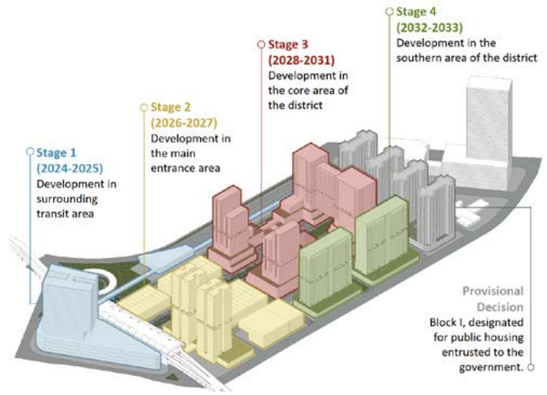


**Figure 6. Staging Development. Source: Author's Analysis.**

The designated areas will undergo phased development utilizing an unbundling system, where the land is segmented into four massive blocks. This strategy opens the region for investment opportunities over a 10-year construction timeline (2024-2033), ensuring a gradual and organized development process. The project is divided into four distinct stages, each focusing on specific areas to ensure a balanced and integrated transformation. Stage 1 (2024-2025) focuses on areas outside the core, consisting of retail mall and apartments connected to a transit hub integrated with MRT and BRT. Stage 2 (2026-2027) will develop the main entrance consisting of retail, cultural, residential spaces, and a green-lined boulevard. Stage 3 (2028-2031) centers on MICE center, hotel, and urban plaza. Stage 4 (2032-2033) completes the project with a building that is mixed of retail apartments and a public plaza. Block I, reserved for public housing, is excluded from the timeline and will be managed by the government.

## 3.3. Collaborative Investment

Land consolidation in this case study involves numerous parties such as landowners, developers, government, company, and even investors, making collaboration essential to achieve effective development. Strong collaboration between various stakeholders is the path to a regenerative urban area (Axinte *et al.*, 2019). The collaboration in the investment system used in this case takes the form of the *inbreng* scheme. In the *inbreng* scheme, land from various owners is combined into one entity to then be reorganized according to a better and more integrated spatial plan. Landowners voluntarily give up part of their land, which will later be allocated for the construction of public infrastructure such as roads, green open spaces, parks, sports facilities, utility networks, and other public facilities.

In return, landowners involved in this scheme receive back a portion of the land that has been reorganized, although its size may be slightly reduced. However, the value of the land tends to be higher because of its more strategic location and the improved quality of the surrounding environment. By involving landowners in the planning process, they not only benefit from increased property value but also play a role in creating a better environment for the community. On the other hand, the government

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or developers can save on land acquisition costs for public facilities and speed up the infrastructure development process without facing many land conflicts.

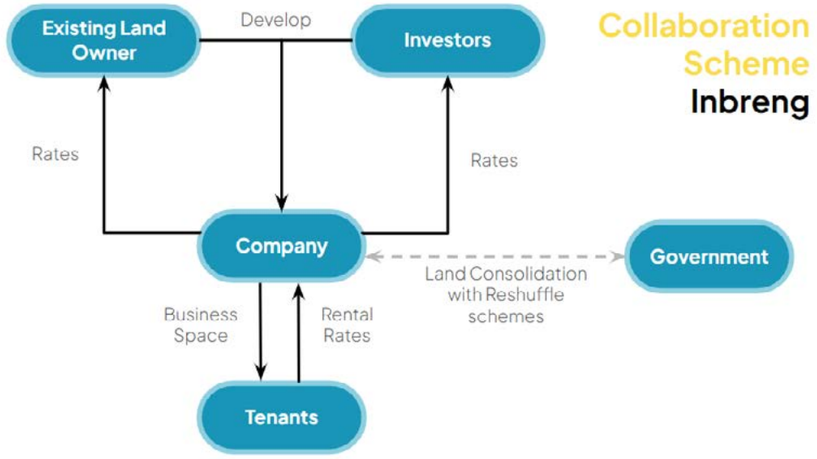


**Figure 7. Inbreng Scheme. Source: Author's Analysis.**

## 3.4.Financial Feasibility Analysis

### Financial Feasibility Analysis Iteration

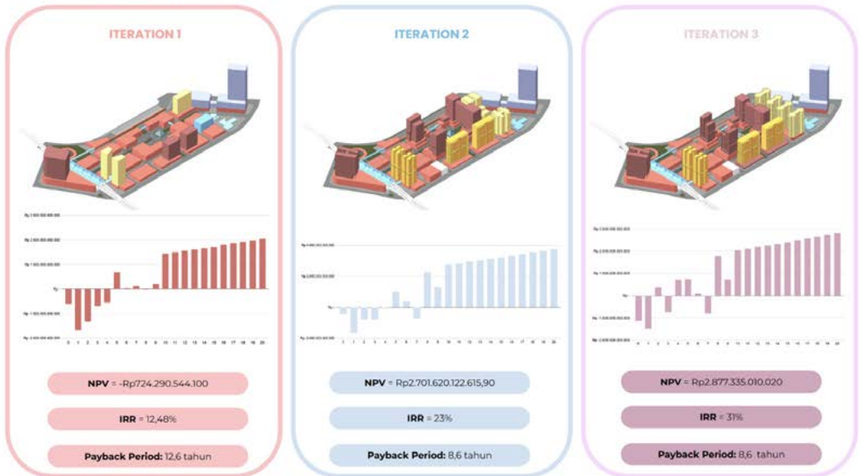


**Figure 8. Financial Iteration Process. Source: Author's Analysis.**



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The financial analysis was conducted in three iterations to find the optimal scenario based on NPV, IRR, and Payback Period. Each iteration involved modifying the functions, intensity, and form of the blocks to improve financial viability. In the first iteration, the development was divided into shopping malls, with additional apartments and parking. Despite increasing intensity in some blocks, the scenario showed a negative NPV, low IRR, and a Payback Period exceeding 10 years, due to low building intensity and lack of function diversity. In the second iteration, Blocks G and H were converted to hotels and apartments, while Block I became social housing. These changes improved the financial metrics, resulting in a positive NPV, higher IRR, and a Payback Period of under 10 years, reflecting a more balanced and profitable strategy. The final iteration focused on public housing massing, but since Block I was excluded from financial calculations, this adjustment did not impact the financial outcome.

### Final Financial Feasibility Analysis

**Cost**

Project costs encompass development, operational, and promotion expenses. Development costs are divided into pre-construction and construction categories. Pre-construction costs include land purchase, technical costs, physical depreciation, and demolition expenses like unloading fees and equipment rental. Construction costs relate to the building phase, influenced by technical requirements and planned gross floor area, and include non-built costs for external infrastructure and necessary licensing fees. After project completion, annual costs arise, including operational costs and promotion costs. Operational costs cover maintenance of both built areas, such as lobbies, and outdoor spaces like parking lots. Promotion costs, accounting for 1% of rent revenue, are allocated for marketing to attract tenants and ensure the development's long-term success.

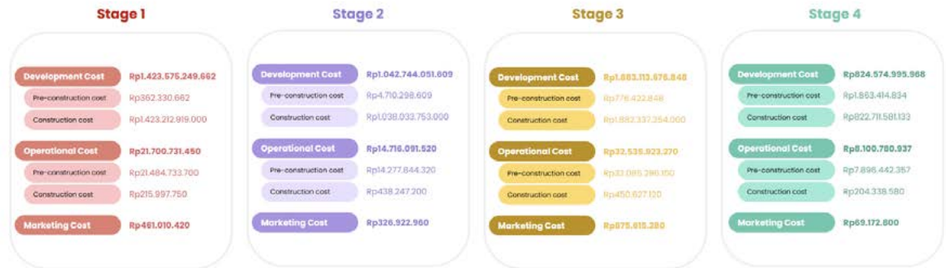


**Figure 9. Project Cost Calculation. Source: Author's Analysis.**

**Revenue**

Project revenue consists of rent revenue and operational revenue. Income in development is obtained through property sales per square meter in the form of rentals. Determination of rental prices per property sector is adjusted to various factors, such as Location (delineation area included in Non-CBD area), Average property prices around the delineation area, and Property rating (3/4/5 stars, low/mid/high end). Construction is carried out in stages, income comes in (CASH IN) 1 year after construction is completed. Operational income is obtained through the amount of Environmental

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Management Fees (IPL) per square meter per month. The amount of IPL is obtained from the amount of building maintenance costs per year. So that operational income is obtained as in addition.

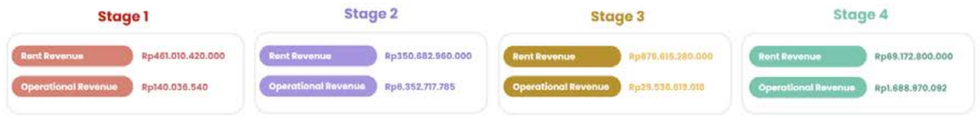


**Figure 10. Project Revenue Calculation. Source: Author's Analysis.**

**Net Cash Flow**

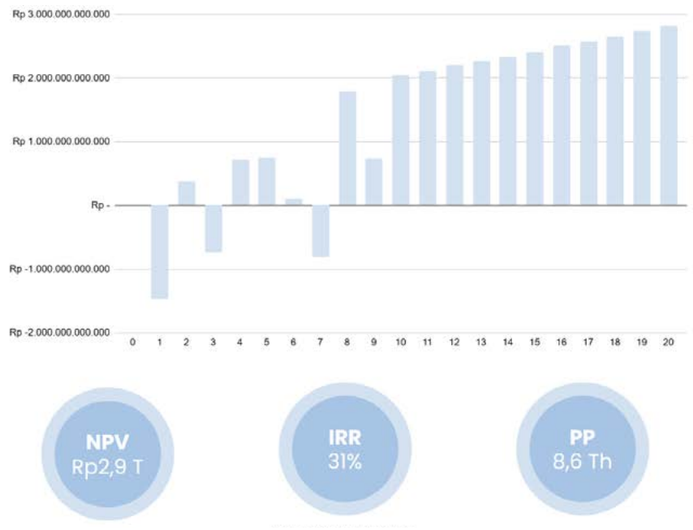


**Figure 11. Cash Flow Graphic. Source: Author's Analysis.**

The financial analysis calculates the cash flow for the area over the next 20 years, adjusting current financial values to account for predicted inflation. Based on the financial feasibility analysis, Overall, the NPV of the development of the Blok M area during the 20 year investment period is IDR 2,877,335,010,020,- The IRR level is 31%, with the PP achieved in the year 9. The findings indicate a positive outlook, with steady annual growth. A NPV of 2.9 trillion Indicates that this project has significant added value, because the NPV value is above 0. An IRR of 31%, Indicates a good rate of return, which already exceeds the expected rate of return of 15%. With PP of 9 years, it is expected that the initial investment will be returned in a relatively short time. These encouraging financial metrics suggest that the Blok M area holds significant potential for future development and profitability. This creates a compelling case for investors interested in partnering with the government and private sector to develop the area.



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## 4. Conclusion

This study focuses on the redevelopment of Blok M, South Jakarta, post-relocation of the capital to Nusantara, aiming to create a financially viable and investor-attractive plan through land consolidation, mixed-use design, and transit-oriented development. The project spans 10 years in four phases, integrating residential, commercial, office, and cultural spaces. A financial analysis using metrics like NPV, IRR, and Payback Period found the plan profitable, with an NPV of IDR 2.9 trillion, IRR of 31%, and a Payback Period of 9 years. Land consolidation and the *inbreng* scheme, which allows landowners to exchange part of their land for reorganized, higher-value plots, are key strategies in promoting sustainable urban growth, making the project appealing to investors.

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*Case Study Report*

# Effects of environmental features in high-rise building window views on perceived oppressiveness

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## Abstract

*Under compact city policies, high-rise buildings' window views are often blocked, increasing oppressiveness. While existing research has examined how building forms and environments influence perceived oppressiveness, there needs to be more investigation into the specific effects of environmental features such as building layout, building spacing, surrounding trees, and viewing floor. Therefore, this study employed virtual reality (VR) technology to evaluate the oppressiveness of various settings. The results showed that a staggered building layout, increased building spacing, and the presence of surrounding trees significantly reduced perceived oppressiveness. There was a nonlinear link between the perceived oppressiveness and the viewing floor. The feeling of oppression rose to a certain point and then started to decline as the viewing floor level increased. This study highlights the moderating role of environmental features on perceived oppressiveness.*

## Keywords

*Environmental Features, Perceived Oppressiveness, High-Rise Building, Window View*

## 1. Introduction

Mental health disorders are pervasive throughout the world and serve as important social issues (Kessler *et al.*, 2009). The increase in high-rise and high-density buildings in compact cities has made mental health issues more common among urban dwellers (Yeh and Yuen, 2011). Although high-rise structures help with land scarcity and population increase, they also frequently upend human scale, make cities less livable, and limit social interaction opportunities (Cappon, 1971; Gifford, 2007; Lee, Je and Byun, 2011).

The towering nature of high-rise buildings introduces a critical mental health challenge: the sense of oppression (Asgarzadeh *et al.*, 2012). The oppressiveness is based on visual perception and can cause fatigue and decreased productivity (Asgarzadeh *et al.*, 2012, 2014). Oppression is long-lasting and hidden, in contrast to transient stresses like traffic jams or challenging tasks at work (Asgarzadeh *et al.*, 2012; Zarghami *et al.*, 2019).

High-rise structures have an oppressive effect on the interior space as well, primarily in the form of blocked window views (Chung *et al.*, 2019, 2022). Windows are an important link between the interior and outdoor worlds in current urban lifestyles, as individuals spend a lot of time indoors (Kaplan, 2001; Brasche and Bischof, 2005). Therefore, healing mental health issues requires an understanding of how various window views affect the feeling of oppression.





## 2. Methodology

This study assessed how various environmental features—such as building layout, building spacing, surrounding trees, and viewing floor—affect perceived oppressiveness. Virtual reality (VR) headsets were used to present panoramic images that simulated window views from high-rise buildings.

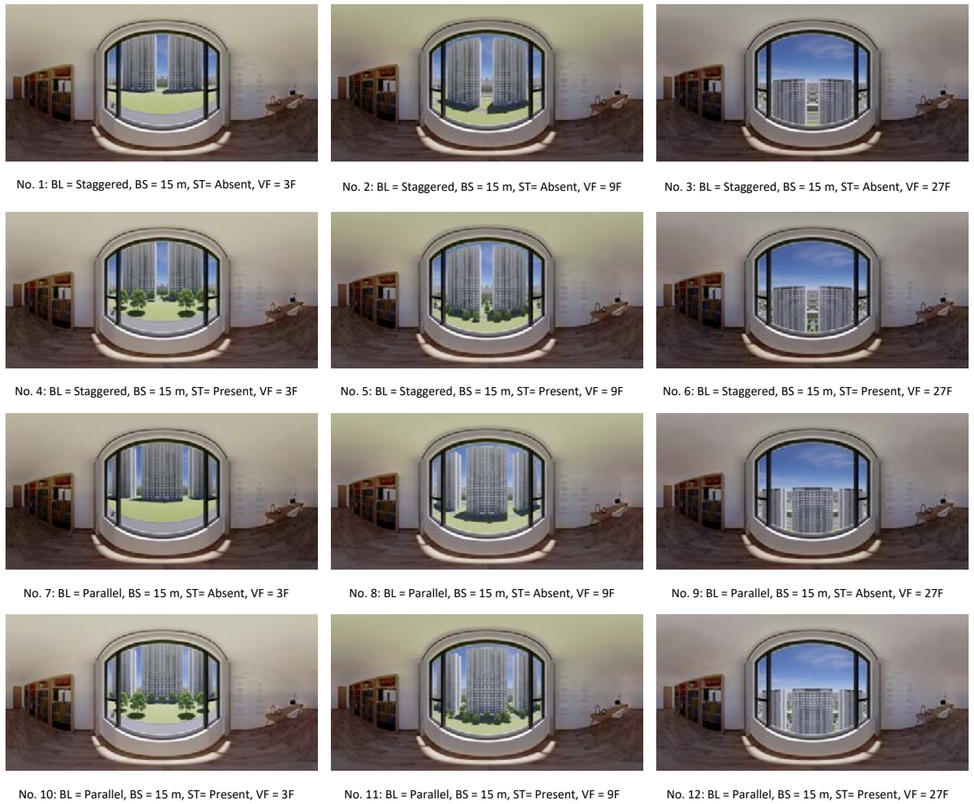
### 2.1. Participants

This study recruited 50 participants from the Architecture and Design Department at Chiba University. The group consisted of 28 men and 22 women, with an average age of 24.5.

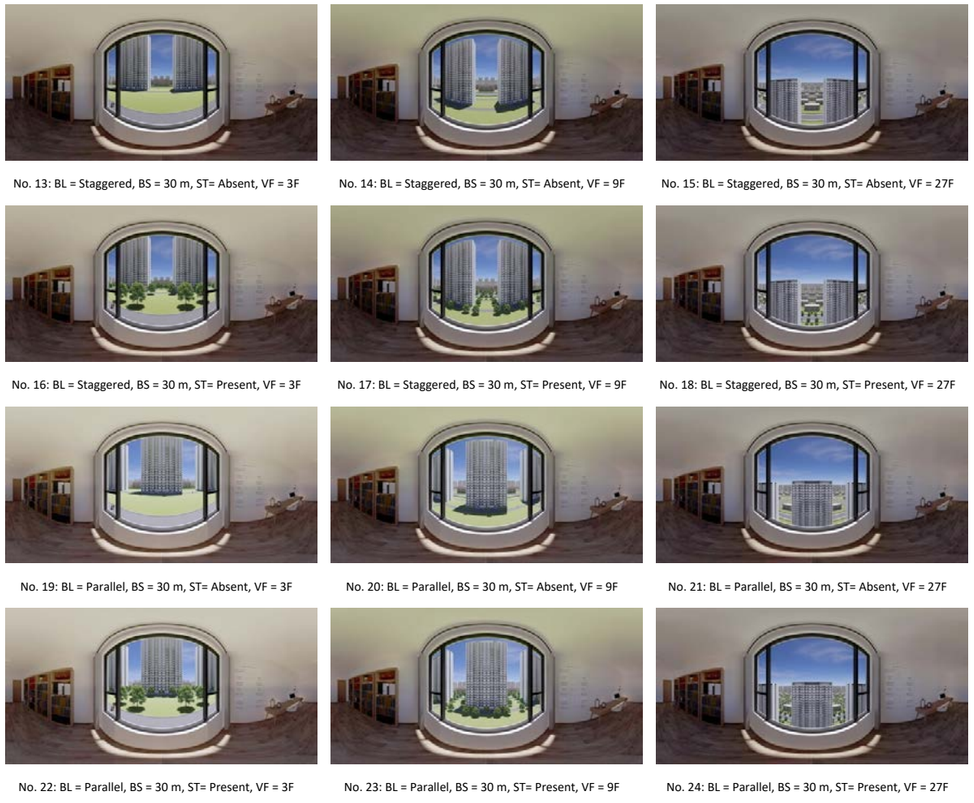
### 2.2. Experimental Settings

This experimental model represents typical high-rise residential complexes in China. It was created using SketchUp (2022) and rendered with Enscape (Mac 1.1.21).

The experimental settings incorporated four environmental features: Building Layout (BL), Building Spacing (BS), Surrounding Trees (ST), and Viewing Floor (VF). Building Layout (BL) was categorized into two types: parallel and staggered. Building Spacing (BS) had two variations: 15 and 30 meters. Surrounding Trees (ST) was divided into two conditions: absent and present. Viewing Floor (VF) comprised three levels: 3rd floor (3F), 9th floor (9F), and 30th floor (30F). A complete factorial design was used to generate 24 experimental settings.



No. 1: BL = Staggered, BS = 15 m, ST= Absent, VF = 3F
No. 2: BL = Staggered, BS = 15 m, ST= Absent, VF = 9F
No. 3: BL = Staggered, BS = 15 m, ST= Absent, VF = 27F
No. 4: BL = Staggered, BS = 15 m, ST= Present, VF = 3F
No. 5: BL = Staggered, BS = 15 m, ST= Present, VF = 9F
No. 6: BL = Staggered, BS = 15 m, ST= Present, VF = 27F
No. 7: BL = Parallel, BS = 15 m, ST= Absent, VF = 3F
No. 8: BL = Parallel, BS = 15 m, ST= Absent, VF = 9F
No. 9: BL = Parallel, BS = 15 m, ST= Absent, VF = 27F
No. 10: BL = Parallel, BS = 15 m, ST= Present, VF = 3F
No. 11: BL = Parallel, BS = 15 m, ST= Present, VF = 9F
No. 12: BL = Parallel, BS = 15 m, ST= Present, VF = 27F



No. 13: BL = Staggered, BS = 30 m, ST= Absent, VF = 3F
No. 14: BL = Staggered, BS = 30 m, ST= Absent, VF = 9F
No. 15: BL = Staggered, BS = 30 m, ST= Absent, VF = 27F
No. 16: BL = Staggered, BS = 30 m, ST= Present, VF = 3F
No. 17: BL = Staggered, BS = 30 m, ST= Present, VF = 9F
No. 18: BL = Staggered, BS = 30 m, ST= Present, VF = 27F
No. 19: BL = Parallel, BS = 30 m, ST= Absent, VF = 3F
No. 20: BL = Parallel, BS = 30 m, ST= Absent, VF = 9F
No. 21: BL = Parallel, BS = 30 m, ST= Absent, VF = 27F
No. 22: BL = Parallel, BS = 30 m, ST= Present, VF = 3F
No. 23: BL = Parallel, BS = 30 m, ST= Present, VF = 9F
No. 24: BL = Parallel, BS = 30 m, ST= Present, VF = 27F

**Figure 1. Experimental Settings. Source: Created by the author.**

### 2.3. Statistical Analysis

The questionnaire employed a paired Semantic Differential (SD) technique, utilizing a 7-point scale. Statistical analysis was conducted using RStudio Desktop (RStudio, Inc., 2022).

## 3. Results

### 3.1. Effects of Environmental Features on Perceived Oppressiveness

Regression analysis was performed to explore the relationship between Perceived Oppressiveness (PO) and several environmental features: Building Layout (BL), Building Spacing (BS), Surrounding Trees (ST), and Viewing Floor (VF). Exploratory Data Analysis (EDA) revealed that BL, BS, and ST had linear relationships with PO, whereas VF displayed a nonlinear relationship. Model fitting results showed that a second-degree polynomial model most accurately predicted PO when VF was used as the predictor. Consequently, the nonlinear regression model for PO was formulated as follows:

$$Y_{PO} = \beta_0 + \beta_1 \times BL + \beta_2 \times BS + \beta_3 \times ST + \beta_4 \times VF + \beta_5 \times VF^2 + \epsilon$$

In this equation, the response variable was denoted as $Y_{PO}$. The dummy variables BL and ST indicated the two levels of the categorical variables. The continuous independent variables were BS and VF, with $VF^2$ representing the quadratic term. The intercept was represented by $\beta_0$, and the coefficients for the respective variables were $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, and $\beta_5$. The error term was denoted by $\epsilon$.





The nonlinear regression analysis examined the impact of four predictors—Building Layout (BL), Building Spacing (BS), Surrounding Trees (ST), and Viewing Floor (VF)—on Perceived Oppressiveness (PO) (Table 1). The model's intercept was estimated at 6.275 (SE = 0.118), with a highly significant t-value of 53.086 ($p < 0.001$).

For the categorical variable Building Layout (BL), using 'Parallel' as the reference category, the 'Staggered' layout significantly reduced PO by 1.148 units (SE = 0.068), with a t-value of –16.826 ($p < 0.001$). Building Spacing (BS), treated as a continuous variable, showed a negative association with PO, estimated at –0.052 (SE = 0.005), and a significant t-value of –11.503 ($p < 0.001$). For the categorical variable Surrounding Trees (ST), with 'Absent' as the reference category, the presence of surrounding trees decreased PO by 0.645 units (SE = 0.068), supported by a t-value of –9.451 ($p < 0.001$).

Viewing Floor (VF) was modeled as a second-degree polynomial. The first component of VF had an estimate of –21.903 (SE = 1.182, t = –18.529, $p < 0.001$), while the second component had an estimate of –8.323 (SE = 1.182, t = –7.041, p = 0.001). The model explained 42.7% of the variance in PO, as indicated by an adjusted R-squared value of 0.427.

**Table 1. BL, BS, ST, and VF predicting PO (N = 1200). Source: Created by the author.**

| | Estimate | Std. Error | t value | p | |
|---|---|---|---|---|---|
| (Intercept) | 6.275 | 0.118 | 53.086 | < 0.001 | *** |
| factor (BL) Parallel | Ref | | | | |
| factor (BL) Staggered | –1.148 | 0.068 | –16.826 | < 0.001 | *** |
| BS | –0.052 | 0.005 | –11.503 | < 0.001 | *** |
| factor (ST) Absent | Ref | | | | |
| factor (ST) Present | –0.645 | 0.068 | –9.451 | < 0.001 | *** |
| poly (VF, 2) 1 | –21.903 | 1.182 | –18.529 | < 0.001 | *** |
| poly (VF, 2) 2 | –8.323 | 1.182 | –7.041 | 0.001 | *** |

Adjusted R-squared: 0.427

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

### 3.2. Graphics for Predicting Perceived Oppressiveness (PO)

Analysis graphics were developed to visually represent predictions of Perceived Oppressiveness (PO) based on environmental features, using a nonlinear regression model and its parameter estimates (Figure 2). In these graphics, Building Layout (BL) and Surrounding Trees (ST) were treated as nominal variables, while Building Spacing (BS) and Viewing Floor (VF) were treated as continuous variables. Specifically, BL was categorized as either parallel or staggered, and ST was classified as either present or absent. The graphs depicted BS values ranging from 0 to 60 meters and VF values spanning from the 1st to the 30th floors, with each floor having a height of 3.0 meters.

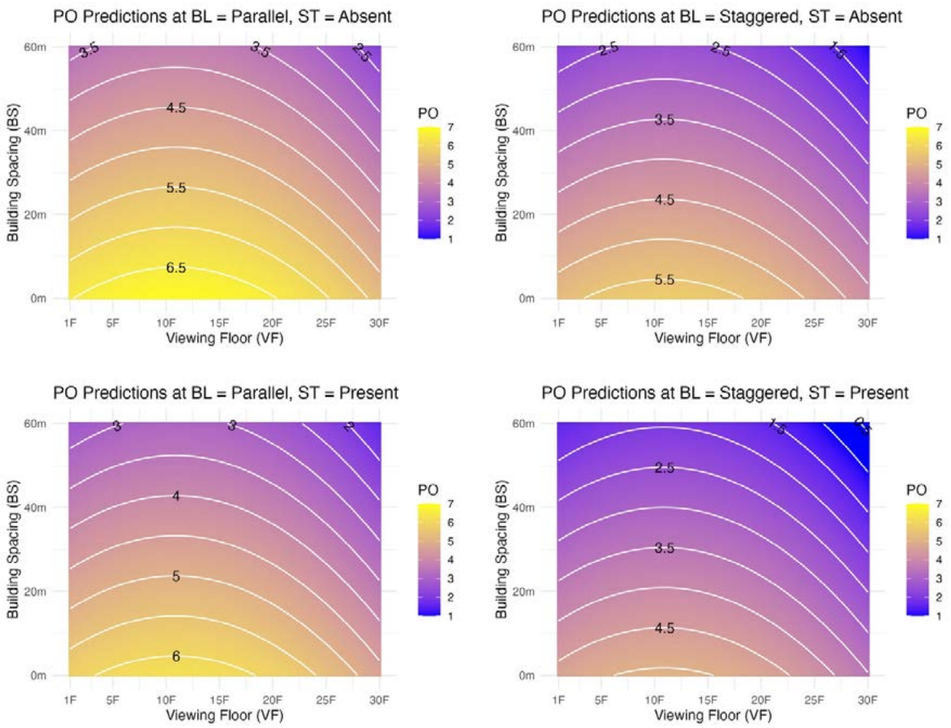



**Figure 2. BL, BS, ST, and VF predict PO. Source: Created by the author.**

## 4. Discussion

According to the results of the nonlinear regression analysis, perceived oppressiveness (PO) was significantly influenced by environmental features. Perceived oppressiveness was significantly decreased by increased building spacing, staggered building layouts, and the presence of surrounding trees. Furthermore, there was a nonlinear link between the perceived oppressiveness and the viewing floor. To be more precise, the feeling of oppression develops first and then falls as the viewing floor gets to a particular height.

Building Spacing (BS) and Building Layout (BL) both have a significant effect on perceived oppressiveness (PO). The 'Staggered' layout significantly decreased PO by 1.148 units (SE = 0.068, $p < 0.001$) in comparison to the 'Parallel' arrangement. Furthermore, there was a negative correlation between Building Spacing (BS) and PO, with an estimate of -0.052 (SE = 0.005, $p < 0.001$). More space between buildings and staggered building layouts can offer wider vistas out of windows, reducing oppressive sensations (Asgarzadeh et al., 2014). The prospect-refuge theory, which postulates that spaces with expansive vistas and a sense of containment enhance emotions of safety and enjoyment, is consistent with this observation (Appleton, 1996; Dosen and Ostwald, 2016).

The presence of Surrounding Trees (ST) was found to decrease PO by 0.645 units (SE = 0.068) compared to when trees were absent ($p < 0.001$). In urban greening, trees in front of high-rise buildings are most effective in alleviating the sense of oppression (Asgarzadeh *et al.*, 2012, 2014). This research further





supports the psychological benefits of urban greenery. Natural elements in urban design are essential to improving the well-being of citizens (Ulrich, 1984; Kaplan, 2001; Wolf *et al.*, 2020).

A second-degree polynomial model was used to represent the nonlinear link between viewing floor (VF) and perceived oppressiveness (PO). The first and second components of VF were estimated as -21.903 (SE = 1.182, $p < 0.001$) and -8.323 (SE = 1.182, $p = 0.001$), respectively. The contours of anticipated PO values followed an inverted U-shaped pattern, indicating a possible threshold effect. Initially, increasing the viewing floor height increased oppressiveness; however, after reaching a specific threshold, additional increases in floor height resulted in less oppressiveness. The highest oppressive views were seen on the middle floors, which primarily offered views of neighboring buildings, obscuring natural elements (Chung *et al.*, 2019, 2022). Lower floors, with views of natural elements, were less oppressive due to the presence of plants (Asgarzadeh *et al.*, 2009). Higher floors experienced lower oppression because they offered more panoramic views of the sky and distant objects, relieving psychological tension (Masoudinejad and Hartig, 2020).

## 5. Conclusions

This study provides valuable insights into how environmental features influence perceived oppressiveness in urban environments. By integrating these findings into urban planning and design practices, it is possible to create environments that not only meet aesthetic and functional requirements but also support the psychological well-being of residents.

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*Case Study Report*

# The First Results of Emergency Assembly Areas after the February 6, 2023 Kahramanmaraş Earthquakes: The Case of Kahramanmaraş Province Center

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## Abstract

*This study aims to compare and investigate the emergency assembly areas that exist in the central districts of Kahramanmaraş, which has got the most damage in the 2023 Kahramanmaraş earthquake. The analysis is made through the criteria of sufficiency, accessibility, and usability/safety as emergency shelters. In this context, the research focuses on the following four main questions; "Are the emergency assembly areas in Kahramanmaraş province center sufficient in terms of areal size and $m^2$ per capita? How accessible are the existing emergency assembly areas before and after the earthquake in Kahramanmaraş province center? How many of the existing emergency assembly areas in Kahramanmaraş province center has been transformed into emergency shelters and which ones meet the usability/safety criteria following this transformation? What is the difference in vulnerability and capacity of emergency assembly areas between the two different settlements that suffered the most damage in the earthquake?" Under the criterion of sufficiency, while studying the areal size (500-2500 $m^2$) and the square meter sizes per capita (gross 1.5 $m^2$), they will be tested under the accessibility criterion through the road grades, the widths of roads (min 7m), the walking distances (500 m).*

## Keywords

*Emergency Assembly Area, Planning Parameters, Earthquake Risk, Urban Planning*

## 1. Introduction

The aim of this study is to compare and investigate the existing emergency shelters in the central districts of Kahramanmaraş, which suffered the most damage in the 2023 Kahramanmaraş earthquake. The analysis is made through the criteria of sufficiency, accessibility and usability/safety as emergency shelters. In this context, the research focuses on the following four main questions: "Are the emergency assembly areas in Kahramanmaraş province centre sufficient in terms of area and $m^2$ per capita? How accessible are the existing shelter areas in Kahramanmaraş province center before and after the earthquake? How many of the existing shelters in Kahramanmaraş province center have been converted into emergency shelters and which ones meet the usability/safety criteria after this conversion? What is the difference in the vulnerability and capacity of the emergency assembly areas between the two different settlements that suffered the most damage in the earthquake?" Under the criterion of sufficiency, while studying the area





(500-2500 m2) and the square meter per capita (1.5 $m^2$ gross), they will be tested under the criterion of accessibility through the road grades, the width of the roads (min 7m), the walking distances (500 m).

In addition, post-earthquake images are used to conduct evaluation through the roads closed due to demolition (bridge/viaduct, ground collapse, building, etc.) and parking, traffic congestion etc. The emergency assembly areas, which serve as emergency shelters, are analyzed in terms of areal size, occupancy-vacancy, slope criteria under the usability criterion, while they will be evaluated in terms of proximity to fault lines, landslides, flood zones, and distance from hazardous facilities under the safety criterion.

Within the scope of the field research, the flood risks for both settlements are evaluated using the National Water Management system, the landslide risks are evaluated using the Atlas Application, and the fault lines are evaluated using the maps from the General Directorate of Mineral Research and Exploration. Fault lines are evaluated using maps from the General Directorate of Mineral Research and Exploration, while hazardous facility usage is evaluated using maps obtained from Google Earth satellite images. The spatial sizes, the occupancy-vacancy, the slope values, the road grades, the widths of the roads are found by calculating from Google Earth application. Access to the area, access within the area is evaluated by using the maps created after the earthquake and published on the General Directorate of Mapping Geoportal site. Satellite images taken within the first week right after the earthquake will be examined by using the "*Satellite Images Map of Turkey-Syria Earthquake*" map from https://turkey.archiving.jp/ and the assembly areas that were used as emergency shelter areas, the unused assembly areas as well as the closed roads and the routes with traffic congestion are investigated.

The research firstly explains the relationship between earthquakes, emergency assembly areas and urban resilience. In the field studies section, the adequacy and catchment area (15 minutes walking distance) characteristics of the emergency assembly areas in Kahramanmaraş province center after the 2023 Kahramanmaraş earthquake are presented.

## 2. Earthquakes, Emergency Assembly Areas and Urban Resilience

The concepts of disasters, emergency assembly areas and urban resilience are closely related to each other. Urban resilience can be defined as the capacity of cities to be prepared against disasters, to minimize disaster risks and to recover quickly after disasters. Major natural disasters such as earthquakes pose significant risks on the social, economic and physical structures of cities. Earthquakes create urban risks that threaten infrastructure, superstructures, buildings, transportation and the entire population in cities. In the face of such disaster risks, urban resilience is a critical concept that determines how cities respond to earthquakes, how they can be managed and how they recover. In order to increase urban resilience, first of all, urban risks should be accurately identified and the building stock should be strengthened (Cutter et al. 2010). Planning of emergency gathering areas is of great importance in order to manage these risks and for the rapid recovery and normalization of life after a disaster.

According to the Turkish Language Association Current Turkish Dictionary, the words emergency and gathering are defined as: "*to be done immediately, urgent*" and "*to come together*". According to Cambridge Online Dictionary, emergency assembly point is defined as "safe areas where people should gather in an emergency". According to The Ministry of Interior Disaster and Emergency Management Presidency (AFAD) definition, emergency assembly points are defined as "*safe areas where the public can gather by moving away from the dangerous area in order to prevent panic and ensure healthy information*

*exchange during the period until temporary accommodation centers are ready after disasters and emergencies".*[1]

Emergency assembly areas are safe places where people can come together and gather safely during and after a disaster. These areas are important places where people can gather immediately after the earthquake, meet their basic needs, provide food and beverage, ensure accurate information flow, provide first aid and temporary shelter. Determining the locations of gathering areas, their adequacy, accessibility and having adequate infrastructure can prevent the chaos after the disaster and ensure that emergency response processes are more effective (Bektaş & Sakarya, 2020).

In countries with high disaster and earthquake risk such as Turkey, the planning of emergency assembly areas is vital for urban resilience. Especially after the 1999 Marmara Earthquake, 2011 Van Earthquake and 2023 Kahramanmaraş Earthquakes, awareness and regulations for emergency assembly areas have gradually increased in Turkey and more importance has started to be given to these areas in urban planning (Erdik, 2000; Bektaş & Sakarya, 2020).

Emergency assembly areas have an important role in increasing urban resilience. Distribution of these areas in the city in an adequate and accessible manner, being safe places where people can reach quickly in case of a disaster contribute to making cities more resilient against disasters. Besides, these areas can also be used for activities such as temporary sheltering, first aid and aid distribution after a disaster.

Studies conducted within the scope of urban resilience show that emergency assembly areas should be considered not only as physical spaces but also as places where social solidarity and organization are strengthened. Increasing the level of knowledge of the society about access to and use of these areas provides an important advantage in post-disaster processes (Jabareen, 2013).

In summary, the interrelationship between earthquakes, emergency assembly areas and urban resilience is critical for cities to be more prepared against disasters and to manage post-disaster processes in the most effective way. Planning these areas as adequate and accessible and informing the society about these areas are among the important factors that increase the resilience of cities.

In the next section, the first findings on the adequacy of emergency assembly areas and catchment areas (15 minutes walking distance) in Kahramanmaraş province center after the 2023 earthquake are presented.

## 3. Findings

2023 earthquakes caused 22.113 buildings to collapse or be heavily damaged, and 2.208 were moderately damaged in Kahramanmaraş. The Kahramanmaraş province center which is one of the most affected areas from these earthquakes consists of the Dulkadiroğlu and Onikişubat districts. These earthquakes reveal again the importance of emergency assembly areas.

In the study area there are 102 emergency assembly areas. They are spatially distributed at the area. The total area of emergency assembly areas is 1.838.000 m². The area's population is 641.880; so, there are 2,9 m² emergency assembly areas per person. It means that it is higher than the standard (1,5 m²).

[1] Republic of Turkey Ministry of Interior, Disaster and Emergency Management Presidency, Press and Public Relations Consultancy. (2019). 'Learn the Gathering Area so You Can Survive - Press Release'. Access address: https://www.afad.gov.tr/toplanma-alanini-ogren-ki-canin-sag-olsun





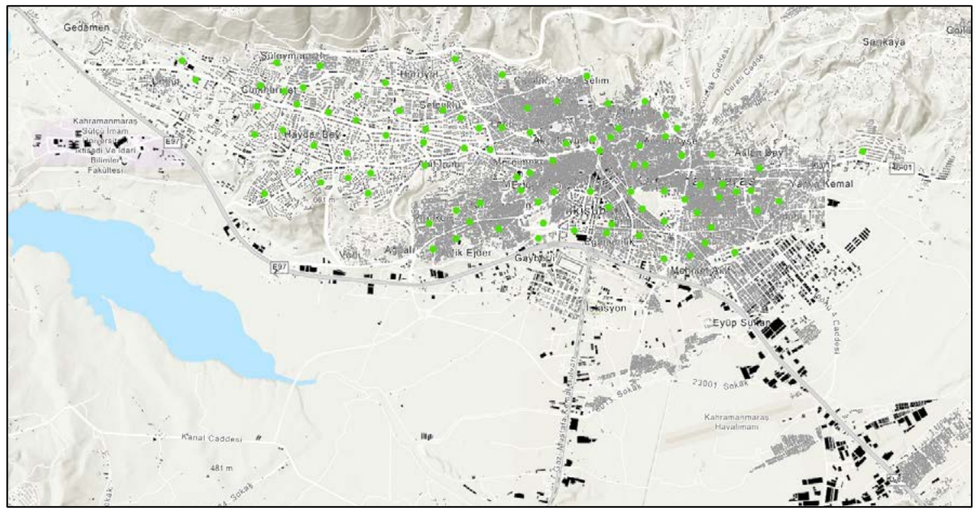


**Figure 1. Emergency Assembly Areas in Kahramanmaraş Province Center. Source Made by Authors.**

The accessibility of emergency assembly areas is analyzed by using GIS network analyst tool. The population should reach to emergency assembly areas in 15 minutes by walking. According to the results approximately 80% of the population can reach to emergency assembly areas in 15 minutes.

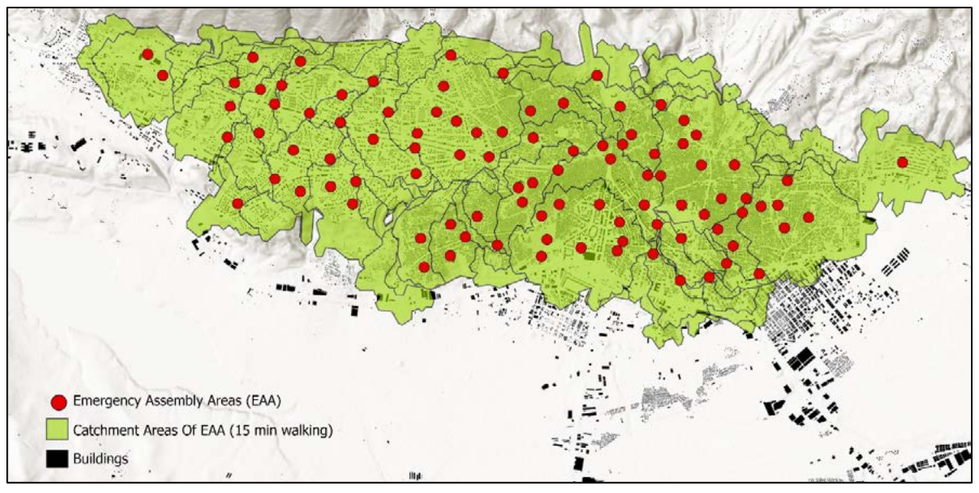


**Figure 2. Accessibility of Emergency Assembly Areas**

The damaged area was determined by the Earth Observatory of Singapore - Remote Sensing Lab with the National Aeronautics and Space Administration's (NASA) Jet Propulsion Laboratory and the California Institute of Technology (Caltech). The red areas show more damaged areas.

The east part of the area is more damaged. There are also many emergency assembly areas. These results show that these emergency assembly areas are located at-risk areas.

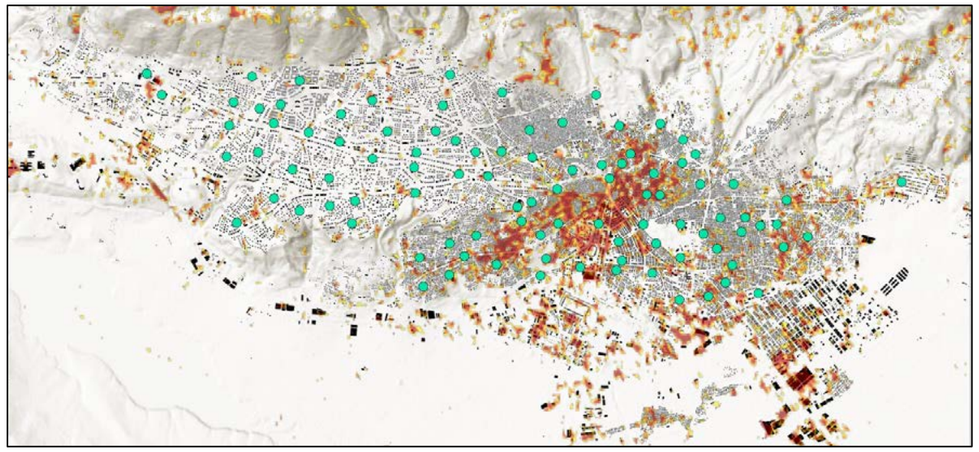

**Figure 3. Damaged Areas and Emergency Assembly Areas**

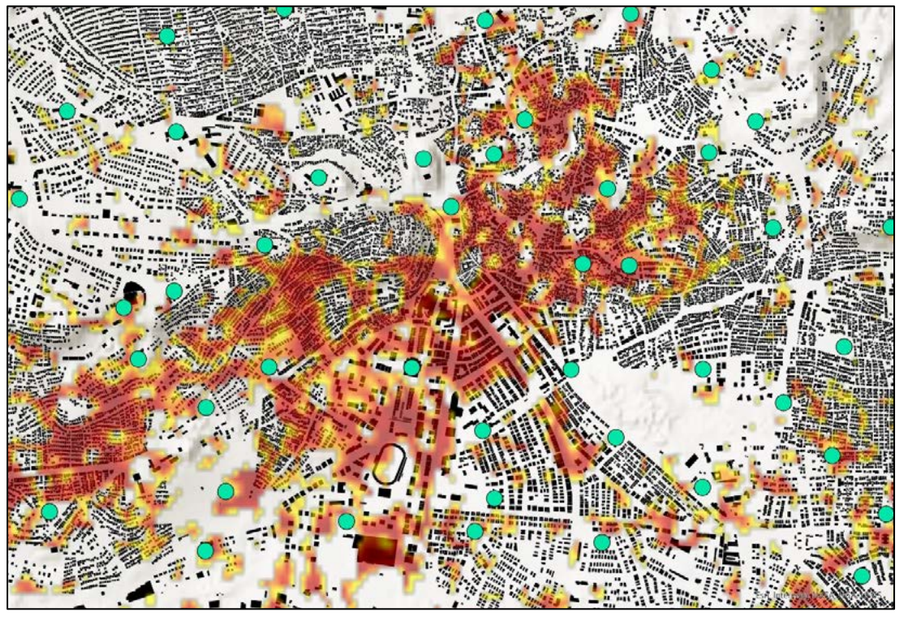

**Figure 4. The Emergency Assembly Areas at most Damaged Area**

The earthquakes affected both emergency assembly areas and their around and affected their accessibility negatively. Even if the destruction inside the emergency assembly areas is low, the high destruction around these areas makes them inaccessible and useless.





**Figure 5. The Emergency Assembly Areas before (above) at after (below) earthquakes**

Also, there is destruction in some of the emergency assembly areas. The social facilities areas like educational, health, social, and cultural facilities and their lots are defined as emergency assembly areas by AFAD. These reveal that the safety of the buildings in emergency assembly areas is crucial for resilient cities.

**Figure 6. Examples of Destruction in the Emergency Assembly Areas**

One of the main importance of emergency assembly areas is to be converted to emergency shelters after disasters. They (should) provide facilities like water, electricity for the short-term necessities of humans affected by earthquakes. The areal photos of before and after earthquakes are compared. In the short term, as seen in the figures above, the emergency assembly areas were not converted to emergency shelters. On the other hand, in the medium and long term, few of these areas started to be used as shelters.

**Figure 7. Emergency Assembly Areas that Converted to Emergency Shelters**

## 3. Result

The unique contributions of this study to the literature are manifold. Firstly, it addresses the scarcity of research on this topic within the planning literature. Secondly, it fills a critical gap by providing a comparative analysis conducted post-Kahramanmaraş Earthquake, in a region that has recently undergone a major seismic event. The practical contributions of this research to urban planning and policy-making are





significant. It rigorously tests the sufficiency, accessibility, and adaptability of emergency assembly areas for conversion into emergency shelters, thereby offering vital insights for the practical planning of such areas. These insights reveal specific deficiencies that need to be addressed in existing emergency assembly areas and highlight key locations where new assembly areas should be established. The findings thus offer substantial contributions to the practical aspects of planning, enhancing the resilience and preparedness of urban areas against future emergencies.

The research shows that there are enough assembly emergency areas in Kahramanmaraş province center, and big part of the area can reach these areas in 15 minutes. They are the strengths of the area, but some of these assembly emergency areas were damaged by the earthquakes. Some buildings in these areas were heavily damaged or collapsed, and earthquakes made them inaccessible. Also, the conversion of these areas to emergency shelters was very limited in the first stage after the earthquakes.

The practical implications of this research extend far beyond immediate emergency response, contributing significantly to the long-term resilience of urban areas. By ensuring that emergency assembly areas are strategically situated, meticulously designed, and effectively capable of serving the population during crises, this study addresses the critical need for enhanced emergency preparedness following recent seismic events. Moreover, it establishes a crucial precedent for future urban planning initiatives, aimed at bolstering safety and resilience in regions susceptible to natural disasters. This research not only fulfills an urgent contemporary need but also paves the way for more robust and resilient urban infrastructure, thereby safeguarding communities against future calamities.

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*Case Study Report*

# Harmonizing Urban Development and Environmental Sustainability through Detailed Spatial Plan (RDTR)

## A Case Study of the Kertek Urban Area in Wonosobo, Indonesia

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### Abstract

*Indonesia's spatial planning efforts include the preparation of detailed spatial planning plan known as RDTR (Rencana Detail Tata Ruang). This case study focuses on the RDTR for four districts (Kalikajar, Kertek, Mojotengah, and Wonosobo) in Wonosobo Regency, Central Java Province, Indonesia, encompassing a total area of 3.105,19 ha. The Kertek Urban Area RDTR Project was developed to elaborate on the Wonosobo Regency spatial planning document (RTRW) and achieve harmonious development related to space utilization. The Kertek area, rich in biodiversity and critical ecosystem services, faces rapid urbanization, necessitating a balanced approach to spatial planning. Therefore, the RDTR aims to structure and balance the functions and intensity of space use with environmental considerations, serving as a regulatory framework for spatial control.*

*In the context of Wonosobo Regency, the plan adopts an agroindustry and ecotourism concept, utilizing a compact and resilient city approach, while also encouraging a robust public-private sector collaboration. Agroindustry and ecotourism are promoted to enhance land value through productive and sustainable use primarily by the private sector. Meanwhile, land management is executed via zoning regulations by the public sector, which limit activities based on land function, employing the Permitted, Limited, Allowed, and Restricted Matrix (ITBX). This matrix provides clear guidance for residents and stakeholders regarding land use and building functions. Furthermore, the compact and resilient approach addresses existing environmental issues in the Kertek urban area and aligns with the land management strategy, which emphasizes preserving the original function of the land, particularly in disaster-prone areas. This strategy aims to provide better guidelines for basic infrastructure development for the public sector while also creating long-term, environmentally sustainable urban development.*

*The RDTR has significantly shaped Indonesian policymaking, not merely as a conceptual plan but as a legally binding Regional Head Regulation. The most significant implication of this is the utilization of regulation matrix and map as the main tools for managing permits, land use, and building construction, offering legal certainty for private investment and ensuring transparency in the licensing process. Additionally, the regulations support efficient and targeted infrastructure planning, environmental conservation, disaster mitigation, and improved social welfare through the allocation of public service facilities for the community. A regular monitoring and evaluation system is essential to identify obstacles and successes in RDTR implementation. Evaluation results should inform the correction of deficiencies and accommodate field changes, ensuring the plan's ongoing relevance and effectiveness.*

### Keywords

*Spatial Planning, Agroindustry, Ecotourism, Zoning Regulations, Compact Resillient City*

## 1. Context of The Project

### 1.1. Kertek Strategic Location

The scope of the Kertek Detailed Spatial Plan (RDTR) encompasses four sub-districts (Kertek, Kalikajar, Mojotengah, and Wonosobo) in Wonosobo Regency, Central Java Province, Indonesia. The RDTR Kertek covers a total area of 3,105.19 hectares, equivalent to 3.06% of the total area of Wonosobo Regency. In detailing the RDTR Kertek, the planning area is divided into four Planning Sub-Areas (SWP), with considerations including regional morphology, spatial planning policy directions, the distribution of residential areas, geographic conditions, and the characteristics of community activities.

**Table 1 Subdivison Planning Area (SWP) of RDTR Kertek**

| No | SWP | Number of Villages/Sub-Districts | Villages/Sub-Districts in Each SWP | Area (Ha) |
|---|---|---|---|---|
| 1 | A | 6 | Karangluhur, Kertek, Purwojati, Sindupaten, Sumberdalem, dan Surengede | 881,48 |
| 2 | B | 4 | Bojasari, Ngadikusuman, Sudungdewo, dan Wringinanom | 670,36 |
| 3 | C | 2 | Kalikajar dan Maduretno | 386,07 |
| 4 | D | 7 | Candimulyo, Candiyasan, Damarkasian, Pagerejo, Purbosono, Tlogojati, dan Tlogomulyo | 1.167,32 |

**Source: Shirvano (2021).**


**Figure 1 Site Location. Source: Shirvano (2021).**



Farmadi, Arbi Ali; Nastiti, Dyah Meutia;
Sani, Fadhila Nur Latifah; Aqabah, M. Retas

Harmonizing Urban Development and Environmental Sustainability through Detailed Spatial Plan (RDTR)

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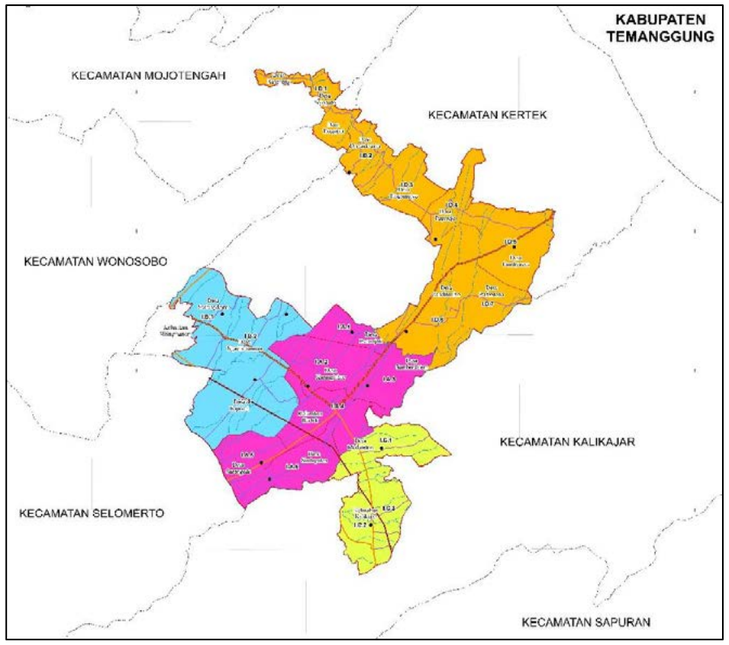


Figure 2 Planning Area Map. Source: Shirvano (2021).

Due to its geographic conditions, Kertek is considered as a strategic location within Wonosobo Regency. Kertek is traversed by one of the main routes on Java Island, the Yogyakarta-Central Java Strategic Corridor, which has contributed to Kertek's growth as a Local Activity Center (PKL). As a designated PKL, Kertek provides services to surrounding areas, particularly in terms of economic activities, public facilities, and social services. One of the key economic service points in Kertek is the Kertek Market, the second largest market in Wonosobo Regency, which receives supplies of vegetables and fruits from various surrounding regions.

In addition, neighbouring Kertek is the Wonosobo Sub-District, designated as Regional Activity Center (PKW), and Selomerto Sub-District, designated as an Area Service Center (PPK), both of which are also located along strategic routes and have economic hubs situated near these routes. These three sub-districts–Kertek, Selomerto, and Wonosobo–collectively known as the Potential Golden Triangle, playing a strategic role in driving economic growth and physical development in Wonosobo Regency.





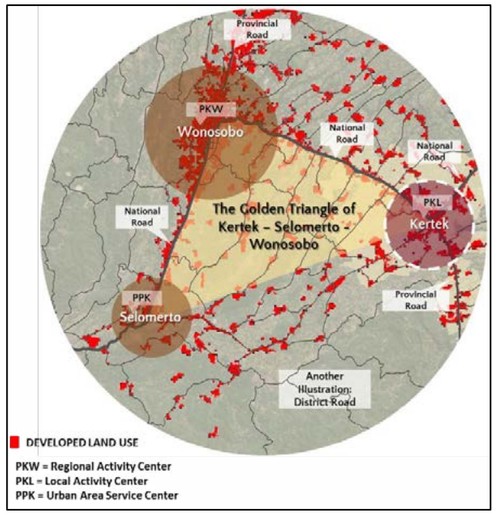


Figure 3 Kertek Strategic Location Map. Source: Shirvano (2021).

The formulation of the Kertek Detailed Spatial Planning (RDTR) plays a crucial role as a guideline for land use management and development control in Kertek Sub-District. This includes zoning regulations, land use planning, and appropriate development management. Given its strategic location, it is expected that land use and development in Kertek can be optimally managed, thereby contributing significantly to the development of the Potential Golden Triangle of Wonosobo.

## 1.2. Opportunities and Challenges

The conflict between regional development and environmental conservation arises when the pursuit of economic growth overlooks the negative impacts on ecosystem. Although development can improve welfare, it can also lead to environmental degradation. Therefore, it is essential to align economic progress with nature conservation, ensuring that both can coexist sustainably. Kertek is endowed with geographic strength and opportunity that can be optimized. Some of Kertek's strengths and opporotunities are as follows:

1. Strategic Locations

   Kertek is traversed by arterial and collector roads that connect it to other regions. This provides significant potential for economic growth in the areas of trade and services, industrial product distribution, and agricultural yields.

2. Strategic Functional Area

   Kertek functions as a Local Activity Center (PKL) serving several surrounding areas. In fulfilling its role as a PKL, Kertek is supported by a range of facilities and infrastructure with a county-wide service scale, including markets, hospitals, schools, banking institutions, and offices. Additionally, Kertek is situated within Wonosobo Regency's Golden Triangle (Kertek – Wonosobo – Selomerto).

3. Abundant Agricultural Commodities

   Kertek is located in the Sindoro-Sumbing highlands, known for its fertile agricultural land. Some of Kertek's main agricultural commodities include rice, corn, cabbage, mustard greens, and scallions.

With extensive farmland and a high volume of production, Kertek's agriculture sector significantly contributes to the economy of Wonosobo Regency. This agricultural potential is poised for further development in the future.

Figure 4 Kertek Agricultural Farm. Source: Shirvano (2021).

4. Opportunity for Natural and Artificial Tourism

Kertek's natural conditions also support the development of ecotourism activities, one of which is the Kledung Corridor, offering stunning views from the slopes of Mount Sindoro-Sumbing. In addition, there are cultural tourism potentials, such as the historical site Situs Bongkotan, religious tourism at Goa Maria Taroanggro, and artificial tourism at Pasar Lawas Kumandang.


Figure 5 Tourist Destinations in Kertek. Source: Kemendikbud.go.id (2019), Traveval.com (2023), and disparbud.wonosobokab.go.id (2023).



Farmadi, Arbi Ali; Nastiti, Dyah Meutia;
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Harmonizing Urban Development and
Environmental Sustainability through Detailed
Spatial Plan (RDTR)

In addition to its location potential, Kertek faces several challenges in its future development. These challenges stem from environmental factors, the impacts of development, infrastructure, and human activities. Some of the key issues in Kertek include:

1. Disaster-Prone Areas

Due to its natural landscape, Kertek is vulnerable to natural disasters, such as landslides and volcanic eruptions, with a medium risk level. The following outlines the total area at risk for each type of disaster in Kertek.

Table 2 Total Area of Disaster Prone Areas by Type in Kertek

| No | Type of Disaster-Prone Area | Luas (Ha) |
|---|---|---|
| 1 | Moderate Risk of Landside | 33,74 |
| 2 | Moderate Risk of Volcanic Eruption | 1.014,45 |
| 3 | Moderate Risk of Volcanic Eruption and Landslide | 262,90 |

Source: Shirvano (2021).

2. Decline in Environmental Quality

The decline in environmental quality in Kertek is primarily caused by urban sprawl and traffic congestion. Increased motor vehicle usage contributes to higher emissions of harmful pollutants, negatively impacting air quality and public health. Urban sprawl can also lead to ecosystem fragmentation and reduced land capacity for water absorption, potentially increasing flood risks and environmental degradation.

3. Misuse of Land and Illegal Mining

This issue arises from insufficient control over land use, exacerbated by rising land demands due to population growth. Additionally, the presence of illegal mining operations in Kertek threatens environmental sustainability and does not contribute to local tax revenue.

Table 3 Deviation of Existing Land Use from the Regulation of the Regional Spatial (RTRW) of Wonosobo District

| Sub-Zone Directions Based on RTRW Wonosobo Regency | Existing Land Use |
|---|---|
| Agriculture Zone | Housing, Trade and Services, and Industry |
| Garden Zone | Housing |
| Horticulture Zone | Mining of Mineral Resources |

Source: Shirvano (2021).

4. Infrastructure Issues

In terms of road infrastructure, several road segments in Kertek do not meet technical standards, and some village roads are still unpaved, consisting of gravel or dirt. Regarding waste management, the availability of Temporary Disposal Sites (TPS) is inadequate and poorly managed. For wastewater infrastructure, certain healthcare facilities lack dedicated wastewater treatment systems. Additionally, clean water services are not comprehensive, and there is no separation between drainage systems and sewage lines.

5. Population Issues

As of 2021, 67% of Kertek's population falls within the productive age group, with 36% being millennials and Generation Z, who are actively seeking employment. However, the limited availability of creative, innovative, and modern job opportunities is driving an increase in youth

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migration from Kertek. Data from Central Java Province between 2017 and 2021 indicate that 70% of migration occurs within the young adult age range (20–39 years).

### 1.3. Objectives of RDTR Kertek Development

Given the background, various opportunities, and existing challenges, the preparation of the RDTR Kertek aims to:

1. **Achieve Balance and Harmony**: Establish a balance and harmony in the functions and intensity of land use within the urban sub-regions
2. **Promote Environmental Sustainability**: Foster the sustainability of residential areas and urban activities, creating a harmonious relationship between humans and their environment, reflected in the patterns of land use intensity within the urban sub-regions.
3. **Enhance Service Efficiency**: Improve the efficiency and outcomes of services, optimizing land use as demonstrated by the establishment of an urban system with measurable oversight of physical development across different areas of the city, both in quality and quantity.
4. **Direct Urban Development**: Provide clearer direction for urban development to facilitate the controlled oversight of physical development in various parts of the city, ensuring that both quality and quantity are monitored.
5. **Facilitate Urban Development Priorities**: Assist in establishing urban development priorities and help formulate zoning regulations to serve as guidelines for orderly construction and detailed spatial management.

## 2. Project Focus

### 2.1. Planning Concept

The **RDTR Kertek** integrates the concepts of **Agro-Industry** and **Eco-Tourism** to support local economic growth based on natural potential. Agro-industry is a form of industrial activity that utilizes raw materials sourced from nature, specifically from the agricultural sector. In broad terms, agro-industry is part of the agribusiness system that involves processing agricultural raw materials using technology to produce new products; in other words, agro-industry is the industry focused on processing agricultural products. The concept of agro-industry is suitable for development in rural areas like Kertek, leveraging both local human resources and natural resources. The development of this agro-industrial concept is expected to create markets for agricultural outputs through the products produced (Amir, 2023).

Meanwhile, eco-tourism is a tourism development concept focused on environmentally friendly and sustainable tourism activities. The emphasis of eco-tourism development is on environmental conservation and biodiversity. This includes the protection of ecosystems and natural habitats. The primary goal of eco-tourism is to preserve nature and local culture while also providing economic and social benefits to local communities. This concept aims to achieve a balance between environmental preservation, education, and sustainable economic activities. The development of eco-tourism also requires cross-sector collaboration and long-term commitment from policymakers (Angela, 2023).

The approach used in the **RDTR Kertek** is based on the concepts of **Compact and Resilient Cities**, aimed at maximizing space efficiency and enhancing resilience to climate change and natural disasters. The compact city concept is a response to the sporadic urban development, known as urban sprawl. It seeks to mitigate the negative impacts of urban sprawl, such as disorganized urban growth. The indicators for measuring





compactness are divided into three dimensions: density, mixed-use, and intensification (Aisyah & Ariastita, 2017). The compact city concept can serve as a solution to existing problems and enhance the integration between land use and transportation systems for urban development (Ratnaningtyas, Rahayu, & Instanabi, 2022).

On the other hand, the resilient city concept relates to a self-sufficient city capable of meeting all the basic needs of its inhabitants through its existing components. This concept closely ties to a city's capacity to withstand, absorb, accommodate, and efficiently recover from the impacts of disasters by restoring the city's structures and functions. The development of the resilient city concept can support initial strategies for resilience and preventive measures, helping to define risk mitigation plans for potential disasters (Abdurrohman, Arkasala, & Nurhidayah, 2021).

In addition to the aforementioned concepts, the formulation of RDTR Kertek carefully considers the policies outlined in the Spatial Planning Regulation (RTRW) of Central Java Province to ensure alignment with broader regional development plans. This is done to ensure that Kertek's planning is not only contextually relevant but also supports the development vision and mission of Central Java Province. With this alignment, it is hoped that the RDTR Kertek can contribute to achieving coordinated and sustainable development between local and regional scales.

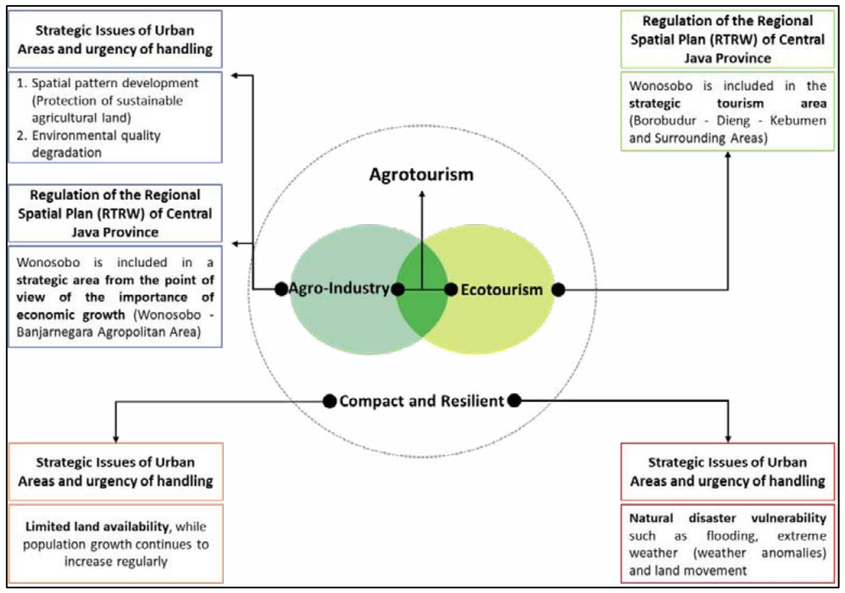


Figure 6 Kertek City Development Concept. Source: Shirvano (2021).

### 2.2. Objectives of Spatial Planning for RDTR Kertek

Based on the review of the potential, issues, and the formulation of the spatial planning concepts previously discussed, the objectives of spatial planning for Kertek are established as follows: **"To realize the urban area of Kertek as a Local Economic Activity Center at the Strategic Node of Wonosobo District that is Quality-Based, Agro-Industry, and Ecotourism, utilizing a Compact and Resilient City Approach."** A more detailed explanation of the objectives of Kertek's spatial planning is outlined below.

1. Local Economy Activity Center

   Kertek has been designated as a Local Activity Center (PKL) in the RTRW of Wonosobo District for 2023-2043, with rapid growth in trade, services, and agriculture. This positions Kertek competitively to serve activities at the district level and neighboring areas.

2. Strategic Node of Wonosobo District

   This strategic node indicates that Kertek has a strategic location and can serve as a supporting activity hub for surrounding areas (Wonosobo and Temanggung).

3. Quality

   With its strategic location and rapid area growth, Kertek is expected to develop adequate facilities, infrastructure, and services that cater to local and regional needs. The quality of these facilities and infrastructure can be optimized to ensure safety, comfort, and sustainability for the community.

4. Agro-Industry and Ecotourism

   Kertek possesses abundant natural resources, particularly in agriculture. The agricultural products can be developed into an agro-industrial sector from upstream to downstream. Additionally, Kertek has potential for natural tourism within the Candiyasan-Keseneng Corridor, designated as a tourism corridor. Both sectors are expected to be leading sectors that can enhance regional and community economies, supported by strategic local potential.

5. Compact and Resilient City Approach

   The compact city approach is adopted due to the increasing population in Kertek, accompanied by a rise in development activities, which may lead to land limitations or urban sprawl. To anticipate uncontrolled development, the compact city approach can be implemented in Kertek. This compact city development also facilitates the construction of accessible facilities and infrastructure for local residents.

   The resilient city approach is adopted to reduce the impact and risks associated with Kertek's vulnerability to disasters, such as landslides and volcanic eruptions. By implementing the resilient city concept, future developments are expected to minimize the effects of natural disasters, such as building damage and loss of life.

### 2.3. Multi-*Stakeholder* Involvement

The Kertek RDTR project involves the participation of stakeholders from various sectors, including Spatial Planning Institutions, Spatial Utilization Institutions, and Spatial Utilization Control Institutions. All these sectors are engaged in a process of discussion, coordination, and mediation to provide insights into their interests and perspectives regarding the development of the Kertek area. The discussion process, referred to as the Spatial Planning Forum, serves as a coordination platform from the central to the regional levels, tasked with assisting the local government by offering considerations in spatial planning implementation. The primary objective of the Spatial Planning Forum is to validate the alignment between spatial planning documents and the Suitability of Spatial Utilization Activities (KKPR), which is subsequently integrated into spatial planning programs. The outcomes of the Spatial Planning Forum are then utilized as a foundation for formulating the Kertek RDTR, incorporating various strategic factors to develop a comprehensive set of objectives for the Kertek area's development.





This methodology ensures a cohesive relationship with long-term plans and future development strategies. It also encompasses indications of programs designed and implemented to guarantee that the spatial utilization plans formulated align with the agreed-upon planning. In the future, each program developed can be assessed through performance indicators to evaluate the resulting outputs and outcomes, thereby ensuring that these programs are executed effectively and efficiently.

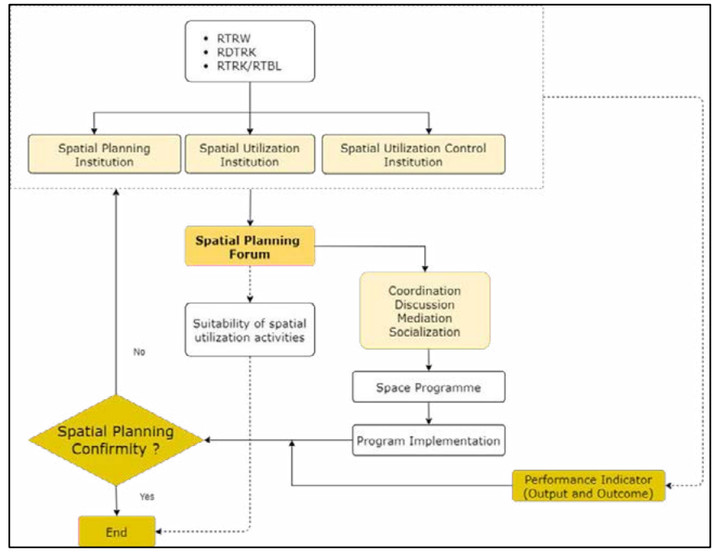


Figure 7 Institutional Linkages and Spatial Planning Process. Source: Shirvano (2021).

## 3. Project Results

### 3.1. Technical Materials

Technical materials such as demographics, the environment, infrastructure, and the economy can serve as the foundation for formulating more accurate spatial planning policies that align with existing conditions. In addition to providing a comprehensive overview of the current state, this document also includes preliminary concepts of zoning regulations. Through the substance that has been developed, this **Fact and Analysis Book** can serve as a guide for sustainable development planning, aiming not only to meet the current needs of the community but also to prepare the planning area to adapt to dynamic environmental, social, and economic changes. Furthermore, this Fact and Analysis Book can provide a solid basis for stakeholders to formulate more targeted, sustainable, and responsive policies to future opportunities and challenges.

The second component is the **Plan Book**, which serves as the Detailed Spatial Planning Report/Narrative that outlines in detail the objectives of spatial planning, encompassing: infrastructure planning aspects (Spatial Structure), land use planning (Spatial Patterns), utilization regulations, and zoning regulations. This Plan Book is prepared based on the in-depth analysis conducted in the Fact and Analysis Book, which integrates crucial data and information regarding the existing conditions of the area. The preparation process for the Plan Book also involves extensive community participation through public consultations, focus group discussions (FGD), and other two-way communication methods, allowing for the collection of diverse aspirations and perspectives from various stakeholders, including local communities. Through

these discussions, the best alternatives that align with the needs and aspirations of different parties can be selected as the basis for formulating the Detailed Spatial Planning (RDTR). Thus, this Plan Book serves not only as a narrative guiding the implementation of spatial planning but also as a strategic document that supports sustainable development and inclusivity within the planning area.


**Figure 8 Fact & Analysis Book and Plan Book Documents. Source: Shirvano (2021).**

The Sustainable Land Use Plan that has been developed is aligned with the Regional Spatial Planning (RTRW) outlined in the Wonosobo District RTRW. The detailed spatial plan emphasizes the importance of environmental conservation, environmental carrying capacity, and environmental sustainability. Within the framework of spatial planning, one of the efforts to achieve environmental conservation is the conversion of mining land into horticultural agricultural land in the Kertek area. This initiative aims to address the pressing need for a balance between urban development and the preservation of vital ecosystem services. It is expected that this land use change plan will reduce the negative impacts of development on the environment while simultaneously supporting sustainable and environmentally friendly land utilization. Thus, this land use change plan not only offers ecological benefits but also promotes regional development that aligns with the principles of long-term sustainability.

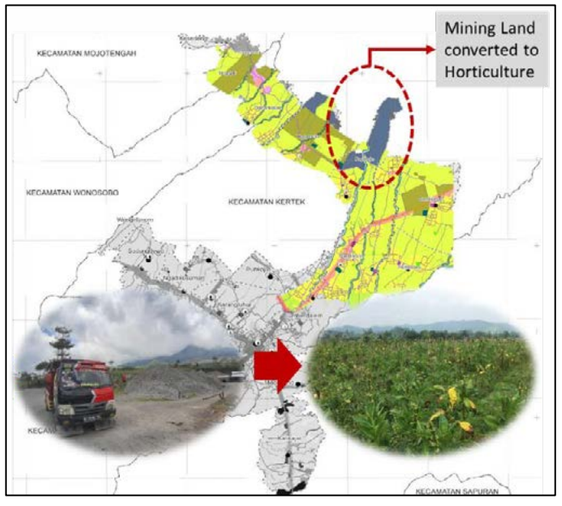


**Figure 9 Strategic Conversion of Mining Land to Horticulture. Source: Shirvano (2021).**





## 3.2. RDTR Map Album

The RDTR Map Album showcases a variety of comprehensive map visuals, including topography, land use, zoning, infrastructure, and special areas (specific regulations). These maps support planning and decision-making by providing clear visualizations of spatial data and development strategies. The creation of this map album involves the analysis of existing conditions, planned developments, and ongoing planning processes.

The map album is presented at a scale or level of precision of 1:5,000 and is accompanied by digital map data that complies with the Geographic Information System (GIS) standards set by the relevant authorities, ensuring accuracy and consistency in spatial data management. The assembled map album consists of at least the following: Planning Area Map, Existing Land Use Map, Spatial Structure Plan Map, and Spatial Pattern Plan Map. Each of these maps provides essential guidance for understanding the dynamics of land use, infrastructure, and potential future land development, as well as offering insights for the formulation of more effective and sustainable spatial planning policies..

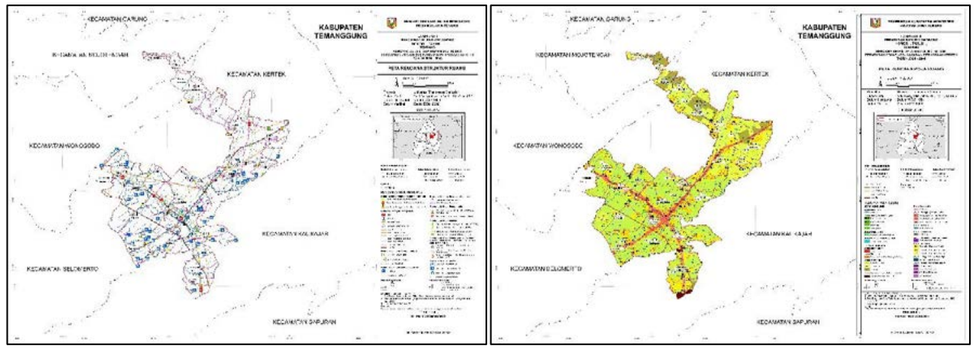


**Figure 10 Example of Map Output. Shirvano (2021).**

## 3.3. Legal Drafting of Regional Head Regulation (RAPERKADA)

In presenting the output of the RDTR, the technical materials that have been prepared will be incorporated into the Draft Regional Head Regulation (RAPERKADA) document. The RAPERKADA is an initial document that outlines proposed regulations and policies for local government management. It is prepared by the local government to address specific issues and guide development within a region, including detailed proposals for new regulations, amendments to existing regulations, and the implementation of strategies aimed at achieving regional development goals and meeting local needs.

The RAPERKADA draft regarding the Kertek RDTR is structured through a clause-by-clause formulation based on the Plan Book, which is then supplemented with attachments, including: Spatial Structure Plan Map, Spatial Pattern Plan Map, Program Indication Table, and Activity and Land Use Regulations Table (ITBX Table). The preparation of this RAPERKADA is crucial because the technical materials that have been compiled will be legalized into the Regional Head Regulation (PERKADA), which holds legal provisions, thereby providing a strong foundation for implementing spatial regulations in Kertek.

The Kertek RDTR PERKADA functions not only as a technical guideline but also as a legal instrument governing land use and building functions within a region. It provides guidance for communities, developers, and other stakeholders regarding zoning, types of permitted activities, and land use regulations.

Moreover, the Kertek RDTR PERKADA serves as a basis for managing permits, including land utilization permits, building permits, and building utilization permits, ensuring that development in Kertek aligns with applicable regulations. This regulation also ensures legal certainty for investors and private parties, thereby encouraging more substantial investment. Additionally, the existence of the Kertek RDTR PERKADA can enhance transparency in the permitting process, accelerating development while preventing conflicts related to land use. It is hoped that by legalizing the Kertek RDTR into PERKADA, the development of the Kertek area can be conducted in a more structured, sustainable manner, aligned with the long-term development vision and mission for the next 20 years.

BAB VII
PERATURAN ZONASI

(1) Peraturan Zonasi sebagai:
a. perangkat oper
b. acuan dalam p
Ruang, terma
development d
c. acuan dalam p
d. acuan dalam p
e. rujukan teknis
penetapan loka
(2) Peraturan Zonasi
a. menjamin dan
b. menjaga kua
penggunaan la
c. meminimalkan
(3) Peraturan Zonasi
a. aturan dasar;
b. teknik pengat
(4) Aturan dasar sebs
a. ketentuan kegi
b. ketentuan inte
c. ketentuan tata
d. ketentuan pra
e. ketentuan kha
f. ketentuan pela
g. ketentuan per
(5) Teknik penaturan

BUPATI WONOSOBO
PROVINSI JAWA TENGAH

RANCANGAN
PERATURAN BUPATI WONOSOBO

NOMOR ... TAHUN ...

TENTANG

RENCANA DETAIL TATA RUANG KAWASAN PERKOTAAN KERTEK
TAHUN 2021-2040

DENGAN RAHMAT TUHAN YANG MAHA ESA

BUPATI WONOSOBO,

menimbang : a. bahwa dalam rangka melaksanakan ketentuan Pasal 7 ayat (1) Peraturan Daerah Kabupaten Wonosobo Nomor 2 Tahun 2011 tentang Rencana Tata Ruang Wilayah Kabupaten Wonosobo Tahun 2011-2031 sebagaimana telah diubah dengan Peraturan Daerah Kabupaten Wonosobo Nomor XX Tahun XXXX tentang Perubahan atas Peraturan Daerah Kabupaten Wonosobo Nomor 2 Tahun 2011 tentang Rencana Tata Ruang Wilayah Kabupaten Wonosobo Tahun 2011-2031, diperlukan pengaturan lebih lanjut mengenai Rencana Detail Tata Ruang Kawasan Perkotaan Wonosobo Tahun 2021-2041;
b. bahwa berdasarkan pertimbangan sebagaimana

**Figure 2 RAPERKADA Source: Shirvano (2021).**

Farmadi, Arbi Ali; Nastiti, Dyah Meutia; Sani, Fadhila Nur Latifah; Aqabah, M. Retas
Harmonizing Urban Development and Environmental Sustainability through Detailed Spatial Plan (RDTR)

| No | Daftar Kegiatan | Zona Lindung | Zona Budidaya | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ruang Tebuka Hijau | | | | | Ruang Terbuka Non Hijau | Pertanian | | | Badan Air | Konservasi | Perikanan | Badan Jalan | Transportasi | Pariwisata | Kawasan Peruntukan Industri | Perkantoran | Pertahanan Dan Keamanan | Pertambangan | Perumahan | | | Perdagangan Dan Jasa | | | Sarana Pelayanan Umum | | | |
| | | | Pemakaman | Rimba Kota | Taman Rw | Taman Kelurahan | Taman Kecamatan | | Hortikultura | Perkebunan | Tanaman Pangan | | Kawasan Konservasi Perairan | Perikanan Budi Daya | | | | | | | Peruntukan Pertambangan Batuan | Perumahan Kepadatan Rendah | Perumahan Kepadatan Sedang | Perumahan Kepadatan Tinggi | Perdagangan Dan Jasa Skala Swp | Perdagangan Dan Jasa Skala Wp | Perdagangan Dan Jasa Skala Kota | Sarana Pelayanan Umum Skala Rw | Sarana Pelayanan Umum Skala Kelurahan | Sarana Pelayanan Umum Skala Kecamatan | Sarana Pelayanan Umum Skala Kota |
| 1 | **PERTANIAN** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Pertanian tanaman semusim | X | X | X | X | X | X | X | I | B | I | B | B | B | X | X | B | X | X | X | X | T | T | X | X | X | X | X | X | X | X |
| | Pertanian tanaman tahunan | X | X | X | X | X | X | X | I | B | I | B | B | B | X | X | B | X | X | X | X | T | T | X | X | X | X | X | X | X | X |
| | Pertanian tanaman hias dan pengembangbiakan tanaman | X | X | B | B | B | B | X | I | B | X | B | B | B | X | X | B | X | X | X | X | T | T | T | X | X | X | X | X | X | X |
| | Peternakan | X | X | X | X | X | X | X | B | B | B | B | B | X | X | X | B | X | X | X | X | B | B | X | X | X | X | X | X | X | X |
| | Jasa penunjang pertanian dan pasca panen | X | X | X | X | X | X | X | I | B | I | X | X | X | X | X | B | X | X | X | X | T | T | X | B | T | X | X | X | X | X |
| | Perburuan, penangkapan dan penangkaran tumbuhan/satwa liar | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pengelolaan hutan | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pemanenan dan pemungutan kayu | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pemungutan hasil hutan bukan kayu | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Jasa penunjang kehutanan | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Perikanan tangkap | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Perikanan budidaya | X | X | X | X | X | X | X | B | B | B | B | B | I | X | X | B | X | X | X | X | B | B | X | X | X | X | T | T | X | X |
| 2 | **PERTAMBANGAN DAN PENGGALIAN** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Pertambangan batubara | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan lignit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan minyak bumi | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan gas alam dan pengusahaan tenaga panas bumi | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan pasir besi dan bijih besi | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan bijih logam yang tidak mengandung besi, tidak termasuk bijih logam mulia | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan bijih logam mulia | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Penggalian batu, pasir, dan tanah liat | X | X | X | X | X | X | X | X | X | X | B | B | X | X | X | X | X | X | X | I | X | X | X | X | X | X | X | X | X | X | X |
| | Pertambangan dan penggalian lainnya YTDL | X | X | X | X | X | X | X | X | X | X | B | B | X | X | X | X | X | X | X | I | X | X | X | X | X | X | X | X | X | X | X |
| | Aktivitas jasa penunjang pertambangan minyak bumi dan gas alam | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Aktivitas penunjang pertambangan dan penggalian lainnya | X | X | X | X | X | X | X | X | X | X | B | B | X | X | X | X | X | X | X | I | B | B | X | X | X | T | X | X | X | X | X |
| 3 | **INDUSTRI PENGOLAHAN** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Industri pengolahan dan pengawetan daging | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | I | X | X | X | B | B | X | X | B | B | X | X | X | X | X |

Figure 32 ITBX matrix attached to RAPPERKADA. Source: Shirvano (2021).



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# 4. Broader Project Impact

## 4.1. Served as a Pilot Project

The document and the whole process of it served as a Pilot Project for developing RDTRs in other rapidly growing areas with similar conditions and scales, particularly those with critical ecosystem services that require effective regulatory and oversight mechanisms. This is especially imporatant given the significant number of RDTRs across Indonesia that have yet to be developed. The matter can be reflected in various forms of documents, whether from the results of spatial pattern mapping, spatial structure, and activity regulation matrices, commonly known as the ITBX table.

## 4.2. Cohesive Space Utilization Models

Models an effort to achieve cohesive space utilization and ecosystem service conservation on a broader scope, considering the interconnectedness and mutual influence of surrounding areas, rather than focusing solely on Kertek development areas. As explained in the context of the Kertek RDTR area, this region possesses high ecosystem services that significantly impact its surroundings, necessitating intervention measures, including environmental and land conservation. On the other hand, land utilization requires clear regulatory handling to ensure that development in the Kertek area can proceed optimally. The Kertek RDTR, through its land use plan maps and activity regulations tables, provides an example of balancing natural and built environments, allowing for continued development within defined activity limits.

Activity restrictions are manifested in a matrix and color gradations on the maps, each representing the extent of land intervention that can be permitted. This model is undoubtedly needed in Indonesia, given the similarity of landforms throughout the country, particularly residential areas in hilly and mountainous regions. In reality, areas affected by urbanization and situated at the interface of rural and urban zones—commonly referred to as suburban areas—should be prioritized for land regulation interventions through spatial planning documents such as the Regional Spatial Planning Document (RTBL) and the Detailed Spatial Planning (RDTR).Kertek can serve as a reference point due to its typology and characteristics, which closely align with the urbanization developments occurring in various regions across Indonesia.

## 4.3. Promotional Civic Engagement

As a comprehensive plan that has and involves various regional stakeholders from local to regional levels, the process of preparing the RDTR has been successfully promotes civic engagement, addresses issues of inequality and marginalization, and enhances safety and security measures. This has been realized through various discussion forums facilitated by the drafting team and the local government. Dialogue with residents is crucial, as the key to the development of the areas surrounding Kertek lies in how the community can play a role in managing their land and environment.





Throughout the entire drafting process, ongoing discussions have raised various issues, particularly concerning the balance between environmental conservation and community economic activities. Additionally, stakeholder mapping has been conducted, which can subsequently inform decisions regarding land use regulations and activities in the area.


Figure 43 Public Engagement of RDTR Kertek. Source: Shirvano (2021).

# 5. Future Development

## 5.1. Document and Process Enhancement

In the vision for the future regarding the development of the RDTR document, several initiatives and innovations can be incorporated into the document's materials. These include:

a. Legal Regulation Mandatory

   Develop to be more structured and balanced the functions as well as focused on intensity of space use with environmental considerations, serving as a regulatory framework for spatial control. Although the drafting process of the RDTR document has also included the preparation of the Strategic Environmental Assessment document, there is a need to strengthen the position of this environmental assessment document as a legal framework for spatial control. Thus, the recommendations from the environmental assessment document can be more integrated into spatial planning and their implementation guaranteed.

b. Process Making

   The process will involve greater collaboration between the private and public sector to develop a comprehensive matrix. Learning from the preparation of spatial planning documents that involve multiple sectors, both public and private, it is crucial that the RDTR document prioritizes dialogues and discussion forums with various stakeholders in its drafting process. This involvement process can take place from the initial drafting stage for gathering aspirations to public consultations regarding regulatory provisions and activities. Discussions and processes which commonly emphasize formal discussions can also incorporate informal discussion methods to achieve more optimal results. This process certainly requires a commitment from the primary drafters to allocate and manage the drafting time effectively and purposefully.

c. Zoning and Regulation Matrix

   Diversifies zoning intensity and provides activity details guideline for effective spatial management. The activity regulation table outlined in the ITBX matrix needs to be reviewed and improved, considering the dynamic nature of current societal developments. Diversification of activities can be initiated based on the typology and transect of development areas, such as city

center, urban, and suburban. This approach is feasible because many activities thrive in urban areas but do not correlate well with suburban areas, and vice versa. While ultimately this table serves as a singular reference, it can be segmented based on transect levels and general characteristics.

Additionally, activity diversification is carried out to accommodate various activities that may occur within a single land use but have a mixed-use residential or development concept, particularly in vertical developments. Such multilayered activities are inherently dynamic and differ from the characteristics of activities that occur solely on a flat site. Therefore, the review and development of the activity matrix can be conducted more holistically and sustainably.

### 5.2. Incorporates Regenerative, Net-Zero and Smart City Initiative

Facing the rapid pace of urbanization and the challenges of the climate crisis presents a unique challenge for planners and designers, necessitating the inclusion and synchronization of planning content with these challenges. Various climate change adaptation initiatives, such as net-zero carbon initiatives, have become significant demands for sustainable development. At a minimum, we need to incorporate net zero carbon initiative and activity permits into the RDTR matrix – promote activities that are more flexible and ressilient in response to changing climate conditions and disaster-prone area. Moreover, considering the massive built environment that is being explored alongside the ongoing demands for development, it is also important to reformulate various forms of spatial planning under Regenerative design zoning area rules. This initiative focuses on intensifying and restoring spaces for nature conservation while accommodating urbanization. Creating climate adaptive climate zone that embrace circular economy principles is essential. The focus of land development and regulation should not only be on creating green spaces but also on regenerating biodiversity within those areas.

The final initiative is to integrate Smart City technology and big data. This is crucial to enhance the decision-making process, ensure that the approach is environmentally responsive and sensitive, enable accurate delineation, optimize public services, and improve land use management. Big data can be manifested in an integrated digital platform that contains spatial information and databases. Based on land parcels and landscapes, this spatial information can then be overlapped with various data related to development regulations. The primary objective is to create a platform accessible to all development actors and the public, as well as policy makers and planners, such as government officials. This platform is also vital to ensure that data and information uniformity can be achieved hierarchically, accessible by both central and local governments.

Other technologies in Smart City development will also significantly support spatial planning and its associated strategies. This includes integrating Smart City elements within both spatial domains and governance in the activity and land use tables of the RDTR document. Ultimately, the RDTR is expected to draw from this single data platform as its foundational spatial data. This not only synchronizes the drafting process but also simplifies the existing RDTR preparation process.

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*Research Paper*

# Development of the Future TOD Area in Blok M Jakarta as a Global Economy District

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## Abstract

*Blok M is one of the areas in Jakarta designated to be a TOD district. This area is expected to contribute to the economy as a global hub. But the area has lost appeal due to a lack of innovation and the 2020 pandemic's challenges. This study identifies opportunities to maximize Blok M's potential as an important transit-oriented area.*

*The objective of this research is to develop a comprehensive and the most optimal design plan for Blok M that addresses the challenges. The study employed a synoptic method approach to facilitate the formulation of sustainable development design strategies. The strategy developed envisions the area as "Blok M: The Metro-Pulse of Jakarta, Enhancing Urbanism with a Human-Centric Ecosystem as a Global Economic Hub". There are 3 key design principles in this concept Create The Identity, Elevate The Activity, and Stimulate The Mobility.*

*The strategic planning and design are expected to develop a livable, inclusive TOD in Blok M, contributing to Jakarta's transition as a sustainable global economic city and serving as a model for regenerative city development. The paper offers practical design principles and planning approaches that can contribute to fostering sustainable urban growth and enhancing the quality of life.*

## Keywords

*Blok M, Global Economy Hub, Human Centric Design, Regenerative City, TOD.*



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## 1. Introduction

With the changes of Indonesia's capital from Jakarta to Nusantara in Kalimantan, the role of Jakarta is undergoing a significant transformation. Jakarta's future development and policy will now focus and leading to enhancing its economic strength by becoming a global city. According to the Jakarta Regional Development Planning Agency (2022), the city is prepared to be a major hub for finance, trade, and international business in Indonesia. As part of this transition, efforts will be made to improve the investment climate and ensure Jakarta continues to make a substantial contribution to Indonesia's GDP. This shift signals an ambitious reorientation of Jakarta's urban agenda, emphasizing global competitiveness while addressing the challenges that come with increased economic activity.

In the context of these ambitions, various districts within Jakarta must adopt more aggressive and innovative strategies to stimulate economic growth. This push for development is further complicated by Jakarta's growing urban challenges. High rates of urbanization have contributed to the main issues, including overpopulation and inadequate infrastructure. The city's migration rate continues to rise, with an influx of between 0.66% - 1.19% annually, equating to approximately 113,000 new residents each year (Statistical Bureau of Jakarta, 2023). With a population of 11.3 million, Jakarta is the 28th most densely populated city in the world, with a density reaching 16,000 people per square kilometer (Statistical Bureau of Jakarta, 2023). The city's rapid population growth worsens its already severe housing shortage, resulting in a backlog of around 1.4 million homes that are needed (Minister of Agrarian Affairs and Spatial Planning of the Republic of Indonesia, 2017). The inability to meet housing demands has led to the spread of informal settlements, further straining urban infrastructure and services.

In addition to urbanization and housing shortages, Jakarta faces critical environmental challenges linked to climate change. The city is increasingly vulnerable to the effects of global warming, which manifest in phenomena such as the urban heat island effect, deteriorating air quality, and more frequent natural disasters, notably flooding. These challenges are driven by high greenhouse gas emissions from fossil fuel consumption and unsustainable land-use changes. The compounding impact of these factors creates a difficult environment for urban planners to develop inclusive, healthy, and livable spaces within Jakarta.

One of the key areas identified for economic development in Jakarta is Blok M, a district located in South Jakarta. Historically, Blok M has been an economic and commercial hub, but it has recently been earmarked for revitalization as a Transit-Oriented Development (TOD) zone with the garden city concept (MRT Jakarta, 2023), which envisions green spaces integrated with urban growth. The introduction of the MRT and the construction of Martatilahu Park initiated in 2017 and 2021 respectively, are part of the district's broader transformation. Blok M is expected to significantly contribute to Jakarta's economic revitalization and its global ambitions. However, despite these efforts, the district faces several setbacks. The area has experienced a decline in visitors and a decrease in business activity, with numerous tenants closing down. This downturn has been attributed to a lack of innovation and an inability to recover from the effects of the 2020 COVID-19 pandemic, which severely impacted local businesses.

Given Jakarta's broader economic objectives and the specific challenges facing Blok M, it is evident that a strategic and well-considered design intervention is required. Blok M must adapt to the changing urban landscape and reassert itself as a future global economic zone. This research aims to explore comprehensive design solutions that can revive the economic district in Blok M and transform Blok M into an integrated and vibrant TOD district. This transformation should give Blok M economic growth contributing to Jakarta's emergence as a globally competitive city while also enhancing the quality of life

of its residents. The success of this endeavor depends on Blok M's ability to balance economic growth with environmental sustainability and social inclusivity, ensuring its long-term resilience in the face of ongoing urban and environmental challenges.

## 2. Method

### 2.1. Site Profile

Blok M is a prominent area located in Kebayoran Baru, South Jakarta, Indonesia, recognized for its vibrant blend of cultural, commercial, and social activities, particularly during the 1970s to the late 1990s. The area holds significant historical and cultural importance, especially for the Japanese community in Jakarta. Over the years, Blok M became a central hub for this community, offering various Japanese businesses such as restaurants and entertainment venues. Moreover, the annual Ennichisai festival, which began in 2010, celebrates Japanese culture through performances and cuisine (Jonathan, Marion and Dewi, 2020). Historically, Blok M was a popular retail and entertainment district, particularly for the younger generation. However, the area has experienced a decline in appeal due to a lack of innovation and has not fully recovered from the impacts of the 2020 pandemic.

Blok M is well-connected to several transit nodes, including a bus terminal and the MRT, making it an integral part of Jakarta's transit network. Additionally, it is home to several prominent commercial centers such as Blok M Square, Blok M Plaza, Pasaraya, and Menara Sentraya. These factors make the area strategically valuable for its development as a Transit-Oriented Development (TOD) zone. In this study, the focus is on the development of the area surrounding Blok M Square, covering a total area of 21 hectares.

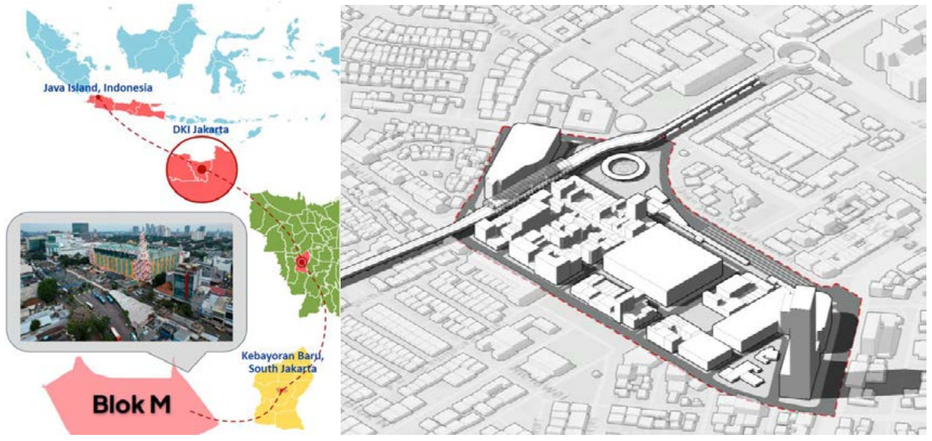


Figure 1. The Existing Site of Blok M. Source: Author Analysis, 2024

### 2.2. Design Approach

This research on the Blok M area development draws on literature related to Transit-Oriented Development (TOD), Human-Centric Design, and Inclusive Economic Growth.

***TOD***





Transit-Oriented Development (TOD) is a development concept focused on enhancing areas within and around mass transit hubs by integrating public transport networks with non-motorized transport options, thereby reducing motor vehicle use (Baidowi and Pius, 2020). This model promotes mixed-use, high-density development with moderate to high land utilization (Minister of Agrarian Affairs and Spatial Planning of the Republic of Indonesia, 2017)


Figure 2. 8 Principles of TOD. Source: ITDP, 2017

According to the Institute for Transportation and Development Policy (ITDP), eight principles of TOD include: (1) Walking: creating pedestrian-friendly environments; (2) Cycling: supporting bicycle use for safer, busier streets; (3) Connectivity: establishing dense road networks for easy access; (4) Transit: ensuring well-provided, affordable public transportation; (5) Mix: fostering diverse activities and residents; (6) Compactness: facilitating shorter urban travel; (7) Density: maintaining sufficient population levels for vibrant public services; and (8) Shift: encouraging sustainable transport modes like walking, cycling, and public transit (Delaware Department of Transportation University of Delaware, no date; University of Arkansas Community Design Center, no date; *TOD Standard 3.0*, 2017).

***Human Centric***

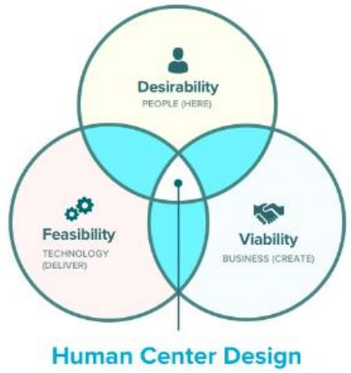


Figure 3. Human Center Design Concept. Source: leadfuze

Human-centric urban design focuses on creating urban spaces that prioritize the needs and well-being of people. This approach contrasts with traditional urban planning, which often emphasizes vehicular traffic and infrastructure over human experience with the key aspects: (1) Pedestrian and Transit-Friendly Features: Research indicates that human-centric designs, such as narrowed streets and wider sidewalks, enhance the livability of urban streets (Gehl, 2013; Das, 2023). Pedestrian satisfaction increases with fewer vehicular lanes and the presence of transit-friendly facilities like bus stops and subway stations (Choi *et al.*, 2016); (2) Social and Environmental Considerations: Human-centric urban design also involves considering

the social, environmental, and economic impacts of urban projects. This approach aims to create solutions that are socially desirable, technically feasible, and economically viable (Volpi, Opromolla and Medaglia, 2019); (3) Humanized Transportation Design: Incorporating humanized ideas into urban road design, such as barrier-free facilities and well-designed sidewalks, aims to meet people's physiological and psychological needs, ultimately achieving harmony between humans and nature (Zhou, Zhou and Zha, 2015; McGill, 2023).

In conclusion, Human-centric urban design is a holistic approach that prioritizes human needs and experiences, enhances community livability, and involves interdisciplinary and community collaboration to create sustainable and desirable urban environments.

***Inclusive Economy***


Figure 4. Inclusive Growth Pillars. Source: UNCTAD

Inclusive economic growth is a multi-dimensional concept aimed at ensuring that the benefits of economic development are equitably distributed across all societal segments (Deng *et al.*, 2013). It emphasizes equal opportunities for all individuals, particularly the disadvantaged, to engage in economic activities and benefit from them. This approach extends beyond traditional measures like GDP per capita to include indicators such as labor productivity, employment, and poverty, reflecting overall societal well-being. Inclusive growth seeks participation from all socio-economic strata in wealth creation, necessitating policies that promote asset accumulation and long-term development for the disadvantaged (Angulo Bustinza and Zeballos Ponce, 2023).

### 2.3. Design Process

This study attempts to develop a design using the synoptic method approach. The synoptic method is a structured and rational approach to urban planning and design that emphasizes a systematic process integrating various alternatives to achieve optimal solutions for urban development challenges (Shirvani, 1985). In our design, we employed three design concepts to achieve sustainable development goals: Transit-Oriented Development (TOD), Human Centric, and Inclusive Economic Growth. We then iteratively developed the design concepts and plans based on economic feasibility, until we reached a design that can be implemented and achieve the goals for the area's development. The following outlines the design process we conducted.





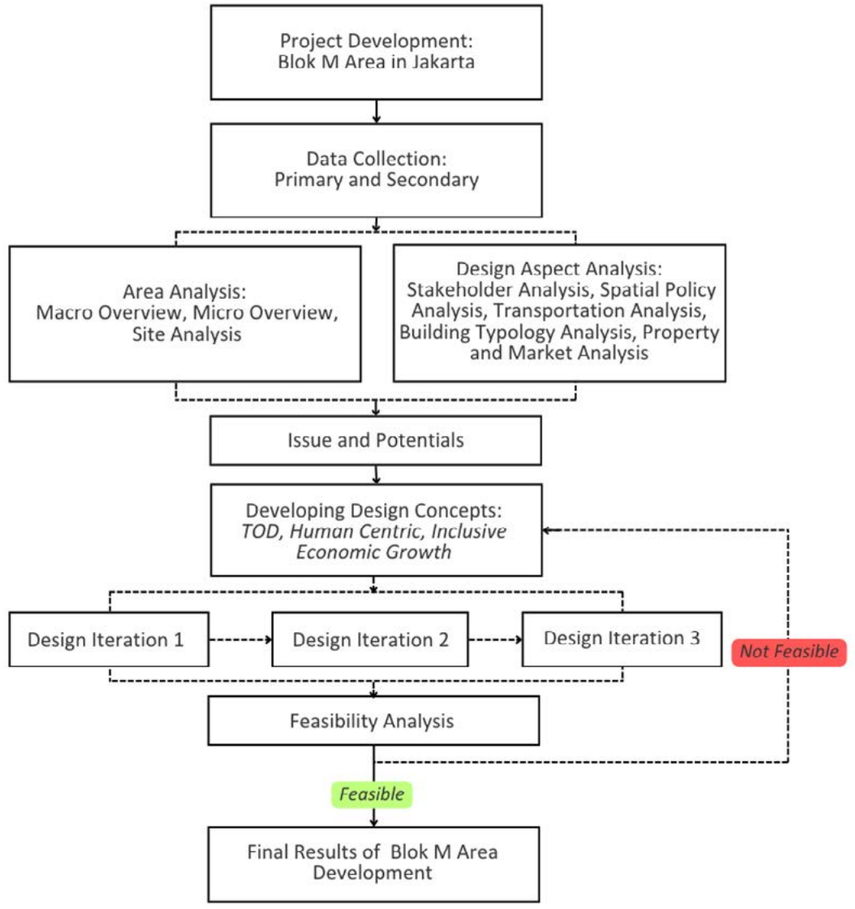


Figure 5. Design Process Framework. Source: Author Analysis, 2024

## 3. Result and Discussion

### 3.2. Design Vision

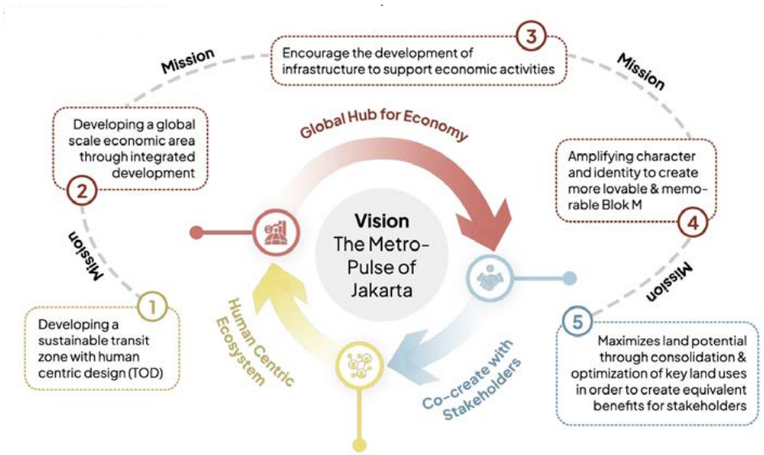


Figure 6. Design Vision. Source: Author Analysis, 2024

The Blok M area is being redesigned with the vision "Blok M: The Metro-Pulse of Jakarta: Enhancing Urbanism with a Human-Centric Ecosystem as a Global Economic Hub," focusing on creating a Human-Centric Ecosystem and establishing Blok M as a Global Economic Hub. This vision will be achieved through three major concepts: human-centric design, a Global Economic Hub, and Co-Creation with Stakeholders.

a. Human-centric Ecosystem

   The Blok M area is directed to become (1) Transit Oriented Development with an area design that can improve the welfare of human life carrying out activities in the Blok M area. The design prioritizes the walkability and accessibility of the area.

b. Global-hub for Economy

   Developing a global scale economic area through (2) integrated development of a vibrant (mixed-use) area. In its implementation, (3) it is necessary to encourage the development of infrastructure to support economic activities (basic services, connectivity, and business incubation facilities), and (4) strengthen the character and identity of the area to create a more beloved and memorable Blok M.

c. Co-create with Stakeholder

   Involves the involvement of various groups and individuals who are affected or have an interest in the design and development of urban space. This is realized by maximizing land potential through (5) consolidation and optimization of land use to provide commensurate benefits for stakeholders.

### 3.3. Design Framework

To realize the vision of the Blok M area as the “Metro-Pulse of Jakarta,” a comprehensive design framework must be established, centered around three key concepts: Create the Identity, Elevate the Activity, and



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Stimulate Mobility. The identity of the area is anchored by Blok M Square, which serves as the central hub, flanked by two sub-centers that are interconnected through visual axes. This deliberate design fosters a sense of place and coherence, making Blok M a recognizable and inviting destination within the city.

To elevate activity within the district, a vibrant mix of commercial, office, and residential functions is incorporated, with particular emphasis on commercial activities that attract visitors and residents alike. This blend not only enhances the area's economic vitality but also encourages social interaction and community engagement. To ensure the area remains lively, excellent pedestrian accessibility is prioritized through the creation of a pedestrian spine that facilitates movement within the district, while motor vehicle access is effectively managed outside the core area, promoting a safer and more walkable environment

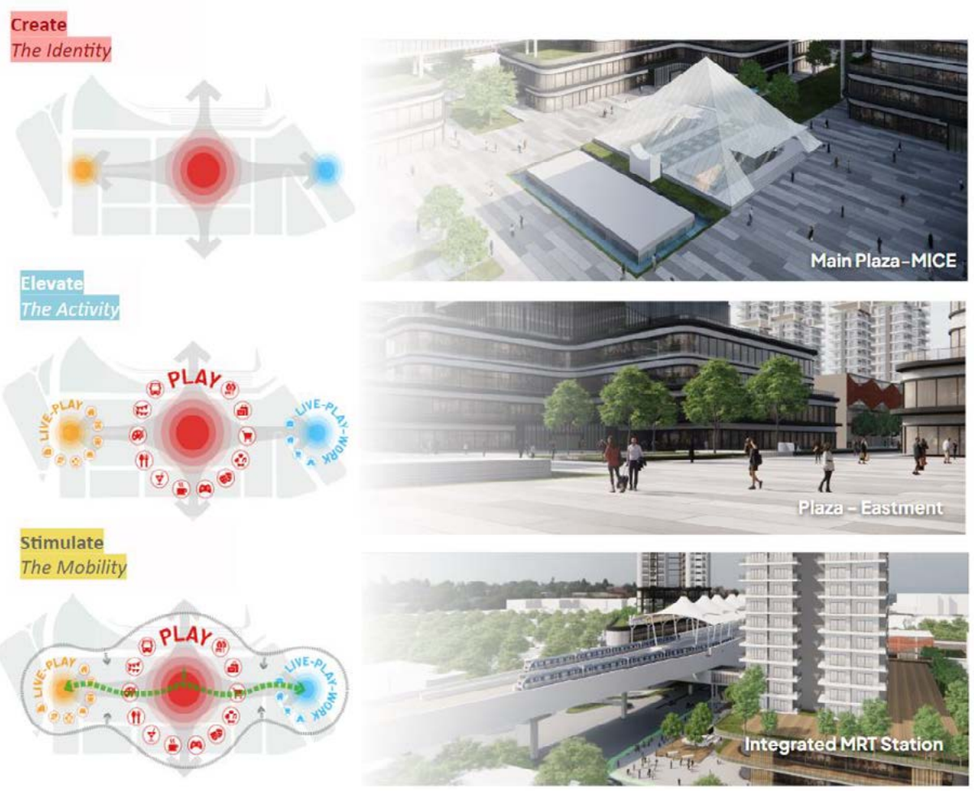


Figure 7. Design Concept Metro Pulse of Jakarta. Source: Author Analysis, 2024

From the framework above, we then translated the approach into an urban design framework in which there are zoning concepts, spatial structure (circulation) concepts, open space concepts, and multilevel spaces. In terms of zoning, this area has 7 (seven) zoning: commercial, mixed-use, residential, open space, public facility, office, and parking. The mixed-use zone is increased to support the human-centric theme and TOD principles. The area is dominated by mixed-use and commercial zones, reflecting the character of Blok M. Commercial zones include F&B retail, cafes, entertainment, art & culture, superstores, hotels, and

shopping malls, which are attractive to investors. The area is also designed to be a superblock model where there are 9 (nine) main blocks with names ranging from Block A (with the westernmost position) to Block I (with the easternmost position). Each block is then subdivided into 2 sub-blocks according to the difference in function designation or the difference in placement.


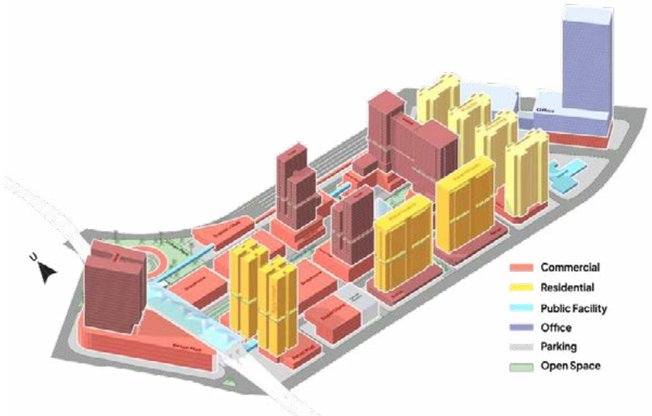


Figure 8. Urban Design Framework (Zoning). Source: Author Analysis, 2024

The area is designed with a focus on pedestrian-oriented access through public easements, making it permeable and easily accessible. The main axis, the "Cultural Main Axis," serves as the primary pedestrian corridor from the MRT station to the center point, creating a monumental impression. Along the main axis, buildings with active frontages will be provided to enhance attractiveness. Motorized vehicles can only access the area through the roads in the north and south, with parking in the basement and on-street parking in the south to support the superstore function. The Blok M bus terminal and the MRT station are





connected by a sky bridge to improve integration between transportation hubs. All roads are designed with interconnectivity, without any dead-ends, to support the overall connectivity within the area.

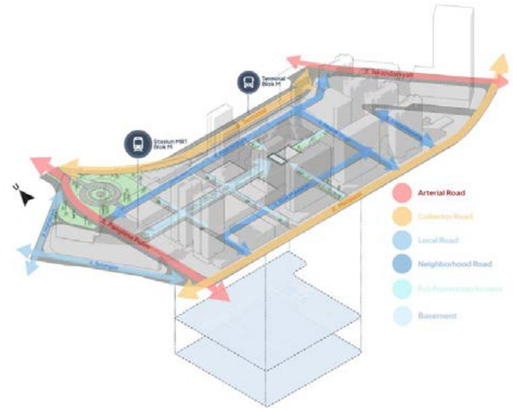


Figure 9. Urban Design Framework (Circulation). Source: Author Analysis, 2024

The open space area in the district has been increased to 35% of the total land, which has been maximized in the form of a plaza designed as a public open space that can accommodate various formal and informal activities. The plaza's design considers accessibility, circulation, and connectivity with the surrounding buildings, further activating the district and improving the microclimate, through the use of vegetation and paving materials that create thermal comfort and good air circulation. Additionally, the green building concept is applied with green roofs and podiums as extra open space, enhancing the visual and environmental quality, as well as offering more recreational and social opportunities for users.

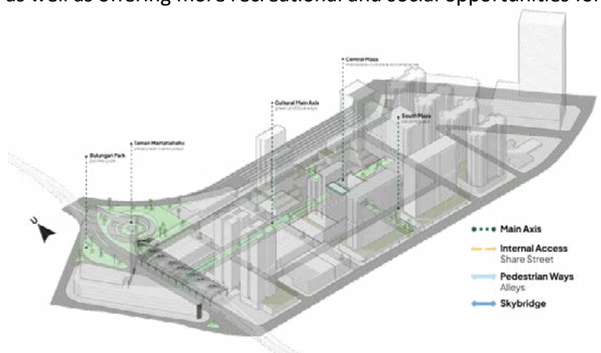


Figure 10. Urban Design Framework (Open Space). Source: Author Analysis, 2024

We conceptualize spatial capacity across three distinct layers: underground/basement, surface, and aerial/building height. By analyzing the potential utilization of each layer, we can optimize the activities assigned to these levels for maximum efficacy. The underground layer is designated for MICE facilities, event galleries, parking, and essential utilities. The surface layer is allocated for open spaces and plazas, fostering social interaction and recreation. The upper layers are reserved for dynamic building functions. This multilevel space approach facilitates the effective utilization of underground, ground-level, and above-

ground spaces through multifunctional buildings that integrate residential, commercial, and office uses. Ultimately, this strategy seeks to enhance density and land-use efficiency while contributing to a more functional and cohesive urban environment.

Figure 11. Urban Design Framework (Vertical Space). Source: Author Analysis, 2024

With all of these concepts in mind, we can effectively visualize a comprehensive three-dimensional rendering of our design ideas, allowing us to better understand the spatial relationships, aesthetic qualities, and functional integrations of the various elements we propose to implement in the Blok M urban environment.



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Figure 12. 3D Render Metro Pulse of Jakarta. Source: Author Analysis, 2024

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### 3.4. Development Strategy

The proposed development strategy adopts an integrated approach that blends economic, human-centric, and collaborative elements. The human-centric design strategy focuses on creating an inclusive and accessible environment by prioritizing pedestrians with the provision of a main boulevard, cycling lanes, and easily accessible public spaces. It ensures direct connections between all buildings and key transit points, such as MRT stations and terminals, reducing dependency on private vehicles. Centralized basement parking minimizes surface traffic and maximizes space for public and commercial use. The design also includes a well-integrated transit hub to facilitate seamless transfers between transportation modes, enhancing travel efficiency. Additionally, buildings are designed with human-scale proportions to promote comfort, accessibility, and social interaction, contributing to the overall well-being of users.

The Global Hub for Economy by Complete Lifestyle strategy aims to develop a dynamic and diverse land-use mix that caters to various lifestyle needs, integrating spaces for work, live, and play. It emphasizes plaza enrichment by enhancing public spaces for recreation, social interaction, and environmental quality. The strategy also focuses on the reorganization of street vendors through relocation to a designated center. Additionally, the inclusive living initiative promotes affordable housing options to ensure inclusivity within the Transit-Oriented Development (TOD) area. The creation of thriving nodes at Blok M Square introduces distinctive landmarks, enhancing the district's identity and vibrancy, while the cultural axis incorporates local cultural elements such as sculptures and traditional architecture to enrich the area's visual experience and cultural identity.

The Co-Create with Stakeholders strategy focuses on optimizing land use through two key approaches. First, the optimum form initiative consolidates small land parcels into more efficient building forms, improving land-use efficiency and enhancing the overall value of the area. Lastly, the multilevel space approach promotes the effective utilization of underground, ground-level, and above-ground spaces through multifunctional buildings that integrate residential, commercial, and office functions. This strategy aims to increase density and land-use efficiency while creating a more functional urban environment.

### 3.5. Future Impact

With these redevelopment ideas, Blok M will present significant sustainable development principles that impact in economy, social, and environment. Economically, it aims to establish a new commercial hub by attracting investment, creating jobs, and increasing property values through integrated mass transit systems like MRT, BRT, and microtrans. This transit-oriented development maximizes land value and drives growth.

Socially, the redesign enhances pedestrian connectivity and accessibility, fostering inclusivity and improving residents' quality of life through public amenities like parks and green spaces. The project will accommodate an increase from 0 to 3,128 households, including 1,480 units for low-income residents, addressing essential needs for affordable housing and social equity.

Environmentally, Blok M emphasizes green open spaces and natural elements, prioritizing emission reduction and non-motorized transport. Compact, high-rise designs optimize land use, reducing the carbon footprint and contributing to a healthier urban environment. The establishment of a low-emission zone, incorporating 35% green open space, further reinforces the area's commitment to sustainability.

Additionally, the development of Blok M: Metro-Pulse of Jakarta is expected to support the growth of Global City Jakarta in alignment with the Sustainable Development Goals (SDGs), particularly Goal 8, which promotes inclusive economic growth, and Goal 11, which aims to make cities inclusive and sustainable.



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## 4. Conclusions

This research establishes a compelling strategic vision and design approach to revitalize Blok M in Jakarta as a vibrant global economic district. The study proposes a human-centric, transit-oriented approach that prioritizes walkability, accessibility, and multimodal integration while fostering inclusive and sustainable growth through the provision of affordable housing, public spaces, and opportunities for economic participation. The design framework also introduces innovative strategies to optimize land use and integrate multi-level spaces, alongside a collaborative stakeholder engagement process, positioning the Blok M project as a replicable model for sustainable urban development that can enhance Jakarta's economic positioning and livability. For the next step, we advocate for the incorporation of the design ideas into the spatial planning framework of Jakarta, particularly in the upcoming relocation of the capital city.

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*Research Paper*

# Challenges of Commuting via Public Transportation: An Analysis of Students Traveling to National University-Manila from the South

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## Abstract

*Assessing the Effects of Relative Humidity to the Health, Comfortability and Cognitive Functions of Students: A Case Study at National University Manila National University- Manila, located in Sampaloc, Manila, experiences high humidity and tropical monsoon climate all throughout the year. Environmental indoor quality is crucial for health and comfort, and humidity affects the classroom's microclimate. This study investigates the effects of humidity on students at National University-Manila. The research examines how humidity impacts health, comfort, and academic performance in classrooms. A mixed-method approach was used in the study, integrating surveys, observations, literature reviews, and experiments. The relative humidity within the campus serves as the unit of analysis, while the students serve as the unit of observation. This study found that health problems like headaches and fatigue during high humidity periods are experienced by the students. The moderate humidity level of 40% to 60% is the proper perceived range for the cognitive and comfort of students. The level of humidity tends to be higher in the afternoon rather than mornings. High humidity hinders concentration and focus, despite perceived comfort in classrooms. Classrooms with air conditioning and windows have lower humidity levels than enclosed spaces like hallways. The beneficiaries of this study are students involved in the management of educational environments. By understanding how relative humidity affects a student's health or well-being and cognitive abilities. It can implement targeted strategies to optimize indoor air quality. Expected outcomes of this study include determining the optimal humidity level that contributes to student health, comfort, and academic performance, as well as providing our recommendations for improving air quality within the university.*

## Keywords

*Commuting Experience, Public Transportation, Transport Demand Management, Traffic Congestions*



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## 1. Introduction

In today's modern world, commuting is now a normal day-to-day activity that most people engage in, especially in college life. College is a path that young adults take to prepare for adulthood and pursue their careers, making educational institutions an important role in shaping one's future. In this stage, young adults experience different challenges, from inconvenience to different stress levels, especially when commuting. Various factors that influence this multifaceted journey, including the physical proximity of the campus to the students. Students that commute longer were found to have higher stress levels which is 37.8% compared to those who have shorter commutes which is 24.1% (Jamil et al., 2022). Researchers have found that students view their commuting experience as a hindrance to their academic success. When students are satisfied with their commute, this positively affects their attendance, participation in activities, and perception of academic success, highlighting the significant impact of transportation on student's well-being (Taylor & Mitra, 2021).

Universities, especially in urban areas, contribute notably to urban mobility patterns, as more students are getting affiliated in these institutions. The transportation pattern to and from these universities can impact urban mobility. In recent years, Italy implemented Transport Demand Management (TDM) to alleviate these issues. Transport Demand Management (TDM) is a set of strategies aimed at maximizing traveler choices, including commuter ridesharing, air quality mitigation, development, and multi-modality in transportation plans, which provide travelers with effective choices to improve travel reliability, according to the US Department of Transportation Federal Highway Administration. . These policies aim to reduce car usage that is one of the cause of traffic and encourage people to start using a different mode of transportation such as biking and public transport. However these policies were limited whether this policies is effective especially in the context of commuting students.

A study conducted about the effectiveness and social efficiency of TDM policies found that while these policies are effective in reducing car use which help alleviate congestion and support the urban mobility plan where focuses on moving people and goods rather than vehicles (Kakujo, 2022)(www.ctc-n.org), only some of these are efficient. Researchers highlighted that thorough analysis in designing policies are needed to ensure that they are both effective and efficient in achieving the goals (Lucia & Romeo, 2015).

### 1.1. Commuting Patterns of Students

Commuting to school and from school is quite common in urban areas which is supported by a study conducted at Mapua Institute of Technology found 63.2% of students who live within campus and dormitories walk, and multimode travel accounts for 21.8% of the total, and it often takes multiple modes to return home, such as walk, bus, LRT, jeepney, or fx (Lim et al., 2017). Students who live near the campus shows different commuting modes to and from school, some students are driven to school but walk back home possibly due to parental convenience or scheduling constraints (Herrador-Colmenero et al., 2019). The pattern may differ, especially at the college level, where some students come from different cities. The choice of mode of transportation can be influenced by gender differences and seasonal factors. Non-motorized modes of transportation are favored in warmer months; this shows disparities between preferences of male and female, with male generally more likely to bike than females (Delmelle & Delmelle, 2012). This was also supported by a study conducted at the University of Leon (ULE), where men use bicycles and motorcycles frequently and women tend to take other modes of transportation (Hidalgo-González et al., 2022). Another study suggests that students who live alone are likely to commute by driving alone, while students who have classmates who live nearby and have friends increase the likelihood of taking public transportation (Zhou, 2012). Study conducted in Sylhet, Bangladesh found that active

commuting is common but most use passive modes, factors such as distance, preferred mode of commuting, socioeconomic status, weather conditions, distance, authority, time effects, road safety, residence, and internet use influence students' choices (Urmi et al., 2022) (Müller et al., 2008). Therefore, understanding the complexities of student transportation to and from campus uncover a multifaceted landscape of challenges.

### 1.2. Challenges of Commuting

Commuting as a student can be a challenge from time management to academic impact. The most common problem that most commuters experience is traffic and long queues that affect both private and public transport. These factors are just one of the few that students face as they travel to school. Students reported a negative impact on their participation on campus activities and academic success where they perceive commuting as a barrier to campus activity (Taylor & Mitra, 2021). This claim is also supported by a study conducted in Davao City, where the correlation between traffic congestion and class attendance motivation has a significant relationship. As students negatively experience traffic as they travel, they feel stress, frustration, and anxiety that impact their motivation to attend class (Rellon et al., 2024). This suggests that traveling a long distance consumes a lot of their time that reduces their availability to study and rest. Research found that longer commutes negatively impact Subject Well-being (SWB) and mental health, while active travel modes such as walking and cycling reduce depressive symptoms and improve their life satisfaction (Liu et al., 2022). Study also shows that Active Commuting (AC) to and from university could be beneficial for the students health since young adulthood is a period where obesity and metabolic syndrome (MetS) is critical, researchers found that male students who walked to campus are less likely to be obese, have lower HDL cholesterol (HDL-C) and high blood pressure compared to passive commuters (García-Hermoso et al., 2018) but in recent study found that there are no correlation between weight gain and commute duration where their findings the highest percentage of weight gain is 34.9% occurring between 5 and 30 minutes (Jamil et al., 2022).

The objective of this study is to evaluate the challenges faced by students at National University-Manila who commute from the southern region of Metro Manila to the campus. This study also aims to identify and analyze how their commuting experiences affect their participation in campus activities and their overall well-being. Additionally, this research investigates the factors that influence the commuting patterns among students from the southern part of Manila, explores the role of gender in shaping to their commuting experiences. Furthermore, the commuting modes chosen by the students will be analyzed for the impact of active commuting in improving physical health. Lastly, the convenience of use and accessibility of the many forms of transportation these students use will be assessed as well as the methods of time management they utilize to get through long travels.

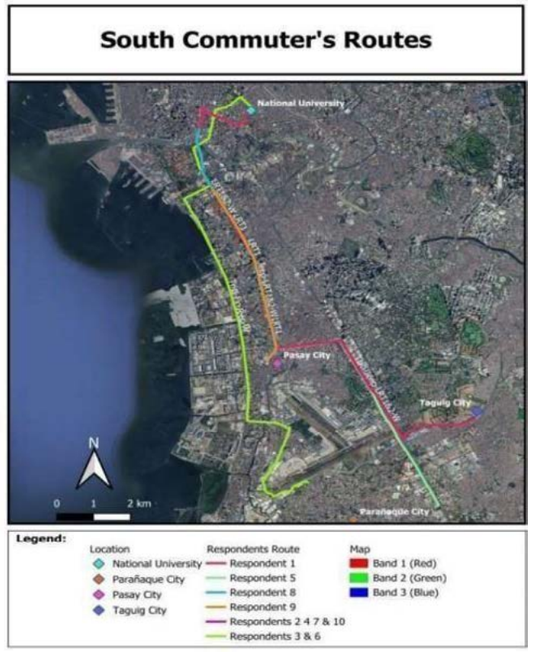
- What are the biggest challenges that students traveling to the National University of Manila from the southern parts of Metro Manila has to face?
- What are the key factors influencing the choice of transportation mode among students commuting from the south?
- How effective are existing transportation policies and infrastructure in supporting the commuting needs of students traveling from the southern regions?





## 2. Methodology

The assessment of the experience of commuters to the national university of Manila among college students from the South. The selected respondents serve as the unit observation of this study, their perceptions and personal experiences will be the main data gathered for this research. Data collection focuses more on how individuals experience or challenges when going to university, this approach allows for a deeper understanding of the challenges faced by college students who have commute. The independent variable is the commuting experience of college student from south to the National University, and its dependent variables are the different distances to the university. Moderating variables transportation options, weather conditions, and socioeconomic status which can affect the relationship of the dependent and independent variables. The variables are the data from QGIS software mapping from a processing toolbox called network analysis.




### 2.1. Spatial Data and Tools using QGIS

Location of student, university, and transportation networks; and network analysis tool to assess the efficiency of various travel routes. This data has significance for organizing and improving the transportation system, to locate possible delays in traffic, places where access to transit is limited, and chances to enhance communication between college campuses and residences for students.

### 2.2. Structured Interview

To study the challenges faced by students traveling by public transportation to National University-Manila from the South, The study will target students living in the southern region such as Parañaque, Makati,

Pasay, etc. Using stratified random sampling, the population is divided into strata based on their place of residence.

### 2.3. Thematic Analysis and Comparative Analysis

This will be used to gather data of students, travel routes that have experienced traffic,times, and which will provide information about the commuting behavior of college students from the south. This information can be crucial for optimizing transportation mobility, enhancing safety measures, and promoting sustainable commuting practices among students.

After getting the data from the respondents, we will use it in the Mapping Software QGIS which will mark the route according to the respondent what is their experience or challenge when they commute. The result of this is that we will use what issue we want to solve. In the process we will do is the structured sampling, our focus is to find college students who live in the South (Pasay, Parañaque, and in Taguig) and for the additional respondent we will look for a young adult, middle age and old adult with a total of 10 all respondents. We conducted the interview face to face and the question contents were 25 questions and it lasted 10-15 mins. The questions include commuting experience, challenges faced, factors influencing transportation choice, gender difference, active commuting and physical health, time management strategies, policies and infrastructure, insight and recommendation from the respondent, in this process we will use thematic analysis, We will collect responses from college students and participants about their common challenges in commuting and their recommendations on all themes. Next, we used a comparative analysis, this is the content of the respondent, what is their experience in commuting, routes that have experienced traffic. All the results of this help to solve through our recommendation to avoid the challenges in commuting of students and commuters in Manila.

## 3. Results and Discussion

Table 1 presents the data collected from the interviews with 7 students of the National University-Manila and 3 participants, from a senior high school student to a working adult up to the elderly. The analysis of the respondent (Resp't) feedback shows several similar insights regarding the challenges, factors that influence choice of transportation, and effectiveness of TDM policies for students that commute from the southern part of Metro Manila to NU-Manila.



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Table 1: Demographics and Commuting Experience of Respondents

| Attribute | Resp't 1 | Resp't 2 | Resp't 3 | Resp't 4 | Resp't 5 | Resp't 6 | Resp't 7 | Resp't 8 | Resp't 9 | Resp't 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Age | 18 | 20 | 17 | 20 | 20 | 20 | 20 | 74 | 17 | 41 |
| Gender | Female | Male | Female | Male | Female | Male | Male | Male | Male | Female |
| Place of Origin | Taguig City | Pasay City | Parañaque City | Pasay City | Parañaque City | Parañaque City | Pasay City | Pasay City | Pasay City | Pasay City |
| Duration of Commute | 2 hrs. | 1 hr | 1-2 hrs. | 25-30 mins | 1-2 hrs | 1-2 hrs | 40 mins - 1hr | 30 mins | 20 mins - 1hr | 1hr |
| Mode of Transportation | Tricycle-Jeepney-LRT1& 2-walk | LRT1 & 2- Walk sometimes | Tricycle FxJeepney-Walk | LRT1 & 2- Walk | Jeepney-LRT 1& 2 | Tricycle-Fx-jeepney walk or Trici-jeepney- LRT1- 2-walk | LRT1 & 2- Walk | LRT1 | LRT1 | LRT1& 2 |
| Traffic Experience | Magallanes Rd & EDSA | Mendiola Intersection | Roxas Blvd. Quezon Blvd. España Blvd. | No particular Issues | EDSA & Paranaque West Service Road | Roxas Blvd. Quezon Blvd. Espanya Blvd. | No particular Issues | No particular Issues | No particular Issues | No particular Issues |
| Time Management | 2 hours before | 1 hr and 30 mins before | 1-2 hours before | 30 mins- 1hr before | 2 hours before | 1-2 hrs before | 2 hours before | None | Leave early | Leave early |
| Factors Influencing Choice | Cost less | Cost less convenience | Fast and convenience | Fastest mode of transp. | Cost less, convenience, faster | Cost less and convenience | Fast and Cost less | Cost less, fast and convenience | Cost less, fast, safe and convenience | Fast and convenience |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Active or Passive Commuting | Walking - to save money | Walking- Faster | Passive Commuting | Passive commuting | Walking- exercise | Active - commuting | Passive commuting | Passive commuting | Active commutin g | Passive commuting |
| Common Challenges | Traffic, Crowd Crush, and Theft | Delay, overcrowding | Mostly Traffic overcrowding | Technical issues with trains | Traffic over - crowding | Traffic delays, crowd crush, safety concerns | Long lines in buying tickets /loading cards | Long lines in buying tickets and over – crowding | Over-crowding | Traffic |
| Impact On | Yes, impacts | Yes, no time | Yes, takes up too | Yes, delays arrival | No impact | Yes, takes up too | Yes, takes up too | No impact | No impact | No impact |
| Travel Time | travel experience | for review | much time | | reported | much time | much time | reported | reported | reported |
| Effects on Daily Routine | Yes, overthinks bad experience | Yes, ruins plans | Yes, could be doing something else | Sometimes affects academic perfor - mance | Yes, Affects daily routine | Yes, affects daily routine | Sometimes affects academic perfor - mance | None | None | None |
| Class Attendance Issues | Frequent | Late but rare case | No | A few times due to delays | Late but rare case | In some cases due to traffic and weather | Late but rare case | Not applicable | Not applicabl e | Not applicable |
| Psychological Impact | Affects focus | Overthinks being late | Not used to this type of travel | Affects academic perfor - mance | Affects academic perfor - mance | Overthinks about arriving on time | Causes stress | Causes stress | Experien ce stress | Experience stress |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Weather Impact | Hot- prefer s air conditioned transport | Hot- prefers air conditioned transport | Hot – prefers air-conditioned transport | Summer – doesn't feel like going to school | Hot – prefers air-condi - tioned Transp. | Hot – prefer s air-conditioned Transp. | Hot – prefer s air-condi - tioned Transp. | Hot prefers air-conditiond Transp. | Hot – prefer s air-condi - tioned Transp. | None |
| Gender Preference | Safety concerns | Males use motor cycles more | Females prefer not to ruin appearance | Females take other modes for safety | Safety concern and Females prefer not to | Females prefer not to ruin appearance | Safety concerns | Safety concerns and comfortability to travel | Safety concerns and Comfor - tability to travel | Safety concerns and Comfor - 9ability to travel |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | or outfit | | ruin outfit | | | | | |
| Active Commuting Practices | Walking from Legarda Station-NU campus | Walking from Legard a Station-NU campus | Walking from UST (Espanya) to campus | Walking from Legarda to NU campus | Walking from Legarda to NU campus | Walking from Legarda to NU or UST Espanya to NU | Walking from Legarda to NU campus | Alay Lakad/ Walking from Baclaran to Carriedo | Biking from Baclaran to Manila | Walking |
| Health Benefits | Improves stamina and endurances | Improves stamina | Improves health and stamina | No notice able changes | No specific changes noted | Improves lower body mobility | No specific changes | No specific changes | Improves stamina, endurance, and stronger bones | Improves health |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preference for commuting | Active commuting to save money | Passive commuting for convenience | Passive commuting for convenience | Passive commuting for convenience | Depends on distance | Active commuting for exercise and save money | Passive commuting for convenience and faster | Passive Commuting for convenience and faster | Active comm - uting for health benefits | None |
| Awareness of TDM Policies | Uses student discounts | Uses student discounts | Not aware | Aware of policies | Aware of policies | Aware of policies | Aware of policies | Aware of policies | Aware of the policies | Aware of the policies |
| Effectiveness of Policies | Effective for saving money | Effective for saving money | Not sure, first time traveling alone | Effective for convenience | Effective for saving money | Effective with student discounts | Effective for saving money | Effective for convenience and cost less | Effective for Convenience , comfort-tability and cost less | Not effective |
| Suggestions for Improvement | Priority lane for students | More public vehicle for students | Lower transportation costs for students | More train stations | Better traffic management | More personnel to manage traffic | Priority lane for students, senior citizen s and workers | None | More Personnel to manage traffic specifically on bike lanes | Widen the roads or expressways |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Overall Satisfaction (15 five is the highest rate for very satisfied) | 2 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |

## 3.1. Results

### 3.1.1. Challenges Faced by Students

Traffic congestion is the one that stands out where it shows as one of the most significant challenges that most respondents had mentioned. The roads where students said they had experienced traffic were Magallanes Rd., EDSA, Roxas Blvd., Quezon Blvd., and España Blvd. This congestion results in delayed travel, which increases the stress level of students. Overcrowding was also mentioned, especially on train stations such as LRT 1 and 2, where long lines for tickets and crowd crushing from passengers coming out of the train during peak hours were the common complaints that cause discomfort among commuters.

Delays and safety concerns were also highlighted as challenges in commuting. Students reported that technical issues with trains and traffic congestion affect their overall commuting experience. Safety concerns were emphasized by most respondents, especially regarding their personal security, and the impact of commuting on the psychological well-being of the students was evident, which causes students to experience stress, anxiety, the fear of being late or marked as absent, and the worry of travel conditions, which affected their focus and academic performance. Weather conditions, especially on hot days, show a significant influence on the choice of mode of transportation, with most respondents preferring to commute using air-conditioned transportation to avoid the discomfort of the heat.

### 3.1.2. Factors Influencing the Choice of Transportation

Cost-effectiveness was the most common factor that influenced students' choice of transportation. Most participants opted for cheaper travel but multimodal travel such as tricycles, FX, jeepneys, and walking to minimize their expenses. The need for fast and convenient travel was another reason why students prefer LRT 1 and LRT 2, which offer fast travel. Safety and comfort were also evident, especially for female students, who prioritized personal safety and comfort, which influenced their transportation choice by avoiding modes that they perceived as risky. Additionally, some respondents favored active commuting, such as walking or biking, for the benefits that it gives them and to save some extra cash.

### 3.1.3. Effectiveness of the Existing Transportation Policies

The student discount on public transportation shows the effectiveness of this policy in reducing costs and making it more affordable for most of the students who commute through multimodal travel. Policies that

aimed at enhancing comfort and convenience were generally accepted, though there were suggestions for improvement. Respondents suggested different enhancements, including more public transportation dedicated to students, traffic management, additional personnel to manage traffic, especially on bike lanes, and wider roads to handle the high volume of commuters.

### 3.1.4. Comparative Analysis

The responses from different cities (Taguig, Pasay, and Parañaque) show that traffic congestion and overcrowding are common issues, though the specific problems are varied. For instance, respondents from Taguig and the eastern part of Paranaque highlighted EDSA, while those from the western part of Paranaque pointed to Roxas Blvd., Quezon Blvd., and España Blvd., and as for Pasay, no particular area since most of them use LRT transportation. Cost and convenience were also consistent factors across all respondents, regardless of where they came from. However, safety concerns were more prominent, especially among female respondents who prioritized personal security and comfort in their choice of mode of transportation.

Discounts were generally accepted across all cities, which suggests a widespread positive impact, but the effectiveness related to convenience varied, with some respondents pointing out the need for improvement in traffic management and an increase in public transportation in their areas. Overall satisfaction levels were mostly similar across different cities, where most respondents rated their satisfaction between 2 and 4 on a scale of 1 to 5. This kind of consistency suggests that while some policies are effective, the southern region of Metro Manila shares a common need for better transportation management and infrastructure.

## 3.2. Discussion

The results of this study shows various challenges, influencing factors and the effectiveness of the existing policies for the commuters from the southern part of Metro Manila to Manila. These results integrate and expand the body of knowledge on the commuting patterns and experiences of students which provide a comprehensive understanding of the complex aspects of student transportation.

### 3.2.1. Challenges Faced by Students

The thematic analysis shows that traffic congestion is a major challenge for students, which is consistent with the previous study that said traffic is a significant source of stress and time loss (Jamil et al., 2022). Some of the costs related to commuting may be lessened by focusing interventions on certain congestion hotspots, such as EDSA, Magallanes Rd., Quezon Blvd., and Roxas Blvd. Overcrowding on public transportation, especially trains, reflects the findings of (Lim et al., 2017), who pointed out that multimodal travel often leads to crowded conditions. Delays and safety concerns make commuting challenges even worse, especially for female students who are affected by safety issues, which supports the findings of Delmelle & (Delmelle 2012) (Hidalgo-González et al., 2022). The psychological effects of commuting, such as stress and anxiety, highlight the need for supportive policies to improve the well-being of commuting students, as also pointed out by (Taylor & Mitra, 2021) (Rellon et al., 2024). The preference for air-conditioned transportation in hot weather adds another layer to the commuting experience and highlights the need for climate-appropriate transportation options.



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### 3.2.2. Factors Influencing the Choice of Transportation

Cost-effectiveness is the main factor that influences the choice of transportation of the students, which aligns with the findings of (Urmi et al., 2022) (Müller et al., 2008) that socioeconomic status significantly affects the commuting preference of students. The preference for faster and more efficient means of transportation, such as LRT1 and LRT2, is evidence of a desire to minimize journey duration and stress, which is highlighted in the findings of (Liu et al., 2022) that longer commutes negatively impact subject well-being (SWB) and mental health. Safety and comfort were important factors, especially for female students, this is supported by one of the studies conducted that found gender differences influence the choice of mode of transportation (Hidalgo-González et al., 2022). As for the health, some participants report that there are no noticeable changes in their health, which reflects the findings of (Jamil et al., 2022) that there is no correlation between weight gain and commuting, but some participants are inclined towards active commuting for health benefits, which aligns with the research of (García-Hermoso et al., 2018) on the physical health benefits of walking or biking.

### 3.2.3. Effectiveness of the Existing Transportation Policies

Student discounts on public transit were appreciated, suggesting that they were successful in lowering the cost of commuting. This finding is supported by (Lucia & Romeo, 2015) that a well designed policies can improve the commuting experience of passengers. Although the need for additional public transportation, improved traffic control, and specialized staff to police traffic, especially on bike lanes, raises questions about whether the policies in place are meeting the requirements of the students as a whole. Respondents 1 and 4 recommend to ease the students commuting experience by adding priority lanes for students and additional train stations which indicate a desire for detailed transportation solutions. The moderate overall satisfaction rating of the respondents (range between 2 and 4 on a scale of 1 to 5) suggest that the need for improvement in the transportation infrastructure and policies aligns with the findings of (Kakujo, 2022) on the mixed effectiveness of TDM policies.

### 3.2.4. Comparative Analysis

Comparative analysis show a common issues of traffic congestion and overcrowding across different cities (Taguig, Pasay, Paranaque) though there are issues on a specific area only. This correlation highlights how common these issues are and how important it is for coordinated transportation planning. Cost and convenience were the main factors while safety concerns are more reported among female respondents which highlight the need for gender sensitive transportation policies. The students' appreciation for the student discounts across different cities suggest that these policies are effective yet the different effectiveness of comfort and convenience policies suggests that specific improvements are required to solve particular transportation issues in various locales.

## 3.3. Limitation

This paper has several limitations that may affect the validity and scope of its findings. First is that the size of participants are limited to a small group of students which may not represent the entirety of the students that commute from the southern region of Metro Manila to NU-Manila. Furthermore, the geography is only focused on students who commute from the southern region of Metro Manila which may mean that the issues faced by NU students coming from northern region are overlooked. The data collected are all based on self-reported experiences which could contain biases which are exaggerated or underreporting. Other factors such as differences between weekdays and weekends or seasonal variation which are not included

in our paper which could influence commuting experiences. The effectiveness of transportation policies are evaluated based on the existing literature and students opinions which may not provide a full range assessment of policy impact and lastly although this research explores the impact of active commuting on the physical health, it does not go into much detail about other possible health effects, like mental health problems brought on by stress from commuting.

## 4. Conclusion and Recommendations

This paper highlights the multifaceted challenges faced by NU students commuting from the southern parts of Metro Manila to NU-Manila. The main challenges include traffic congestions, overcrowding on public transportation, delays, safety concerns, and the psychological impact of stressful commutes. These findings align with existing literature and emphasize the importance of these issues especially in urban settings.

The key factors that influence the choice of mode of transportation among students were identified as cost-effectiveness, convenience, safety, comfort, and health benefits which also align with previous research that support the importance of these part to improve students' commuting experiences. Students satisfaction with the current transportation policies and infrastructure was found to be moderate; while student discounts on public transportation effectively lower costs, more public vehicles, improved traffic management, and increased safety measures are clearly needed; these findings suggest that current policies are inadequate and call for improvements in order to fully meet the needs of commuting students.

To alleviate these issues targeted interventions are necessary to reduce traffic congestion in designated hotspots like Roxas Boulevard, Quezon Boulevard, España Boulevard, EDSA, Magallanes Road, and more. These could include improving public transportation options, building more road capacity, and putting in place better traffic management systems. Enhancing safety measures and comfort in public transportation especially for female students, through increase security presence, traffic management and student focused policies which is designed for effectiveness and efficiency.

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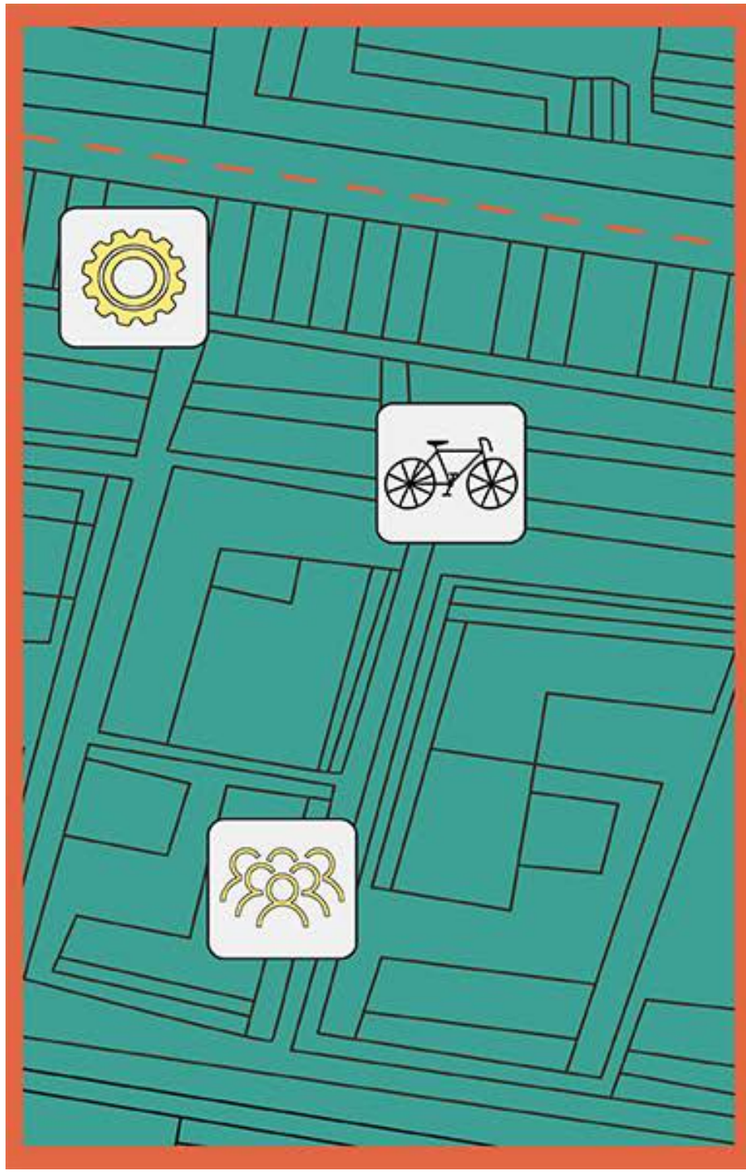

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## Brownfield Urban Planning & Development:

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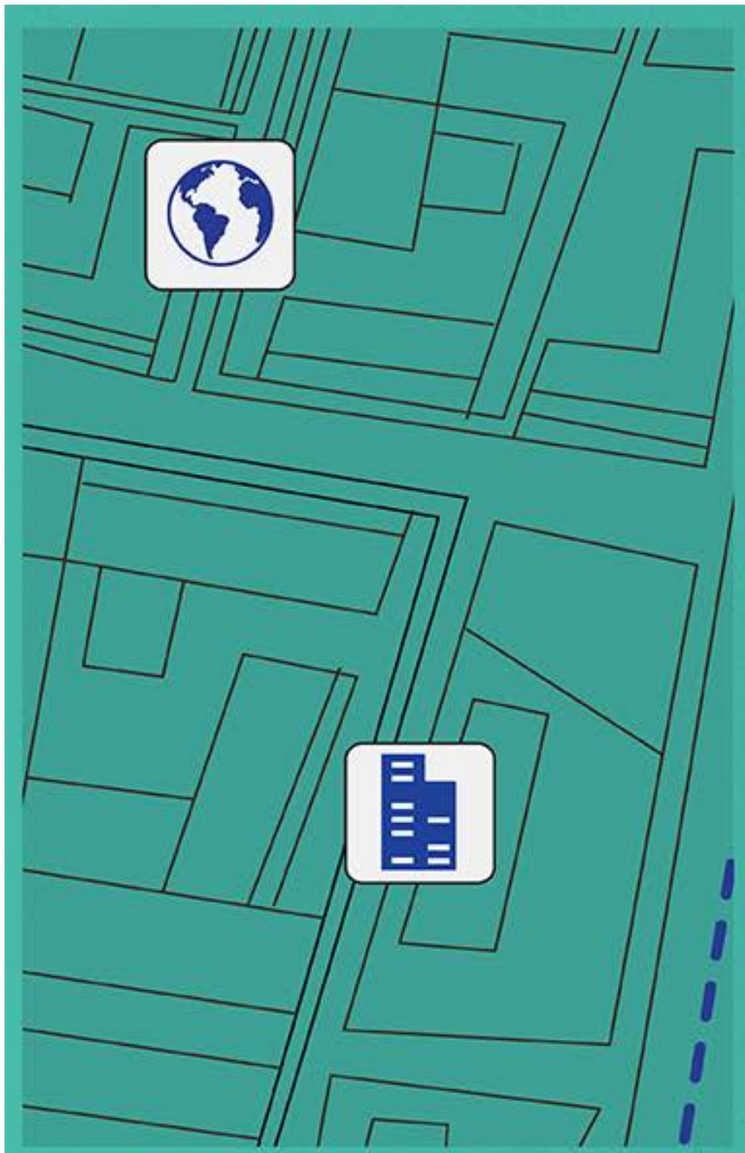

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# TRACK #3

## Climate Adaptive and Resilient (new) Cities:

## Advancing Adaptive Resource Reutilization

# TRACK 3 PAPERS

## TRACK 3: Climate adaptive and resilient (New) Cities: Advancing Adaptive Resource Reutilization

### 3.1 Policy to Practice: Scaling Innovations for Climate Resilient Cities



### 3.2 Designing Climate Adaptive Urban Environments



### 3.3 Culture-centered, Community-driven Resilience Planning and Action

*Research Paper*

# Assessment of Environmental Carrying Capacity

## Concepts and Implementation in Indonesia

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**Abstract**

*Population growth and climate change are causing strain on natural resources and environmental quality. Sustainable development, with its focus on efficient management and lower emissions, is seen as a solution to these challenges. The concept of environmental carrying capacity, which aims to balance the provision and utilization of the environment, aligns with the principles of sustainable development. This research will examine the concept, measurement techniques, and implementation of environmental carrying capacity in various regions of Indonesia. Statistical and spatial quantitative approaches are used to analyze the condition of carrying capacity in dimensions such as water, land, air, ocean, and biodiversity. The results of the study will show the threshold level of environmental carrying capacity mapped on a regional scale as a pilot based on the natural characteristics of the region. The conclusion emphasizes the importance of enhancing the environmental carrying capacity to ensure the sustainability of natural resources in Indonesia.*

**Keywords**

*Environmental carrying capacity, environmental threshold, sustainable development*

## 1. Introduction

Megatrends such as population growth and urbanization are leading to socio-environmental problems due to the high demand for environmental resources (KLHK, 2023; UNDP, 2014). It is estimated that global water demand will increase by 40%, energy demand by 50%, and food demand by 35% in 2014-2030 (Retief et al., 2016). These socio-environmental issues are worsened by The Triple Planetary Crisis of climate change, biodiversity loss, and pollution which can compromise sustainability and lead to resource scarcity (Stockholm Resilience Centre, 2023; Steffen et al, 2015). Notably for water scarcity with around 70% of urban areas at risk due to climate change (UCCRN, 2018; PWC, 2015).

Indonesia's population is expected to reach 324.06 million by 2045 with more than 70% living in urban areas (UN-DESA, 2022; Simarmata et al., 2023). However, Indonesia's environmental conditions are declining with a temperature increase of around 0.03°C per year (KLHK, 2020), a loss of 17% of biodiversity (Setiawan, 2022), and air pollution that reduced life expectancy of its population by 2.5 years (Lee & Greenstone., 2021). However, Indonesia has also ecoregional characteristics with the availability of abundant natural resources such as water, arable land, biodiversity, and minerals. Consequently, Indonesia is considered a global mega biodiversity hotspot with at least 17% of the world's blue carbon potential (CIDES and WWF, 2021).

The environment provides the basic capital for development and thus needs to be planned with its growth limits (von Weizsäcker & Wijkman, 2018). Effective development plans should integrate socio-economic challenges and prioritize environmental resilience (KLHK, 2023; Swiader et al., 2020). These





challenges are certain to continue to increase, with implications for overshooting conditions on the natural resources availability. It will threaten conflicts between ecological space and human needs that potentially impact population mortality (Yue & Wang, 2019). Environmental degradation not only causes ecosystem vulnerability but also hinders sustainable development (Morshed et al., 2024; Ye et al., 2021).

Therefore, the principles of equity and sustainability need to be emphasized in efforts to protect natural resource use. The Environmental Carrying Capacity (ECC) approach is considered to correlate with these principles because it focuses on estimating the environment's ability to fulfill human needs without degrading its functions (KLHK, 2023; Schroll et al, 2012). Qian et al. (2021) use ECC as a reference to integrate social development with nature preservation, especially in vulnerable ecological areas. Similarly, Zhang et al. (2019) stated that new urban development plans in China are required to monitor its ECC limits. In conclusion, ECC is a limit to growth that can estimate the natural resource availability that can fulfill human needs including food, water, shelter, and energy (Lane et al, 2013; Edelman, 1997).

In Indonesia, ECC is normatively mandated by Law No. 32 of 2009 as a tool for environmental and social safeguards. Therefore, ECC assessment is crucial as Indonesia is an archipelago country with abundant natural resources, yet has significant physical and social vulnerabilities due to its large population. Moreover, ECC is also aligned with the 1945 Constitution that guarantees the right of Indonesian citizens to a healthy environment. In this paper, we aim to assess and identify the valuation of ECC in Indonesia based on the supply and demand conditions of potentially renewable resources. We also present the challenges and limitations of this ECC assessment, including finding accurate methods and data availability to measure physical conditions, as well as addressing gaps between ECC implementation and existing policies.

## 2. Literature Review

### 2.1. Environmental Carrying Capacity: A Strategic Pillar for Sustainable Development

In the context of the development process, two things are interconnected creating a domino effect. It is illustrated that humans continuously exploit natural resources to fulfill their needs. But at the same time, humans will also confront ecological crises that threaten their lives due to environmental pressures (Shi et al., 2019). The ecological crises for example the risk of water and food availability, air purity, and the productivity of flora and fauna (Muta'ali, 2011). So over time, the recommendation for sustainable development has grown as a means of overcoming these environmental issues (Subekti & Suroso, 2018).

In 1987, the World Commission on Environment and Development defined sustainable development as "the process of meeting present needs without compromising the ability of future generations to fulfill their own needs". Sustainable development was further emphasized after the publication of *The Limits to Growth* which concluded that economic growth would be severely limited by the limited availability of natural resources (Fauzi & Oxtavianus, 2014). Thus, sustainable development can be used to manage the contradiction between social and economic development, as well as environmental protection.

The role of ECC is needed as a key approach to illustrate the importance of sustainable development. Manafi et al (2009) show the sustainability of natural resources relies on utilization that doesn't exceed their carrying capacity. So ECC is often used as a threshold in supporting human needs, which if exceeded will cause environmental damage (Santoso et al, 2014; Kozlowski, 1990). The population consumption of natural resources is also responsible to climate change. The case in Indonesia where expansions of agriculture and plantation are 96% of the main drivers of deforestation to fulfill population needs and economic growth (Austin et al., 2019). If left untreated, it will reduce the ECC threshold so it cannot be reused (Nurikah & Cahyani, 2019). Whereas Indonesia's forest which is estimated at around 120 million hectares allows Indonesia to become a carbon offset superpower so that ECC can be pursued in mitigating climate change impacts.

Simarmata et al. (2023) evaluated ECC implementation on an urban scale also related to climate change, with water crises being the main issue. This implementation can lead cities to apply the Sponge City concept ensuring water availability as the primary component of ECC with water-sensitive urban design in reducing carbon missions. Meanwhile, Isman et al. (2017) used carbon footprint as a key ECC component to determine the land's capacity to absorb carbon. Thus, ECC indirectly allows it to be used as an approach for formulating policies related to climate change as part of sustainable development.

### 2.2. Challenges in Implementing Environmental Carrying Capacity for Effective Environmental Management

The implementation of ECC in Indonesia has been integrated into spatial legislation concerning environmental issues (Schroll et al., 2012). Following the Law No. 32 of 2009 which serves as the legal basis for environmental management in Indonesia. ECC in that law refers to the ability of the environment to support human lives, other living beings, and the balance between them. ECC is then used as a limiting factor in the utilization of natural resources such as in forestry, tourism, agriculture, and mining sectors (KLHK, 2023). This highlights the crucial role of ECC in ensuring environmental sustainability to support the population's livelihoods in Indonesia.

Even though it has been mandated by the law, the Indonesian government still encountered challenges in assessing ECC. Especially the discrepancy between the scientific knowledge and accuracy of data availability. It has led ECC to undergo alterations to its operational definition to accommodate the established methods approach. However, based on the concept, ECC in Indonesia emphasizes the balance between supply and demand, both of which are considerably influenced by ecosystem services. Firmansyah et al. (2020) also stated that ECC based on ecosystem services is a valuable approach to describing environmental conditions quantitatively and spatially to fulfill human needs. MEA (2003) divides ecosystem services into provisioning services, regulating services, supporting services, and cultural services. Whereas Burkhard and Maes (2017) further provide a detailed of these services according to natural resource types and characteristics.

Ecosystem services are highly dependent on ecoregions as forming the natural characteristics of the environment in providing natural resources. Therefore, ECC in Indonesia is ensured by the physical conditions of the region and its capacity to regenerate from environmental depletion. Indonesia's ability for assessing ECC began with water resources which are the main support to basic living needs. The ECC refers to the capability of water provisioning and regulating services that can estimate water availability, population thresholds, and the regional distribution of water deficit. However, these ECCs only calculate the quantity of river basin without considering its quality which generalizes that all river water is usable.

Meanwhile Hamakonda et al. (2019) stated the quality of most rivers in Indonesia has been polluted in recent years. Of the 111 rivers identified, only 8% met the required quality standard in 2022 (BPS, 2023). This prompted the Indonesian Government to conduct another ECC assessment based on land resources that are indirectly affected by water availability and biodiversity. At that time, they used biocapacity and ecological footprint methods which are implicitly mandated by Ministerial Regulation No. 17 of 2009. Furthermore, this approach is regarded as the most effective method because land can affect overall environmental sustainability (Subekti & Suroso, 2018). Same as before, it also encountered challenges due to limitations of analytical tools, which are less accurate when linked spatially. Such as standardized land needs per capita on islands remain uniform even though the consumption rate must be different.

Thus, we see the evidence that ECC assessment in Indonesia still has many limitations, which in turn motivates the Indonesian Government to continue refining its assessment by strengthening the methodologies and data availability. These efforts have prompted Indonesia to re-assess ECC by adding other resources related to potentially renewable. According to Miller (1990), these resources encompass freshwater, prime land, air, biodiversity, and ocean ecosystems. These resources will influence each other so that they can be utilized sustainably.





## 3. Methodology

This study was held to follow up on the ECC assessment conducted by the Government of Indonesia in 2015. The current ECC assessment is carried out at an island scale, considering Indonesia's position as an archipelago. In this preliminary research, the province of Bali was selected as the study case because Bali faces environmental sustainability challenges considering its position as a global tourism center. The ECC assessment will focus on the sustainability of 5 potentially renewable natural resources, namely freshwater, arable land, water, ocean, and biodiversity. This analysis used the Multiple Criteria Analysis (MCA) approach to combine each ECC of the resources. The MCA is frequently used in decision-making for environmental policy (Balasubramaniam & Voulvoulis, 2005). The MCA was employed to determine the relative weight of these resources based on their impact on ECC.

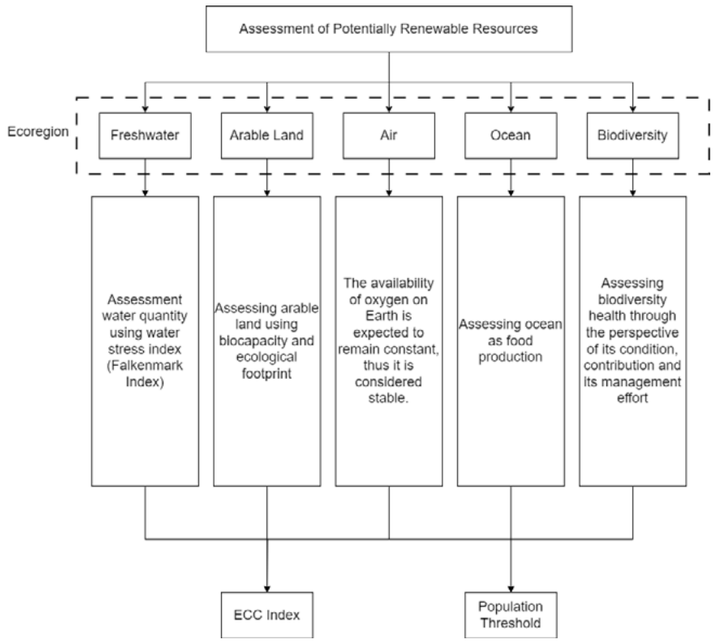


**Figure 1 The Concept of ECC Assessment in Indonesia**
Source: Authors, 2024

### 3.1. Data Collection

In this study, relevant data per each potentially renewable resource is used as follows.

**Table 1 Data Collection in ECC Assessment**

| Potentially Renewable Resources | Parameter | Variable |
|---|---|---|
| Freshwater | Ecosystem Services | Ecosystem Services for Water Provision |
| | Natural Water Supply | Water Supply Debit |
| | Polluted Water | Total Suspended Solids |
| | | Dissolved Oxygen (DO) |
| | | Biochemical Oxygen Demand (BOD) |
| | | Chemical Oxygen Demand (COD) |
| | | Total Fosfat |
| | | Fecal Coliform |
| | | Total Coliform |
| | | Other pollutants that can be found in the monitoring point |

| Potentially Renewable Resources | Parameter | Variable |
|---|---|---|
| | Water demand per capita | Water demand standard per capita for domestic, agriculture, and industry using Falkenmark Index |
| | Population | Total population |
| Arable Land | Biocapacity | Arable Land Cover |
| | | Ecoregions |
| | Ecological Footprint | Land Demand for Food |
| | | Land Demand for Clothes |
| | | Land Demand for Shelter |
| Ocean | Food Production | Temperature |
| | | Chlorophyll |
| | | Oxygen |
| | | Plankton |
| Biodiversity | Biodiversity Condition | RTE Species |
| | | Habitat Types |
| | | Forest Connectivity |
| | | Essential Ecosystem |
| | Biodiversity Contribution | Ecosystem Services for Biodiversity & Habitat Supports |
| | Biodiversity Management | Conservation Area |

Source: Authors, 2024

## 3.2. Data Analysis

**Freshwater Carrying Capacity**

This term is defined as the ability of the region to provide freshwater resources to fulfill human needs. This is obtained through the ratio between the water supply (surface and groundwater) and the per capita water demand which is represented by the Falkenmark Index. Water quality assessment as assimilative capacity is used as a reducing factor for water supply because it can represent the polluted water. This results in a Water Stress Index that is valued ranging from 1 as water scarcity and 5 as no water stress.

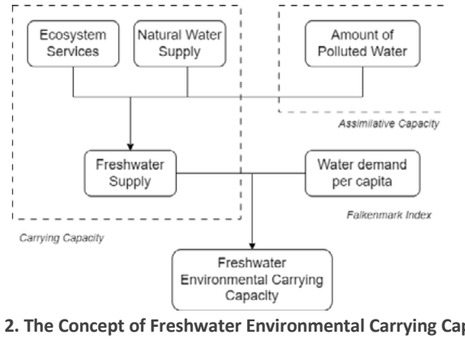


**Figure 2. The Concept of Freshwater Environmental Carrying Capacity**
Source: Authors, 2024

**Arable Land Carrying Capacity**

This term is defined as the ability of the region to provide arable land to fulfill human needs for food, clothing, and shelter. This is obtained through a supply and demand approach, where the supply side is represented by the biocapacity of the region and the demand side is represented by the ecological footprint of humans that can be supported from the region. The biocapacity calculation excludes lands that provide water management services, support habitat and biodiversity, and are high carbon sinks. In addition, land located in conservation areas is also excluded from the calculation due to the need for biodiversity living space.





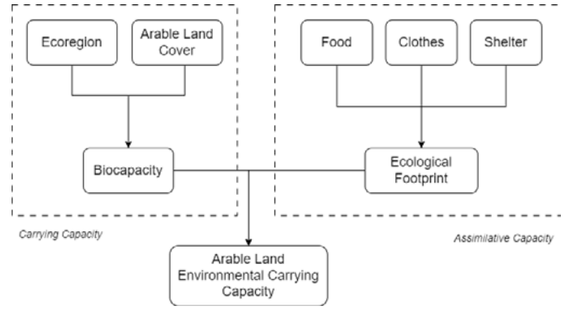


**Figure 3 The Concept of Arable Land Carrying Capacity**
Source: Authors, 2024

**Ocean Carrying Capacity**

This term is defined as the ability of the ocean in each region to support fish to human needs as food sources. This method is a modification of the IKLI (Indonesian Ocean Health Index), which was adopted from the OHI (Ocean Health Index). This method used four indicators that are interrelated through weighted overlay based on expert judgment as follows: temperature (20%), chlorophyll (20%), oxygen (30%), and plankton (30%).

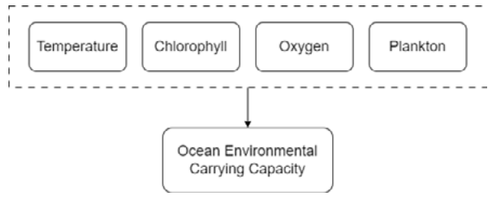


**Figure 4 The Concept of Ocean Carrying Capacity**
Source: Authors, 2024

**Biodiversity Carrying Capacity**

This term is defined as biodiversity's health both on condition and contribution dimension and its management efforts. The method uses four indicators with a weighted overlay analysis which is based on expert judgement as follows: (1) biodiversity conditions (30%) with habitat types, endangered species, and forest connectivity; (2) biodiversity contribution (30%) with ecosystem services; and (3) biodiversity management (40%).

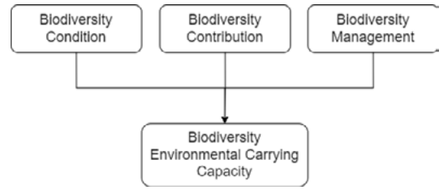


**Figure 5 The Concept of Biodiversity Carrying Capacity**
Source: Authors, 2024

**ECC Threshold**

The ECC threshold is defined as the maximum capacity of the environment in some areas to fulfill human needs without damaging the ecosystem. This study has two thresholds related to the index and population size as follows:

- **Index Threshold**
  The Index Threshold is used to determine whether the aggregate index value is in a steady state of adequacy. The Index Threshold identification utilizes the Analytical Hierarchy Process (AHP), a widely used decision-making tool for selecting the most relevant criteria (Vaidya & Kumar, 2006). The Index Score for each resource reflects the dominant indices in Bali, with weights derived from expert judgement assessing the impact of resources on ECC: freshwater (0.44), arable land (0.26), air (0.076), ocean (0.093), and biodiversity (0.128). For the Index Threshold, an index of 3 on a scale of 1-5 was used which represents the midpoint of the quantity and quality of resources remaining adequate. The formula used is as follows:

$$Index\ Value = (Index\ Score\ x\ Index\ Weight)$$

- **Population Threshold**
  The population threshold is used to determine the maximum number of populations that can be supported by the ECC. However, this research has limitations as not all the resources can produce a population threshold. It is only based on resources that have provisioning ecosystem services as follows:
  Freshwater Carrying Capacity

$$Population\ Threshold\ in\ Freshwater\ = \frac{Availability\ of\ Usable\ Water\ (m^3/year)}{Standard\ Water\ Demand\ (m^3/cap/year)}$$

  Arable Land Carrying Capacity

$$Population\ Threshold\ in\ Arable\ Land = \frac{Availability\ of\ Land\ (ha/year)}{Ecological\ Footprint\ (ha/cap/year)}$$

  In this research, the determination of the population threshold was based on a conservative approach and minimal risk management, focusing on the minimum quantity that can be utilized. Thus, it can reduce pressure and prevent overcapacity on resources.

## 4. Findings and Discussion

This study identifies the ECC assessment for potentially renewable resources at the island levels using spatial analysis based on supply-demand concepts. The main finding in this research is the conditions of each resource represented in the form of an index. The index serves as a reference for determining thresholds based on resource availability and population that can be supported.

### 4.1 Mapping the ECC Value of Potentially Renewable Resources

The ECC assessment of the five potentially renewable resources is based on the analysis of each indicator, which represents the supply and demand of resources in Indonesia. The results of the ECC reflect the quantity of available resources to fulfill basic human needs. The analysis and mapping results of the ECC assessment, particularly for Bali Province, are as follows.

**Freshwater Carrying Capacity**

According to the analysis, surface water from river basins is estimated at 1,645,890,623.61 $m^3$/year, and groundwater from aquifers at 1,389,000,000 $m^3$/year. This indicated that ecosystem service through precipitation and evaporation can naturally provide 3,034,890,623.60 $m^3$/year of water in Bali Province. However, not all of this water is usable due to water pollution. It is estimated that contaminated water in Bali totals 333,837,968.59 $m^3$/year. Consequently, the total usable water to fulfill the population's basic needs is 2,701,052,655.01 $m^3$/year. Total usable water is the basis for estimating the Freshwater Carrying Capacity Index by dividing it by the existing population. The map shows that 52% of Bali Province's area has low Freshwater Carrying Capacity, failing to fulfill the required standards. With the current population, the average water supply is 613.28 $m^3$ per capita per year, indicating overall water scarcity.





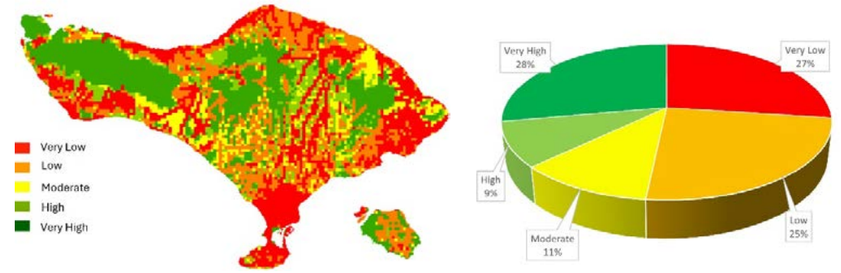


**Figure 6 Map of Arable Land Carrying Capacity**
Source: Analysis, 2024

**Arable Land Carrying Capacity**

The availability of arable land in Bali is defined by subtracting areas dedicated to protected forests, high-value ecosystem services for food, and highly critical land from the province's total area. This results in 385,378 hectares/year of arable land or about 68% of Bali's total area. On the demand side, the ecological footprint is expected based on basic needs: 0.05 ha/cap/year for food, 0.41 ha/cap/year for clothing, and 0.00029 ha/cap/year for shelter. Compared to the existing population, it implies that every person in Bali needs arable land by 0.07 ha/cap/year or about 321,769.46 ha/year of Bali's total area. These indicators serve as the basis for estimating the Arable Land Carrying Capacity Index by dividing them. The map shows that 64% of Bali Province's area has low Arable Land Carrying Capacity, which indicates two conditions: (1) Some areas are restricted from human activities to fulfill their needs, and (2) The unprotected areas are insufficient to fulfill the population's requirements optimally.

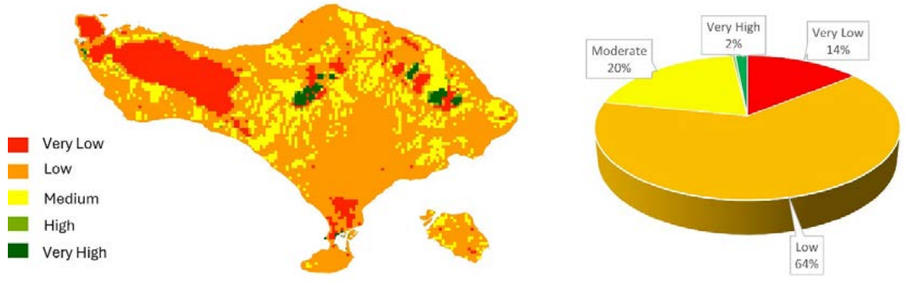


**Figure 7 Map of Arable Land Carrying Capacity**
Source: Analysis, 2024

**Ocean Carrying Capacity**

The assessment of Ocean Carrying Capacity differs from other renewable resources by focusing on the ocean ecoregion. Ocean ecoregions include coastal waters with a relatively homogeneous species composition relevant to fisheries management. This assessment aggregates areas within the same ocean ecoregion rather than relying on administrative boundaries. The analysis identifies key indicators supporting fish food sources: (1) moderate sea surface temperatures, which indicates optimal plankton production; (2) high chlorophyll availability, which indicates a healthy ocean ecosystem; (3) sufficient oxygen levels for sustainable food sources; and (4) moderate phytoplankton availability which indicates supporting primary production for fish. These four indicators serve as the basis for estimating the Ocean Carrying Capacity Index through weighted overlay. The map shows that Bali Province is located in the ocean ecoregion of Bali and Nusa Tenggara and predominantly at Level 3. This indicates moderate ocean conditions that adequately supply fish resources, though improvements are needed to address pollution issues.

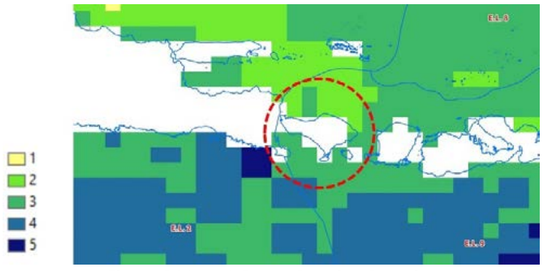


**Figure 8 Map of Ocean Carrying Capacity**
Source: Analysis, 2024

**Biodiversity Carrying Capacity**

The assessment of Biodiversity Carrying Capacity focuses solely on terrestrial availability, excluding ocean biodiversity. The analysis identifies key indicators affecting biodiversity sustainability: (1) Sub-Index of Habitat Contribution, which is predominantly low in providing breeding habitats; and (2) Sub-Index of Habitat Condition, which indicates high habitat diversity but significant fragmentation, low peat distribution, and reduced karst coverage, suggesting a loss of ecological function, low forest connectivity implies that remaining forest areas are poorly linked, and the presence of Rare, Threatened, and Endangered (RTE) species is moderate, indicating a considerable proportion of threatened species. These two indicators serve as the basis for estimating the Biodiversity Carrying Capacity Index through weighted overlay. The map shows that 43% of Bali Province's area has low Biodiversity Carrying Capacity, which indicates high ecological pressure from intensive human activities, particularly land conversion, resulting in the loss of natural habitats.

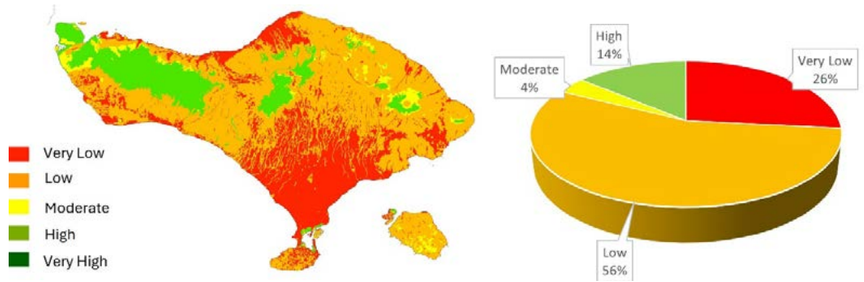


**Figure 9 Map of Biodversity Carrying Capacity**
Source: Analysis, 2024

## 4.2 ECC Threshold

After assessing each ECC's potentially renewable resources, the ECC threshold needs to be estimated based on index value and population. The threshold determines whether the aggregate index value is ideal or sufficient. If the index value is below the threshold, it is considered less optimal for the area to fulfill human needs. The threshold is set by comparing the aggregate index (dominance) with the median classification value for each resource, with an index value of 3 as a midpoint based on a Likert Scale of 1 to 5, with higher values indicating better ECC conditions. The threshold is also influenced by weighting from the AHP analysis, which prioritizes the impact of each resource on ECC sustainability. The most influential resources are freshwater, prime land, biodiversity, ocean, and air.

**Table 2 Index Value and Index Threshold in the ECC Assessment of Bali Province**

| ECC | Freshwater | Arable Land | Air | Ocean | Biodiversity |
|---|---|---|---|---|---|
| Index Value | 0.44 | 0.52 | 0.38 | 0.28 | 0,26 |
| Index Threshold | 1.32 | 0.78 | 0,23 | 0.28 | 0,38 |





Source: Analysis, 2024

The table shows that the aggregate index values for freshwater, prime land, and biodiversity are below their respective thresholds. This indicates that these resources in Bali Province are not in optimal condition to fulfill human needs. Consequently, policy interventions are necessary for the utilization, management, and protection of these resources. It is recommended to enforce stricter monitoring regulations and permits related to extraction activities in the area. Even though air is one of the potentially renewable resources, the Air Carrying Capacity was excluded from the analysis, as the literature suggests that oxygen availability on Earth remains constant and consistently above the threshold. The ocean resource index aligns with its threshold, indicating that the condition of Bali Province's ocean ecosystems is currently optimal but requires careful management to ensure sustainability.

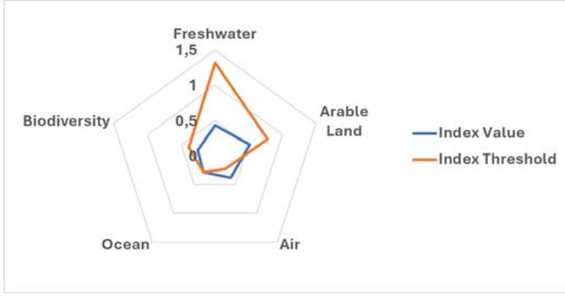


**Figure 10 The Relationship Between Index Values and Threshold Index Using a Spider-Web Chart. Source: Analysis, 2024.**

This research also estimated the population threshold, which is defined as the maximum number of populations that can be supported by the ECC. Experts reveal that this threshold can only be reliably established for resources with quantifiable assessments, which are freshwater and arable land. The Freshwater Carrying Capacity is calculated by dividing the total usable water by the Falkenmark Index standard of 1,700 $m^3$ per capita per year, which supports approximately 1,588,855 people. For Arable Land Carrying Capacity, the available arable land is divided by the total ecological footprint per person, which supports approximately 5,526,750 people. By aggregating it on the lower capacity resource, the overall ECC condition in Bali Province can support a population of up to 1,588,855 people.

## 4.3 Research Limitations

As stated before, the Indonesian Government has employed a variety of methodologies to conduct a comprehensive assessment of ECC. However, during the assessment process, we encountered several challenges, one of them such the available data did not fully align with the commonly accepted methodologies. Despite these challenges, we remain committed to reassessing ECC by incorporating each potentially renewable resource, which is interdependent to ensure environmental sustainability. Each of these potentially renewable resources has limitations that are rooted in specific characteristics of each potentially renewable resource, as outlined in the following table.

**Table 3 The Limitations of ECC Assessment on Potentially Renewable Resources**

| Potentially Renewable Resources | Limitations of ECC Assessment |
|---|---|
| **Freshwater** | • The availability of usable water is static, based on the average calculations of rainfall and evaporation, along with the percentage of pollution index for one year.<br>• Water quality is generalized from monitoring points that are not evenly distributed.<br>• Water demand is estimated using general standards from previous studies to meet domestic, agricultural, and industrial needs per capita. |

| Potentially Renewable Resources | Limitations of ECC Assessment |
|---|---|
| **Arable Land** | • Land availability is static, determined based on land cover identification within one year, without accounting for potential changes in land cover.<br>• The availability of data for calculating food, clothing, and housing needs varies by year.<br>• The conversion of food, clothing, and housing needs into ecological footprint (in hectares) is assumed to be uniform for every individual within administrative boundaries. |
| **Air** | The Air Carrying Capacity cannot be calculated, as the Earth's oxygen levels are estimated to remain constant; therefore, only the Air Assimilative Capacity can be measured. |
| **Ocean** | Calculations based on indicators and weighting are based on expert judgment in relevant fields, which requires field validation. |
| **Biodiversity** | |

Source: Analysis, 2024

## 5. Conclusion

### 5.1 Broader Project Impact

ECC assessment can be used as a tool for policy and decision-making to promote sustainable development that can balance human needs and environmental preservation. The balance resulting from the assessment of ECC in policy and decision-making can be the optimal point that must be preserved as the economy and population grow. The concept of ECC integrated with spatial planning and long-term development planning can become a new perspective in determining optimal boundaries.

### 5.2 Next Development

The ongoing ECC assessment in Indonesia is preliminary research focusing on incorporating five potentially renewable natural resources. This research recognizes that there are still gaps in assessing ECC, so the following improvement is needed.

- ECC assessment needs to be further developed based on the latest science and technology that is recognized nationally and internationally.
- Early research still produced separate ECC values for each five potentially renewable resources. Therefore, future efforts need to be made to combine these ECCs into one holistic value.
- Mainstreaming the integration of ECC into existing and future policies is crucial. This is important to ensure that if an area exceeds its carrying capacity, all planning and activities within it must be done with caution.

## Acknowledgment

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*Research Paper*

# Multilevel Governance and Sustainable Energy Transition:

## Exploring the Role of Regional Energy Planning in Indonesia

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**Abstract**

*Indonesia grapples with a pressing energy dilemma, characterized by high greenhouse gas emissions, reliance on fossil fuels, and significant energy imports. [1] Transitioning to a sustainable energy system is imperative. Multi-Level Governance (MLG) offers a promising framework to engage diverse stakeholders in energy planning and decision-making processes. This research investigates the role of MLG in regional energy planning in Indonesia, focusing on the provinces of West Java and Bangka Belitung. By employing the POAC framework, this study aims to contribute to the development of more sustainable and effective energy planning strategies. The findings emphasize the need for robust monitoring and evaluation mechanisms aligned with Provincial Regional Energy Plans (RUED-P). Additionally, enhancing stakeholder capacity, fostering inter-sectoral cooperation, and leveraging technology are crucial for optimizing RUED implementation in these regions.*

**Keywords**

*Energy transition, Multi-Level Governance (MLG), POAC System, Regional Energy Planning, West Java, Bangka Belitung*

## 1. Introduction

Indonesia is grappling with a complex energy dilemma. The country's energy landscape is characterized by high greenhouse gas emissions, significant reliance on fossil fuels, and substantial energy imports. In 2022, fossil fuels accounted for 86.2% of Indonesia's energy mix, with oil and natural gas imports constituting 25.4% of total energy needs (Ministry of Energy and Mineral Resources, 2022). To address these challenges and ensure a sustainable energy future, Indonesia must transition to a clean and renewable energy system (Widyasari, 2021).

A key strategy for achieving this transition is through effective multi-level governance (MLG). MLG involves multiple levels of government and stakeholders working collaboratively to address complex issues like energy transition (Bulkeley & Betsill, 2005; Hoogstra & Kohler, 2002). By fostering coordination, collaboration, and knowledge sharing, MLG can enhance the effectiveness of energy policies and facilitate the integration of diverse perspectives and interests.

This research aims to investigate the role of MLG in regional energy planning in Indonesia. By examining two case studies - West Java and Bangka Belitung - this study seeks to understand the specific challenges and opportunities associated with MLG in different regional contexts. West Java, with its large population and high energy demand, faces significant challenges in balancing economic growth with environmental





sustainability. Bangka Belitung, on the other hand, possesses abundant renewable energy resources but requires effective governance mechanisms to harness its potential.

Through a comparative analysis of these two provinces, this research aims to identify key factors that influence the effectiveness of MLG in regional energy planning. The findings will contribute to the development of more effective and sustainable energy policies and strategies for Indonesia.

## 2. Materials and Methods

### 2.1. Research Approach

This study employs a qualitative research approach to delve into the complex and context-specific nature of MLG in regional energy planning. A qualitative approach enables a deep understanding of the social, political, and economic factors influencing energy decision-making processes. By utilizing methods such as interviews, observations, and document analysis, this research aims to gather rich, contextual data and uncover nuanced insights.

The selection of a qualitative approach is justified by the need to explore the subjective experiences, perceptions, and motivations of key stakeholders involved in MLG. This approach allows for a more nuanced understanding of the challenges and opportunities associated with MLG implementation in the context of Indonesia's energy transition.

### 2.2. Data Collection Method

This research employed a qualitative case study approach to delve into the intricacies of MLG in regional energy planning. Data collection involved a combination of in-depth interviews and document analysis.

In-depth interviews were conducted with key stakeholders involved in energy planning and decision-making processes in West Java and Bangka Belitung. These stakeholders included government officials, policymakers, energy planners, and representatives from civil society organizations. The interviews were semi-structured, allowing for flexibility in exploring relevant themes and emerging issues.

Document analysis was conducted to examine a range of documents, including energy policies, regional energy plans, research reports, and news articles. This analysis provided valuable contextual information and supported the findings from the interviews.

By combining these data collection methods, this research aimed to capture a comprehensive understanding of MLG practices and their impact on energy planning in the two case study regions.

### 2.3. Data Collection Method

To gather the necessary data for this research, a mixed-methods approach was employed. This approach involved both qualitative and quantitative data collection techniques.

- Qualitative data was collected through in-depth interviews with key stakeholders involved in energy planning in West Java and Bangka Belitung provinces. A semi-structured interview guide was used to ensure that the interviews were focused and systematic. Additionally, document analysis was conducted to examine relevant policy documents, reports, and news articles. A document analysis guide was developed to facilitate a comprehensive and systematic review of the documents.

- Quantitative data was collected through the analysis of secondary data, such as energy statistics, economic indicators, and demographic data. This data was used to quantify trends and patterns in energy consumption, production, and emissions.

**Legal Basis**

The formulation and implementation of Regional Comprehensive Energy Plans (RUED) in Indonesia are anchored in several key laws and regulations.

- **Law Number 30 of 2007 on Energy** mandates that regional governments formulate RUEDs aligned with the National General Energy Plan (RUEN). It further emphasizes the government's responsibility to ensure adequate, reliable, and affordable energy supply, as well as the promotion of renewable energy sources.
- **Law Number 12 of 2011 on the Formation of Legislation** outlines the procedures for drafting and approving regional regulations, including RUEDs. This law ensures that RUEDs are developed and implemented in accordance with national laws and regulations.
- **Presidential Regulation Number 79 of 2014 on National Energy Policy** positions RUEDs as crucial instruments for achieving the goals outlined in the National Energy Policy. This regulation prioritizes the development of renewable energy sources and energy efficiency, encouraging active participation from regional governments in energy management.

These legal frameworks provide a strong foundation for analyzing the role of Multi-Level Governance (MLG) in regional energy planning. MLG, as a governance approach involving multiple levels of government and stakeholders, is expected to enhance the effectiveness of the energy transition in Indonesia.

### 2.4. Data Analysis Method

This research employed a qualitative data analysis approach, drawing upon various techniques to interpret and analyze the collected data. The data analysis involved a combination of thematic analysis and the application of the POAC management framework.

1. **Qualitative Descriptive Analysis**, a qualitative descriptive analysis was employed to examine the RUED policies of West Java and Bangka Belitung. This analysis focused on three key aspects:
    - **Policy Determinants:** This aspect explored the factors influencing the formulation of RUED policies, including political, economic, social, environmental, and technological factors.
    - **Policy Substance:** This analysis delved into the content and substance of the RUED policies, examining their goals, objectives, strategies, and programs.
    - **Policy Impact:** This aspect assessed the impact of RUED policies on the energy transition in both provinces, considering both positive and negative outcomes.

    To conduct this analysis, a systematic approach was employed, drawing on the principles of qualitative data analysis outlined by Miles and Huberman (1994). The data collected through document analysis was carefully examined and categorized.

2. **POAC Management Model**, The POAC management model (Planning, Organizing, Actuating, and Controlling) was utilized to analyze the implementation of MLG in regional energy planning. This model provided a structured framework for understanding the various stages of the MLG process.





- **Planning**: This stage involved examining the planning processes for RUEDs, including the identification of goals, objectives, and strategies.
- **Organizing**: The organization stage focused on the establishment of institutional arrangements, allocation of resources, and the assignment of responsibilities for implementing RUEDs.
- **Actuating**: This stage involves the implementation of RUEDs, including the mobilization of resources, the coordination of stakeholders, and the monitoring of progress.
- **Controlling**: The control stage involved the evaluation of RUED implementation, the identification of deviations from planned outcomes, and the implementation of corrective actions.

By applying the POAC model, this research aimed to identify the strengths, weaknesses, and opportunities for improvement in the implementation of MLG in the two case study provinces.

## 3. Findings and Analysis

### 3.1. Qualitative Descriptive Analysis

**1. Policy Determination of Factors**

The formulation of Regional Comprehensive Energy Plans (RUED) in West Java and Bangka Belitung is influenced by a multifaceted array of factors. These factors encompass both national and regional considerations, ensuring that the RUEDs are tailored to the specific needs and circumstances of each province.

**Energy Potential and Needs Assessment:** A comprehensive assessment of the energy potential and needs of each region is crucial. This involves analyzing available energy resources, such as fossil fuels and renewable energy sources, as well as the energy demand patterns of various sectors, including residential, commercial, and industrial.

**Regional Contextual Factors:** Geographical, economic, social, and cultural factors play a significant role in shaping RUEDs. These factors include the region's topography, climate, population density, and socio-economic conditions. Understanding these factors enables policymakers to develop policies that are aligned with local realities and priorities.

**Stakeholder Engagement:** Involving a diverse range of stakeholders, including government agencies, private sector entities, and civil society organizations, is essential for the successful formulation and implementation of RUEDs. Engaging with these stakeholders ensures that their perspectives and concerns are considered, leading to more inclusive and sustainable energy policies.

By carefully considering these factors, policymakers can develop RUEDs that are both ambitious and achievable. These plans should aim to balance economic growth with environmental sustainability, promote energy efficiency, and accelerate the deployment of renewable energy sources.

**2. Policy Substance**

The RUEDs of West Java and Bangka Belitung outline specific and measurable energy targets, demonstrating a strong commitment to achieving energy resilience and sustainable development. These plans prioritize the development of renewable energy sources, such as solar and wind power,

to reduce reliance on fossil fuels. Additionally, they emphasize energy efficiency measures across various sectors, including industry, households, and transportation.

The RUEDs also establish a framework for implementing these targets through specific strategies and programs. These strategies include:

- **Renewable Energy Development:** Identifying and developing renewable energy resources suitable for each region.
- **Energy Efficiency:** Promoting energy-efficient technologies and practices in various sectors.
- **Energy Conservation:** Encouraging energy-saving behaviors and implementing policies to reduce energy consumption.

By focusing on these key areas, the RUEDs aim to contribute to a more sustainable and resilient energy future for West Java and Bangka Belitung.

**3. The Impacts of Policy**

The RUED policies in West Java and Bangka Belitung have far-reaching implications, extending beyond technical aspects of energy. These policies contribute to energy resilience by reducing dependence on fossil fuels and diversifying the energy mix. Additionally, they play a crucial role in climate change mitigation by reducing greenhouse gas emissions. Furthermore, RUEDs promote equitable access to energy, ensuring that all segments of society can benefit from affordable and environmentally friendly energy. By stimulating the development of renewable energy industries and fostering energy efficiency, these policies also contribute to economic growth and job creation. Ultimately, the implementation of RUEDs demonstrates a commitment to sustainable development, balancing economic growth with environmental protection and social equity.

## 3.2. POAC Management Model

**1. Planning**

Energy policy planning in Indonesia is a crucial step in supporting sustainable development and fulfilling global commitments. The dynamics of national energy policy show a positive trend, with an increasing focus on the renewable energy transition (Ayu Arsita et al., 2021). The principles of postmodern planning, which emphasize communication, participation, inclusion, and collaboration, have become an important foundation in formulating RUED in West Java and Bangka Belitung.

Analysis shows that the RUED planning process in both provinces has been carried out well and thoroughly. There are RUED documents containing clear visions, missions, targets, strategies, and programs. This planning process refers to Presidential Regulation of the Republic of Indonesia Number 1 of 2014 concerning Guidelines for the Preparation of the National General Energy Plan. However, there are several knowledge gaps that need to be considered to improve the effectiveness of RUED planning. First, a more in-depth analysis needs to be conducted regarding the assumptions and projections used in the process of formulating targets and strategies. This is important to ensure that RUED is realistic and achievable in dynamic conditions. Second, a more comprehensive stakeholder mapping and in-depth analysis of the roles and responsibilities of each party need to be carried out. This will help in developing effective coordination and collaboration strategies among stakeholders.

**2. Organizing**





Implementation of RUED in West Java and Bangka Belitung has been accompanied by the establishment of institutions to support the smooth running of the process. However, analysis shows that coordination among stakeholders still needs to be improved to ensure the effectiveness of RUED implementation. This is a crucial area that needs to be addressed to optimally achieve the goals of RUED. Building a clear and structured coordination mechanism is an essential first step. This can be achieved through the formation of a communication and joint decision-making forum involving all relevant stakeholders. This forum will be a forum for exchanging information, discussing problems, and formulating solutions together collectively.

The next step is to increase institutional capacity through training and human resource development. Stakeholders need to be equipped with adequate knowledge and skills to carry out their duties and functions in the implementation of RUED. This can be done through training programs, seminars, and workshops focused on RUED-related issues such as renewable energy, energy efficiency, and energy management.

In addition, providing incentives and rewards for stakeholders who contribute to the implementation of RUED should also be considered. This can be a motivator for stakeholders to actively participate and make the best contributions to achieving RUED targets. The form of incentives and rewards can vary, such as non-monetary awards such as certificates and diplomas, as well as financial incentives that can help reduce the operational burden of institutions. By building effective coordination, increasing institutional capacity, and providing appropriate incentives, the organization of RUED implementation in West Java and Bangka Belitung can be optimized. This will pave the way for the realization of a sustainable RUED that provides maximum benefits for the community and the environment.

**3. Actuating**

While socialization and education about RUED have been conducted in West Java and Bangka Belitung, these efforts need to be intensified to stimulate greater public awareness and participation. This is a crucial key to driving effective and sustainable RUED implementation. More effective and targeted communication and education strategies need to be developed. This needs to consider the culture, characteristics, and needs of the community in the area. Personalized and relevant approaches will be more easily accepted and understood by the public. The involvement of local mass media, community leaders, and community organizations can also help expand the reach of education and increase public participation.

Empowering the community is the next crucial step. Through training and mentoring, the community needs to be equipped with the knowledge and skills to utilize renewable energy and apply the principles of energy efficiency in their daily lives. This can be done through technical training programs, workshops, and direct field mentoring. The role of regional leaders cannot be ignored. Regional leaders need to demonstrate strong commitment and leadership in encouraging public participation and garnering support from various stakeholders. This can be done through pro-RUED policies, intensive education and socialization, and active involvement of the community in the energy decision-making process. By building strong public awareness and participation, and strengthening the commitment and leadership of stakeholders, direction in the implementation of RUED in West Java and Bangka Belitung will be more effective. This will pave the way for a sustainable energy transition and provide maximum benefits for the community and the environment.

**4. Controlling**

Monitoring and evaluation (M&E) systems have been implemented in West Java and Bangka Belitung to monitor the progress and impacts of RUED. This is an important step to ensure the accountability and effectiveness of RUED implementation. However, analysis shows that the M&E system still needs to be strengthened to achieve its goals optimally. The development of clear, measurable, achievable, relevant, and time-bound (SMART) performance indicators is an essential first step. These indicators must be able to measure various aspects of RUED implementation, such as the achievement of renewable energy targets, energy efficiency, greenhouse gas emissions reduction, and socio-economic impacts. SMART indicators will help in monitoring progress objectively and measurably, as well as identifying areas that need improvement.

The implementation of a periodic and transparent reporting and evaluation system is also key. Data and information on the progress of RUED implementation need to be collected, analyzed and reported periodically to all stakeholders. These reports must be transparent and easily accessible to the public, to increase accountability and public trust in the implementation of RUED. The use of information and communication technology (ICT) can also help strengthen the M&E system. Digital platforms can be used to collect data, monitor progress, and generate reports in real-time. This will increase the efficiency and effectiveness of the M&E system, and facilitate decision-making based on accurate and up-to-date data.

By strengthening the M&E system through the development of SMART indicators, the implementation of periodic and transparent reporting and evaluation, and the utilization of ICT, the control of RUED implementation in West Java and Bangka Belitung will become more effective and accountable. This will ensure that RUED is implemented correctly and achieves its goals of realizing a sustainable energy transition and providing maximum benefits for the community and the environment.

## 4. Key Findings and Recommendations for Indonesia’s Energy Transition

### 4.1. Strengthening Multi-Level Governance (MLG) for Effective Energy Transition

This research has revealed compelling evidence that the implementation of Multi-Level Governance (MLG) in the Regional General Energy Plans (RUED) of West Java and Bangka Belitung has proven effective in enhancing coordination and integration among stakeholders. This is a crucial key in overcoming various obstacles faced in Indonesia's energy transition. The findings indicate that MLG can be a strategic instrument in fostering collaboration among parties, ranging from central and regional governments, the private sector, to the community. With strong coordination and integration, various barriers to energy transition, such as lack of coordination among stakeholders, overlapping policies, and limited resources, can be addressed more effectively.

Furthermore, this research recommends strengthening the implementation of MLG in national and regional energy transition policies and strategies. This can be done by:

- **Building a clear and structured institutional framework**: Establishing clear roles and responsibilities for each stakeholder in the energy transition process.
- **Enhancing communication and coordination mechanisms**: Building effective communication platforms to facilitate information exchange and coordination among stakeholders.
- **Developing joint programs and activities**: Designing joint programs and activities that involve the active participation of all parties.





- **Strengthening stakeholder capacity**: Improving the knowledge and skills of stakeholders in understanding and implementing the energy transition.

The implementation of MLG in the RUED of West Java and Bangka Belitung can serve as a model for other regions in implementing MLG for energy transition. This model demonstrates that with strong collaboration and integration, the energy transition can proceed more effectively and achieve the desired targets. Strengthening the implementation of MLG is a crucial step in realizing a sustainable energy transition in Indonesia. With solid collaboration among parties, Indonesia can achieve renewable energy targets and build a clean, environmentally friendly, and sustainable energy system for a better future.

### 4.2. Enhancing Stakeholder Capacity

Indonesia's energy transition requires the active role of various parties, from the government to the private sector and the community. To effectively achieve the goals of the energy transition, strengthening stakeholder capacity is key. This research shows that stakeholders, whether government, private sector, or community, need to have a deep understanding of the energy transition, including its principles, goals, and benefits. This can be achieved through the development of comprehensive and targeted training and education programs. These programs must be designed considering the needs and characteristics of each stakeholder.

In addition, easy and broad access to information about the energy transition also needs to be increased. This can be done through various media, such as websites, publications, seminars, and workshops. With adequate information, stakeholders can understand their role in the energy transition and take appropriate actions to support the process. Strengthening stakeholder capacity and increasing access to information are two strategic steps that need to be prioritized in realizing a successful energy transition in Indonesia. By increasing knowledge, skills, and access to information, stakeholders can become key actors in driving change toward a more sustainable energy system.

### 4.3. Utilization of Technology

The energy transition does not only rely on changes in policies and behavior but also on the utilization of appropriate technology. This research shows that three aspects of technology, namely the development of renewable energy (RE) technology, the utilization of information technology, and the development of energy infrastructure, play an important role in supporting an effective energy transition in Indonesia. First, the development of competitive and sustainable new and renewable energy (RE) technologies is key to reducing dependence on fossil fuels. RE technologies such as solar, wind, and hydropower need to be continuously developed to be more efficient, affordable, and accessible. Second, the utilization of information technology can improve the efficiency and effectiveness of energy management. Technologies such as smart grids, energy monitoring systems, and energy data platforms can help optimize energy use, reduce waste, and increase transparency in the energy system. Third, the development of energy infrastructure that supports the energy transition is equally important. This includes the construction of durable and flexible power grids, efficient energy storage systems, and infrastructure for the distribution of RE.

Overall, this research shows that the combination of MLG, RUED, and POAC management systems, and the utilization of appropriate technology can be a powerful formula for achieving an effective energy transition in Indonesia. With the support of appropriate policies and strategies, Indonesia can realize a clean, sustainable, and resilient energy system for a better future.

## 5. Conclusions and Recommendations

### 5.1. Conclusions

This research analyzed the role of Multi-Level Governance (MLG) in regional energy planning in Indonesia, focusing on case studies in West Java and Bangka Belitung. The results showed that MLG, Regional General Energy Plans (RUED), and the POAC management system are crucial instruments in Indonesia's energy transition. Effective implementation of MLG and RUED, supported by a robust POAC management system and appropriate policies and strategies, can help Indonesia achieve renewable energy targets and realize a sustainable energy transition. Key findings of this study include:

- **Importance of MLG**: MLG has proven effective in enhancing coordination and integration among stakeholders and addressing various barriers in the energy transition.
- **Role of RUED**: RUED, as a regional energy planning document containing strategies and targets for achieving energy resilience in the region, has proven effective in guiding the energy transition in West Java and Bangka Belitung.
- **Effectiveness of the POAC management system**: The implementation of POAC (Planning, Organizing, Actuating, Controlling) in the RUED of West Java and Bangka Belitung has shown positive results in achieving renewable energy targets.
- **Importance of strengthening stakeholder capacity**: Strengthening the capacity of stakeholders, including government, private sector, and the community, to understand and implement the energy transition is crucial for the success of the energy transition.
- **Utilization of technology**: The utilization of renewable energy (RE) technology, information technology, and the development of energy infrastructure that supports the energy transition is essential to increasing the efficiency and effectiveness of the energy transition.

In summary, the research highlights the importance of a multi-faceted approach to energy transition, involving strong governance, effective planning, capacity building, and technological innovation. By implementing these recommendations, Indonesia can successfully achieve its renewable energy targets and build a sustainable energy future.

### 5.2. Recommendations

Based on the research findings, several important steps are recommended to enhance the effectiveness of the energy transition in Indonesia. These steps include:

- **Strengthening the implementation of Multi-Level Governance (MLG)**: This can be done by building a clear institutional framework, enhancing communication and coordination mechanisms among stakeholders, developing joint programs and activities, and strengthening stakeholder capacity in understanding and implementing the energy transition.
- **Improving Regional General Energy Plans (RUED)**: RUEDs should be improved by more clearly defining the roles and responsibilities of stakeholders, strengthening monitoring and evaluation systems to track the progress and impact of RUEDs, and developing RUEDs that are contextual and suitable to the conditions and needs of the region.
- **Increasing stakeholder capacity**: Stakeholder capacity can be strengthened by developing training and education programs on the energy transition, increasing access to information for





stakeholders, and encouraging active participation of stakeholders in the energy transition process.

- **Utilizing technology**: The appropriate use of technology is crucial to supporting the energy transition. This can be done by developing competitive and sustainable new and renewable energy (RE) technologies, utilizing information technology to improve the efficiency and effectiveness of energy management, and developing energy infrastructure that supports the energy transition.
- **Formulating appropriate policies and strategies**: Policies and strategies supporting the energy transition need to be formulated considering various aspects, including social, economic, and environmental factors. These policies and strategies must be comprehensive, measurable, achievable, relevant, and time-bound (SMART).

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*Research Paper*

# Assessment of Environmental Assimilative Capacity
## Approaches and Implementation in Indonesia

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**Abstract**

*The concept of assimilative capacity has been used as an indicator to assess the environment's ability to absorb pollutants without damaging potentially renewable natural resources. However, comprehensive research that integrates the five renewable natural resources (fresh water, arable land, air, biodiversity, and marine ecosystems) at a macro-scale within a specific region has yet to be conducted. This study employs statistical analysis to categorize pollutant indices and ecosystem service indices and cross-tabulation to define levels of assimilative capacity. The spatial analysis visualizes the data distribution. Notably, the current calculation of environmental assimilative capacity, a pioneering effort, was conducted in Bali Province, marking a significant step forward in the field. The environmental carrying capacity of Bali Province is classified as moderate when aggregated. These findings provide essential insights for applying precautionary principles in environmental planning, aiming to improve the quality of life. They also offer valuable data for governments to shape policies for their regions. By understanding and utilizing these insights, we can work towards enhancing environmental health.*

**Keywords**

*Environmental Capacity, Potentially Renewable Natural Resources, Pollution Index, Environmental Services*

## 1. Introduction

### 1.1. Background of the Study

Indonesia is projected to face significant environmental and social challenges by 2045. Its population is expected to reach 324.06 million, over 70% of which will reside in urban areas (UN-DESA, 2022; Simarmata et al., 2023). Rapid urbanization, coupled with population growth, is expected to place substantial pressure on natural resources. As human habitation expands, the demand for essential resources such as clean water, arable land, clean air, and biodiversity will increase, leading to heightened consumption levels and significant environmental stress.

The anticipated rise in consumption levels directly correlates with the growing production of waste and the exacerbation of pollution. Notably, Indonesia is already the second-largest contributor to marine plastic waste, with estimates ranging between 1.3 million and 3.2 million tons of plastic entering the oceans each year (Jambeck et al., 2015). Furthermore, Indonesia experiences severe air pollution, primarily during the dry season, driven by forest and peatland fires. In 2019, air quality index (AQI) values in certain regions exceeded 500, far surpassing the hazardous level of 300 (World Air Quality Index Project, 2019). These environmental issues highlight the critical importance of sustainable resource management to maintain the ecological balance necessary for supporting life in the country.





Recognizing the urgency of these challenges, Indonesia has taken legislative steps to address its environmental sustainability. The introduction of Law No. 32 of 2009 institutionalized the use of Environmental Carrying Capacity (ECC) and Environmental Assimilative Capacity (EAC) as essential instruments for environmental and social safeguards. These frameworks serve as tools to evaluate the environment's ability to absorb waste and pollutants without compromising ecological health. Furthermore, Government Regulation (PP) No. 22 of 2021 provides specific guidelines for waste management and pollutant standards, reinforcing efforts to mitigate environmental degradation.

Despite these initiatives, Indonesia faces substantial challenges in assessing its EAC comprehensively. Accurate methodologies and data availability remain elusive, resulting in gaps between the country's EAC assessments and the effective implementation of existing policies. This issue is particularly critical as Indonesia continues its development trajectory, and a more precise evaluation of EAC is essential to balance economic growth with environmental sustainability.

To address these gaps, the current study aims to evaluate Indonesia's environmental assimilative capacity on a macro scale, focusing on five key renewable natural resources: fresh water, arable land, air, biodiversity, and marine ecosystems. By assessing the 2023 EAC across these dimensions, this research seeks to provide actionable insights that can guide environmental planning and policy formulation in Indonesia, ensuring that development can proceed without undermining the country's ecological and environmental health.

### 1.2. Literature Review

Research into environmental assimilative capacity (EAC) has developed significantly in recent years as nations grapple with the need to balance development and sustainability. The EAC concept is vital to understanding how much environmental stress a region can bear before detrimental effects occur. In the case of Indonesia, where rapid urbanization, industrialization, and population growth are pressing concerns, assessing EAC becomes a crucial component of environmental management.

#### 1.2.1 Theoretical Foundations of EAC

Environmental assimilative capacity refers to the environment's ability to absorb, break down, or disperse pollutants without damaging the ecosystem's health or functionality. Previous studies have defined EAC as a critical indicator of how much human activity an ecosystem can support sustainably (Schroll et al., 2012). This framework is particularly significant in regions like Indonesia, where natural resources are essential for both economic activities and human survival. Furthermore, by understanding EAC, planners, and policymakers can design strategies that minimize environmental degradation, thus ensuring long-term sustainability.

However, despite its importance, estimating EAC is challenging, as it requires not only extensive data but also appropriate methodological frameworks. Various studies have highlighted the difficulties in accurately measuring EAC due to the multifaceted nature of environmental systems and the interactions between different resources, such as land, water, and air (Drucker & Lafferty, 2006). Therefore, more comprehensive and region-specific methodologies are required, particularly in areas as diverse as Indonesia, to improve EAC assessments.

#### 1.2.2 Research on Environmental Capacity in Indonesia

While research on EAC is still evolving globally, the situation in Indonesia has seen some partial studies, particularly in relation to the pollution load in river basins and air quality (Prawoto et al., 2015). These studies often focus on isolated issues, such as water pollution in specific regions or air quality in urban centers, leaving out a holistic understanding of how Indonesia's environment can assimilate various forms of stress. For instance, air pollution resulting from forest fires is well-documented, particularly in studies

highlighting the sharp rise in particulate matter (PM2.5) during the dry season (World Air Quality Index Project, 2019).

Water quality has also been an area of considerable focus in EAC research in Indonesia. Indonesia's extensive river systems, which serve as vital water sources for millions of people, have been found to be increasingly polluted due to urbanization and industrial activities. Several studies have noted that large amounts of untreated wastewater are released into these rivers, pushing their assimilative capacity to the brink (Suratno & Yusuf, 2020). However, despite these findings, a comprehensive assessment of how multiple natural resources interact to form the environmental assimilative capacity is still lacking.

### 1.2.3 Policy Instruments and Challenges in EAC Assessment

Indonesia has developed various policy frameworks aimed at improving environmental sustainability. Law No. 32 of 2009, for instance, marks an important legislative step by emphasizing the need to consider both Environmental Carrying Capacity (ECC) and EAC as tools for safeguarding ecological health (Schroll et al., 2012). However, the effectiveness of these policies has been limited due to difficulties in data collection and application. The challenge of accessing reliable data on the state of natural resources and environmental degradation remains a significant hurdle in estimating the country's EAC accurately.

In addition, Government Regulation (PP) No. 22 of 2021 contains specific guidelines for waste management and pollutant standards. It represents a critical effort by the Indonesian government to curb the negative environmental impacts of industrial activities and urban waste production. However, the gap between the policy guidelines and their implementation persists. Studies have indicated that while the framework for EAC is in place, the actual execution of policies often falters due to a lack of adequate institutional capacity and resources (Tjandra, 2017).

### 1.2.4 Integrating EAC into Spatial Planning

Integrating environmental assimilative capacity into spatial planning represents another crucial development in Indonesia's environmental policy. EAC has been recognized as an essential component of regional spatial planning, particularly in determining how much human activity can be sustained without causing environmental damage (Simarmata et al., 2023). However, this integration faces several challenges, including technical limitations in accurately forecasting environmental thresholds and the capacity of local governments to implement these frameworks effectively.

Schroll et al. (2012) argue that integrating EAC into spatial planning is essential to manage the environmental impact of urbanization and industrialization, especially in regions with high population density and rapid land conversion. These insights provide a pathway to creating more resilient urban environments that balance economic growth and ecological sustainability. Despite these policy advancements, further research and refinement in methodologies are needed to close the gap between theoretical frameworks and on-the-ground applications.

The literature on environmental assimilative capacity underscores the complexity of accurately assessing how much stress Indonesia's environment can handle. While existing research highlights key aspects of water, air, and land-based resources, there remains a pressing need for a more integrated approach to understanding the interplay between multiple resources. By addressing methodological challenges, improving data collection, and ensuring the effective implementation of policies, Indonesia can make significant strides in aligning development goals with sustainable environmental management.

## 2. Method

Researchers selected the province of Bali as the study area for environmental assimilative capacity due to the rapid, large-scale development in the tourism sector. This growth has placed significant pressure on five potentially renewable natural resources. The increasing number of tourists, coupled with the





expansion of tourism infrastructure, drives the intensive use of natural resources, which consequently diminishes the environment's assimilative capacity—its ability to absorb negative impacts like pollution and waste.

This study employs a quantitative approach, utilizing cross-tabulation, spatial analysis, and literature review methods to assess the assimilative capacity within the concept of environmental carrying capacity. Researchers use the cross-tabulation method to examine the relationship between the environmental carrying capacity concept, specifically between variables such as substances, energy, or pollutant components, and absorptive variables based on data distribution. These relationships are then statistically analyzed to determine the assimilative capacity of a given environment.

According to Creswell (2014), the quantitative approach is an effective way to identify patterns and relationships in data. Researchers analyze pollutant variables using a pollutant index approach while they assess environmental absorptive variables through an environmental service index approach. Spatial analysis is applied to map the pollutant index, convert point data into polygons, and map the environmental service index using the supply and demand approach of ecosystem services (Burkhard, 2017). Both data variables are then categorized on a scale from low to high. The overlap of these two datasets is analyzed using a series of queries to extract specific data, resulting in a mapping of the assimilative capacity of the environment across each of the five potentially renewable natural resources as part of the environmental carrying capacity assessment approach.

### 2.1. Data Collection

The data used in this study include:

- **Pollutant Data:** Researchers gathered the pollutant index for five potentially renewable natural resources. They used interpolated results from water quality index monitoring points for clean water resources. For land resources and biodiversity, they applied the number of hazardous and toxic waste (B3) reporting points from companies, distributing them with weighted categorization of land use. For air resources, they interpolated data from air quality index monitoring points. For marine resources, they used monitoring points with marine quality index data to identify clean waters. The Ministry of Environment and Forestry (KLHK) provided this data.
- **Absorptive Data:** Researchers applied the 2022 environmental service approach provided by the Ministry of Environment and Forestry. They used the environmental service for water provision for water resources, the environmental service for soil formation for land resources, the environmental service for habitat and biodiversity support for biodiversity, the environmental service for air quality for air resources, and notably, the comprehensive Marine Ecoregion Information for marine resources.
- **Ecoregion and Land Cover Data:** Researchers used data on Natural Landscape Characteristics (KBA) and Natural Vegetation Characteristics (KVA), along with land cover time series for 2022, provided by the Ministry of Environment and Forestry.

### 2.2. Data Analysis

Assessing the Assimilative Capacity of Potentially Renewable Resources

1. Identifying Pollutant Index Classes

Our researchers begin by collecting and processing the necessary data to identify pollutant index points. The process involves collecting spatial data from various monitoring points that record pollutant levels. These data points, representing specific geographic locations, are then interpolated using techniques such as Inverse Distance Weighting (IDW). This interpolation estimates pollutant values in areas between known data points, enabling the creation of a continuous surface of pollution levels. This surface is then divided

into zones based on pollution intensity thresholds, transforming the scattered points into polygons that represent areas with similar pollution levels. The resulting polygons provide a clear and visual representation of the distribution of pollution, making the findings easily understandable.

2. Identifying Environmental Services Classes

Our researchers overlay ecoregion data on Natural Landscape Characteristics (KBA) and Natural Vegetation Characteristics (KVA) with Land Cover (PL) data to create environmental services through scoring and weighting methods. This approach, as highlighted by Crossman et al. (2013), provides a crucial framework for assessing the landscape's capacity to deliver ecosystem services. The identified environmental service is water regulation. Scoring assesses the condition of each environmental parameter, while weighting is applied based on the importance of each parameter, ensuring a comprehensive evaluation.

Researchers can apply the following formula:

$$\text{Environmental Service} = (W\_KBA \times KBA) + (W\_KVA \times KVA) + (W\_PL \times PL)$$

Where:

- KBA represents the score for natural landscape characteristics,
- KVA represents the score for natural vegetation characteristics,
- PL represents the score for land use,
- W_KBA is the weight for natural landscape characteristics,
- W_KVA is the weight for natural vegetation characteristics,
- W_PL is the weight for land use.

3. Development of the Assimilative Capacity Assessment Cross Tabulation Matrix

Table 1 Assimilative Capacity Assessment Cross Tabulation Matrix

| Matrix | | Environmental Services | | | | |
|---|---|---|---|---|---|---|
| | | Very Low | Low | Moderate | High | Very High |
| Pollution Index | Heavily Polluted | Low EAC | Low EAC | Low EAC | Moderate EAC | Moderate EAC |
| | Moderately Polluted | Low EAC | Low EAC | Moderate EAC | High EAC | High EAC |
| | Lightly Polluted | Moderate EAC | Moderate EAC | High EAC | High EAC | High EAC |

Source: Author, 2024

4. Analysis and Mapping of Environmental Assimilative Capacity

The process for this analysis follows these steps: Researchers apply the overlay process from Step 1 to both pollutant index data and environmental services index data. By comparing the results from two different periods, they can identify the assimilative capacity of each potentially renewable natural resource using a series of queries to extract specific data.





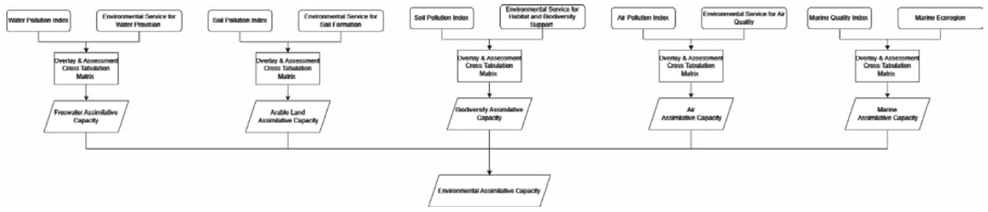


Figure 1 Assessment Methodology. Source: Author, 2024

## 3. Findings and Discussion

### 3.1. Assessment of Assimilative Capacity

**Freshwater Assimilative Capacity**

Widely, 83% of the pollutant index identifies pollutants in the moderately polluted category. The distribution of water pollutant indices reveals that 2% of the low or heavily polluted index affects the Denpasar area and its surroundings, while 15% of the lightly polluted index impacts the highlands of Buleleng, Bedugul, and Bangli. This data underscores the fact that high pollution levels in Bali Province can make water unsuitable for consumption without thorough treatment, significantly exacerbating the clean water crisis in many areas.

Additionally, the environmental services index for water supply shows that 50.63% of the region falls into the very low and low categories, while 49% falls into the moderate category. This finding underscores the inadequacy of Bali's natural absorption capacity. A lower environmental services index for water supply suggests that the availability of usable water decreases, highlighting the urgent need for action.

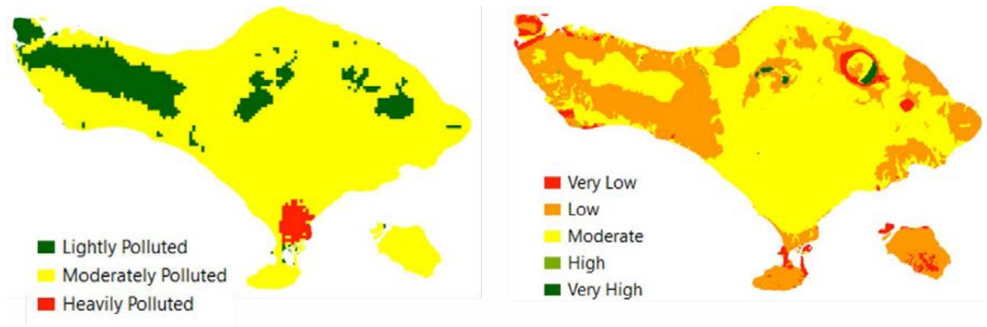


Figure 2 (Left) Water Pollution Index and (Right) Ecosystem Services - Water Providers. Source: KLHK, 2022

These two factors indicate that pollution and lack of usable water dominate much of the region. Consequently, Bali Province's clean water assimilative capacity ranks as moderate. When an ecosystem or water body has a low assimilative capacity, it struggles to absorb or break down pollutants, which can lead to pollutant accumulation in the water, potentially causing more severe contamination. This highlights the vulnerability of the environment to the effects of pollution.

**Arable Land**

The distribution of pollution indices for agricultural land shows that 4% of the land in this region is categorized as highly polluted, presenting significant challenges for agricultural productivity. This category generally affects areas with intensive farming practices or poor waste management. Meanwhile, 55% of

the agricultural land falls into the moderately polluted category, indicating that while these lands still hold agricultural potential, pollution remains a major barrier to achieving high yields.

In terms of environmental services related to soil formation regeneration, agricultural land in Bali Province shows a less concerning trend. Approximately 16% of agricultural land in this region provides very low levels of ecosystem services, such as nutrient cycling and soil health. This shows that soil degradation and pollution likely reduce the capacity of these areas to sustain agricultural production. The moderate level of ecosystem services, covering 52% of the land, suggests that some areas are better managed but still face risks related to sustainable farming.

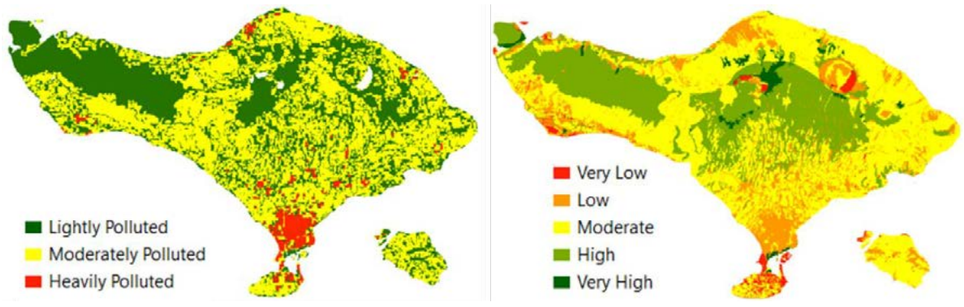


Figure 3 (Left) Soil Pollution Index and (Right) Ecosystem Services - Soil Formation for Land Resources. Source: KLHK, 2022

The combined impact of pollution and declining ecosystem services leads to a landscape with diminished assimilative capacity. With a significant portion of farmland both polluted and offering low ecosystem services, maintaining sustainable food production presents an increasing challenge. Addressing soil health and sources of pollution could help restore agricultural productivity in Bali Province.

**Biodiversity**

Regarding biodiversity, 41% of the biodiversity areas in Bali Province are categorized as highly polluted, threatening habitats and ecosystems vital to various species. This pollution directly affects the resilience of biodiversity in the region, making it more difficult for flora and fauna to thrive. Moderately polluted areas, which cover 55%, still support life but face increasing challenges due to habitat degradation and contamination.

In terms of ecosystem services supporting habitats and biodiversity, Bali's biodiversity shows a mixed picture. About 29% of biodiversity areas offer very low support for habitats and biodiversity. This means the biodiversity in these areas only partially benefits the ecosystem, whether due to pollution, habitat loss, or other environmental pressures. Conversely, 60% of the area shows very high scores, indicating that some biodiversity hotspots are still functioning well in supporting critical ecological processes.





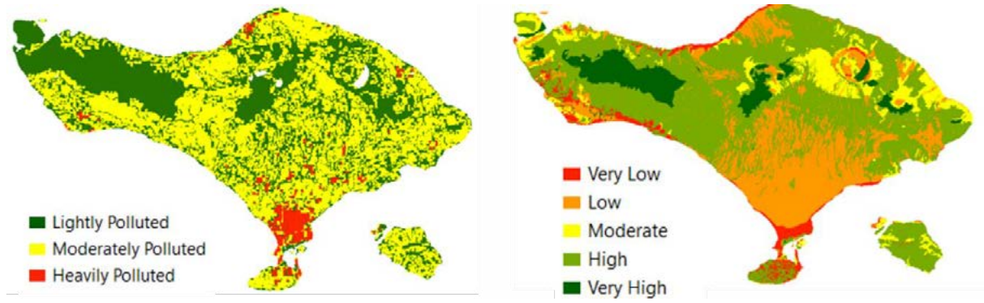


Figure 4 (Left) Soil Pollution Index and (Right) Ecosystem Services - Habitat And Biodiversity Support. Source: KLHK, 2022

Pollution pressures and varying levels of ecosystem services create a fragile balance for Bali's biodiversity. Without strong conservation efforts and pollution management, this balance, which supports Bali's rich biodiversity, may become increasingly disrupted, potentially leading to species population declines and ecosystem health deterioration.

**Air**

Broadly, almost all the air pollution index identifies pollutants within the mildly polluted category. The distribution of air pollution indices indicates that 1% of the highly polluted index affects urban areas with heavy traffic, such as Denpasar and Kuta, while 20% of the mildly polluted air index occurs in highland areas like Buleleng and Bedugul. This data shows that although most of Bali experiences low to moderate air pollution, areas with intensive human activity are more vulnerable to poor air quality.

Furthermore, the environmental service index for clean air provision shows that 4.25% of Bali is categorized as very low, while 42.87% falls into the moderate category. This shows that while much of the region still maintains moderate air quality, pollution significantly impacts some areas, and the ecosystem's ability to filter or break down air pollutants continues to decline. These areas may require additional measures to prevent further degradation of air quality.

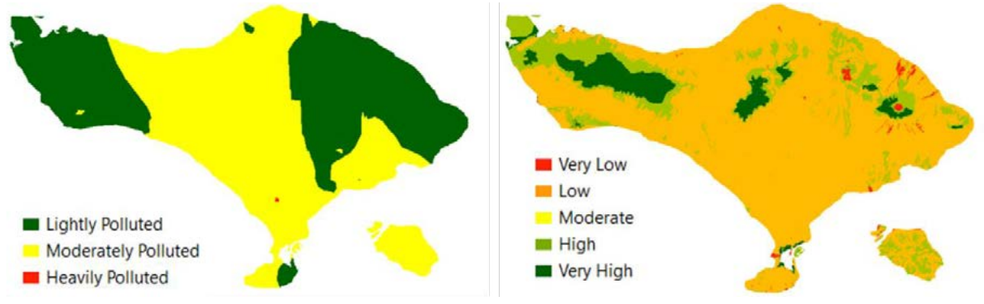


Figure 5 (Left) Air Quality Index and (Right) Ecosystem Services - Air Quality. Source: KLHK, 2022

These two factors indicate that air pollution and ecosystems' limited capacity to maintain clean air are major concerns in many regions. With much of the ecosystem's air capacity only at moderate levels, Bali faces challenges in balancing human activity and environmental health. Failure to address pollution sources could lead to an accumulation of air pollutants, ultimately increasing health risks for the population and threatening environmental sustainability.

**Ocean**

In Bali Province, there are currently only 15 monitoring points dedicated to tracking seawater quality, concentrated solely around the waters of Tanjung Benoa Beach. Recent data reveals that 10 out of these 15 points are classified as heavily polluted. Additionally, Tanjung Benoa Beach itself is considered moderately polluted, with several water quality parameters exceeding the maximum allowable limits for marine tourism, according to environmental standards. This highlights not only the localized environmental stress but also the need for expanded monitoring and stronger marine protection strategies, particularly in areas heavily utilized for tourism.

The concept of a marine ecoregion goes beyond geographic boundaries, encompassing distinct ecological areas characterized by unique marine biodiversity and environmental conditions. Understanding these ecoregions is critical for effective conservation strategies and the sustainable management of marine resources. By integrating both biotic (living organisms, such as fish, coral, and other marine species) and abiotic (non-living components like water quality, temperature, and nutrient levels) factors, conservation efforts can be better targeted to protect the complex interactions that support marine life. This holistic approach is essential for maintaining the ecological integrity and resilience of marine ecosystems in the face of environmental challenges and human activities.

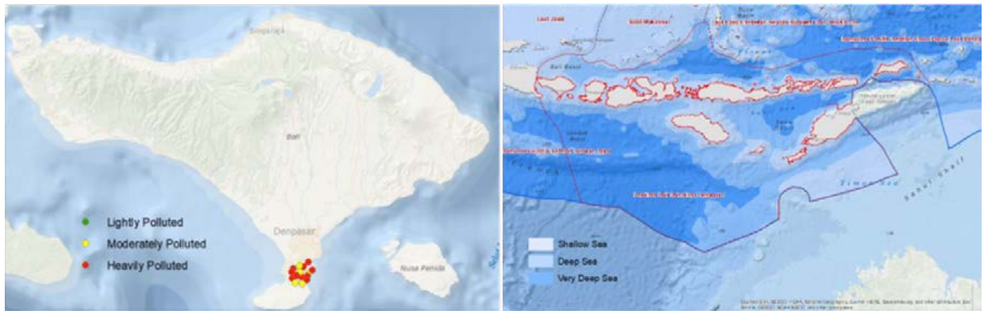


Figure 6 Monitoring Points with Seawater Quality Index and (Right) Marine Ecoregion Information. Source: KLHK, 2022

## 3.2. Mapping the EAC Value

**Freshwater**

A spatial distribution of the freshwater assimilative capacity across Bali Province is categorized into three levels: High EAC (green), Moderate EAC (yellow), and Low EAC (orange/red). From the map, it is evident that areas with high assimilative capacity (green) are scarce, representing only about 6% of the region. These areas are confined to a few localized patches, while the majority of Bali is dominated by regions with moderate to low capacity to absorb and process pollutants. The map illustrates a critical situation where most of the island's freshwater systems are no longer able to effectively handle pollution, threatening both water quality and overall ecosystem health.





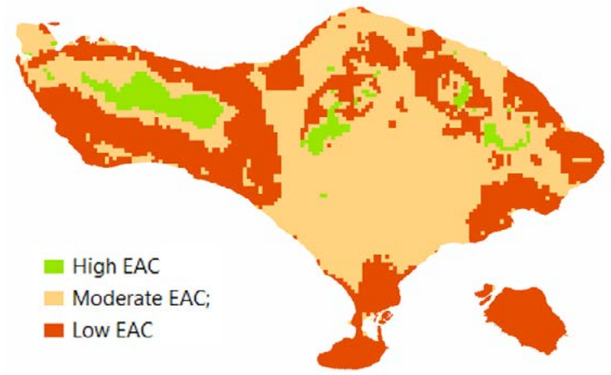


Figure 7 Freshwater Assimilative Capacity. Source: Data Processing Results, 2024

**Arable Land**

Notably, 48% of arable land in the province is classified as having a high assimilative capacity, indicating a significant ability of these regions to absorb pollutants and support agricultural activities. This high capacity is crucial for maintaining food self-sufficiency in Bali, enabling the land to withstand and mitigate the impacts of agricultural runoff and other pollutants. The presence of high EAC areas suggests that there are substantial opportunities for sustainable farming practices and conservation efforts in these regions.

However, the map also highlights areas with low EAC, primarily located in the southern part of the island, particularly near urbanized zones and coastal areas. These low EAC regions indicate a higher susceptibility to pollution and a decreased ability to support agricultural activities. The concentration of low EAC areas near urban centers underscores the gravity of the situation, signifying the challenges faced due to urban expansion, which often leads to habitat degradation and increased pollution. The proximity of these regions to vital freshwater resources exacerbates the risk of water quality degradation, threatening not only agricultural productivity but also the overall health of ecosystems in Bali. Addressing the imbalance between high and low EAC areas will be essential for ensuring long-term environmental sustainability and agricultural resilience.

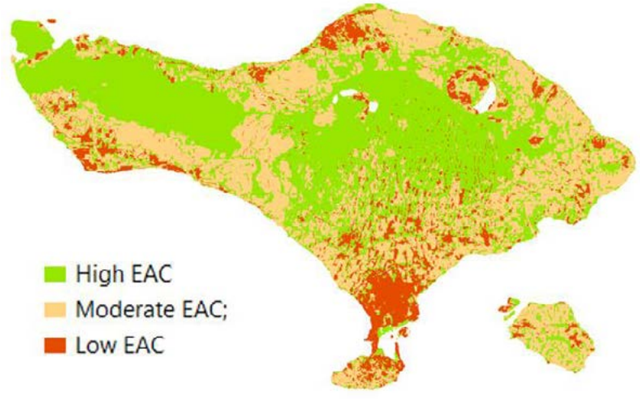


Figure 8 Arable Land Assimilative Capacity. Source: Data Processing Results, 2024

**Biodiversity**

The map depicts the Biodiversity Assimilative Capacity (EAC) of Bali Province, highlighting different levels of ecological sensitivity and vulnerability across the region. About 65% of the province is categorized as having a high EAC, meaning that these areas are capable of absorbing pollutants while maintaining genetic and habitat diversity. This ensures that various species continue to thrive and interact within these ecosystems. The areas marked in red indicate regions with low EAC, primarily sprawling in the southern part of Bali. This region encompasses the urban and highly developed areas around Denpasar and the southern peninsula, including popular tourist destinations like Kuta, Nusa Dua, and Jimbaran, where biodiversity is more vulnerable due to development pressures and lower capacity to mitigate environmental impact.

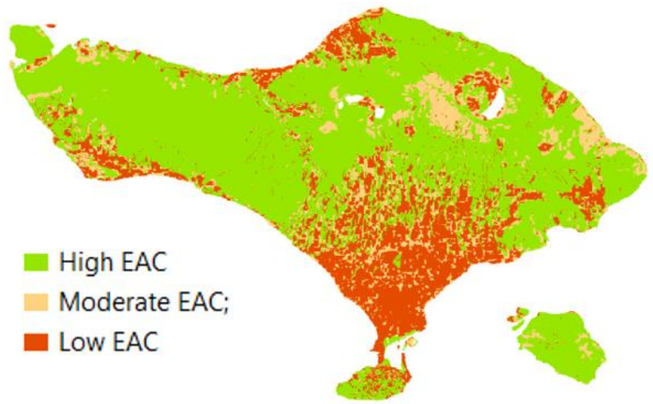


Figure 9 Biodiversity Assimilative Capacity. Source: Data Processing Results, 2024

**Air**

The image displays the air assimilative capacity (EAC) across Bali Province, revealing that 53% of the area is categorized as having high air quality capacity, represented in yellow and green tones. This significant percentage indicates that the province has a strong ability to absorb air pollutants, thereby maintaining good air quality and minimizing health risks related to air pollution for both residents and visitors. However, regions with low EAC are primarily concentrated in the southern part of the island, particularly in urbanized areas such as Denpasar and Kuta. These densely populated locations face challenges related to traffic congestion, industrial activities, and tourism, leading to increased levels of air pollution and posing potential health risks. Addressing these challenges through effective environmental management strategies will be essential to sustain air quality across Bali.





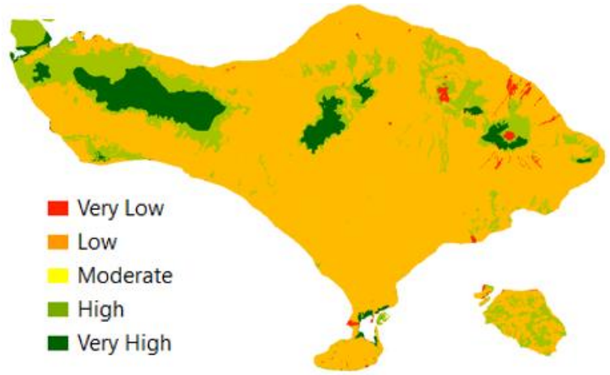


Figure 10 Air Assimilative Capacity. Source: Data Processing Results, 2024

**Ocean**

The southern coastal waters of Bali Province exhibit a lower Environmental Assimilative Capacity (EAC) compared to other regions, indicating a diminished ability to absorb and neutralize pollutants. This reduced capacity is attributed to the detection of pollutants at consistent depths along the coastline, signifying a pervasive distribution of contaminants in these marine areas. Notably, the southern coastlines, encompassing areas such as Kuta, Seminyak, and Canggu, face significant pollution challenges, particularly from plastic waste and urban runoff (Siddharta, 2019). In contrast, the northern and eastern coasts, which are less developed and more rural, tend to have higher EAC levels, benefiting from relatively pristine conditions and robust natural filtration systems.

Mangrove ecosystems, vital for coastal health, are present in both heavily and sparsely populated areas of Bali. However, their health varies; mangroves near urbanized regions like Denpasar are often degraded due to pollution and land-use changes, while those in less developed areas remain relatively healthy (Sugiana, 2022). The condition of mangroves directly influences the EAC of coastal waters, as healthy mangroves enhance water quality through nutrient cycling and sediment trapping, thereby bolstering the environment's capacity to assimilate pollutants.

**Environmental Assimilative Capacity**

The table highlights the environmental status of key potentially renewable natural resources, revealing that freshwater is the most vulnerable, with moderate pollution, low ecosystem services, and a low capacity to absorb pollutants. Arable land, while also moderately polluted, has a moderate capacity to support ecosystem services and process pollutants. Biodiversity, air, and ocean resources are in better condition, showing high environmental assimilative capacity and ecosystem services, though moderate pollution levels could pose future risks. Overall, the data suggests that freshwater systems need the most urgent attention, while ongoing monitoring of pollution in other areas is crucial for long-term sustainability.

Table 2 Results of The Category Class of Each Level of Assimilative Capacity of Each Potentially Renewable Natural Resource.

| Potentially Renewable Natural Resources | Fresh Water | Arable Land | Biodiversity | Air | Marine |
|---|---|---|---|---|---|
| Pollutant Index | Moderately Polluted | Moderately Polluted | Moderately Polluted | Lightly Polluted | Moderately Polluted |
| Ecosystem Services Index | Low | Moderate | High | Moderate | High |

| Potentially Renewable Natural Resources | Fresh Water | Arable Land | Biodiversity | Air | Marine |
|---|---|---|---|---|---|
| Environmental Assimilative Capacity | Low | Moderate | High | High | High |

Source: Data Processing Results, 2024

The radar chart provides a visual comparison between the Pollution Index (represented in black) and the Ecosystem Services Index (represented in green) across five key resources: Fresh Water, Air, Arable Land, Biodiversity, and Marine environments. Each resource is assigned a weight by the Analytic Hierarchy Process (AHP), with Fresh Water weighted at 0.44, Arable Land at 0.26, Biodiversity at 0.12, Air at 0.00076, and Marine at 0.09. The chart reveals that the pollutant index for Fresh Water and Air is significantly higher than their respective ecosystem services indices, suggesting that these resources are more polluted in relation to the ecosystem benefits they provide. For Arable Land, the indices are nearly identical, indicating a balance between the pollution levels and the resource's capacity to deliver ecosystem services. In contrast, Biodiversity and Marine environments exhibit a higher ecosystem services index compared to their pollutant index, suggesting that despite some pollution, these resources continue to provide considerable ecological value.

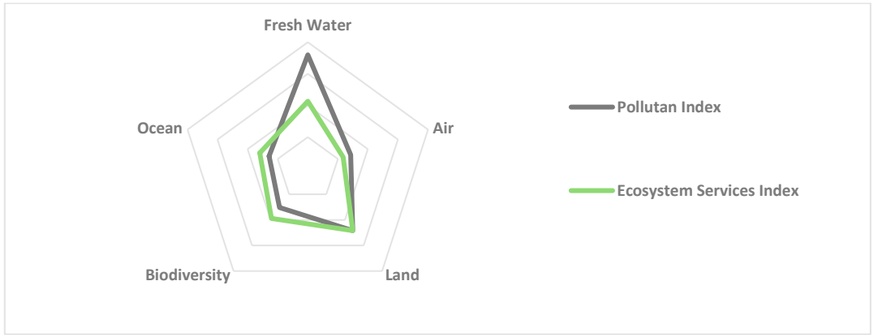


**Figure 11 The radar chart provides a visual comparison between the Pollutant Index (represented in black) and the Ecosystem Services Index (represented in green) across five key resources. Source: Data Processing Results, 2024**

In terms of the relationship between the pollutant index and ecosystem services index, freshwater and air show a higher pollutant index than their respective ecosystem services index. This means that these resources are more polluted than they are able to provide ecological benefits, highlighting their vulnerability and the need for intervention. For arable land, the pollutant index is equal to the ecosystem services index, indicating a balance between pollution levels and the land's ability to support agriculture and ecological functions, though both are under moderate stress. In contrast, biodiversity and ocean resources show a lower pollutant index compared to their ecosystem services index, meaning that despite some pollution, these systems continue to provide significant ecological benefits, reflecting their resilience and higher capacity to maintain ecosystem health.

### 3.3. Research Limitations

The primary limitation of this research lies in the fact that environmental assimilative capacity calculations were not based on direct pollutant samples but instead relied on aggregated and interpolated data. Additionally, the monitoring points are limited and concentrated mainly in industrial areas, which has led to elevated pollutant index values in both industrial and residential zones. Furthermore, when assessing air and water resources, important factors such as water currents, wind direction, and their interactions with air and freshwater were not considered. In terms of biodiversity, the study needs a specific approach





to address its role in natural resource management. Since pollutant absorption varies across species, the differing capacities of species to absorb pollutants should have been considered. This omission could impact the accuracy of the assimilative capacity assessment at the ecosystem level.

## 4. Conclusion

### 4.1. Broader Project Impact

This research highlights the potential for reducing pollution, enhancing ecosystems, and fostering climate resilience through sustainable practices. By promoting green infrastructure and integrating environmental assimilative capacity assessments, Indonesia can better manage urbanization and protect ecosystems. Additionally, education and behavior change initiatives can empower communities to adopt eco-friendly practices, reducing waste and pollution. These efforts build social capital, equipping communities to adapt to climate change while fostering a healthier environment and enhancing resilience against environmental stresses.

### 4.2. Next Development

Data capital and the development of calculations enhance integrated water management systems, waste management, and water recycling systems for adaptive management. Field data play a crucial role in adaptive management by informing the implementation of green infrastructure and optimizing integrated water management, waste management, and water recycling systems to improve ecosystem services. Data capital is essential in optimizing resource allocation in waste management practices by leveraging advanced analytics and real-time data. This integration not only strengthens decision-making processes but also assures more efficient operations, instilling confidence in the system.

## Acknowledgment

We extend our sincere gratitude to the Indonesian Association of Urban and Regional and Ministry of Environment and Forestry of the Republic of Indonesia for funding this project, providing crucial data and insights, and connecting us with other experts, which were essential to the success of this research.

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*Case Study Report*

# An Assessment of Flood Disaster Through Plans at Kayseri Province in Türkiye: Lessons for Urban Resilience/Floodproofing and Planning

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Adem SAKARYA, Yildiz Technical University, Türkiye

## Abstract

*This research aims to evaluate the vulnerabilities of floods in the central district of Kayseri province through risk factors, and to develop suggestions for floodproofing approaches under the headings of "avoidance", "mitigation" and "sharing". As a result, risk mitigation/floodproofing for flood risk is suggested under the headings of “avoidance”, “mitigation” and “sharing”. While dry valley areas and flood hazard zones are evaluated within the scope of prevention proposals, afforestation works, flood roads that can turn into channels in case of flood, green streets, water plazas, bio-retention, rain garden, rain ditches, increasing urban permeable surfaces, reducing surface flows, flooding elevation, etc. evaluated within the scope of reduction recommendations. The risks cannot be reduced to zero, but it can be reduced by early warning systems, intervention plans, insurance, taxes, funds, etc. These are the factors suggested under the heading of sharing with interventions. Suggestions for adaptation capacity were developed within the scope of the transformational adaptation approach, which is the most beneficial against high-risk levels.*

## Keywords

*Climate change, flood risk, risk mitigation, floodproofing, urban resilience, urban planning.*

## 1. Introduction

The study investigates the flood disaster on risk factors in Kayseri, Türkiye. In the study area, there have been many flood disasters that have affected life significantly from the past to the present. When the distribution of flood events that have occurred since 1950 is examined, it is seen that Kayseri ranks fifth in the country with 215 flood events. Therefore, it is important to investigate the city that has flood risk from past to present and the cities that come into prominence with innovative adaptation and risk-reducing strategies against potential flood risks in the future.

The aim of this research is to assess the vulnerability to flooding in the central district of Kayseri province through risk factors and to develop proposals for floodproofing approaches under the headings of "avoidance", "mitigation" and "sharing". In the related literature, it is determined that the main reason for the floods and overflows in the city center was unplanned/wrong land use. While some of the stream beds are completely closed, some continue under the road. It has been observed that the streams with open tops progress through the concrete ground. In the continuation of this, the risk of flooding increased with the increase in settlements in the creek flood areas. In the Kızılırmak Basin Flood Management Plan and





the Provincial Disaster Risk Reduction Plan, there are general statements to reduce the flood risk, but there are no spatial provisions in the development plans made at the local level and no measures are taken.

As a result, flood risk mitigation/flood proofing is proposed under the headings of 'avoidance', 'mitigation' and 'sharing'. While dry valley areas and flood hazard zones are evaluated in the context of prevention proposals, afforestation works, flood roads that can be converted into channels in the event of a flood, green streets, water plazas, bio-retention, rain gardens, rain ditches, increasing urban permeable surfaces, reducing surface flows, flood elevations, etc. are evaluated in the context of mitigation recommendations. The risks cannot be reduced to zero, but they can be reduced through early warning systems, intervention plans, insurance, taxes, funds, etc. These are the factors proposed under the heading of sharing with interventions. Suggestions for adaptive capacity have been developed as part of the transformational adaptation approach, which is most useful for high levels of risk.

As climate change intensifies, urban areas face increasing risks of extreme weather events, particularly floods. Kayseri, being highly susceptible to flood events due to both climatic and anthropogenic factors, serves as an exemplary site to explore urban resilience strategies. This study's examination of flood risk factors and the efficacy of floodproofing measures in Kayseri contributes valuable insights into how cities can adapt to and mitigate the impacts of climate change. By identifying vulnerabilities and proposing adaptive measures such as improved land use planning, green infrastructure, and early warning systems, this research supports the development of resilient urban environments that can withstand and recover from climate-related disruptions.

The research first explains the relationship between climate change, urbanization and flood risk and then, in the field studies section, seeks to answer the question of whether spatial planning can reduce flood risk in Kayseri.

## 2. Climate Change, Urbanization and Flood Risk

There is a mutual interaction between climate change, urbanization and flood risk. Today, the relationship between urbanization and climate change is an important issue that is being addressed with increasing frequency. These three factors mutually affect each other and can cause a great deal of damage, especially in urban areas.

Climate change, together with the increase in greenhouse gases in the atmosphere, is leading to a rise in average temperatures and an increase in the magnitude, frequency and severity of extreme weather events. This leads to more frequent heavy rainfall and storms, increasing the risk of flooding. These extreme weather events caused by climate change disrupt the natural water cycle, preventing water from infiltrating into underground reserves and causing water to accumulate on the surface, which can accelerate the occurrence of floods (IPCC, 2021). Increasing impervious surfaces in cities increase surface runoff and negatively affect flood risks.

The impact of the relationship between climate change and urbanization in creating flood risks is examined through two basic variables, namely changing precipitation regimes and increasing runoff with urbanization. One of the important factors that increase the risk of flooding in cities is the changing precipitation regime. Due to the decrease in vegetation as a result of urbanization, the precipitation regime changes with lower evapotranspiration (Chang & Franczyk, 2008; Pielke et al. 2002). Another significant factor contributing to urban flooding is runoff. A thorough comprehension of the impact of urbanization and climate change on runoff is essential for mitigating the adverse social, economic, and environmental consequences of flooding (Zhao et al., 2016).

The process of urbanization prevents rainwater from being absorbed by the soil, as natural surfaces are replaced by waterproof concrete, asphalt and other structural surfaces. As a result, runoff increases and can exceed the capacity of infrastructure systems, leading to flooding in urban areas. Especially in densely populated and unplanned growing cities, the absence or lack of proper water drainage systems and the closure of natural waterways by development further increase the risk of flooding (Dale, 1997; Chang & Franczyk, 2008; Pielke et al. 2002).

When the interaction between climate change and urbanization is assessed, the impacts on flood risk become more pronounced. Heavy rainfall caused by climate change can lead to greater flooding due to the impact of impervious surfaces present in urban areas (Kundzewicz et al., 2014). For example, floods in Turkey in recent years are considered to be a result of both climate change impacts and unplanned urbanization.

Lack of technical infrastructure and planning in cities makes it difficult to manage the combined impacts of climate change and urbanization. Protecting natural watersheds, developing blue green infrastructure and developing risk adaptation strategies against climate change are important steps to reduce flood risk.

In summary, the impact of climate change and urbanization on flood risk should be addressed with a comprehensive and integrated approach. Combining urban planning and climate change adaptation policies can contribute to reducing flood risk in urban areas. In this process, sustainable blue green infrastructure solutions and nature-based strategies are critical for effective risk management.

## 3. Findings

Kayseri is one of the important provinces in case of flood disaster in Türkiye. For the last year, it ranks fifth in the country with 215 flood events. The province center of Kayseri is examined in this study.

Kayseri province center includes Kocasinan, Melikgazi and Talas district. The population of these districts is almost 1,2 million in 2023.  In the study area, there are 172,723 buildings.





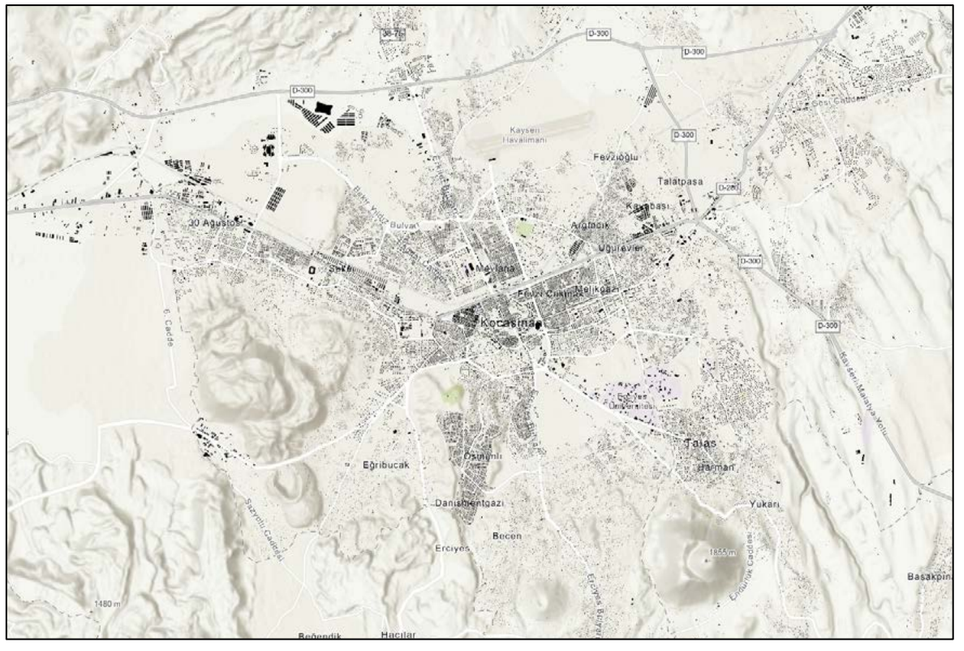


**Figure 1. Study Area.**

The flood risk in Türkiye is analyzed and determined by the Ministry of Agriculture and Forestry. The Q50-Q100- Q500 data is used for determining the flood risk area, and they are categorized according to their level.

In the study area, there is a generally moderate level of risk. Additionally, there is high risk around the airport. There are rivers that may cause flood risk in these areas.

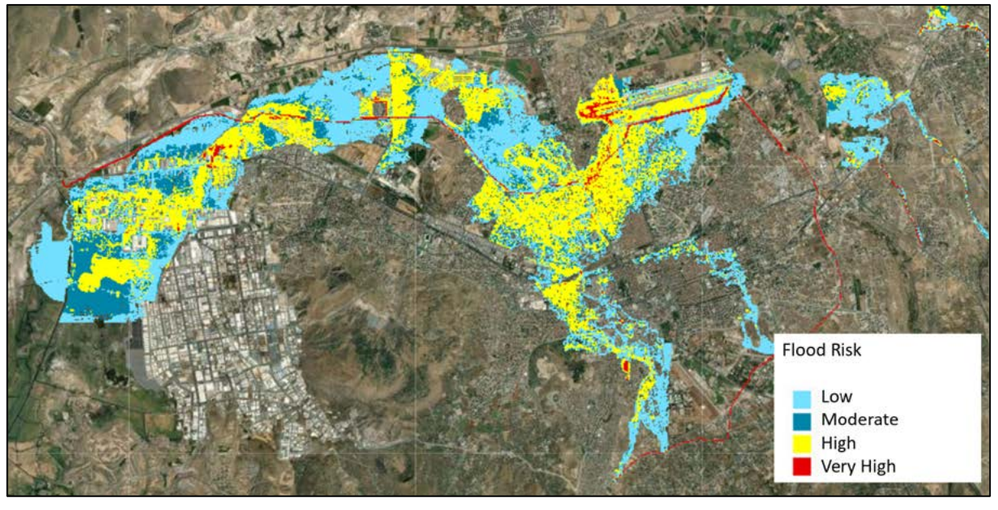


**Figure 2. Flood Risk at the Study Area.**

12 % of buildings (21.350 / 172.723) are located in flood risk areas. Especially in the south part of the airport the density of buildings in flood risk areas is remarkable.

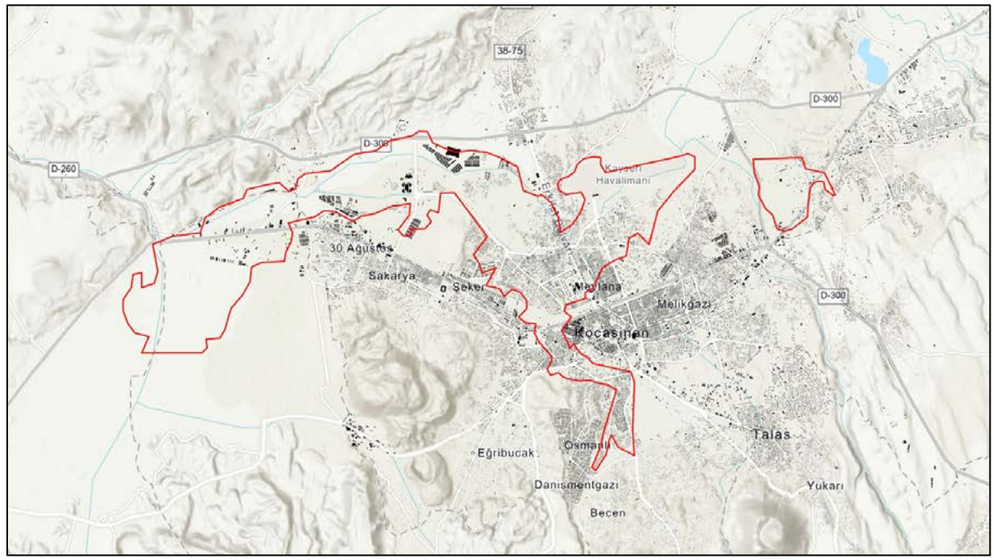


**Figure 3. The Buildings in Flood Risk Areas.**

It is absolutely seen that there is a flood risk in Kayseri province district. For resilient city, urban plans should develop land use decisions to minimize the risk.

There is a top-level land use plan in Kayseri approved in 2018. In the study area, housing, housing development area, urban service area, industry and other functions were planned.

| Function | Area (ha) |
|---|---|
| Airport | 586 |
| Social Infrastructure | 82 |
| Housing Development Area | 34431 |
| Housing | 22035 |
| Urban Service Area | 6882 |
| Commercial | 701 |
| Industry | 6940 |
| Technical Infrastructure | 71 |
| Tourism | 4749 |
| University | 1021 |





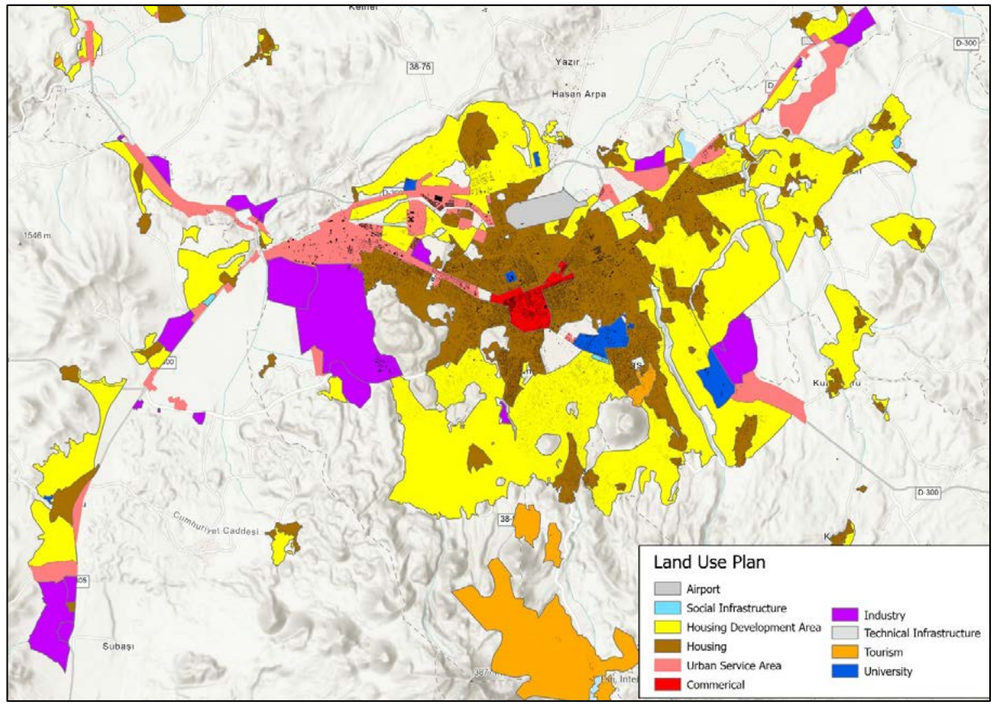


**Figure 3. Top-level Land Use Plan in Kayseri.**

The land use decisions and flood risk area were superimposed. The building area that defined in the plan are overlaps the flood risk area. In this sense, it may be said that the plan supports the current urban development in the area.

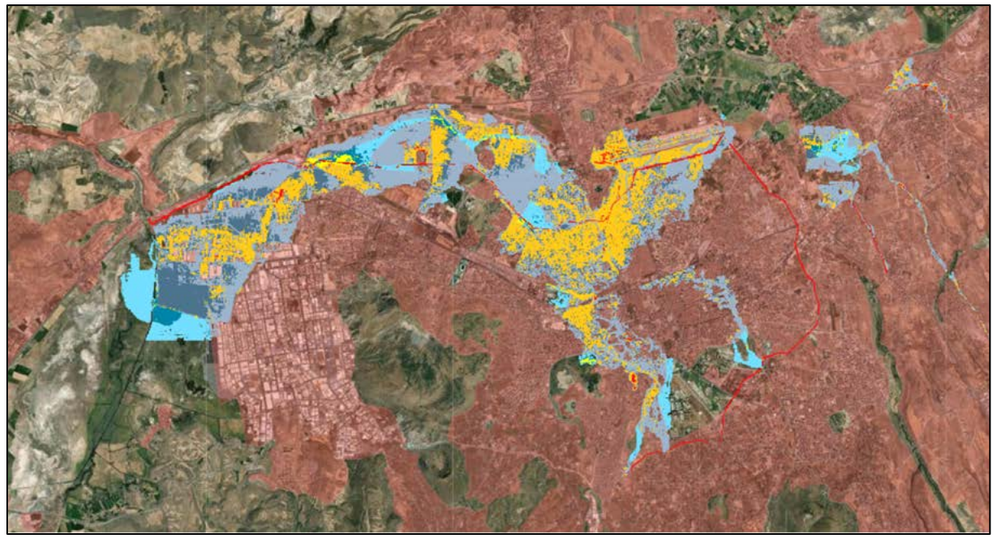

**Figure 4. Top-level Land Use Plan and Flood Risk Area in Kayseri (light red areas show the buildig area in the plan).**

In the study area, 17% of the housing area is defined at top-level land use plan under the flood risk, it is 20 % for urban service area and 68% for the airport. On the other hand, the 2680 ha of housing and housing development area is also under flood risk.

| Function | Area (ha) in Risky Area (X) | Area (ha) in Plan (Y) | X/Y (%) |
|---|---|---|---|
| Airport | 399 | 586 | **68%** |
| Social Infrastructure | 0 | 82 | 0% |
| Housing Development Area | **827** | 34431 | 2% |
| Housing | **1853** | 22035 | 8% |
| Urban Service Area | **1389** | 6882 | **20%** |
| Commercial | 120 | 701 | **17%** |
| Industry | 621 | 6940 | 9% |
| Technical Infrastructure | 0 | 71 | 0% |
| Tourism | 0 | 4749 | 0% |
| University | 36 | 1021 | 4% |



Bektaş, Y.; Sakarya, A.
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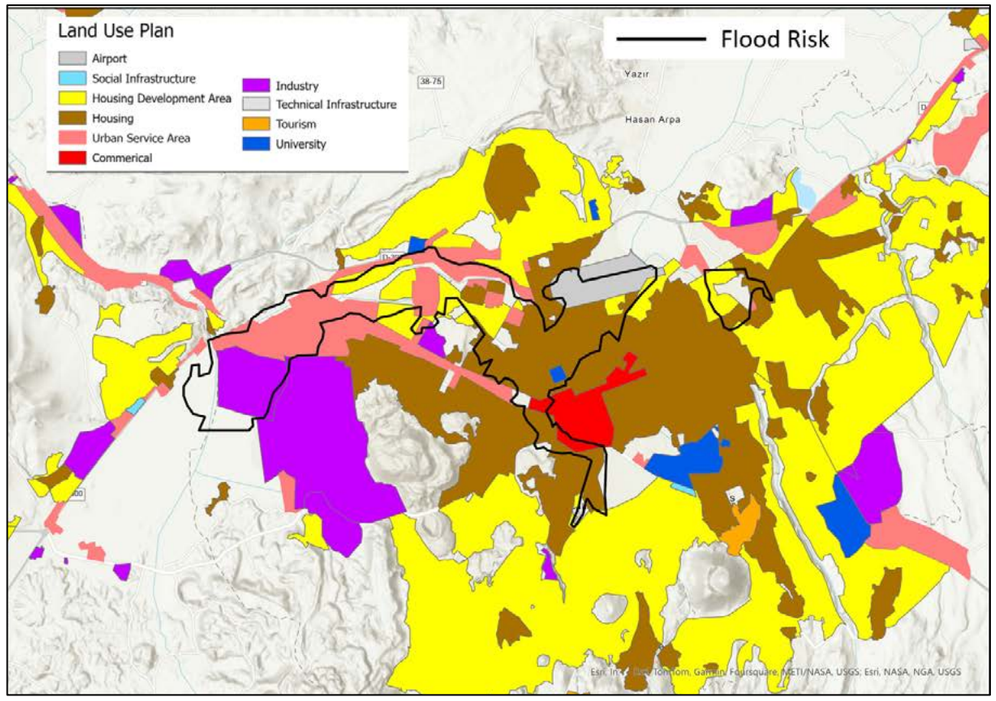


**Figure 4. Top-level Land Use Plan and Flood Risk Area in Kayseri**

## 4. Result

This study contributes significantly to planning and policy-making practices by addressing the pressing issue of flood risk management in urban areas, using Kayseri as a case study. The findings show that, even if there is an analysis for the flood risk areas, the plans did not develop the land use decisions according to this analysis. The housing, housing development, airport, and urban service area defined at the top- level land use plan are at risk of flooding. Therefore, the results highlight the critical need for integrating flood risk considerations into urban planning processes. The unplanned and improper land uses in flood-prone areas of Kayseri underscore the importance of incorporating adaptive planning measures to mitigate flood risks. Recommendations such as the designation of flood hazard zones, implementation of green infrastructure (e.g., rain gardens, permeable surfaces), and the development of flood management plans tailored to local contexts are essential for reducing vulnerabilities.

Moreover, this study advocates for a shift in policy from reactive to proactive flood management strategies. It emphasizes the need for comprehensive disaster risk reduction plans that include spatial provisions at the local level. By suggesting measures under the categories of "avoidance," "mitigation," and "sharing," the research provides a framework for policy-makers to develop holistic flood risk management strategies. These strategies include not only structural measures but also community-based approaches such as afforestation, early warning systems, and risk-sharing mechanisms like insurance and disaster funds.

The adoption of these recommendations can enhance the resilience of cities, making them better equipped to handle the challenges posed by climate change. This research thus serves as a practical guide for planners and policy-makers aiming to create adaptive and resilient urban environments.

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*Research Paper*

# Integrating Environmental Carrying Capacity with Social Behavior: Strategies Towards Sustainability and Climate Resilience in Indonesia

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## Abstract

*The sustainability of the environment, as a fundamental component of sustainable development, is contingent upon not only environmental carrying capacity but also social behaviour. Social behaviour is reflected in consumption patterns of natural resources and demonstrates climate resilience. The objective of this research is to integrate three key elements: environmental supporting capacity, environmental assimilative capacity, and social behaviour, in order to assess environmental sustainability in Indonesia in a holistic manner. This study employs a mixed-method approach to develop an integrative model between environmental capacity and social behaviour. The findings of this study demonstrate that this integration provides a more comprehensive picture of the long-term endurance of the national environment. Moreover, this integration elucidates the national climate resilience conditions based on social behaviour. This integration serves as a crucial input in formulating national climate change adaptation action plans, urban environmental protection and management strategies, and as a recommendation for sustainable urban spatial planning. The study concludes by emphasising the importance of a multidimensional approach in urban environmental policymaking and in optimising natural resources utilisation to achieve genuine sustainability.*

## Keywords

*Environmental carrying capacity, social behaviour, sustainability, climate resilience, Indonesia.*

## 1. Introduction

National development has entered a new phase with the enactment of Law No. 59/2024 on the National Long-Term Development Plan (Rencana Pembangunan Jangka Panjang Nasional/RPJPN) 2025-2045. This period is crucial for the future of the Republic of Indonesia and is characterised by high uncertainty and global issues, including global megatrends (demographic dividend, urbanisation, etc.) (Ministry of National Development Planning/Bappenas, 2023), global risks (World Economic Forum, 2024) such as technological



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progress and competition for natural resources in the context of global geopolitics, and global environmental challenges, also known as the triple planetary crisis, which includes climate change, pollution and biodiversity loss (UNEP, 2020). These uncertainties and challenges need to be anticipated in national development planning.

The RPJPN 2025-2045 (Republic of Indonesia, 2024) has been formulated with the expectation that it will serve as a framework for national development towards the nation's enduring vision and mission: to become a sovereign, progressive and sustainable country. The 'sustainable' aspect needs to be elaborated in the context of advancing the environmental, economic, social and governance dimensions of sustainable development. As outlined by the Stockholm Resilience Centre (2016), the economic and social dimensions (including governance) are seen as intrinsically linked to the environmental dimension. This corrects the current understanding of these dimensions as separate entities.


**Figure 1. Environmental Aspects as the Basis for Sustainable Development.**
**Source: Stockholm Resilience Center (2016)**

Environmental Carrying Capacity (ECC) is understood as a fundamental tool that represents environmental sustainability in Indonesia. This concept serves as the basis for the sustainable use of natural resources, as required by Law of the Republic of Indonesia No. 32/2009 on Environmental Management and Protection (Republic of Indonesia, 2009), and is applied in various sectors, including spatial planning, agriculture, mining, fisheries, and others. In Indonesia, ECC is divided into two components: carrying capacity, which refers to the number of people the environment can support, and assimilative capacity, which refers to the environment's ability to absorb pollutants or pollutant loads (Khanna et. al, 1999; Republic of Indonesia, 2009).

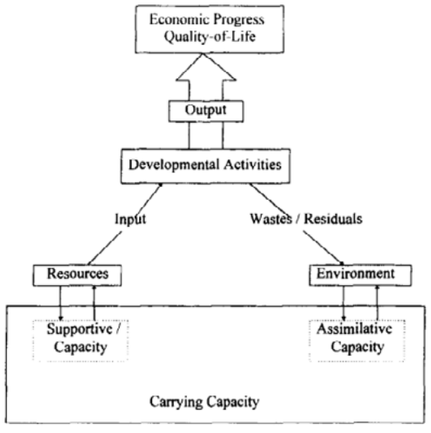


**Figure 2. Implementing Environmental Carrying Capacity in Indonesia.**
**Source: Khanna, et al (1999)**

In Indonesia, the concept of Environmental Carrying Capacity (ECC) is typically approached from two perspectives: the supply aspect, which concerns the capacity of the environment, and the demand aspect, which encompasses the utilisation of natural resources by humans, including population size and consumption patterns. If demand exceeds supply, it can be concluded that the ECC has been exceeded, and vice versa (MOEF of the Republic of Indonesia, 2023a). The supply aspect of ecosystem services exerts an influence on the functioning of social and economic factors, thereby underscoring the necessity for environmentally friendly governance efforts to maintain a surpassed ECC (Martin-López, 2014).

Considering the aforementioned explanation, the integration of ECC with social behaviour is of paramount importance to achieve sustainable development. Consequently, this research aims to integrate ECC (environmental supporting capacity and environmental assimilative capacity) with social behaviour to provide a comprehensive assessment of environmental sustainability in Indonesia.

## 2. Literature Review

### Concept of Environmental Carrying Capacity in Indonesia

The concept of Environmental Carrying Capacity (ECC) has been predominantly focused on the notion of "supporting capacity". Edelman (1997) defines carrying capacity as a limit to growth. Lane et al. (2013) posit that a carrying capacity assessment entails the utilisation of modelling techniques to ascertain the extent of natural resources that can be harnessed for the sustenance of life, encompassing food, water, shelter and energy. Meanwhile, Santoso et al. (2014) conceptualise carrying capacity as a threshold or critical level of productive land area required to support human needs. Exceeding this threshold can result in environmental degradation (Kozlowski, 1990). Such degradation is frequently associated with human-ecological systems, manifested in the depletion of natural resources, loss of biodiversity, land degradation, pollution, and other environmental issues (Swiader et al., 2020).

Conversely, the concept of environmental assimilative capacity is well-established and employed in a variety of assessments to advance the objective of sustainable development. In their 2014 study, Fouad





and colleagues define environmental assimilative capacity as the ability of the environment to absorb and process pollutants without compromising its health. This is influenced by two key factors: pollution levels and human intervention efforts. As defined by Khanna et al. (1999), assimilative capacity represents the maximum pollution load that can be discharged into the environment without affecting its designated use. This concept is closely linked to environmental supporting capacity, which encompasses the limits of natural resources and the ecosystem's ability to sustain human activities.

As previously mentioned, ECC in Indonesia is mandated by Law No. 32/2009 on Environmental Protection and Management as the basis for the utilization of natural resources in the absence of an environmental planning framework. ECC includes environmental supporting capacity and environmental assimilative capacity and is derived from an environmental inventory conducted at the ecoregion level. Ecoregions of Indonesia refer to geographical areas that share similar characteristics in terms of climate, soil, water, native flora and fauna, as well as human-nature interactions that represent the integrity of natural systems and the environment (Republic of Indonesia, 2009).

As previously stated, the Indonesian Environmental Protection and Management Act (No. 32/2009) requires the use of the Environmental Considerations Certificate (ECC) as the foundation for the utilisation of natural resources in the absence of an environmental planning framework. ECC encompasses both environmental supporting capacity and environmental assimilative capacity, derived from an environmental inventory conducted at the ecoregion level. Ecoregions of Indonesia are defined as geographical areas exhibiting analogous characteristics in terms of climate, soil, water, native flora and fauna, as well as human-nature interactions, which collectively represent the integrity of natural systems and the environment (Republic of Indonesia, 2009).

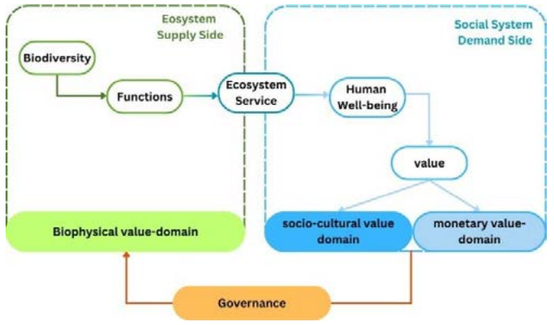


**Figure 3. Integrating Ecosystem and Social System with Ecosystem Services**
**Source: Martin-López (2014), modified.**

The ecoregions and ecosystem services of Indonesia place particular emphasis on renewable natural resources. This approach is aligned with the framework proposed by Miller and Spoolman (2016), which defines these natural assets as those that can regenerate themselves through natural processes within a timeframe ranging from hours to centuries. However, this potential for regeneration is contingent upon ensuring that the consumption rate does not exceed the replenishment rate. The renewable resources include freshwater, arable land, biodiversity, oceans, and clean air. These resources are also addressed in the national environmental protection and management plan (MOEF of Republic of Indonesia, 2023b).

In terms of implementation, the initial guideline for calculating environmental carrying capacity (ECC) in Indonesia was set forth in the Ministry of Environment and Forestry of the Republic of Indonesia (MOEF) Regulation No. 17 of 2009 concerning Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning. However, this regulation concentrated solely on supportive capacity. In order to promote sustainable natural resource management, the MOEF has taken significant steps, including the establishment of national water carrying capacity in 2019, which was subsequently updated in 2023. Furthermore, in 2023, the MOEF completed the calculation of national arable land carrying capacity. The calculation of both water and arable land carrying capacity is based on a comparison between the availability of natural resources and human needs. These calculations employ specific standards, such as per capita clean water requirements or land requirements for agriculture, as benchmarks.

The availability of carrying capacity data enables the government and relevant stakeholders to develop more measurable and sustainable development plans. This information is crucial for identifying regions that have exceeded their carrying capacity, thereby facilitating the implementation of mitigation and adaptation measures. Furthermore, carrying capacity data can serve as a foundation for establishing more effective natural resource management policies.

### Social Behavior Related to Environment

In accordance with the stipulations set forth in Law No. 32 of 2009, the utilisation of natural resources in Indonesia is governed by the principle of Environmental Carrying Capacity (ECC). This principle emphasises the necessity for the sustainability of environmental processes, functions, and productivity, while also ensuring the safety of the public, the quality of life and welfare of the population. This highlights the significance of integrating social considerations and human well-being as determinants of environmental demand.

The 2023 study, conducted by the MOEF, has provided detailed insights into the interrelated concepts of public safety, quality of life, and welfare. The concept of public safety can be understood as a state of health and security. It can be considered healthy when related to life safety and secure when associated with safety from hazards and disasters. The quality of life is associated with cultural advancement (in light of Indonesia's rich cultural heritage) and human development. In contrast, welfare is reflected in economic growth, general price stability, and the open unemployment rate. The study suggests that these three aspects are interlinked with environmental sustainability and the achievement of low-carbon and climate-resilient development (MOEF of the Republic of Indonesia, 2023a).

Social behaviour can be defined as the consequence of a multitude of human experiences and interactions with their environment, manifested in their knowledge, attitude, and practice (Sarwono in Populix, 2023). These three components are commonly referred to as the knowledge-attitude-practice (KAP) framework. The KAP framework is widely used in health education and in developing countries for family planning programmes. It serves as a guideline for understanding the mechanisms of health education in influencing patient behaviour change and health outcomes (Jaccard et al., in Populix, 2023).

Prior research conducted by the government has indirectly explored social behaviours related to climate resilience. The Central Bureau of Statistics (Badan Pusat Statistik/BPS) published a report entitled "Indicators of Pro-Environmental Behavior" (2012), which provided an overview of household behaviors related to environmental concern. The indicators covered a range of areas, including housing facilities, energy use, water use, transportation, waste management, and concern for the surrounding environment.





Subsequently, BPS updated this publication with the "Environment Indifferent Behavior Index Report of Indonesia" (2017), which served as a counterpoint to the previous version. The objective of this report was to measure the level of environmental indifference in various regions of Indonesia. A higher index value indicated a higher level of environmental indifference, while a lower value signified greater environmental concern. Both publications demonstrate that Indonesian society exhibits moderate levels of environmental concern and climate resilience-related behaviors.

## 3. Methodology

Building upon prior research conducted by the MOEF, this study extends the scope of assessment in order to gain a deeper understanding of the environmental condition (ECC) of Indonesia. While previous studies have primarily focused on the supportive capacity of freshwater and arable land, this research incorporates a wider range of renewable resources, including biodiversity, air quality, and ocean. This comprehensive approach allows for a more holistic view of the environmental condition of Indonesia.

The calculation process of the Indonesia Environmental Sustainability Index is divided into three stages. The initial stage entails the calculation of the supporting and assimilative capacities, which collectively constitute the environmental carrying capacity, leading to the generation of the ECC Index. The subsequent stage involves the calculation of the Social Behaviour Index. The final stage integrates the Indonesia ECC Index with the Social Behaviour Index.

### Calculation

The calculation of the ECC Index is conducted through an assessment of the supporting and assimilative capacity for the following five renewable resources:

In this study, the renewable resource of freshwater is calculated for both its supporting capacity and its assimilative capacity. The calculation of water supporting capacity is conducted by means of a comparison between the available water supply and the water demand that is required in order to support the population through the provision of ecosystem services. The calculation of assimilative capacity is performed by measuring a range of parameters, including Total Suspended Solids (TSS), pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Phosphates, $NO_3$, and Fecal Coliform. Furthermore, the water quality standards for rivers and lakes will be integrated to provide insight into the water's assimilative capacity. The findings of this analysis will elucidate the quantity of water that can be supplied and the extent of pollutant load that can be absorbed, thereby enabling the utilisation of water in a manner that does not exceed the natural assimilative capacity of the aquatic ecosystem.

In this study, arable land is considered a renewable resource, with calculations made for both supporting and assimilative capacity. The calculation of arable land supporting capacity employs a projection of optimal land cover to support a specific population. In contrast, the calculation of arable land assimilative capacity is derived from the land quality index developed by MOEF, which is based on the area of forest and shrubland cover within forest areas and protected zones. This parameter reflects the land's capacity to support human activities without compromising its ecological functions.

In order to assess the supporting and assimilative capacities of marine environments, the Marine Ecological Carrying Capacity approach is adopted. The evaluation of marine supporting capacity is based on a number

of parameters, including the maximum sustainable yield (MSY), seawater quality, and the condition of marine ecosystems such as coral reefs and mangroves. The data is then subjected to analysis in order to ascertain the extent to which the ocean is able to support the food requirements and economic activities of coastal communities. In order to assess the marine assimilative capacity, the parameters include fish biomass, seawater quality, the health of marine ecosystems (comprising coral reefs, mangroves and seagrass), and the level of marine pollution. The results of this analysis will indicate the extent to which the ocean is able to support fisheries and marine tourism activities without resulting in a degradation of marine ecosystem quality or biodiversity.

In regard to air quality, this study will focus on the calculation of the assimilative capacity of the ecosystem. The assimilative capacity is determined by comparing the regulating services of the ecosystem with the actual air quality, using $NO_2$ and $SO_2$ as parameters. The results of this calculation will indicate the extent to which the environment is capable of absorbing air pollutant loads.

The assessment of supporting and assimilative capacity is conducted using the Multidimensional Biodiversity Index, developed by the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) (Soto-Navarro et al., 2020). This index broadly measures the contributions of "biodiversity for people" and "biodiversity for nature." This approach integrates the various dimensions of biodiversity, thereby providing a more comprehensive representation of ecosystem health.

The assessment of the social behaviour index is conducted using the knowledge-attitude-practice (KAP) method, which is employed to evaluate patterns of production, consumption, and the associated impact on natural resource pollution. This approach offers insights into the ways in which knowledge and attitudes shape behaviours that contribute to environmental degradation.

Once the ECC Index and Social Behavior Index have been determined, the two indices are integrated to produce the Environmental Sustainability Index, which provides a comprehensive depiction of the ECC. The index values range from 0 to 1, with a value closer to 1 indicating optimal environmental processes, functions, and productivity. This suggests that renewable natural resources, such as water, land, oceans, air, and biodiversity, can adequately support human life and other ecosystems with minimal negative impact from human activities. Conversely, a lower value indicates the opposite.



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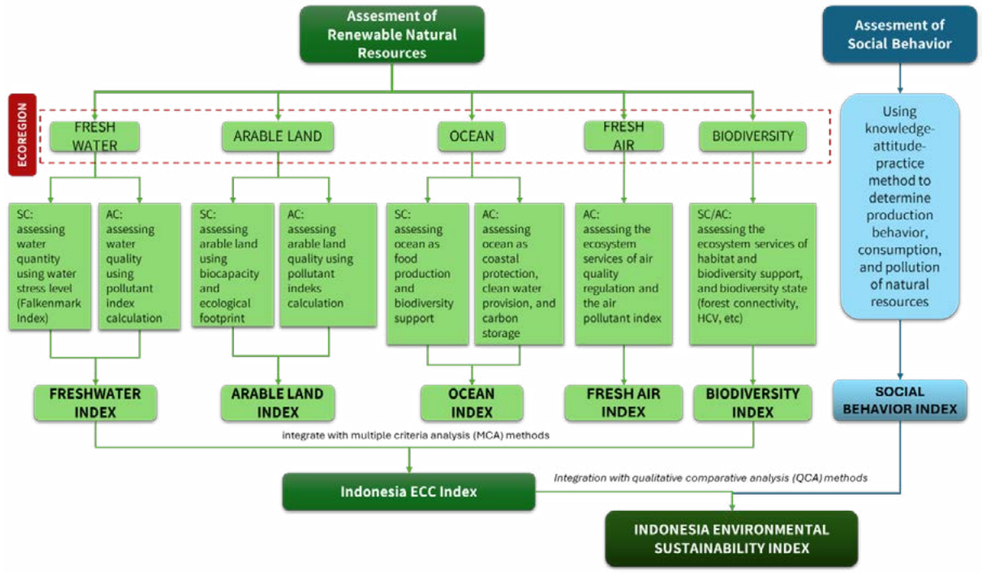


**Figure 4. Concept of Integration of ECC and Social Behavior Assessment.**
**Source: Developed by the author (2024).**

### Data and Source Data

The data employed in this study is primarily drawn from the MOEF, particularly data pertaining to the five renewable resources. The data utilised in calculating the social behaviour index is the result of a collaborative effort between the MOEF and academic institutions, as well as social and economic research organisations. The calculation process involves the input of experts, practitioners, and policymakers.

## 4. Findings and Discussion

This study represents an initial exploration of the subject matter, and all findings presented in this article are preliminary drafts that require significant refinement. As a preliminary investigation and for illustrative purposes, this article presents the ECC calculation for the Indonesian province of Bali. Bali was selected due to its status as an internationally renowned tourist destination, known for its rich cultural heritage and tourist appeal, yet facing significant challenges related to overtourism. It is therefore crucial to assess the province's environmental capacity to support its population and tourism activities. Subsequently, this article provides the Environmental Sustainability Index calculations for all regions across Indonesia.

The ecoregion of Bali exhibits a number of characteristics in common with those of Java Island and several surrounding islands. These include distinctive landscape features, natural vegetation characteristics, and land cover. The Province of Bali is characterised by a diverse range of landscapes, predominantly comprising mountains and hills. These landscapes exhibit a variety of ecoregions, including volcanic and structural hill complexes, volcanic mountain complexes (Bali-Lombok and Flores), karst hill complexes, fluvial plains, and coral/organic complexes. This diversity of landforms gives rise to a variety of land slopes and four main morphological features: plains, hills, mountains, and calderas. The Province of Bali has four

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lakes that were formed by past volcanic eruptions: Lake Beratan, Lake Buyan, Lake Tamblingan, and Lake Batur. These lakes have nutrient-rich soil from volcanic deposits. At the time of writing, Bali is home to two active volcanoes: Mount Agung and Mount Batur. The topography of Bali, which is characterised by a mountainous landscape, has resulted in the formation of 401 rivers. The longest of these is the Tukad Ayung, which flows for 62.5 km and predominantly empties into the southern coastline. In addition to lakes and rivers, Bali also has significant groundwater resources, with the Denpasar-Tabanan Basin being the largest and most water-abundant. The natural vegetation of Bali is primarily composed of evergreen monsoon lowland forests, particularly in the central and eastern mountainous regions. The diverse forest cover in these areas helps to reduce surface runoff, with a higher density of vegetation leading to greater water absorption. The distribution of land cover in Bali is generally aligned with the topography of the island, with plantations commonly situated between forests and urban areas. Plantations, which may be either mixed or monoculture (such as cacao or coconut), are typically located at the periphery of forests, while shrublands and dry fields are predominant in South Kuta and Nusa Penida due to the thin karst soils with sandy loam textures and carbonate bedrock (MOEF of Republic of Indonesia, 2023c).

Following an assessment of the characteristics of the ecoregion, calculations were conducted to determine the supporting and assimilative capacity of each renewable natural resource in Bali. The results indicate that, overall, the supporting capacity and assimilative capacity of freshwater resources are at a low level. In contrast, the supporting capacity of arable land resources is low, but the assimilative capacity is reasonably good. Marine resources show a fairly good level of both supporting and assimilative capacity. Air quality reflects a moderate level of assimilative capacity, while biodiversity reveals low supporting capacity yet adequate assimilative capacity. It can thus be concluded that the environmental supporting capacity and environmental assimilative capacity of Bali are less than optimal (see Figure 5).

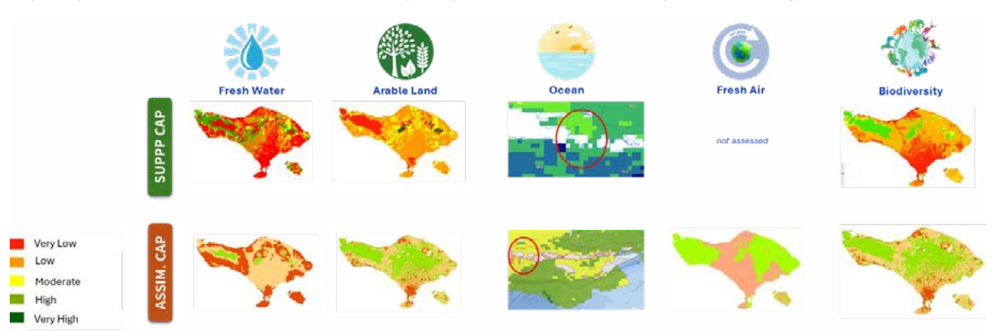


**Figure 5. Assessment of Environmental Supporting Capacity and Assimilative Capacity of Bali**
**Source: Authors' analysis, 2024.**

The social behaviour in Indonesia is identified through the knowledge-attitude-practice (KAP) approach to understanding environmentally friendly behaviours. The term "knowledge" encompasses individuals' comprehension of environmental issues, climate change, and the consequences of their actions on the environment. "Attitude" denotes individuals' sentiments or predispositions towards the environment and their sense of obligation to act. "Practice" signifies the tangible behaviors individuals engage in based on their knowledge and attitudes towards the environment and climate change. These elements are interlinked with consumption behaviors and pollution related to the five renewable resources.





The social behaviour observed in Indonesia is generally indicative of a favourable standing, with moderate levels of knowledge, positive attitudes and good levels of practice. This general pattern is consistent across different regions in Indonesia, including the province of Bali. The discussions conducted emphasise the necessity of enhancing "knowledge" in order to further encourage "practice", thus ensuring more environmentally friendly consumption and pollution behaviours in relation to the five renewable resources (Authors' analysis, 2024).

Following an assessment of the ECC in Indonesia (represented visually by the Province of Bali) and an understanding of the social behaviour conditions in the country, the next step is to determine the Indonesia Environmental Sustainability Index. The integration of these two variables into a calculation reveals that the Indonesia Environmental Sustainability Index is at a level of "good" or "high condition." The ECC across various regions in Indonesia is diverse, reflecting the distinct ecoregional characteristics and population concentrations of each region. Currently, Java Island is the most densely populated, with fertile land and moderate clean water availability. Social behaviour plays a significant role in this context, as environmentally friendly practices, responsible consumption, and reduced pollution by the population can effectively mitigate pressure on the environment, allowing the ECC to recover both now and in the future. However, this recovery will depend on the implementation of adequate interventions targeting social behaviour (see Table 1).

**Table 1 Indonesia Environmental Sustainability Index**

| Region | ECC Index | Social Behavior Index | Indonesia Environmental Sustainability Index |
|---|---|---|---|
| Sumatera | High | Moderate | High |
| Java | Very Low | High | Low |
| Bali-Nusa Tenggara | Moderate | Moderate | Moderate |
| Kalimantan | High | Moderate | High |
| Sulawesi | Very High | Moderate | High |
| Maluku | Very High | Moderate | High |
| Papua | High | Moderate | High |
| **INDONESIA** | High | Moderate | High |

**Source: Authors' analysis, 2024.**

Table 1 presents a threshold that elucidates the interrelationship between the two variables and the conditions prevailing in diverse regions of Indonesia. The threshold was determined through a process of discussion and agreement, with specific cutoff values established for the ECC Index and the Social Behavior Index. Subsequently, the data was represented in four quadrants, based on the aforementioned threshold. Quadrant I comprises cases where both the ECC Index and the Social Behavior Index exceed the threshold. Quadrant II encompasses instances where the ECC Index falls below the threshold, while the Social Behavior Index surpasses it. Quadrant III represents scenarios where both the ECC Index and the Social Behavior Index are below the threshold. Finally, Quadrant IV includes cases where the ECC Index exceeds the threshold, while the Social Behavior Index falls below it.

The results demonstrate that Indonesia as a whole, along with several regions, is situated within Quadrant IV. In contrast, Java Island and the Bali-Nusa Tenggara Archipelago are positioned in Quadrants II and III, respectively (see Figure 6). This finding highlights the significance of conserving and safeguarding the environment to maintain and enhance the ECC, as well as managing consumption and pollution behaviours to further develop responsible social behaviour.

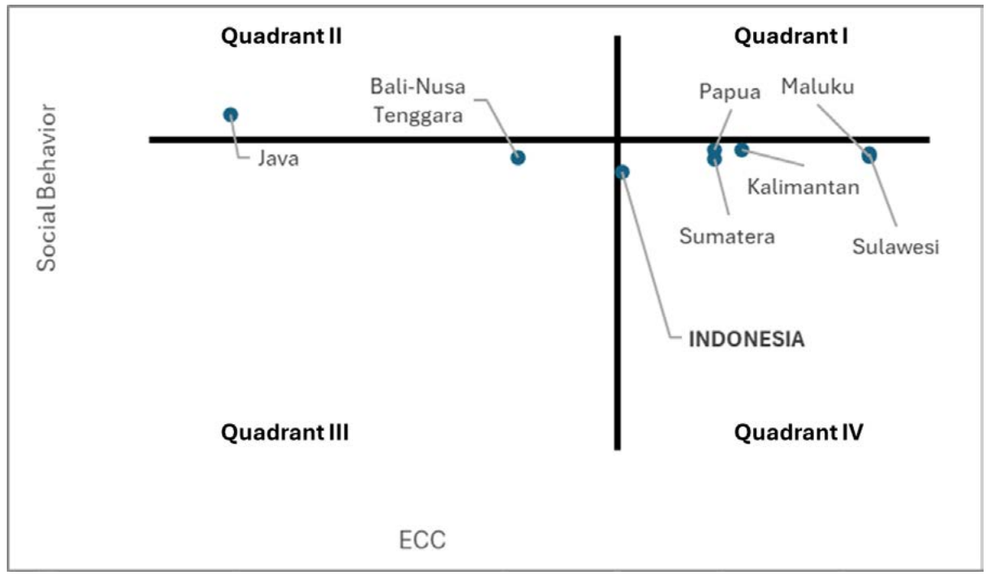


**Figure 6. Indonesia Environmental Sustainability Index in Quadrant Visualization**
**Source: Authors' analysis, 2024.**

The integration of environmental, social and economic factors provides a comprehensive perspective on the state of the environment and national climate resilience. The integrated result can be employed in a number of strategic policies in Indonesia, including the formulation of national medium-term development plans, environmental protection plans, climate change action plans, spatial planning, and other sectoral plans. This is with a view to making them more inclusive and sustainable. These findings underscore the critical importance of environmental conservation and protection efforts to sustain and improve the ECC. They also emphasise the need to manage consumption and pollution behaviours in order to foster more environmentally responsible social behaviour.

## 5. Conclusion

Sustainable development must be grounded in a robust and enduring environmental aspect. This environmental aspect can be indicated, among other things, by a good Environmental Carrying Capacity (ECC). ECC reflects the ability of the environment to support various human activities without diminishing the quality and quantity of available natural resources. Furthermore, it is essential to understand the social behaviour characteristics of the population in utilising natural resources. This understanding is crucial, as community behaviour plays a significant role in the success of sustainable development.



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This study seeks to integrate environmental, social and behavioural perspectives in order to gain a more comprehensive understanding of the factors that contribute to environmental sustainability and climate resilience. The findings of the analysis indicate that Indonesia is currently performing at a relatively high level in terms of the index, however, there is an urgent need to promote more responsible social behaviour among the general population. The implementation of more responsible and sustainable social behaviour has the potential to enhance the utilisation of natural resources and mitigate negative environmental impacts. The findings of this integration have the potential to inform and enhance various strategic and sectoral planning efforts, thereby enabling Indonesia to progress towards achieving its Vision of Golden Indonesia 2045 and improving climate resilience in the future.

It is important to note that this is a preliminary study and that various limitations remain to be addressed. These limitations include the necessity for further methodological and analytical development and a more profound elaboration of the methodologies and analyses used. It is recommended that discussions with experts and stakeholders be conducted to gain deeper and more contextual insights. Furthermore, testing the validity and utility of the study's results as inputs for planning is necessary to refine this research. Through these steps, it is hoped that the findings of this study can make a significant contribution to environmental policy and sustainable development in Indonesia.

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*Research Paper*

# Identification of Adaptive and Sustainable Water Provision for a Healthy and Resilient City

## A Case Study of Coastal Area in Bandar Lampung

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### Abstract

Bandar Lampung's coastal slum areas face challenges accessing clean water worsened by the climate crisis. Current solutions like extending PDAM pipelines and using bottled water from wells are insufficient for long-term sustainability. Bandar Lampung's coastal slum areas face challenges accessing clean water worsened by the climate crisis. Current solutions like extending PDAM pipelines and using bottled water from wells are insufficient for long-term sustainability. The study utilized a mixed-methods approach, combining qualitative interviews with stakeholders and quantitative analysis of water access data. Data collection involved surveys, site visits, and archival research. The research identified the inadequacy of current water provision methods and emphasized the need for adaptive and integrated solutions. Stakeholder interviews revealed the importance of collaborative governance in addressing water access challenges. Quantitative analysis highlighted disparities in water access between different areas within the slums. The study's significance lies in its contribution to urban resilience theory by proposing integrated approaches to water provision in vulnerable coastal areas. Practically, it informs policymakers and planners on the importance of inclusive governance and sustainable infrastructure development for addressing water access challenges exacerbated by climate change.

### Keywords

Coastal slum areas, Water access challenges, Climate crisis impact, Mixed-methods approach, Collaborative governance, Urban resilience theory.



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## 1. INTRODUCTION

### 1.1. Problem and Research Gap

Indonesia, particularly in coastal cities like Bandar Lampung, has experienced significant population growth, reaching 1.1 million people (BPS, 2024). Globally, urbanization trends indicate that over half of the world's population now resides in urban areas, with projections showing this figure will exceed 70% by 2050 (Liu et al., 2020; UN DESA, 2018 in Guerry et al., 2021). This rapid urbanization, combined with the climate crisis, presents numerous challenges, especially in coastal areas where urban settlements are concentrated. As a major trade and service center in southern Sumatra, Bandar Lampung faces high population density and inadequate infrastructure, fostering the growth of vulnerable slum settlements that are prone to disasters such as floods, which in turn impact public health (BAPPENAS, 2014).

Urban infrastructure is becoming increasingly critical in light of global urbanization, necessitating improvements in public service delivery. The World Economic Forum has identified five major challenges cities face: environmental threats, energy resource scarcity, inequality, technology, and governance (Schwab, 2018). Among these challenges, ensuring access to safe and adequate drinking water for domestic and daily needs is fundamental to human well-being. Urban activities put immense pressure on water resources, especially in densely populated areas, making comprehensive urban water planning essential to meet both present and future demands. Moreover, government stakeholders play a crucial role in facilitating water supply through market-based paradigms (Maharani et al., 2019.).

Bandar Lampung, as a hub of commerce and services, is increasingly vulnerable to climate change, particularly in coastal areas (Ilmi et al., 2020). Climate change exacerbates hydrometeorological disasters and worsens water scarcity, affecting agriculture and public health due to insufficient drainage systems, particularly in congested urban areas like Bandar Lampung (Boer, 2012 in Dai et al., 2018). Flooding incidents, intensified by extreme rainfall, pose significant risks to community health and water security in coastal slum areas (Ilmi et al., 2021). Consequently, water resource management is vital for urban water supply amidst the climate crisis (Suprapto, 2012). However, public awareness of climate change in Bandar Lampung remains limited, increasing the city's vulnerability compared to Jakarta (Manik et al., 2013).

With growing urban populations, the demand for water continues to rise, further exacerbated by the COVID-19 pandemic. The lack of efficient water distribution infrastructure and limited capacity for sustainable urban water management aggravates the water crisis in densely populated areas (Feizizadeh et al., 2021). Through literature reviews and field studies, this research aims to identify inclusive and sustainable urban water supply strategies to address both current and future water needs. The complexity of slum settlements requires a holistic approach that considers social, cultural, and economic aspects to tackle water supply challenges (Geddes, 1915; Obie, 2018). Bandar Lampung's coastal slum areas serve as a representative case study, underscoring the importance of inclusive and sustainable urban water provision in regions vulnerable to climate change.

## 2. METHOD & CONCEPT

This study employs a descriptive analysis with mixed-methods approach, focusing on inclusive and sustainable characteristics and efforts in response to the climate crisis. The research aims to develop an inclusive, sustainable, and healthy city, emphasizing adherence to specific standards for drinking water quality and sustainable water use for hygienic sanitation, as regulated in *Permenkes RI No. 32 of 2017*. Additionally, one of the specific indicators used is the "Healthy Residential Area Infrastructure," outlined in the *Minister of Health Regulation No. 34 of 2005* on Healthy City Implementation.

The data analysis method in this study adopts a descriptive qualitative approach based on Creswell (2016), used to describe results from field observations, questionnaire-based interviews, and literature reviews.

The analysis focuses on inclusive and sustainable efforts in responding to the impacts of the climate crisis. Inclusivity is based on resilience criteria from the *Evaluation Handbook Resilience Coastal Communities against Tsunamis and Other Coastal Hazards* (2007), while sustainability is aligned with the 2030 Sustainable Development Goals, specifically Goal 6: Clean Water and Sanitation, and the *Minister of Health Regulation No. 492 of 2010* on Drinking Water Quality Standards.

According to Kodoatie (2003:5), clean water is water that can be used for washing, bathing, cooking, and consuming after it is boiled. Similarly, Suipin (2003:13) defines clean water as water that is colorless, odorless, and has a fresh taste suitable for consumption by health standards. On the other hand, water used for hygienic sanitation must meet adequate quality for daily needs but differs from drinking water standards (*Minister of Health Regulation No. 32 of 2017*).

The data collection in this study includes both primary and secondary sources, with the main method being questionnaire-based interviews conducted directly by the researchers (Suyanto & Satinah, 2005) to understand the characteristics of slum settlements in coastal areas and efforts to supply clean water with a focus on inclusivity and sustainability (Suryani et al., 2020). Field observations were made to examine the patterns, forms, and adaptation mechanisms of communities in mitigating the impacts of the climate crisis. Secondary data was used to strengthen and complement field findings and the researchers' arguments. The research sites included districts directly adjacent to the coast of Bandar Lampung City, such as Teluk Betung Timur, Teluk Betung Selatan, Bumi Waras, and Panjang, as shown in Figure 1.

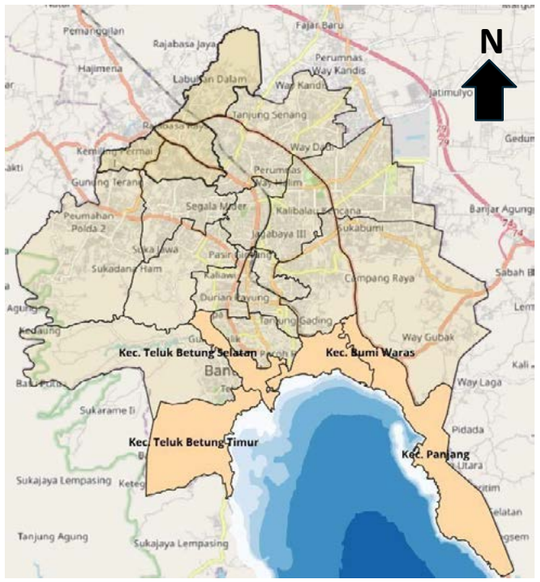


**Figure 1. Editing the Headline. Source: ISOCARP.**

In determining the sample size for the survey, the Isaac and Michael method is used, which requires the following conditions: (1) the population size is known; (2) a chosen level of error (significance level) of 1%, 5%, or 10%; and (3) this method is specifically applicable for samples with a normal distribution. The sample size is calculated in more detail using the Isaac and Michael formula (Sugiyono, 2013) as follows:

Formula:

S: Sample size

$\Lambda^2$: Chi-Square value





N: Total population

P: Probability of success (0.5)

Q: Probability of error (0.5)

d: Margin of error (the difference between the sample mean and the population mean)

Table 1. Proportion and sample size of the study

| District | Total Population | Proportion in the city | Sample size |
|---|---|---|---|
| Bumi Waras | 14.018 | 0,2433 | 93 |
| Panjang | 20.203 | 0,3506 | 135 |
| Teluk Betung Utara | 4.512 | 0,0783 | 30 |
| Teluk betung Timur | 12.580 | 0,2183 | 84 |
| **Total** | | | **342** |

## 3. RESULTS AND DISCUSSION

### 2.1. Results

This section discusses the findings from field data based on questionnaires and observations. The results reveal trends in efforts to address the impacts of the ongoing climate crisis, based on the existing conditions in the field.

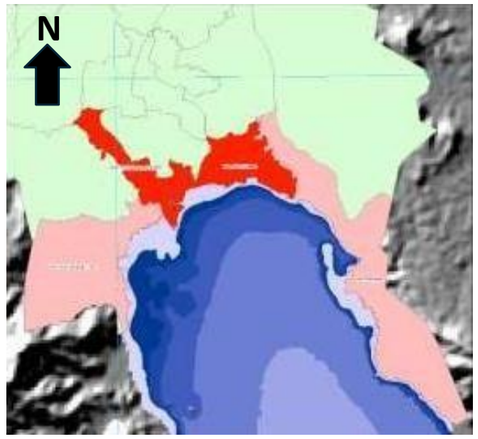


**Figure 2. Sanitation Hazard Map in Coastal Areas of Bandar Lampung City.**

The level of vulnerability to poor sanitation is particularly severe in two of the 20 sub-districts in Bandar Lampung's coastal areas, with two others rated as low risk. However, in all four sub-districts, the slum level is quite high, with over 50% of the total area classified as slum settlements. The four most affected sub-districts are Teluk Betung Timur, Teluk Betung Selatan, Bumi Waras, and Panjang. These areas are directly adjacent to the coast and face the highest risk from the climate crisis, which includes poor sanitation, lack of clean water, disease outbreaks, and hydrometeorological disasters such as floods, tidal waves, and extreme weather conditions.

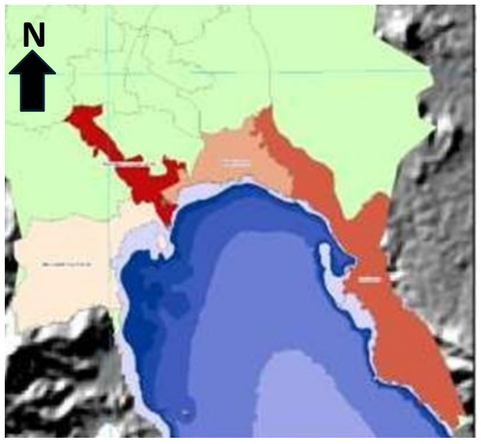


**Figure 3. Level map settlement seedy coast of Bandar Lampung Cityt**

This increased risk becomes neither inclusive nor sustainable if these issues are not adequately addressed, as it negatively impacts the vulnerable populations living in these areas.

The level of slums in the coastal areas of Bandar Lampung City varies significantly, but the total slum area now accounts for more than half of the overall region. This is particularly evident in settlements directly bordering the coast, most of which are built on illegally occupied land. The high level of slum development is an indication that the communities living there are becoming increasingly vulnerable and at greater risk from the impacts of the ongoing climate crisis.

These conditions heighten the threat to these populations, emphasizing the need for special attention to the coastal slum areas of Bandar Lampung City. In particular, there is a pressing need to address inclusivity and sustainability in the provision of clean water, as access to clean water is a fundamental human right that must be fulfilled

**A. Urbanization and Climate Change Challenges In Coastal Area**

Hydrometeorological disasters are increasingly frequent, a trend that has profound implications for coastal communities in Bandar Lampung, particularly those residing in slum settlements. These areas, characterized by high population density, such as North Teluk Betung and Bumi Waras, face significant vulnerabilities exacerbated by climate change.

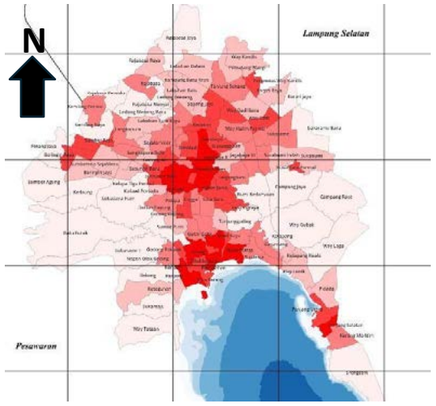


**Figure 4**. Density Map





The impacts of these disasters manifest in various forms, including tidal flooding and inundation during tidal surges, which lead to extensive disruptions in daily life. Residents in these densely populated sub-districts often endure prolonged interruptions to their daily activities and suffer considerable material losses. Floodwaters can damage not only buildings but also electronic devices and other valuable possessions, further compounding the economic and emotional toll on affected families.

Access to safe, clean drinking water emerges as one of the most critical challenges during and after these flooding events. The inundation often contaminates local water supplies, making it exceedingly difficult for residents to obtain clean water for consumption. With drainage systems frequently clogged due to debris and urban runoff, the problem is exacerbated during intense rainfall, leading to severe flooding that can engulf entire neighborhoods.

In light of these challenges, effective disaster management efforts must prioritize ensuring that basic needs, including access to clean water and sanitation, are met both during the disaster and throughout the recovery and post-disaster transition phases. This requires implementing sustainable practices that guarantee continuous access to safe water under all conditions, which is essential for safeguarding public health and well-being.

Furthermore, addressing the specific vulnerabilities of coastal areas is crucial in developing resilience strategies. As these regions face increasing threats from climate change, including flooding and poor sanitation, it is imperative to invest in robust infrastructure improvements, such as better drainage systems and reliable water supply networks. Such measures will not only enhance immediate disaster response capabilities but also contribute to long-term community resilience against future hydrometeorological challenges.

Table 2. Community Water Sources

| District | Sub District | River overflow | Clogged drainage | High rainfall |
|---|---|---|---|---|
| Bumi Waras | Garuntang | | 1 | 5 |
| | Kangkung | | | 5 |
| | Sukaraja | | | 1 |
| Teluk Betung Timur | Keteguhan | 1 | 1 | |
| | Perwata | | 1 | |

The table above shows the daily water demand, measured in liters, for slum settlements in the coastal areas of Bandar Lampung City. The Bumi Waras District has the highest percentage of water demand because its settlements are relatively more congested compared to other districts. A total of 3,130 liters per day is required by residents in the slum areas along the coast, which represents a significant amount and a considerable proportion of household expenses.

Access to reliable water sources is already difficult, and the local PDAM (municipal water utility) has struggled to extend its reach to these areas. As a result, residents rely on bottled or gallon water and water from vendors as short-term solutions. However, these options are not sustainable, particularly during disasters when the regular water distribution is disrupted. This leaves the community in a precarious position, highlighting the need for a more reliable and long-term solution to their water needs.

The current need for clean water in coastal communities is primarily met through daily water sources that residents rely on. Most areas face significant challenges in obtaining clean water, with many people resorting to using bottled gallon water or water in containers to meet their daily needs, as well water from

wells is no longer viable. This is particularly true for districts like Bumi Waras and Panjang, which are located directly along the coast.

Residents in these areas rely on repeated daily deliveries of water via containers and gallon refills transported by water carts. These water sources are located in the more inland districts, a considerable distance from the coast, where groundwater is still accessible. However, not all settlements have access to PDAM water pipe networks. Dense settlements, many of which are illegal, pose significant barriers to water distribution due to limited access for infrastructure development.

As a result, residents spend a significant amount of money on water. Public awareness of how difficult it is to access water in these overcrowded coastal slum areas is limited, especially since many of these settlements are informal or illegal, making it challenging for government assistance to reach them. Despite these hardships, residents continue to rely on informal means to survive and meet their water needs (Ilmi et al., 2021).

Urban flooding has significantly impacted local communities, particularly in the Bumi Waras and Teluk Betung areas. This issue is also believed to affect two other sub-districts. Incidents of tidal flooding, river overflow, and water accumulation due to heavy rainfall have been observed annually over the past decade.

In response to these conditions, local residents have adapted their building practices by using materials such as concrete to reinforce structures. They have also raised the height of their buildings and created storage spaces beneath the roofs of their homes to safeguard belongings during emergencies. Additionally, they have elevated the floors of their houses, especially in kitchen areas, to mitigate the risks associated with flooding and tidal surges (Ilmi et al., 2020).

**B. Slum Conditions and Water Scarcity**

Environmental conditions play a crucial role in shaping the health outcomes of local communities, particularly in the context of climate crises. The interplay of changing weather patterns—such as rising temperatures and humidity—creates an environment conducive to the proliferation of disease-carrying mosquitoes, notably those responsible for dengue fever. This health risk is further compounded by declining water quality resulting from increased contamination, which can lead to waterborne diseases like diarrhea.

In Bandar Lampung City, these challenges are acutely felt by residents of coastal slum areas, where over 50% of the land in four coastal districts—Teluk Betung Timur, Teluk Betung Selatan, Bumi Waras, and Panjang—is occupied by slum settlements. The high population density in these areas heightens the risks associated with poor environmental conditions, making them more vulnerable to health crises.



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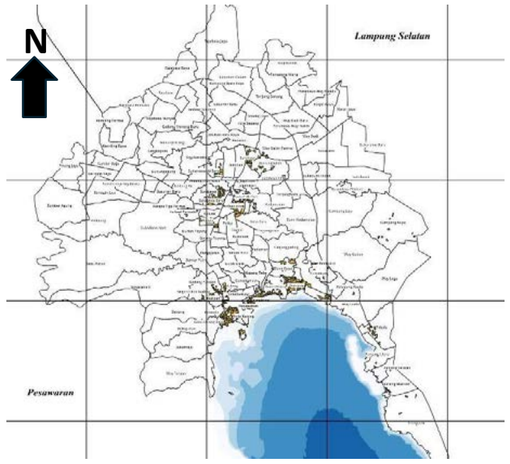


**Figure 5.** Slum Map

Access to clean water is limited in these coastal districts, forcing residents to rely on expensive alternatives such as refillable water gallons and water cart deliveries. This dependence on costly water sources exacerbates existing economic challenges, particularly in slum areas where financial resources are already constrained. Alarmingly, only 0.02 percent of the water needs in these coastal areas can be formally met by government provisions, with Teluk Betung Selatan and Timur facing the lowest availability of clean water services. This inadequate formal supply correlates closely with the prevalence of slum settlements, highlighting the systemic challenges faced by these communities.

Table 3. Water Provision

| District | Refill water | Cart | Well water | Formal (PDAM) |
|---|---|---|---|---|
| Bumi Waras | 3205lt | 0 | 150lt | 65lt |
| Panjang | 368lt | 95lt | 0 | 45lt |
| Teluk Betung Selatan | 120lt | | 1000lt | 15lt |
| Teluk Betung Timur | 100lt | | 1980lt | 20lt |
| **Total** | **3793lt** | **95lt** | **3130lt** | **145lt** |

However, amid these challenges, informal methods of water provision have emerged as a crucial lifeline for residents. While not sustainable in the long term, these informal sources can temporarily alleviate the immediate water scarcity and help communities cope with the adverse effects of flooding and climate change. Nevertheless, these solutions are not a substitute for comprehensive, sustainable urban water management strategies.

Therefore, efforts to ensure urban water provision must be integrated with initiatives aimed at improving environmental conditions and promoting healthy lifestyles. If these deteriorating environmental and health conditions are left unaddressed, they will worsen over time, increasing the vulnerability of coastal communities. This necessitates a holistic approach that incorporates environmental management strategies alongside urban water supply solutions, thereby safeguarding public health and enhancing community resilience against the challenges posed by climate change.

**C. Economic and Health Impact**

Public access to water in Bandar Lampung City demonstrates significant disparities, closely linked to household income and expenditure on daily water consumption. Analysis of the income and expenditure data reveals that a substantial portion of household income—up to 50%—is allocated for water needs, particularly among residents in the Bumi Waras and Panjang sub-districts. Here, the economic burden of water costs is felt acutely, as many residents rely on purchasing refilled water and gallon containers to meet their daily consumption requirements. This reliance on expensive water alternatives is compounded by a lack of subsidies for basic needs, which places additional strain on already tight household budgets.

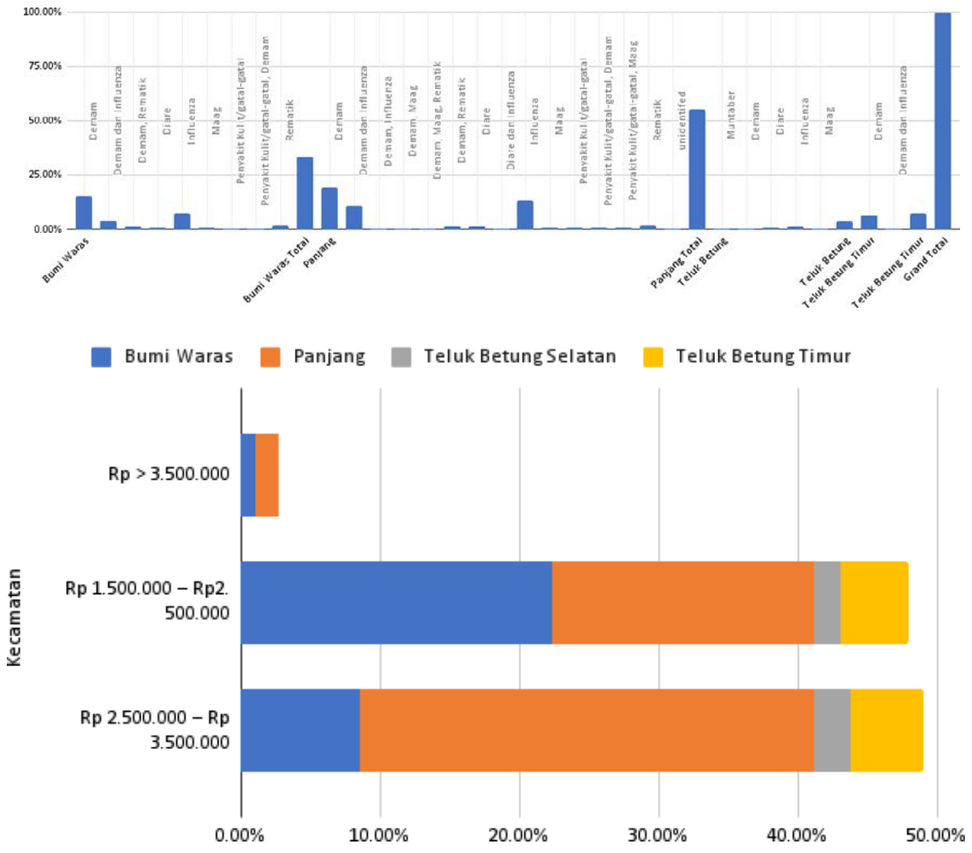


**Figure 6.** Income and Expenditure for Water Consumption

In some cases, households may spend as much as 1 million rupiah solely to access water, highlighting a significant financial commitment that underscores the vulnerability of informal coastal communities. This suggests that if a formal water supply system were available, residents could potentially afford a more stable and reliable source of water, alleviating some of the financial pressures they currently face.

Moreover, the challenges associated with accessing safe, clean water are exacerbated by the frequent flooding and poor sanitation conditions prevalent in coastal slum areas. These environmental factors contribute to a range of public health issues, including the spread of waterborne diseases such as diarrhea and vector-borne diseases like dengue fever. During flooding events, the difficulty of obtaining clean water becomes even more pronounced, as contaminated water sources pose severe risks to community health.





To effectively address these interconnected challenges, there is a critical need for enhanced urban water supply systems, particularly in the coastal slum areas of Bandar Lampung City. Investments in urban infrastructure that improve access to clean water are essential. Additionally, ongoing improvements to drainage networks and river basins are necessary to maintain surface water quality and mitigate the impacts of flooding.

Incorporating alternative water supply solutions, such as rainwater harvesting and brackish water distillation, can also play a pivotal role in providing residents with more reliable sources of clean water. Such measures would not only help to meet current demands but also contribute to long-term sustainability and resilience against the adverse effects of climate change and urban flooding. Through a comprehensive approach that prioritizes both formal water supply systems and alternative methods, the health and well-being of coastal communities can be significantly improved.Figure 6. Health Conditions in Slum Areas.

## 2.2. Discussion

**A. Inclusivity**

Access to drinking water is a shared responsibility among the central government, provincial authorities, and local governments. In many developing countries, even with ample water supplies, inadequate regulations can lead to exploitation by private companies, mirroring issues observed in developed nations where profits from water supply often benefit unrelated sectors (Handipuro, 2003). This mismanagement can jeopardize sustainability.

In Lampung Province, including Bandar Lampung City, local authorities are focusing on developing a clean water supply system through improved piping networks. This effort is outlined in the 2022 Government Plan for Drinking Water Provision (PKPCK Service, 2021). Interviews and observations indicate that the public desires an inclusive and sustainable water supply system, with potential subsidies from local governments through regional enterprises.

Efforts to enhance urban water access in coastal areas of Bandar Lampung City are crucial, especially in the face of climate change. Inclusivity in this context reflects the diverse and heterogeneous nature of coastal communities, which embrace various cultural and social activities. Despite facing challenges from rising tides and increased flooding, many households now have access to basic necessities like clean water and electricity.

However, simply adapting homes to higher elevations is insufficient. There is a pressing need for mitigation strategies to address climate-related risks. Efforts to provide clean water must consider local social and cultural aspects to ensure fair and equitable access. This holistic approach will enhance sustainability and improve the overall well-being of coastal residents.

**B. Sustainable**

In sustainable development, governance involves collaborative efforts that integrate human development, economic growth, and environmental protection. Key principles for effective governance include participation, the rule of law, fairness, inclusiveness, efficiency, responsiveness, transparency, accountability, and consensus-building (BAPPENAS, 2020).

In Bandar Lampung City's coastal slum settlements, the community has demonstrated these principles while striving for sustainable urban water supply. Residents allocate a significant portion of their expenses to meet clean water needs and have shown resilience in responding to disasters, even without fully understanding the climate crisis. Research by Ilmi et al. (2020) indicates that these coastal communities have adapted to environmental challenges by leveraging local resources and fostering strong communal ties, particularly during disasters.

Moreover, the community plays a vital role in supporting initiatives from central and local governments, such as the KOTAKU program, PNPM, and PAMSIMAS, although these programs may not always operate optimally. To enhance sustainable clean water provision, it is crucial to consider local environmental conditions and optimize future water availability.

Utilizing regional water supply systems (SPAM) and harnessing dams on major rivers, such as the Way Sekampung and Way Tulang Bawang, can create sustainable water sources. However, this must be accompanied by environmental restoration activities to enhance ecological functions within river watersheds and urban ecosystems. This collaborative approach to clean water management not only ensures access for all communities, especially those in vulnerable coastal slum areas but also fosters good governance, responsive to community aspirations and capable of managing strategic environmental changes effectively.

### C. Healthy and Resilient City

Healthy and resilient cities require an inclusive and sustainable approach to providing clean water. Inclusivity means ensuring equal access to drinking water for all communities, especially marginalized coastal areas, supported by strong regulations to prevent the exploitation of water resources. The strategic development of the Lampung Province Regional Drinking Water Supply System is aimed at ensuring a fair distribution of clean water through a comprehensive pipe network.

Sustainable water governance also necessitates collaboration among government, society, and the private sector to utilize water sources efficiently and sustainably. By adhering to principles such as participation, transparency, and accountability, this initiative aims to meet basic societal needs while enhancing resilience against the climate crisis, particularly in disaster-prone regions like the coastal areas of Bandar Lampung City. Effective and inclusive water resource management will lead to a healthier and more resilient urban environment for all communities.

## 3. CONCLUSION

Efforts to provide urban water in Bandar Lampung City must be inclusive and sustainable, especially for coastal slum areas. These communities face significant vulnerabilities due to the climate crisis, poor economic conditions, and external factors that threaten their quality of life.

To build healthy cities, equitable access to safe and clean water is crucial for public health and resilience. Expanding urban water infrastructure and improving drainage systems will enhance access and mitigate flooding. Incorporating alternative solutions like rainwater harvesting and brackish water desalination can effectively address water shortages and flood risks while promoting community participation.

Additionally, raising public health awareness about clean water practices and disaster preparedness is essential. Community-based initiatives can empower residents to adopt safe water habits and better prepare for environmental challenges.



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Sustainable and inclusive governance requires collaboration among all stakeholders to ensure safe, adequate clean water and sanitation. Upholding principles of participation, fairness, and efficiency will lead to a healthier, more resilient urban environment for all residents in Bandar Lampung's coastal slums.

## 4. Acknowledgements

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*Case Study Report*

# Nature, Culture, and Economy: Holistic Development Planning in the Dieng Plateau's Menjer Lake Area

## Preserving Natural and Cultural Heritage through Building and Environmental Plan (RTBL)

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**Abstract**

*The case study project is centered on the Menjer Lake Area, a Geosite within the Geopark Dieng Plateau, notable for its rich biodiversity and potential for sustainable development. The site serves as a pilot project aiming to benefit the local economy, nature, and culture. Its natural attractiveness has drawn domestic and international tourists, influencing the built environment in the surrounding area. Consequently, the local government has initiated preventive development measures to maintain and sustain the nature and geopark by formulating improved concept of building and environmental plan.*

*The unique geographical conditions of the plateau were pivotal in the concept development. In response to the changing climate, the site was designed to adapt to its natural, cultural, and rural conditions. The diverse natural landscapes, including geodiversity, extensive lakes, hilly areas, and densely populated areas, underpin the project's main vision: "To Develop the Telaga Menjer Geosite Area into a Natural Tourism Area with Locality, Sustainable and Community-Based Context." This vision is endorsed by the community, along with the four sub-visions: "Conserve, Complete, Character, and Community".*

*To ensure the sustainability of the region's biodiversity, which encompasses rural, aquatic, riparian, and terrestrial ecosystems, the plan implements the Nature-Based Solution concept. This approach is guided by general biodiversity guidelines and a four-stage mitigation hierarchy (avoid, minimize, restore, and offset) to maintain and mitigate the adverse impacts of increasing human activities. The emphasis is on enhancing the area's regenerative processes and natural cycles.*

*Additionally, the Healthy and Resilient Community concept integrates comprehensive residential planning, including integrated and appropriate health, education, and disaster evacuation facilities. It also comprehends the water cycle by preserving green and blue areas and adjusting development functions to account for water flow in the area.*

*The plans and designs articulated in the Building and Environmental Plan (RTBL) for the Telaga Menjer Geosite Area constitute a development control document comprising several physical and non-physical elements. These plans will be formalized into Regional Regulation and Building Regulation and included in the Draft Regional Regulation (Raperda). The purpose of this document is to ensure effective and appropriate space utilization, unify the character and improve the quality of buildings and the environment, control physical growth, meet community needs, and guarantee the maintenance of development outcomes.*
*This guide will be used by the Regional Government (related to the area's development) and stakeholders involved in the Telaga Menjer Geosite's development, including the private sector and the community. At the government level, a comprehensive understanding of the development direction and applicable principles is essential for those with authority over development control. This translates into a basic framework, general guidance, and detailed public guidance. Other stakeholders, such as the private sector and the community, must align development directions within land parcels, which are translated into detailed private and block guidelines.*

**Keywords**

*Sustainable Development, Geosite, Nature-Based Solutions, Community Based Context*

## 1.Context of The Project

### 1.1. Strategic Location of Menjer Lake Area

The Telaga Menjer area has been designated as a geosite due to its significant geological diversity, making it a potential tourist attraction of both national and international scale. Located in two villages — Maron Village and Tlogo Village — the Telaga Menjer Geosite represents a natural asset of ecological, cultural, and economic importance. If developed comprehensively, the Telaga Menjer Geosite area has the potential to serve as a pilot project for the development of tourism areas based on sustainability principles, with significant impacts on economic, environmental, and socio-cultural conditions.

Telaga Menjer Geosite area is located in Garung District, covering Maron Village and Tlogo Village with a development area of ±170.30 hectares. According to the Wonosobo Regency Spatial Planning Plan (RTRW) for 2022-2042, Telaga Menjer area is designated as a tourism zone with a focus on developing it as a priority tourism destination. Centered on the Menjer Lake Area, a geosite within the Dieng Plateau Geopark, the area is notable for its rich biodiversity and cultural heritage. It has been established as a nature tourist park with a tourist zone developed around key attractions. This zone offers easy accessibility to other areas, has strong tourist appeal, provides ample amenities, is well-developed, and benefits from extensive promotions. The Telaga Menjer area, which is managed by the Wonosobo Regency Government, is also slated for the development of a river and lake port, with plans for the Telaga Menjer Port in Garung District. According to Wonosobo Regency Regulation Number 8 of 2017 concerning the Tourism Development Master Plan 2017 – 2032, the Telaga Menjer area in Garung District is part of the Kejajar-Garung Regional Tourism Strategic Area (KSPK).

Guided by eco-cultural tourism principles, the focus extends beyond agricultural areas, to encompass regional development aligned with Geopark regulations. Garung District is one of the administrative areas included in the Kejajar-Garung Regional Tourism Strategid Area, which also forms part of the Dieng Plateu Geopark National Tourism Strategic Area. The Telaga Menjer Geosite has been designated as the core of the Main Buffer Zone, which is characterized by easy accessibility to other zones, strong tourist appeal, comprehensive amenities, advanced development, and extensive promotion efforts. Additionally, the Telaga Menjer Geosite has been established as a natural tourism park with a tourism zone built around key points of interest. This tourism zone may overlap with eco-tourism areas and supporting regions, based on the spatial structure, density of tourist attranctions, and tourism hierarchies.

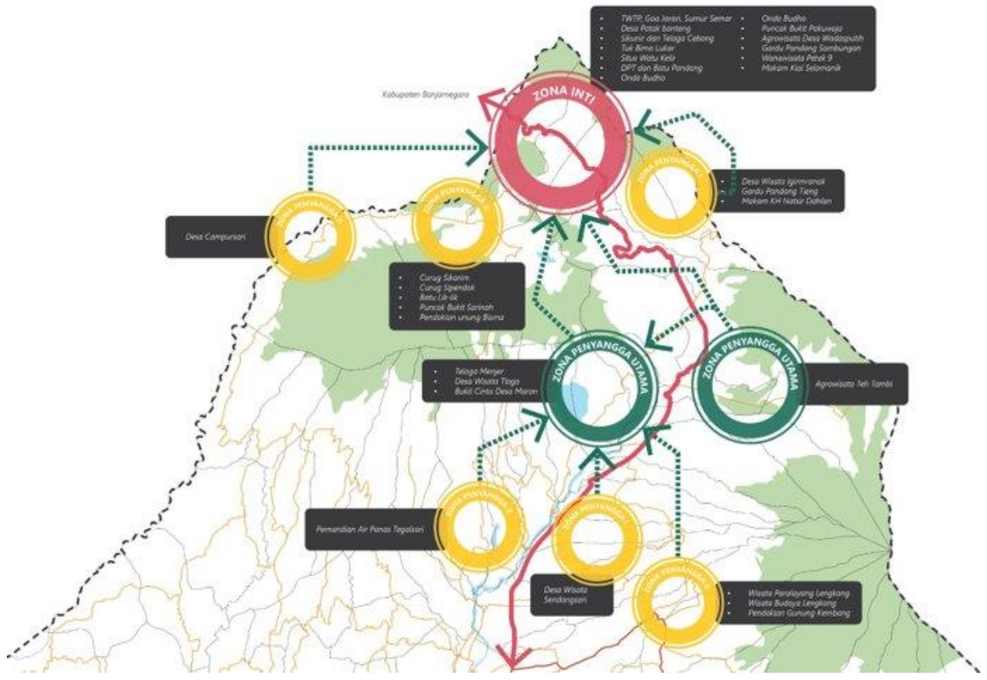


Figure 1. Menjer Lake Site Context. Source: Shirvano (2023).

The current water tourism activities in the area include lake tours using bamboo boats. Visitors can take selfies with the stunning natural landscape as a backdrop from all sides. Along the lake's perimeter, various business activities have flourished, including homestays, restaurants, cafes, and camping grounds. These developments are managed by multiple stakeholders, including the Wonosobo Regency Tourism Office, the Village Government through Bumdes business units, individual entrepreneurs, tourism awareness groups (pokdarwis), and other business collectives. The rapid growth of tourism enterprises around the lake underscores the needed for spatial planning to ensure the lake's economic benefits are sustainable and have a broader impact, particularly in the Margomarem Rural Area. With proper planning and integrated tourism development, the area is expected to experience a significant increase in small and medium-sized enterprises (SMEs) in the future.



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Nature, Culture, and Economy: Holistic Development Planning in the Dieng Plateau's Menjer Lake Area

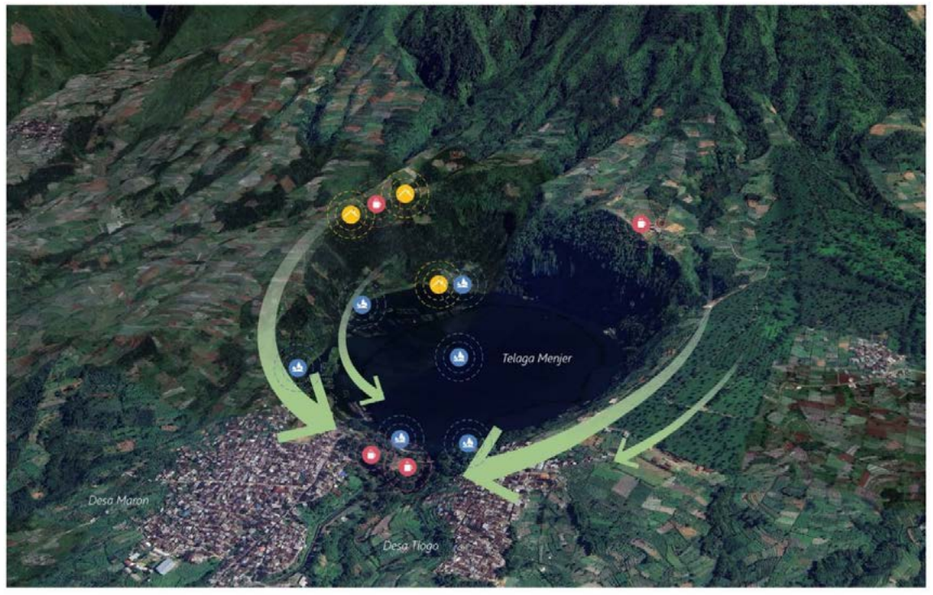


Figure 2. Menjer Lake Current Activities. Source: Shirvano (2023).

## 2.Project Focus

### 2.1. Development Strategies

Based on the analysis conducted, several strategies and visions have been established, including the planning and development of the area in alignment with the local context, forming and strengthening the character and identity of the region, and taking into account the directives and policies outlined in related documents that encompass the area. Additionally, the strategies aim to reinforce and clarify spatial patterns and structures at both macro and micro levels, ensuring that they can be realized within a specific timeframe. These strategies also consider the available resources and environmental carrying capacity, while prioritizing the interests and aspirations of the local community, government, and other stakeholders.

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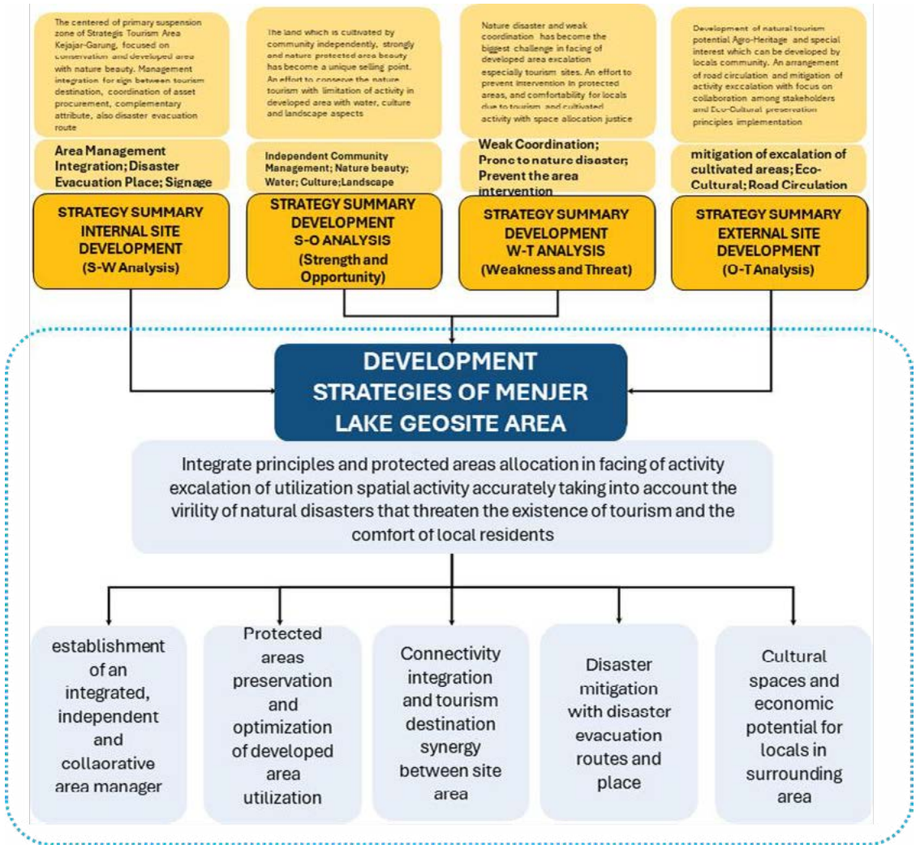


Figure 3. Development Strategies Framework. Source: Shirvano (2023).

Based on the aforementioned criteria, the vision for the area is formulated as follows: "**Establishing the Tekaga Menjer Geosite as a Nature-based Tourism Area with a Focus on Locality, Sustainability, and Community Engagement**".

This project emphasizes three key aspects: **Local Context,** where the Detailed Spatial Plan (RTBL) is designed with reference to local conditions through primary analysis (field surveys) and secondary analysis of the area. **Sustainability,** where the RTBL is guided by sustainable development principles, taking into account environmental carrying capacity, protected areas, and natural resources while minimizing negative impacts on the environment. **Community-based Approach,** where the RTBL will offer guidelines to empower the community in managing the area, allowing them to take on a self-sufficient role in its management.

The overarching vision includes several sub-visions, which offer more detailed guidance for the development and management of the area. These sub-visions are as follows:

1. **Conserve.** This emphasized that the development guidelines for the area and the intended outcomes prioritize nature conservation in designated zones. In addition to focusing on the natural environment, conserve also encompasses aspects such as nature-based education, eco tourism, ecosystems, and biodiversity.
2. **Complete.** This highlights that the development guidelines and final objectives aim to offer a complete and diverse range of functions and activities within the area. "Complete" referes to the comprehensiveness of infrastructure (including tourism infrastucture and other supporting facilities), various types of commercial or trade and service activities, the implementation of complete streets adapted to the area's context and scale, as well as the completeness of amenities and public facilities available in the region.
3. **Character.** This focuses on strengthening the character of the area according to the local context in the development guidelines and final outcomes. "Character" includes aspects of a vibrant and lively area, the uniqueness of the local context, and the physical and social characteristics of the area (such as environment, topography, climate, and community). These characteristics are adjusted according to the scale of the design area, from the macro to the micro level.
4. **Community.** This stresses the importance of local community involvement in the development guidelines and final objectives. "Community" refers to management based on community or grassroots involvement. It is hoped that community-based management will foster the local economy and encourage economic circulation among residents.

## 2.2. Concept Implementation

To implement the area's development, more concrete concept and methods have been established. These concepts are as follows:

1. Nature-Based Solutions (NBS). NBS is a concept that addresses problems using nature-based approaches, providing positive impacts on human well-being and biodiversity. NBS is closely linked to ecosystem services, which offer direct benefits to humans. NBS is the primary overarching concept encompassing several sub-concepts, such as Green Infrastructure, Stormwater Management, Low-Impact Development, Water-Sensitive Urban Design (WSUD), Biodiversity-Sensitive Urban Design (BSUD), Landscape Preservation, Ecology Conservation, Renewable Energy, and Sustainability.
2. Local Architecture. This concept focuses on architecture that emphasizes the local context. Local Architecture includes the use of local materials, temporary or semi-permanent structures in protected or conservation zones, restrictions on building intensity according to the local environment, and distinctive, unique physical architectural characteristics in the area.
3. Eco-Tourism. Eco-Tourism is a nature-based tourism concept that considers environmental carrying capacity and sustainability principles. The Eco-Tourism concept includes Sustainable Management (such as waste, water, and visitor management), Sustainable Activities, Sustainable Transportation (including transit systems, restrictions on motorized vehicles in the area, walkability, and more), and Sustainable Hospitality.
4. Placemaking. This concept promotes the creation of public spaces that serve as the heart of a community. It encourages the development of vibrant public spaces that transform an area from merely a 'space' into a meaningful 'place.' The concept includes the creation of complete streets adapted to the area's context and scale, the provision of public facilities, pedestrian-friendly designs, and the introduction of mixed-use functions. The application of placemaking takes into account the carrying capacity of each area.

5. Healthy and Resilient Community. This concept fosters healthy and resilient communities through sustainable and circular food systems, agricultural activities, sustainable clean water, wastewater, and waste cycles, as well as integrated disaster mitigation strategies. This concept aims to strengthen social and economic ties within the community, empower the population, and enhance the overall quality of life.

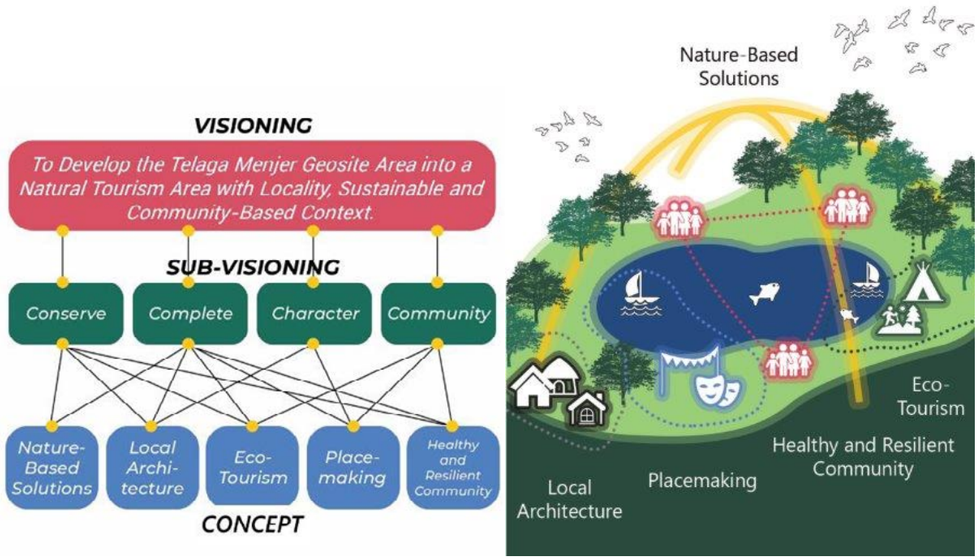


Figure 4. Visioning and Concept. Source: Shirvano (2023).

## 3.Project Results

### 3.1. Zoning

Based on the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (Permen ATRBPN) No. 21 of 2021, tourism areas with the typology of nature-based destinations are divided into Core Zones (Conservation Areas), Transition Zones, and Supporting Zones (Activity Areas).

1. **Core Zone (Conservation Area)**: The core zone is the area where the geosite is located, which in this case includes the water body of Telaga Menjer and its riparian zones, aimed at protection and conservation efforts. The core zone also encompasses areas around Telaga Menjer with steep slopes and high levels of natural disaster risk. Visitor numbers in the core zone are restricted, and certain areas are off-limits to visitors to support conservation efforts, protect the environment, and safeguard visitors from potential natural hazards.
2. **Transition Zone**: The transition zone serves as a buffer area between the Core Zone and the Supporting Zone. In the management of the transition zone, this area can be either developed or undeveloped with low-intensity usage. In the transition zone, visitor numbers are limited, and the density is lower compared to the supporting zone. Tourism infrastructure, facilities, and amenities are spread out with lower intensity than in the supporting zone, utilizing construction and architectural systems that do not negatively impact the environment.





3. **Supporting Zone (Activity Area)**: The supporting zone is a built-up area with medium to high intensity and includes tourism activities with medium to high visitor density. It features complete infrastructure and a main road network that supports the area's functions. Tourism facilities and amenities in this zone are available with higher intensity than in the transition zone, offering a vibrant, diverse, and comprehensive range of functions, activities, and attractions.

| Deciding Criteria for Sub-Zone Area | | | |
|---|---|---|---|
| **Criteria** | **Core Zone** | **Transition Zone** | **Supporting Zone** |
| **Object/Asset** | Main asset/core object of the preserved site and a few supporting objects | | |
| **Functions** | Lakes | Not lakes | Not Lakes |
| **Slope** | > 30% | 0 – 5%, 5 – 10%, 10 – 30% | 0 – 5%, 5 – 10% |
| **Disaster Risk** | High | Medium | None – Low |
| **Water Boundary** | 50m/Local Protected Area | - | - |
| **Land Use Plan** | Local Protected Area | Local Protected Area | Rural residential area |
| | Other Preserved Area | Community Plantations | Urban residential area |
| | | Community Forests | |

Figure 5. Sub-Zone Criteria. Source: Shirvano (2023).

The determination of these three zones is based on the analysis of multi-layered maps that consider several aspects, including the spatial distribution of land use (zoning directives, existing land use, and the spatial plan of the Wonosobo Regency RTRW for 2023-2043), natural disaster mitigation and safety (natural disasters and evacuation routes, slope gradients, and weather conditions), biodiversity ecosystems, the economy, public and social facilities (amenities), utilities and infrastructure (facilities), road network circulation (accessibility), and green open spaces. Additionally, the Dieng Geopark Master Plan document and the Ministry of Public Works Regulation No. 6 of 2007 concerning Guidelines for the Preparation of Detailed Spatial Plans (RTBL) also play a role in the subdivision of development areas. In the multi-layered map analysis, criteria for determining sub-zones in each aspect are first established in order to produce development sub-areas.

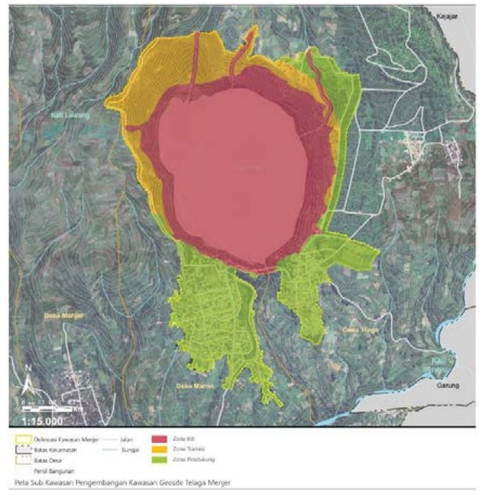


Figure 6. Map of Menjer Lake Development Zone. Source: Shirvano (2023).

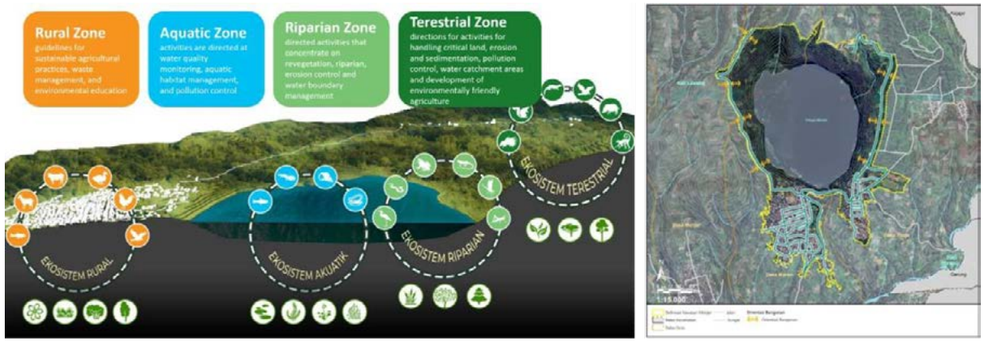


Figure 7. Ecosystem and Buffer Zone. Source: Shirvano (2023).

### 3.2. Detailed Guidelines

Following the subdivision of the development areas, general guidelines were established for the road network, land use planning, ITBX and intensity distribution, green open space system, utilities and infrastructure, public and social facilities, biodiversity ecosystem, and disaster mitigation.

Detailed public guidelines were then established for the road network (including primary local roads, primary and secondary neighborhood roads), parking areas, intersections and crossings, bus stops, road equipment, signage, advertising, and watery boundary areas.

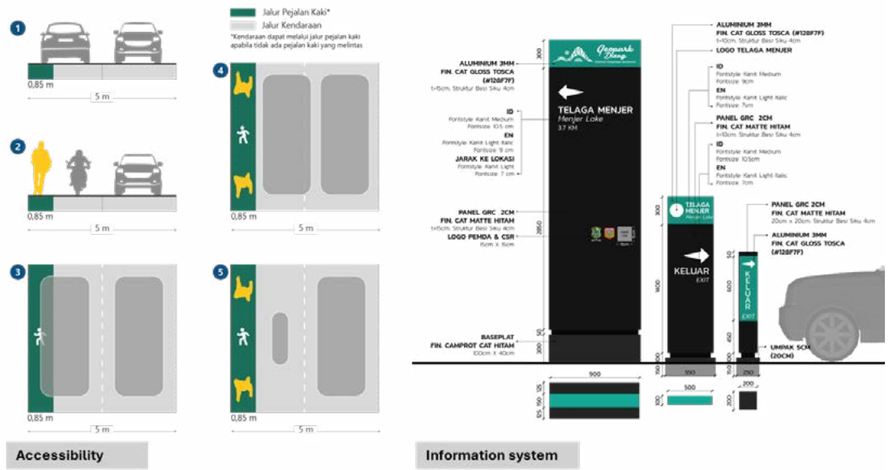


Figure 8. Detailed Public Guidelines. Source: Shirvano (2023).

Detailed private guidelines were also established, regulating building forms, roof & wall elements, building openings, the relationship between buildings and the site, the surroundings, site configuration, and the site environment.





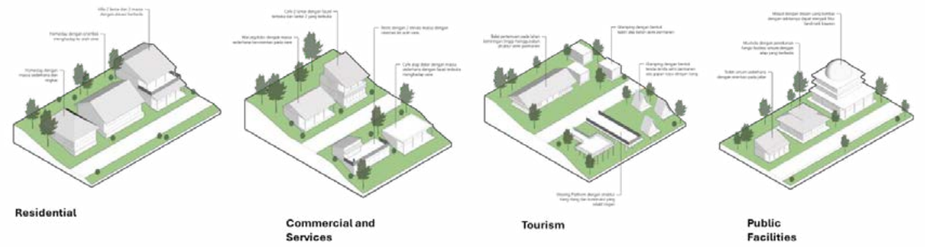


Figure 9. Detailed Private Guidelines. Source: Shirvano (2023).

## 4. Broader Project Impact

The Telaga Menjer area has been **designated as a geosite due to its rich geological diversity**, which makes it **an attractive tourist destination on both a national and international scale**. Located in two villages—Maron Village and Tlogo Village—Telaga Menjer Geosite is **a natural asset with ecological**, **cultural**, and **economic significance**. If developed thoughtfully and comprehensively, Telaga Menjer Geosite can serve as **a pilot project for sustainable tourism development**, with a **significant impact on economic, environmental, and socio-cultural conditions.**

The increasing interest of tourists in visiting Telaga Menjer Geosite has influenced the development of nature-oriented tourist attractions such as Bukit Cinta, Bukit Seroja, and the Telaga Menjer water body. Therefore, a guiding document on building and environmental regulations is necessary to accommodate tourist activities while maintaining the balance of the ecosystem. This document serves as an instrument to ensure that tourism development in the area aligns with sustainable principles, preserving the site's natural and cultural heritage

The impact of your project on broader community development includes:

- **Providing Studies on Development Dynamics:** The project generates studies on the dynamics of tourism development potential, environmental sustainability, and the improvement of community quality of life, aimed at developing an international-standard tourism area.
- **Ensuring Alignment with Community Needs:** It ensures that the development is implemented in accordance with the aspirations and needs of the community, supporting sustainable environmental and area development.
- **Fostering Community Ownership:** By cultivating a sense of ownership within the community, the project ensures that the outcomes of the development are maintained and preserved post-implementation.
- **Guiding Stakeholders:** The project serves as a reference for stakeholders involved in zoning elements, the provision of basic infrastructure, and area management over the next five years.
- **Establishing a Unified Vision:** It helps establish a common understanding among all stakeholders involved, ensuring cohesive and effective collaboration throughout the development process.

## 5. Future Development

The investment program for the development of the area consists of both physical and non-physical initiatives, including the empowerment of the local community as the main actors in the development of the Telaga Menjer Geosite area. This program will be implemented over a five-year period, with the ultimate goal of organizing and enhancing the Telaga Menjer Geosite area.

To achieve the development targets for the Detailed Spatial Plan (RTBL) of the Telaga Menjer Geosite area, several key components must be considered, including:

1. **Institutional and Governance Structures:** Establishing effective governance and institutional frameworks to manage and oversee the development process.
2. **Branding and Promotion:** Developing and executing strategies to enhance the area's brand and promote it as a tourist destination.
3. **Economic Development of the Area:** Fostering local economic growth through tourism-related activities and businesses.
4. **Environmental Conservation:** Implementing measures to preserve the natural environment and maintain ecological balance.
5. **Spatial Planning and Design:** Planning and organizing the physical layout of the area to optimize land use and ensure sustainable development.
6. **Basic Infrastructure:** Developing essential infrastructure to support tourism and local community needs.
7. **Architectural Accents:** Incorporating unique architectural elements that reflect the area's cultural and natural heritage, enhancing its visual appeal.

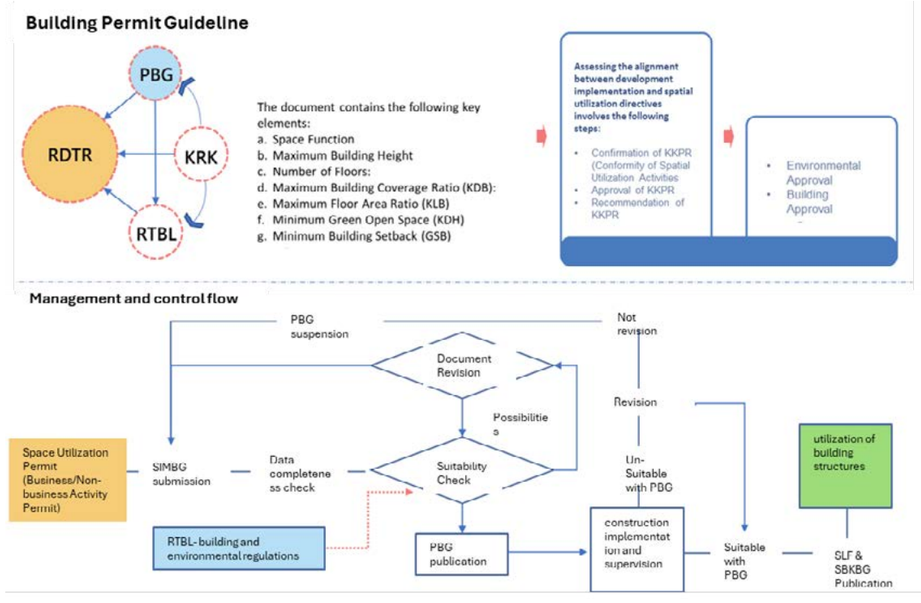


Figure 10. Building Permit and Control Management. Source: Shirvano (2023).





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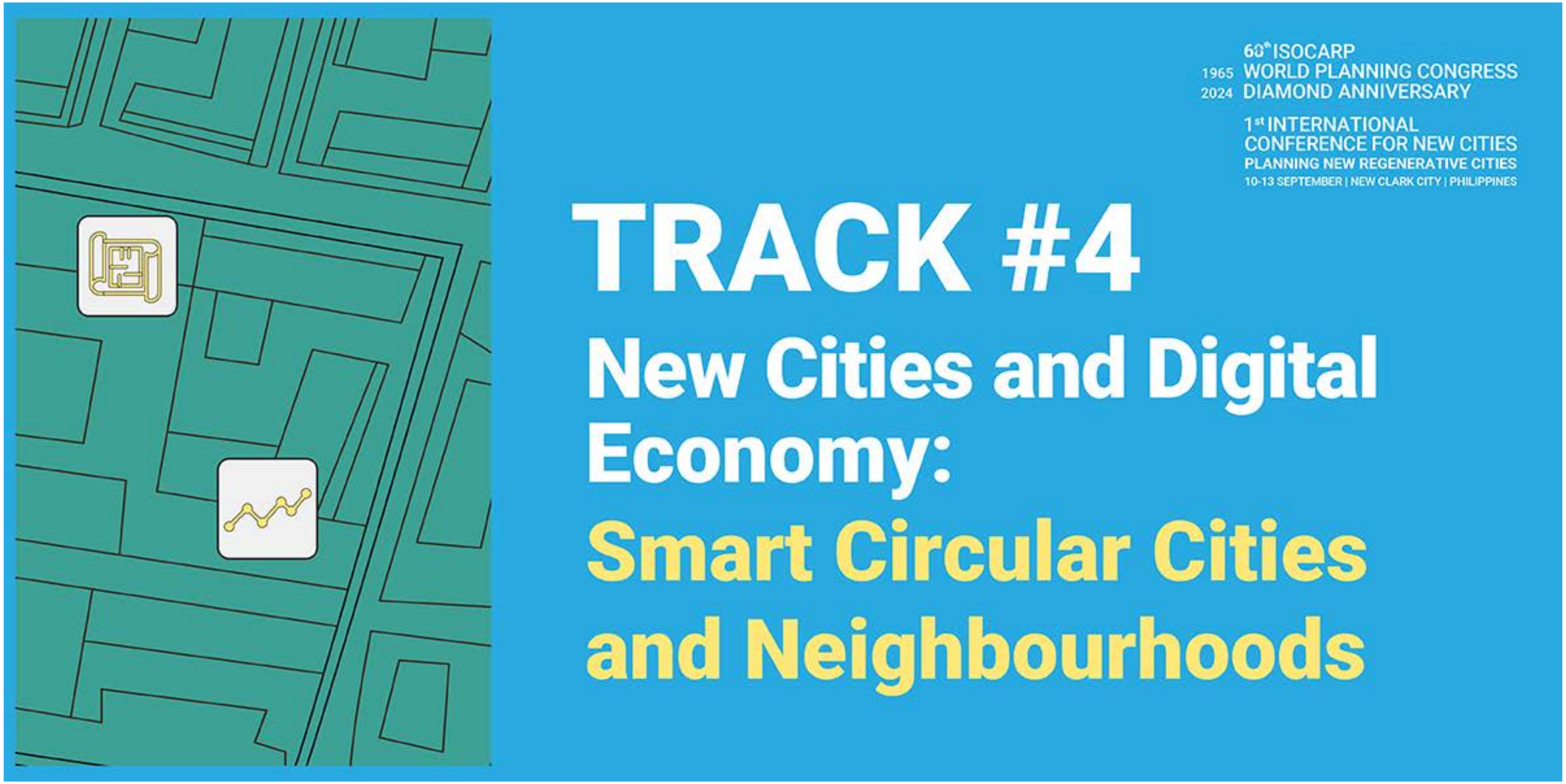
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TRACK #4
New Cities and Digital Economy:
Smart Circular Cities and Neighbourhoods

# TRACK 4 PAPERS

## TRACK 4: New Cities and Digital Economy: Smart Circular Cities and Neighbourhoods

### 4.1 Towards Digitally-driven Sustainable and Resilient Cities

Eugenio III SANTIAGO

Accountability in E-Governance Urban Planning
Towards Resilient and Regenerative Cities

*Research Paper*

# Accountability in E-Governance Urban Planning Towards Resilient and Regenerative Cities

EnP/Dr. Eugenio III SANTIAGO. PUP and PCU Manila, Philippines

## Abstract

*This research explores the important connection between accountability, e-governance, and urban planning in relation to creating resilient and regenerative cities. With the rise of urban populations and the intricate challenges cities encounter, e-governance has surfaced as a valuable asset for improving urban planning procedures. Nonetheless, the adoption of digital systems in city governance presents major accountability challenges. This research conducts an extensive literature review to explore how accountability systems can be successfully incorporated into e-governance frameworks to enhance urban planning results. Essential discoveries emphasize the significance of openness, genuine citizen involvement, and flexible governance in developing responsible e-governance frameworks. The research highlights essential obstacles, such as algorithmic clarity, data confidentiality, the digital gap, and the necessity for enhancing institutional capabilities. It further examines the influence of technological progress like big data, artificial intelligence, and blockchain on accountability systems. Suggestions entail creating thorough accountability protocols, nurturing a transparent data environment, encouraging cooperative decision-making, and establishing ongoing assessment procedures. The study highlights the importance of a comprehensive strategy that takes into account the technological, social, cultural, and ethical aspects of urban governance. This research adds to the expanding literature on smart cities and digital governance, connecting technological progress with ethical and efficient urban management. Its results and suggestions could greatly influence policy-making and urban planning activities, steering the creation of more sustainable, inclusive, and resilient urban spaces in response to the challenges of the 21st century.*

## Keywords

*E-Governance, Urban Planning, Accountability, Urban Regeneration*

## 1. Introduction

Unlike any previous time in history, urban growth became unparalleled in the 21st century with cities becoming the primary geographical space for most people. The United Nations (2018) noted that 55% of the world's population lived in cities as of 2018 that is expected to increase to 68% by 2050. The pace of urbanization comes with vast opportunities and challenges to cities' around the world changing essentially the social, economic and environmental dimensions of human habitation. Seto et al., (2017)

Factors such as availability of economic resources, diverse culture and centers of innovation attracted people to cities resulting in migration from rural to urban areas. However, an increased population further increased the existing problems of urban areas and added new problems. Some of the most common problems of contemporary cities are:





1) Climate Change and Environmental Degradation: Cities are responsible for 7.7 billion tons which account for 37% of global greenhouse gas emissions and, in return, are most exposed to the impact of climate dynamics, such as sea-level rise, extreme climatics, and urban heat islands (Rosenzweig et al., 2018).
2) Resource Scarcity: Due to mass migration to urban settings, land-based resources such as water and electricity get massively depleted, thus more efficient and effective resource management systems have to be adopted (McDonald et al., 2014).
3) Social Inequality: Processes related with urbanization usually aggravate the social and economic differences causing problems with housing, the availability of services, and geographic dispersion of minorities (UN-Habitat, 2020).
4) Infrastructure Stress: The majority of urban areas do not have the capacity to cater for infrastructural needs of the increased people leading to traffic, shortage of adequate public facilities and decline of urban living standards (Dodman et al., 2017).
5) Public Health Concerns: The density of cities may also be a factor for the transmission of some diseases, as it was explained during the COVID-19 pandemic, which made more evident the importance of strong health systems (Acuto, 2020).
6) Economic Volatility: Cities are now more interconnected compared to the past blueprints; this means urban areas are open to economic shocks and therefore implementation of economic approach always requires flexibility (Sassen, 2018).

These problems illustrate the urgency for a new generation of strategies for urban planning and management, which can build resilience and healing in the face of emergent complex mechanisms of urban systems (Meerow et al., 2016). This rapid urbanization presents both opportunities and challenges for cities worldwide, fundamentally reshaping the social, economic, and environmental landscapes of human settlements (Seto et al., 2017). The allure of cities as centers of economic opportunity, cultural diversity, and innovation has driven this urban migration. Introduction to e-governance in urban planning

Acknowledging the above mentioned different urban issues, e-governance appears to be an innovative solution that can improve urban planning and management activities. E-governance can broadly be seen as the application of ICT tools for conducting government business and providing public services. In this case, an ICT can be understood as a device or tool that can be utilized to reach out and communicate with people. In this context, e-governance has the capability of altering the connection between the municipal authorities and the citizens living in the town. (Chourabi et al., 2012).

In the case of spatial planning, the following aspects can be included in e-governance: 1) Geographic Information Systems (GIS) for spatial analysis and planning; 2) E-participation through social networks for public involvement and participatory planning; 3) Analytics of information for decision making purposes and providing basement; 4) Virtual reality and architect's models for urban planning; and 5) Technologies of a smart city for controlling and managing urban infrastructure and ervices.

The need of introducing e-governance in spatial planning looks promising in terms of its potential advantages, which are: 1) Streamlined Processes: Bureaucratic procedures can be simplified with the use of e-tools, which can increase the efficiency of service delivery. (Garcia et al., 2020);

2) Enhanced visibility: Planning processes and outcomes can be displayed on the web where the public can access the information. This is helpful in cultivating public trust and accountability. (DIY, 2010a); 3) Enhanced Citizenship: The deployment of digital engagement instruments can reduce the constraints of citizenship on the decision-making of planning processes and this may bring about a broader representation and inclusiveness in decision making (Simonofski et al., 2017); 4) Evidence Based Planning: Planners can be assisted by analytics to be able to make more reasoned decisions that are backed by holistic and current data (Kitchin, 2014); 5) Proactive planning: Digital technologies and real-time feedback mechanisms can assist in more proactive and flexible urban planning methods (Batty, 2013).

However, there are also issues that come with the incorporation of e-governance in the urban planning processes such as the digital divide, matters of data protection and the necessity of institutional capacity building (Janssen & van der Voort, 2016). In addition to this, as urban governance becomes more digitalised, the establishment of appropriate accountability systems is key in order to safeguard the integrity of the citizens and the potential abuse of the office.

This research has a single focus which is to explore how systems of accountability can be integrated into e-governance frameworks for improved urban planning processes and outcomes aimed at resilience and regeneration. In this manner, this research intends to add up to the existing literature on smart cities and digital governance as well as offer practical recommendations for urban planners, policymakers and technologists who are mesh between e-governance and urban development.

To these ends, the research is designed around two core questions:

1) What are the structures for embedding accountability systems within the e-governance systems in order to enhance urban planning processes and outcomes which are focused on resilience and regeneration?

2) How can these accountability mechanisms work effectively with e-government systems to enhance urban planning processes?

These questions has been the accountability dilemmas that prevail within e-governance planning for urbanization in cities and then suggesting possible approaches for addressing these problems based on technology, moral and legal frameworks. The research will investigate the possibilities of how measures of transparency may be used to strengthen citizen participation in decision making processes in regard to challenges faced in urban growth and development.

In answering these questions, this research seeks to assist in the improvement of towns and cities which are highly sustainable, inclusive and adaptive. It proposes to solve the problem of the balance between the development of technologies and the responsible and effective governance of the cities, which in its turn paves the way for better future technologies in the cities of the future. This study, in general, has a chance of influencing the policymaking, urban management, and the creation of advanced and adaptive urban systems that can counter balance the multilevel challenges.

In the context of Urban Planning, e-governance has emerged as an evolutionary step forward by embracing information technology in various dimensions of planning goals and processes, efficiencies and relationships. According to Batty et al., vertical e-governance, or the e-governance for urban planning purposes, can be described as ‘the use of information and communication





technologies to enhance and foster urban governance and planning processes. This covers many areas, including spatial ICT-assisted interventions and computer aided citizen participation tools.

Similarly, various factors have contributed to the integration of e-governance in urban planning. First, the coordination use of communication technologies with a wide variety of urban systems gives rise to the need for improved methods of collecting necessary information, analysing it, and making decisions based on what has been analysed (Kitchin, 2014). Second, there is a huge demand for planning that is both participatory and more accountable to the public which the internet or digital platforms can provide (Ertiö, 2015). Finally, modern technologies BY 2020 such as artificial intelligence, Internet of Things (IoT), and big data analytics have significantly transformed the way cities are managed and planned (Yigitcanlar et al., 2020).

E-governance in the context of city planning is associated with the following principal elements:

1) Spatial Data Infrastructure: Geographic information systems (GIS) and other related spatial technologies utilized in mapping and analysing features of cities (Tao, 2013).

2) Citizen Participation Platforms: E-tools for public involvement and joint planning and decision-making processes (Falco & Kleinhans, 2018).

3) Urban Analytics: Firm level and national level information and advanced data analysis techniques applied by collecting all the relevant evidence to inform the policy decision (Batty, 2013).

4) Smart City Technologies: The use of IoT sensors and responsive monitoring technologies to manage a city (Zanella et al., 2014).

5) Digital Twins: 3D representations of cities that can be used for virtual backend city testing (Dembski et al., 2020).

The applications of these e-governance tools processes of urban planning are substantially enhanced. For instance, Participatory GIS (PGIS) has been demonstrated to increase community participation in planning decisions (Brown & Kyttä, 2014). Likewise, resorts to urban analytics can enable planners to discover certain patterns and trends which may not be discerned through the conventional approach that would assist in decision making more efficiently.

## 2. Methodology

This research adopts a systematic literature review strategy that is guided by the principles set forth by Kitchenham and Charters (2007). The process of the review is subdivided into three stages: planning, conducting, and reporting. Such consistent structure is aimed at providing a comprehensive, non-biased and reproducible analysis of the existing body of knowledge concerned with e-governance, accountability, and urban planning within the framework of resilient and regenerative cities.

In conducting the literature search, a variety of sources will be utilized including: Scopus, Web of Science, IEEE Xplore and Google Scholar among others. Along with such professional sources, the search will also include relevant material from so-called grey literature published by reputable institutions – the United Nations, World Bank, OECD. During the selection the authors preference will be given to articles published during the past decade (2013-2023), conference papers and policy papers, which follow rigorous peer review processes. However, the foundations of earlier periods, from archaea up to pre-industrial, will be included wherever such representations are important for the development of a theory or providing a historical perspective.

Focusing on the selected literature, a thematic analysis would follow that would enable identification of major themes, trends and gaps in the current body of literature on accountability in electronic governance for urban planning. Such a systematic and critical review of literature will help in answering the research questions as well as in adding to the current debate on the construction of resilient as well as regenerative cities through accountable e-governance systems.

## 3. Findings and Results

The e-governance practice in urban planning has hence developed some key accountability concerns which must be dealt with if real and fair urbanization is to be achieved. These can overall be grouped into four categories: data governance, algorithmic governance, digital divide, and the public participation.

- Data Governance: One of the main accountability aspects within e-governance of cities is data governance. With the growing reliance of cities on intelligent decision-making processes, the ethical questions related to the acquisition, storage, purpose and exchange of city data arise. According to Kitchin (2014), there is a clear need for unambiguous data governance structures to mitigate the issues of the data's ownership, privacy and security. The enormous quantities of data that are acquired from the internet of things (IoT) technologies, sensors and citizen engagement raise possibilities of the data being abused or accessed unlawfully. Furthermore, accountability in urban planning activities in relation to the decisions made and the outcomes is dependent on the facts on the ground. If this information is inaccurate or grossly biased, it is likely that the corresponding decisions will be equally biased and potentially worsen urban inequalities (Zook, 2017). For example, in predictive policing algorithms, historical data may contain elements of bias and, as a result, the given algorithm may later execute potentially discriminatory behaviour in law enforcement practices (Richardson et al., 2019). In order to resolve them, cities should implement restrictive data governance principles so that data collection and utilization are open and transparent, people's privacy is respected, and the integrity of the data is not compromised. The European Union's General Data Protection Legislation (GDPR) is a detailed framework on data protection which is useful in diverse contexts and may also be suitable for urban data governance (Cuno et al., 2019).

- Decision-making by Algorithm: There are raising concerns related to accountability of decision-making processes as algorithms continue to grow in number in urban planning and design processes. Algorithms are tempted to be treated as neutral and objective instruments whereas they tend to be determinant of pre-existing biases leading to inequitably, unfair or discriminatory outcomes (Eubanks, 2018). The sheer number of algorithmic systems and their complexity and opacity means both the subjects of decisions and sometimes even their creators do not have any understanding about how the decision was made. This leads to the so-called 'black box' problem (Pasquale, 2015). On the other hand, accountability within the context of algorithmic decision-making implies fair explanation of data used, procedure or logic applied and explanation of the any consequences that the decision may have. Algorithmic accountability was introduced by Janssen and Kuk (2016) and defined as: herd mentality where algorithms/procedures should be visible, understood and be reportable for the purpose of proper governance. Some cities have taken steps to address this issue. For example, New York City established an Automated Decision Systems Task Force to examine the use of algorithmic decision systems in city agencies and develop recommendations for them for safe usage basis (New York City Automated Decision Systems Task Force, 2019).

- Digital Divide: This issue continues to be an accountability challenge in e-governance 'urban' planning. With the majority of urban services and opportunities for participation finding their way online, there is a threat that some people who do not have the access to these technologies or the competence to operate them, may be left out of the equation altogether (van Deursen & van Dijk, 2019). Such a scenario of exclusion on the basis of technology can result in some sections of society being excluded from even the processes of urban planning and in the case of e-governance, it may lead to an uneven sharing of its dividends. The digital divide is present in many communities and to address this, William et al. (2014) highlights three complementary strategies that include improving digital infrastructure, fostering digital literacy, and making sure that non-digital forms of participation and service delivery are still available. For instance, the city of Barcelona while seeking to address the issues of digital exclusion has implemented the Digital City Plan as one of the tactics in the City of Barcelona Red Wires which included promoting schemes to ensure that all citizens benefit from and are included in the city's digital transition (Barcelona City Council, 2017).

- Public Participation: One of the most important questions with regard to this phenomenon is how e-governance can enhance public participation in urban planning and design and development processes. Also, it raises questions of accountability with regard to the meaning and completeness of public participation in unsupervised digital formats. Falco and Kleinhans (2018) observe that most of the users in the majority of the digital platforms for participatory engagement do not represent plural views which means that the views held by the group will be biased or concentrated on barely one notion. In addition to that, there are also worries with respect to the level and quality of the engagement that takes place online. It is suggested that shallow engagement in the form of a single poll or a survey is not able to deal with the intricacies of urban problems or engage in productive discourse (Afzalan & Muller, 2018). When it comes to fulfilling the responsibility in public participation, it is not enough to just present the digital engagement tools, structures that are engaging, reasonable and have an effect are needed too. Tallinn and Reykjavik are in this sense examples of participatory cities. Citizens in Reykjavik create an interactive website where they can submit proposals and vote on the ideas that are contributed by other residents. Since the crowdsourced input is built into the decision-making process, it allows residents to influence the outcomes of urban design and planning (Lackaff & Grímsson, 2018).

Technological advancements have profoundly affected the mechanisms of accountability in the processes involved in e-governance urban planning as they have not only strengthened the existing ones but also introduced new ones. The growth in big data and the new analytics technologies have changed the urban planning scene, making it possible to have a broader understanding of the development of cities, as well as more information and technology usage in decision making. However, such development changes also the level of accountability of the mechanisms. On the one hand, big data could improve accountability of the system and enable more informative and evidence-based planning to be undertaken with the time since majority of the urban systems would have sufficient and timely information (Kitchin, 2014).

On the other hand, the very high level and scale of big data may become a barrier for the citizens and the supervisory institutions to appreciate thoroughly the basis of the decisions made. There is also a concern of focusing too much on numbers which may affect qualitative information and local knowledge

(Karpf, 2020). There is an urgent need to build information bases for the population and the decision makers and designing simple graphical representations of data.

From the predictive maintenance of infrastructures to the best management of traffic, artificial intelligence (AI) and machine learning technologies are already proving useful in the field of urban planning which is a developing field. These technologies to enhance urban management are however not without raising new issues of accountability. For many of these AI systems, it's hard to understand and dispute their decisions, which might have the effect of limiting democracy. In addition, AI technologies are only as good as the data they analyse, and if there are biases or flawed assumptions in the basic design, those deficiencies will be incorporated into the AI (Noble, 2018). In order to increase accountability in the context of AI-assisted urban planning, cities have to embrace forge two principles with respect to "explainable AI" and high standards of tests and audits of AI systems.

Several regulatory and institutional challenges face the accountable e-governance systems implementation in the urban planning process.

- Regulatory Gaps: The advancement of new technology happens at a faster rate than the formulation of its regulatory structures. Most legislations and policies in place were not enacted with the thought of digital technologies hence, the regulatory loopholes which may jeopardize e-governance accountability systems (Janssen & van der Voort, 2016). For instance, the presence of data protection legislation cannot rule out that the deployment and analytics of urban IoTs and big data analytics face complex issues. In the same way, traditional procurement laws may not be particularly effective when applied to the rapid prototypes under development. In order to fill these gaps, cities, and then national governments, must be able to integrate a more system-based and dynamic regulatory approach. The "agile governance" approach may be especially helpful for addressing challenges in e-governance as it focuses on the need for continuous policy processes and collaboration between regulators and innovators. (World Economic Forum, 2018).
- Institutional Capacity: There are serious gaps on the institutional capacity from many of the city governments in the area of effective e-governance system implementation and management. This encompasses not only the technical skills but also the implementation and operational structures needed to institutionalize organizational decision making and promote citizen interaction (Gil-Garcia & Pardo, 2005). To build this capacity takes high level commitment in investments and orientations that are human-centric, organizational and training based. Cities have to nurture new positions such as chief data officers and civic tech teams while promoting innovation and digital savoir faire at all levels within the institutions. Some cities have sought to tackle this problem by establishing innovation units or labs within the city. For instance, Boston's Office of New Urban Mechanics advances city hall technologies and urban planning in-house through constant innovation and technological diversification (Crawford & Walters, 2013).
- Interoperability and Standards: The lack of common policies and accountability frameworks when developing urban e-governance systems which cut across agencies and departments is because of the fragmented manner in which each agency operates on its own technology and data standards consequently hinders accountability as information and actions are difficult to coordinate across city government. The key step in creating e-governance systems that are integrated and stronger governed is the establishment of data sharing standards and protocols as well as system integration standards. There are also examples for cities of how to tackle the issue of data standardization. For instance, the EU's INSPIRE Directive is intended to develop the spatial data infrastructure required for environmental policies (European Commission, 2007).
- Public-Private Partnerships: Most e-governance projects tie up with private tech companies which raises issues of accountability and public-private interests. There are fears that such projects may result in the loss of public service or urban necks and systems to private hands (Sadowski, 2020). Especially, cities have to formulate policies and guidelines for e-governance design and practice to mitigate the challenges posed by public-private partnerships in the practice by ensuring public stewardship of such partnerships. The data sovereignty model advocated by Barcelona which seeks to limit the extent to which urban data can be held by non-state actors would help mitigate some of these challenges (Calzada, 2018).

Clear articulation of those responsible for undertaking activities and the monitoring of the activities would help improve participation and decision-making processes of the citizens in e-governance Urban planning. In this section, some of the dimensions of transparency in e-governance are analysed:

- Open Data Initiatives: Open data initiatives, which do this automatically and consistently address access to government data by making it available for use by the general public, are considered one of the most effective aspects of transparency in e-governance. Open data initiatives assist in urban analysis, Algorithm Design, and Implement and Enhance the Participatory Governance (PG) and Legislative (LP) efforts of citizens, scholars, and civic technology firms towards improving government functions (Janssen et al., 2012). Some of the cities have developed open data portals to enhance their e governance strategies. For instance, New York City's Open Data encourages citizens to access and interact with a plethora of urban data ranging from building permits to taxi trip records which helps foster transparency and data managed political participation (New York City Open Data, 2021). However, the presence of data alone is not enough to promote transparency. It may also include what the citizens term as low threatened people. This may require presenting data in different formats, providing guidelines on how to engage with the complexity of the datasets, and explaining how the issues were dealt with and scoped to avoid confusion.
- Non-Partisan Policy Decision Making: e-governance transparency includes the area of not only the data but also the decision making, its processes and structures. This means putting out to the public information about the process of decision making, who the decision makers are and what metrics were deployed to choose one of the alternatives. Digital tools can prove useful in fostering transparency in the decision-making structures. For instance, web-based applications where citizens can observe how urban development projects progress or how city council representatives vote can foster transparency and trust in the public (Schmidthuber et al., 2017). Some cities have gone as far as using participatory budgeting processes which allow for citizen participation in making budget allocation decisions. In Paris, for instance, a participatory budget allows voters to propose projects and fund them through the city's budget which is more open and diverse (Cabannes, 2017).
- Explainable AI and Algorithmic Transparency: With AI and algorithmic systems becoming more integrated into urban planning decision making processes, their transparency becomes fundamental. The conception of 'explainable AI' seeks to enhance human understanding of AI system decision making processes (Adadi & Berrada, 2018). Cities engaging AI into these systems should endeavor to enhance their transparency by defining how these systems operate, the data used, and the interpretation of output in relation to its usefulness in decision making. Some cities such as Amsterdam and Helsinki have made efforts in this direction by

establishing AI registries that include the AI systems in use by the city government (AI Registry, 2020).

- Citizen Feedback Mechanisms: This also means establishing such mechanisms that allow citizens to express their opinions about the decisions made in relation to the urban space and systems of e-governance. Certain measures can encourage citizens to provide feedback and comments including the use of websites, which in turn means that the cities will be able to reach out to a wider audience and deal with complaints and recommendations more efficiently. For example, in Seoul the "Democracy Seoul" platform encourages citizens to suggest ways to improve the city, engage in debates about urban matters, and decide on issues through voting. Likewise, citizens are informed about the utilization of their contributions in the decision-making processes (Seoul Metropolitan Government, 2019, p. 281).

The need for the aspects of transparency for purposes of accountability is never in doubt. However, that transparency does not come without its limitations and adverse effects. Information overload, a loop brought about by excessive transparency, is said to be the problem where a citizen does not find relevant information, or the citizen is unable to grasp the substantive issues (Etzioni, 2010). Transparency and demands for it could, in fact, be turned to a political weapon extremely selectively and strategically by governments to give the appearance of political liberalism whilst great problems remain hidden (Fenster, 2015). Furthermore, transparency is not an absolute value as it should be tempered with other factors such as national security and privacy. It is necessary for cities to develop appropriate measures of transparency that do not disclose too much sensitive information whilst ensuring that there is enough transparency to allow for real oversight and participation of citizens. Though e-governance has the potential to improve accountability and transparency in planning processes in cities, achieving this has its own challenges which include technological, institutional and social processes. There is need for cities to formulate integrated policies that will not only exploit the benefits of digital technologies but will also mitigate the threats and risks that go with them. This will help develop urban governance systems which are more open, accountable and participatory and thus aid them to build and develop sustainable and regenerative cities.

## 4. Conclusions

The intersection of accountability, the application of e-governance and urban planning dimensions for building resilient and regenerative cities was the central focus of this research. It was noted that e-governance has the potential to such an extent transform the urban planning in cities, all the while recognizing the limitations surrounding seeking accountability in such e-systems.

Core e-governance in the context of urban planning can be derived from Principles of accountability, sovereignty relevance and stakeholder engagement. As such, these principles provide a basis for the development of inclusive, sustainable and relevant urban planning practices to meet the current needs of cities.

Considerable recognition is given to the role of transparency in confidence building within the relationship between citizens and the governmental agencies. The research states openly that urban planning processes can benefit from open data, participatory, and visualization initiatives. At the same time, this work makes a point that the issue of transparency is wider than the availability of data, it also includes the explanation of how decisions are made, especially those taken by algorithms.

Active and engaged participation by the citizens is underscored as a most important element for promoting inclusive and sustainable development of the cities. E-governance tools have the capacity to expand and enhance the role of the citizens in the urban planning process, but the evidence we have





suggests the prominence of real concerns, including the digital divide and inclusiveness, in achieving participation.

There is growing recognition of the need to develop action frameworks that can address multi-level City's fast changing context and problems. The work we do supports that there is a role for the governance structures that manage change in a responsible manner to deliver the benefits of the technological changes, that are in practices fitting the values of society at a particular time.

The important point, on the other hand, is that this work demonstrates why we need a more comprehensive approach that examines practices of urban governance about technology but takes into account also social, cultural, and ethical aspects. This is especially relevant at the local government level where people feel the effects of e-governance on government activities most strongly.

The research shows what types of accountability in e-governance are based on the principles of social inclusion – and what types of urban practices they produce. If the means and the processes of the means are made in a manner that fulfils the keywords of transparency, participation, and adaptability, then the cities will be able to use the advantages of the technology in developing the urban areas to be more liveable, just, and sustainable.

However, the study also reveals key constraints in building accountable e-governance systems. These encompass algorithmic transparency, data privacy and security, digital divide, and the absence of institutional capacity building. Here, innovation, policy change and a strong sense of publicism all come into consideration but not in isolation.

## 5. Recommendations

Considering the objectives of this research, we make the following recommendations to advance accountability practices within e-governance for urban planning:

- Develop Comprehensive Accountability Guidelines: There is no doubt that there is an urgent need for guidelines on accountability in the context of e-governance in cities. These guidelines need to take account of algorithmic transparency, issues of data governance, privacy protection as well the ethics in the use of technologies for urban planning. These should be participatory and be formulated by government officials, technology specialists, urban planners and citizens.
- Enhance Digital Infrastructure: For efficient and sustained e-governance systems, strong digital infrastructure is critical. Resources should be directed at building reliable, secure and inter-compatible technologies that are adaptable to an integrated approach to urban planning. This includes not merely hardware and software but extending to formulation of standards and protocols for interoperability of various systems.
- Encourage an Open Data Culture: Cities need to work towards an open data culture towards urban data which is clear and availed to the citizens. This is not just about making data available, but also about offering the necessary tools and training to the citizens so that they can effectively make sense of the data available and put it to use. Open data policies have to be implemented within a framework that addresses data quality, privacy, and data usage.
- Encourage Co-Creation in Decision-Making: E-governance tools should enable stakeholders to participate in the planning processes. This revolves around creating participatory systems that are accessible and clearly communicating how the feedback people give is used in the planning process, and also making sure that citizens' voices are present in the planning documents.

- Establish and Maintain Evaluation Strategies: There should be routine reviews and evaluations on the e-governance systems implemented to analyse the extent of their success as well as their strengths, weaknesses, and impacts on society. Such evaluations should not be restricted to technological aspects only, but also include social dimensions and moral aspects.
- Raise Awareness about the Digital Divide: All possible measures should be taken to eliminate the digital divide and allow the usage of e-governance systems by everyone. This can be done by making e-governance systems more accessible, offering training on the systems, as well as using a combination of online and offline promotional techniques.
- Enhance Institutional Capacity: Local governments should aim at increasing their institutional capacity in order to enable them to successfully execute and manage e-governance systems. Such as training public officials, nurturing innovative mindsets, and establishing relationships with academic institutions as well as technology practitioners.
- Develop Ethical AI Frameworks: Um, since there is a trend of cities using AI in the planning of structures, the cities should come up with ethical AI frameworks that would ensure the use of these technologies is responsible and is accountable. These frameworks should include considerations on algorithmic bias, transparency and the human right to be heard before an AI-mediated decision is made.
- Strengthen Public-Private Partnership Governance: There should be explicit governance mechanisms for smart city initiatives that employ the public-private partnership model. These should ensure that the role of the private sector in such initiatives does not contradict public interests and that key decisions are made publicly.
- Promote Anticipatory Regulation: The regulatory approaches adopted should be more forward looking and dynamic to keep up with the fast pace of technological changes. This could include the creation of regulatory sandboxes which would enable emerging technologies and governance structures to be implemented but in limited areas to assess their suitability.

Significance and Impact

In this research, we close an important gap between technological progress and humane, effective city management. It brings to bear the twin issues of accountability and e-governance in respect of urbanization planning and draws salient lessons about the ways in which cities can use digital technologies to improve resilience and sustainable development in the context of upholding public trust and democratic principles.

The research has the potential to positively influence policy making and urban planning practice. It contributes to the effective urban environment by explaining both the benefits and the drawbacks of the e-governance methods in urban planning practices and offers an example for cities that look for establishing more purposeful, robust and responsive digital governance structures.

All in all, this research furthers the cause of the grand agenda of constructing the cities of the future – technologically smart, and at the same time, eco-friendly, diverse and robust. While answering the important question on the provision of accountability in the context of digitalized urban governance practices, it is a step toward ensuring better and appropriate use of technology in the future development of cities. The world over, the cities are faced with extreme challenges like climate change, social disparity, and unprecedented urbanization. Thus, the findings and recommendations of this research can help cities lay guidelines about urban governance systems that will be more effective in dealing with such issues. As such, it participates in the worldwide endeavor of promoting more just, sustainable, and adaptable cities and regions.



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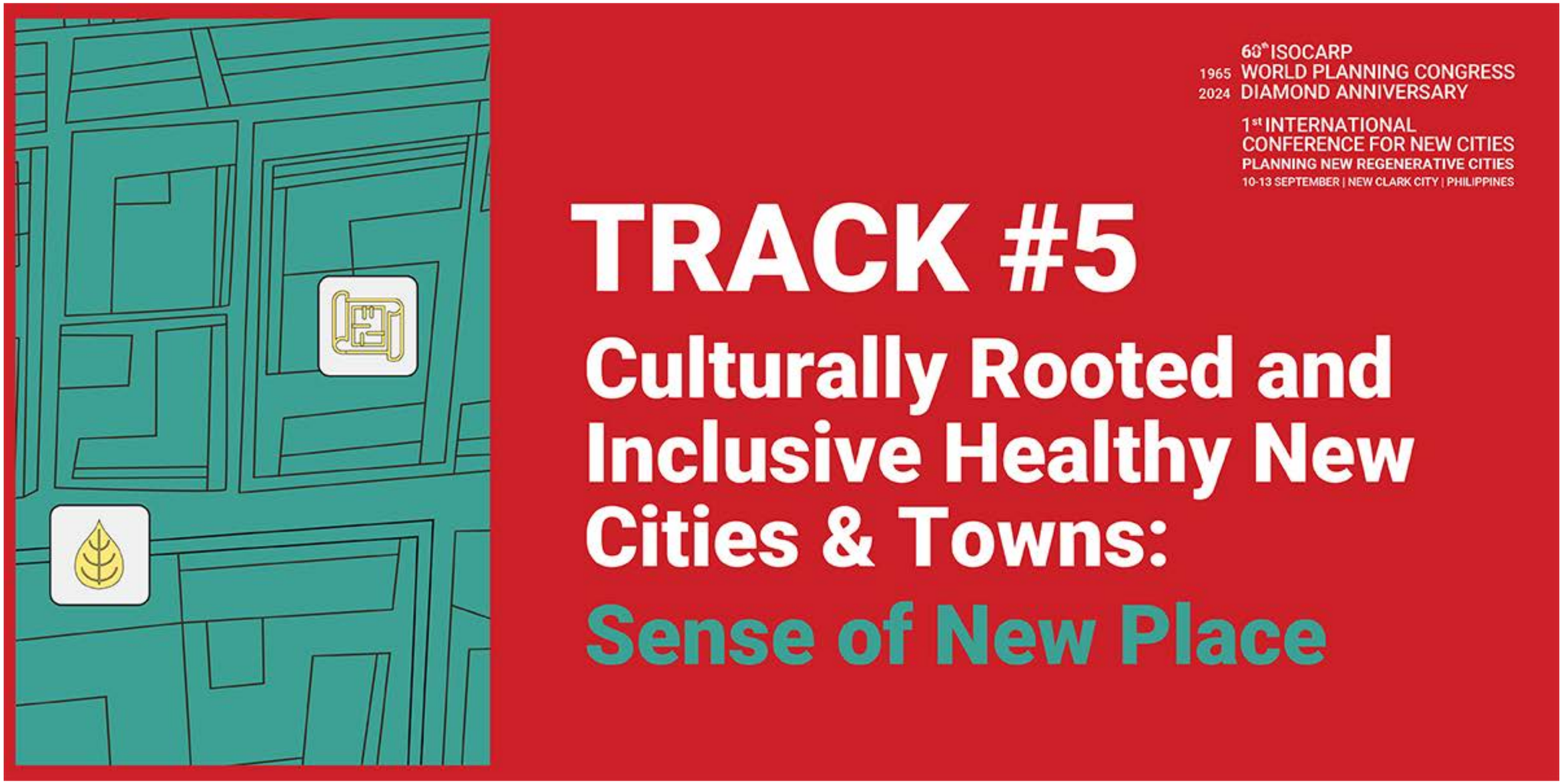
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TRACK #5
Culturally Rooted and Inclusive Healthy New Cities & Towns:
Sense of New Place

# TRACK 5 PAPERS

## TRACK 5: Culturally Rooted and Inclusive Healthy New Cities & Towns: Sense of New Place

### 5.1 Examining the Values of Places in New Cities & Towns: Inclusive and Culturally Rooted



### 5.2 Creating a Sense of Place Toward a Healthy, Wellbeing New Cities and Towns



### 5.3 Strengthening Planning Concepts and Instruments for Healthy and Culturally Rooted Communities

*Research Paper*

# Radical imaginaries and new places for children in cities

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## Abstract

*Top-down urban visions, design competitions and manifestos have a long tradition of urban planning and design, unlocking desired discourse on imaginary urban futures such as regenerative cities. At the same time, we are living in a state of meta-crisis threatening the state of health at a planetary scale. As urbanisation continues to increase, cities could be part of the transformation process to enable regeneration and a return to planetary health. However, as cities are nested within complexities associated with cultural practices, policies, and making- processes, often such vision can lead to unintended outcomes and leave vulnerable population groups behind. In many cases, children, which are our future, are often overlooked. In this paper, we seek to speculate about a different way of imagining healthy cities by first introducing a speculative non-linear theoretical framework as our vision for cities, second applying the framework to three different international case studies to harness the transformational power of being in the city for children and engaging in everyday life observations related to children. In a sense, this is a radical departure from traditional visioning as we centre the visioning around ontological cuts from the existing conditions. Third, we conclude with a set of research questions as a targeted provocation to overcome the meta-crisis that seems so deeply caused by the human condition.*

## Keywords

*Urban vision, speculative imaginaries, regenerative cities, children, everyday life, public space*

## 1. Introduction

The human capacity for imagination has been part of urban visions since urban design and town planning evolved as a distinctive discipline. Deployed as a strategic tool to urban visions assist in informing political and policy decisions to improve the health of people living in urban conditions. Ebenezer Howard's Garden City (1965), the Chicago School with the top-down City Beautiful movement (Carlino & Saiz, 2008), and the rigid technocratic Charter of Athens (Corbusier & Eardley, 1973) are only some of the prominent early exemplars where visions for urbanity had long-lasting affects on the way we think, design and plan cities. However, the integration of such vision continues to develop in the second half of the 20th century, highlighting the role of the human dimension and experience in shaping environmental conditions. Jane Jacobs's (1961) famous critique of urban conditions in New York in the 1960s is conceived as an urgent call to value all user experiences as a core part of realising shared visions so that cities offer something to everyone. At the same time, Kevin Lynch (1960) asserted that people create mental maps based on core spatial elements that influence their experiences as well as Gorden Cullen (2012), with his concept of 'serial vision', suggested integrating humans' visual perceptions. Now, our collective awareness has and continues to evolve and integrate factors such as regenerative design, meaningful community engagement such as participatory co-design, nature-based solutions, or novel technology framed under the conceptual umbrella of smart cities and even Artificial Intelligence (AI) now used to decentre human superiority thinking. Arguably, the New Urban Agenda (United Nations, 2017) linked to the Sustainable Development Goals (SDGs) is perhaps the most comprehensive normative policy vision to date, generating the canvas on how urban environments should be approached to achieve healthy, liveable, equitable and resilient urban environments for all. However, arguably, contemporary urban environments are made up of multitudes of complex assemblages that escape simplistic slogans and reductionist recommendations that have the intention to improve conditions but instead lead to new sets of challenges as 21st-century urbanity increasingly becomes more fragile, fragmented, and unjust (Clos, Sennett & Sassen, 2018). Since the global COVID-19 pandemic shook up our way of life, the health domain spearheaded by the World Health Organisation acknowledges the need for interdisciplinary collaboration at all scales (local, regional, national, global) required to attain not just the health for people but also animals and our environment, framed under the conceptual umbrella of One Health (WHO, 2017). For One Health to work it may benefit from highly nuanced, performative onto-epistemologies (Barad, 2003, 2007) that can reveal contradictions, ambiguities, hidden or lost experiences and possible perceptions that are closely entangled with the social and spatial-material worlds in the broadest sense.

For the purpose of this paper, we position ourselves with expansionist perspectives that can be associated with concepts such as non-duality, nonlinearity, emergence, intersectionality, more-than-human perspectives and relationality. Within such a position, pluriversal methodologies question our established development paradigm and allow us to reimagine much more free-flowing post-structural epistemologies (see Bathla, 2024). Compared to established methodologies, they will enable us to gain insights into diverse and highly nuanced social worlds (human and non-human). After all, there is very little time left before irreversible shifts at the planetary scale will set us further back regarding the implementation of the New Urban Agenda and the Sustainable Development Goals. Bathla's (2024) outlines a range of pluriversal methodologies that in a sense lend themselves to One Health approach, but also challenge the following:

- Assumed neutrality of the researcher
- Privileges of verbal and textual methods
- Anthropocentrism
- Defiance of the pluriversal onto-epistemologies, what he called disembodiment and secular ontologies
- Participation and restitution of knowledge, and lastly
- Disowning of creative and imaginative possibilities of research.

In this sense, we seek to contribute to the closing of a research gap by first, introducing a novel speculative pluriversal imaginary research assemblage loop (SPIRAL) that functions as the conceptual frame to engage at the foundational level (radical) on how things come to be. Here, assemblage, as described by DeLanda (2016), shall be understood as a set of relations between objects (material or/and immaterial), which engage with external objects but, as Harman (2011, p. 19) elucidates, "is a real thing considered apart from any of its relations with other such things". Each object, therefore, is a real entity that does not rely on other objects or a fundamental ground of being but is grounded in its emergent reality (Howdyshell, 2020). Second, we test the research assemblage on three case studies related to children and health situated in three incommensurable spatial-material and socio-cultural contexts to enable new pathways to realise regenerative and healthy cities for all humans and nonhumans. Third, instead of providing a conclusion we



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continue to think differently and offer a set of new questions that invites scholars and practitioners to collaborate with us and to further test the role of radical imaginaries, and urban health.

## 2. Speculative Pluriversal Imaginary Research Assemblage Loop (SPIRAL)

In the following section, we will introduce SPIRAL. While this explanation might be perceived as linear sequenced, it is necessary to stress that each element is ontologically grounded and connected in an ongoing and irreducible state of flow. Despite that we consider stories, narratives, politics, policies and materiality as part of our larger post-qualitative inquiry, they remain in constant flow and change their position to another. Therefore, we acknowledge that as with any conception of any idea conveyed in writing, limitations apply. To underpin the flow and loop state, each circle has a different colour and a dot associated with it that can be moved on any part between various of these elements, whilst ontology linked to the observer or reader (a social world) is always present. Combined SPIRAL is an imaginary research assemblage that operates as an entry point to reveal hidden aspects that exist in pluriversal words and their irreducible becoming.

### 2.1. Ontology (Mind/ Body/ Spirit)

The SPIRAL is a radical imaginary product itself and should be conceived as a conceptual tool to frame our line of inquiry, as the border has to be drawn somewhere. As this paper addresses urban health issues it is inspired by Hancock's (1985) Mandala of Health: A model of the human ecosystem that embraces circularity as a symbol of the universe and public health. Health, as such, is experienced as an individual (a social world) and, in his model, is comprised of body, mind, and spirit. Despite that, it is seen as the centre or focus but should not be viewed in isolation but rather in a flowing state of relationship to every other element in SPIRA that is in motion (see Figure 1).

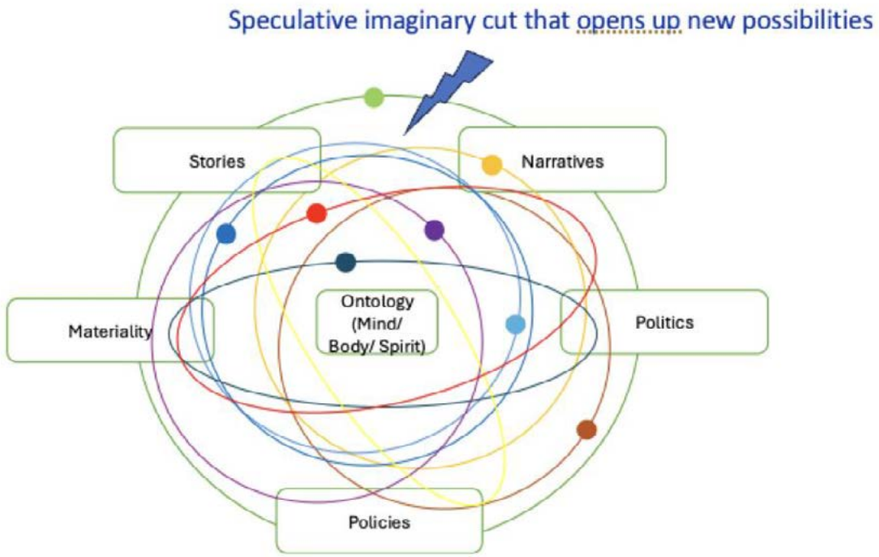


**Figure 1. A visualisation of SPIRAL. Source: G. Mews.**



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### 2.2. Stories

The relationship between meaning-making and human experience, as well as perception of everyday life accounts, is proven within the wider transdisciplinary discourse (Joranger, 2023). In fact, stories are a universal cultural practice that carries rich insights that shape our understanding and communication about ourselves (a social world) and other people around us (other social worlds). Stories can be fully imagined or playfully simulated as products of the mind; however, in many respects, stories are situated between factual accounts of events that take place. Italo Calvino (1972, p.114) suggested in his book 'Invisible Cities' that *"Everything imaginable can be dreamed, but even the most unexpected dream is a rebus that conceals a desire or, its reverse, a fear. Cities, like dreams, are made of desires and fears, even if the thread of their discourse is secret, their rules are absurd, their perspectives deceitful, and everything conceals something else."* Meaning and rich insights are produced and shared through stories with others around us. The stories we tell ourselves are situated within the ongoing process of social relations and, therefore, impact those around us in proximity. Here, proximity serves as the space of encounter that can be territorialised in a physical place or deterritorialised (non-physical), as discussed in depth by Deleuze and Guattari (1987/2021).

### 2.3. Narratives

Stories are part of larger narratives that surround us and shape our (social and cultural) existence. Narratives can serve diverse functions as part of everyday life and can include entertainment, education, which includes research and facts, cultural practices, identity formation to place, and sharing wisdom, values, and life lessons. For example, Proshansky made in 1978 the crucial link between place and individuals' identity. Subsequently, other scholars adopt the research theory and co-create a larger narrative. Such narratives are shared, meaning that they integrate plurality associated with the social worlds of others around us. Importantly, these narratives, if shared, can evolve into religions or ideologies as they provide the foundations of a shared understanding, fragmented insights into human existence, and moral values. An agreed shared view of the 'world', alignment of value systems, collective identities, and situated cultural rituals and spatial practices generate a sense of belonging to another and a place.

### 2.4. Politics

Under such conditions, narratives become political as tensions can arise between individuals' social works and the co-create social world based on the underlying narrative. For example, the urban anthropologist Setha Low's (1996, 2006) body of work on spatial politics of public space compelling demonstrates that narratives are closely tied to politics and consequently distribute power in unequal and dynamic ways that can easily remain hidden. Within our predominant modus operandi and governance frameworks, politics will inform policy to shape the ongoing process of how cities enable better conditions for all.

### 2.5. Policies

Especially when narrowing down this story about SPIRAL within the context of children, spatial politics and health, Gleeson and Sipe's (2006) work on Creating child-friendly cities as well and Freeman and Tranter's (2011) work Children and their Urban E*nvironment: Changing Worlds* capture the tone of its time making policy-relevant observations and suggestions. At the same, the more-than-human perspective remains less developed. Fortunately, Malone, Tesar and Arnd (2020) picked up where others left off and examined the *Posthuman Childhood conditions,* decentring human superiority thinking in relation to spatial-material practices.

### 2.6. Materiality

Materiality here is the totality of properties associated with the distinct nature of objects, substances, or phenomena that can be perceived or experienced through the senses. When policies are combined with

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funding, a particular form of energy, imbued with action and materiality, is being shaped. In turn, that meaning people ascribe to materiality and place shapes the stories we create, tell and share with others. Urbanity or cities, as such, are potent playgrounds for the modification of materiality.

### 2.7. Speculative imaginary cut of SPIRAL

Within the SPIRAL framework, this is the part where urban visions are generated through speculative imaginary cuts that are symbolised through a blue flash (figure 1). This element allows us to escape the loop in which we can engage in speculation on endless, highly nuanced, performative, onto-epistemological urban visions. Such visions generate an abstract assemblage of infinite possibilities and open up different possible SPIRALs that, in turn, allow us to reimagine children in cities to harness their regenerative potential in pursuit of better health (human and non-human) (figure 2). As we embrace openness and non-duality, the cut can be placed between any of the elements present in the loop. However, the cuts cannot exist in isolation as they would otherwise remain intangible sense. The cut is relationally connected to a case study and the ontological perspective of the author and reader that meaning can be socialised. That socialisation is symbolised as the connecting loop between different visions highlighted in green in Figure 2.

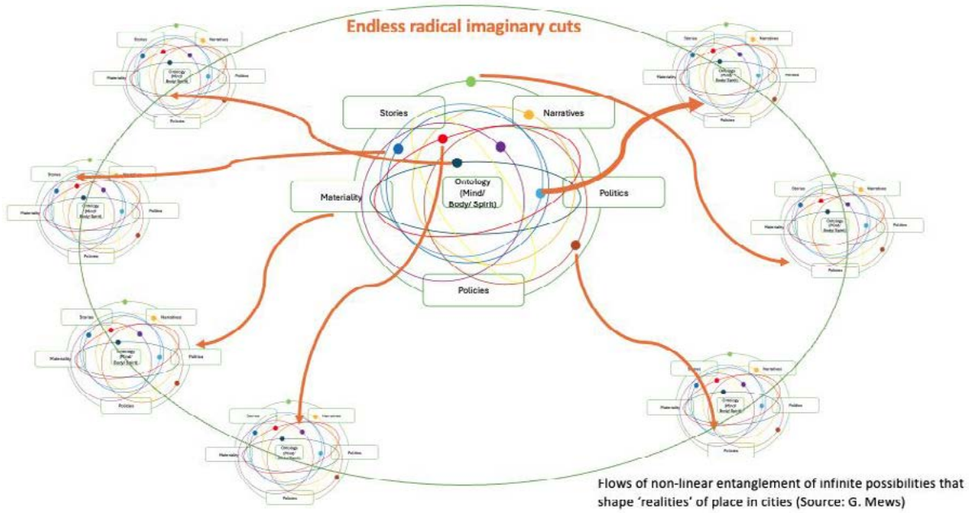


**Figure 2. A visualisation of unlimited urban visioning in the SPIRAL. Source: G. Mews.**

## 3. Case study Logan, Australia

To overcome abstract theoretical divisions of the SPIRAL framework and spatial practices, we are now testing the framework in three distinct socio-cultural contexts, starting with children in public spaces in Logan, Australia, Venice, Italy, and Rio de Janeiro, Brazil. The first case study is situated in the city of Logan, Australia. Logan is a distinct local government area situated on the land of the Yugambeh people, which is part of the larger metropolitan area of Brisbane, Meanjin. The suburb Woodridge is home to 12,530 people living on 4.67 square km, with 26 per cent of the population classified as children (3,011 children in the age range of 0-14) (.id 2021). The majority of the urban morphology is classified as suburban detached housing, segregated land use and an abundance of public space in the form of streets that predominantly cater for private vehicle use. As a cultural landscape, these are the conditions in which most children grow up and play across Australia (see Scharoun & Mews, 2018) and, therefore, serve well to test the SPIRAL approach.





Across Australia, over 16 percent of the population is under the age of 12, and an estimated 65 percent of parents do not feel confident in identifying signs of social and emotional challenges in their children (Australian Government 2021, p. 135). Subsequently, there is an urgent need to address health inequalities around opportunities to increase physical activity and enable a broad range of environmental experiences in neighbourhoods (Cochrane et al. 2019).

Kenny Street is a typical suburban neighbourhood street with road blockages at both street ends when the neighbourhood play activities take place. It is approximately 800 metres long with a one-metre-wide concrete footpath on the northern side of the street (figure 3). Kenny Street merges with Douglas Street towards the east with a sharp corner. Towards the west, the juncture is formalised through a T-juncture into Shannon Street with a wider sightline. A few trees provide partly shade onto parts of the footpath in fragments. While the street was blocked for motorised traffic, eight cars were parked on the verge around nine o'clock in the morning. A temporary fold-up tend had been erected, and a free BBQ was being set up.

A small table with toys and outdoor play materials had been made available to stimulate play activities. The political activism of Neighbourhood Play Networks in Logan aims to ensure children participate in locally designed activities and approaches that enable access to active play more often - ideally every day. The program stresses that children do not see separateness between spaces and places to play and the wider community (Logan Together 2020). To reverse the trend of social isolation and lack of play opportunities in public spaces, Logan Together initiated Kenny Street, a neighbourhood street play day, in which the street is closed through traffic and under the guidance of a community play champion, children can reclaim public space for social encounters as a place of belonging. Massey (2004) argues that spaces, such as Kenny Street, function as places that are inherently connected with culture, which in turn is carried into place through bodies. Here, bodies function as an animated and energised conduit, allowing us to experience a relational engagement with the world in dynamic and temporal ways and noting that children are not an inherent property of an individual or human but a dynamic body of different forces with the ability to (re)configure 'what is'. Children here frequently self-report a perceived increased level of physical activity and sense of connection in moments of outdoor play, treasuring these moments of joy together through play by being outside with friends (human and non-human). In addition, children reported physical safety concerns but again demonstrated sophisticated levels of self-awareness, indicating a level of competency that adults do not easily grant. Yet, despite the success, the imitative was not mainstreamed by the government or led to policy revisions.


**Figure 3. Play in Kenny Street, Logan. Source: G. Mews.**

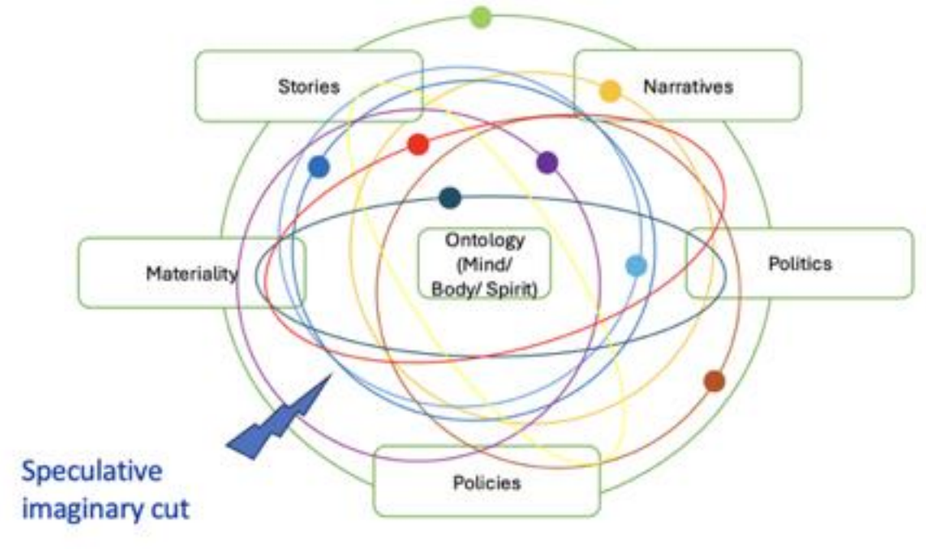


**Figure 4. SPIRAL in Logan. Source: G. Mews.**

The speculative cut in the SPIRAL supports a different type of urban vision for Logan and is inserted here between Policies and Materiality (Figure 4), in which local government authority holds agency to pass a new policy that actively breaks down the barriers and enables conditions in which every neighbourhood street in Woodridge is declared to be a play street. The German "Spielstrasse" concept functions as proof of concept and cultural transferability, which has been demonstrated with the Neighbourhood Play Project. This policy includes speed restrictions for vehicles around 7 km/h, an enforceable law that prioritises





children and their right to independent mobility at the neighbourhood network scale. In addition, the policy actively incorporates the intangible values of the community. These can improve the sense of stewardship and increase the level of care as well as the sense of belonging. Financial incentives and support allow residents to serve their community and their becoming through process-oriented place-making (figure 3). This may occur through a rich assemblage of artistic projects (figure 3), new flora (trees or food crops), and higher fauna diversity (chicken, bees etc.) which can be perceived as 'messy' or uncontrolled but adds a sense of awe and wonder to each street which a level of care is evident in the spatial-material practices not just of 3,011 children but all 12,530 residents. The policy is directed towards the regenerative potential of human and non-human health and their coexistence.

## 4. Case study Venice, Italy

Venice is a particular example in terms of urban design; it has two built environment characteristics that are strongly related to the SPIRAL, such as a human scale and a double fractal urban fabric (see Figure 5). Here, the human scale refers to the characteristic of the built environment that allows social interaction to occur in the urban sphere. It is well known that Venice is a worldwide tourist attraction; in fact, it is one of the cities most affected by over-tourism due to governmental political agenda.

This intricated urban fabric, in conjunction with the cultural landscape and policies regulating the use of public spaces (see Lara-Hernandez, 2023), lays the way for a fertile environment for emerging and contested narratives.

**Figure 5. Venice is a double fractal city. Source: J.A. Lara-Hernandez (2023)**

Not long ago the streets in Venice like many other medieval cities were the stage of urban everyday life. Currently, Venice's population is less than 50,000 and has been consistently declining from a peak of 175,000 in the 1970s, and its streets are mainly used for tourist transit. Furthermore, Tourism Services Index scores are positively associated with percentage values in demographic decline and unoccupied dwellings (Ignaccolo, C., Zheng, Y., & Williams, S., 2023). Venice is going through a process of depopulation and aging, as many others in European City Centres (Larraz and García-Gomez, 2020). If the population falls below 40,000, there is concern that Venice will cease to be a viable living city (Hosany, 2024).

Regarding children, on the one hand, the Venice Council encourages children to appropriate public spaces due to their unique, safe and peaceful ambience (Comune di Venezia, 2023). While on the other hand, the

use of public spaces in Venice is heavily regulated (Comune di Venezia, 2022). Moreover, some squares have been declared “off limits” for children by the Urban Police and Security Regulations of the Commune (Bon, 2019). By doing so, residents (children, too) are deprived of their right to use their city. Thus, we have contradictory policies enacted over the use of public spaces.

Nevertheless, the sense of community among the residents remains strong. We constantly claim their right to appropriate THEIR public spaces even in terms of crises (Lara-Hernandez, 2023). Furthermore, in many of the squares, there has been a renascence of liveability in the sense that entire families gather and temporarily appropriate them for celebrating events (see Figures 6 and 7) as they have always been.

**Figure 6. Children playing in San Giacomo del Oreo. Source: J. A. Lara-Hernandez.**





**Figure 7. Children painting in the square in San Jacomo dell Orio. Source: J.A. Lara-Hernandez.**

Regarding children, Venice is what the pre-industrial city used to be—a place where parents are not the “drivers” of their children. There are no cars or any kind of vehicles, so children can just go out to gather, play, enjoy, and learn. They have freedom of movement, they can explore, and they can certainly appropriate public spaces.

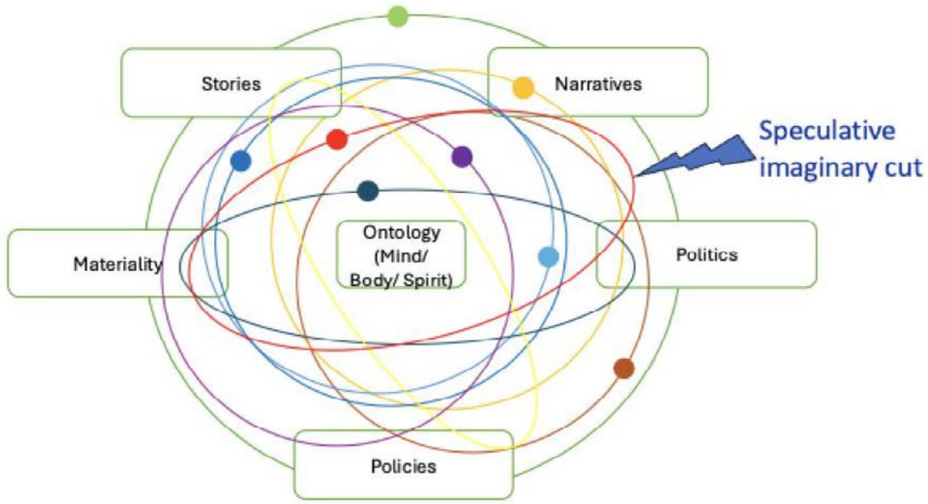


**Figure 8. SPIRAL in Venice. Source: G. Mews.**

Our speculative cut to support an alternative urban vision is inserted here between Narratives and Politics (Figure 8), in which residents, despite restrictive policies, actively re-appropriate public spaces, especially children. There are no cars or any kind of vehicles. Therefore, they can just go out to gather, play, enjoy and learn. They have freedom of movement; they can explore, and they can certainly temporarily appropriate public spaces. Furthermore, in terms of urban design, the city layout encourages social encounters in public spaces, which enhances a sense of community. These assemblages of material and immaterial practices attain culture and narratives which affect materiality and vice versa (Simmel, 1969). In such scenarios, the "customary law" could enact more power than the state law, creating alternative narratives. Utilising SPIRAL facilitates us to grasp such narratives that pave the way to politics and, subsequently, policies that are invisible to the foreign eye, affecting materiality.

## 6. Case Study Maré Slum, Rio de Janeiro, Brazil

The Maré Slum, also known as Favela de Maré in Portuguese, is made up of seventeen communities and is home to nearly 140,000 people. One of the communities, called Ramos, is situated along Guanabara Bay facing Rio de Janeiro International Airport (Galeão) and the University of Rio de Janeiro (UFRJ). Despite being the target of numerous government initiatives and political interests, Maré is still officially classified as a favela, although its residents view it as an urban neighbourhood. There is a lack of quality open spaces and greenery, as the area has very few trees. The construction of the Ramos Swimming Pool, also known as Ramos Carlos Roberto de Oliveria Dicoró Beach Environmental Park, was completed in 2001. The pool is now one of Rio's most significant social infrastructure projects, providing a public space for people of all ages (Figure 9).

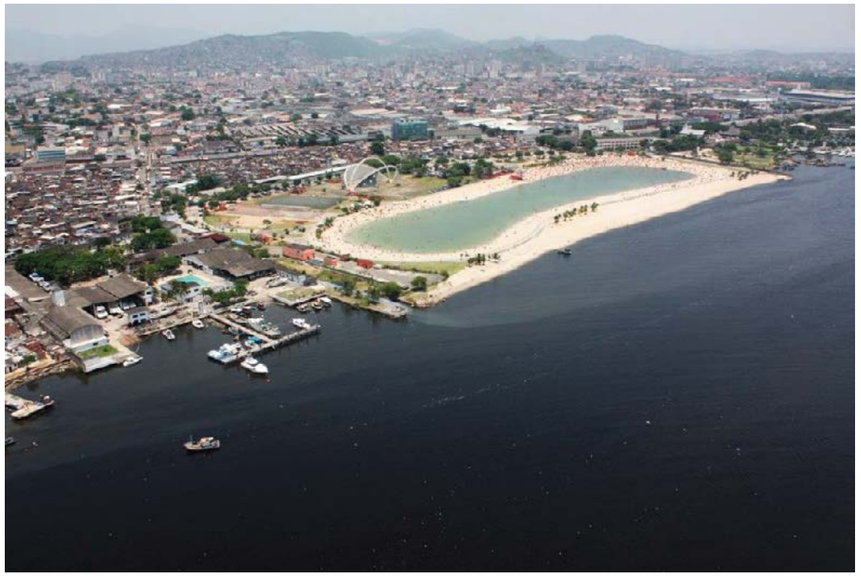

**Figure 9. Ramos Swimming Pool on a closed day. Source: Bombana, Turra & Polette, 2022.**

As for the context, the spatial-material practice in the context of Maré is a product of a culture that normalises ever-deepening segregation within its structural DNA. The South Zone of the city, where the famous beaches of Copacabana, Ipanema and Leblon are located, has an immaterial fence of protection dedicated to the residents of these neighbourhoods and to tourists (Iwata &Del Rio, 2004). Bus routes that used to directly connect areas such as Ramos to the beaches of Copacabana and Ipanema were





progressively cancelled to prevent residents from the outskirts from 'invading' the elite beaches on weekends. At the same time, the Pool became increasingly popular and phenomenally successful since a prominent TV soap opera features the Pool. Testimony to such fame is evidenced in the catchphrases and stories that resonate repeatedly across Rio. The Ramos Pool is a place and wonderful attraction for families from the outskirts and neighbourhoods as yet another success story of the 'Cidade Maravilhosa', meaning Marvelous City (Bombana, Turra & Polette, 2022). The large size of the beach and its easy access to all residents consistently attract with approximately 50,000 a high number of visitors on weekends (Figure 10). Within the government's pursuit to democratise public space, the beach remains up to date a beacon of hope within the urban landscape.

**Figure 10. The Ramos Swimming Pool in a weekend. Source: Pinto, 2014.**

The water body that fills the pool contains 30,000,000 litres of seawater over 27,000 square metres to simulate the material object of the beach as a place for all. The symbolic relation to power and memory erasure that Ramos Pool brings should not be underestimated (Sbarra, 2020). By creating an 'exclusive' beach for the peripheral population, the unspoken political discourse occasionally emerges in the print news - socially heated headlines that state that only 'black' residents of nearby favelas with little education use the pool. More recently, news noted that the water was contaminated by urine and faecal coliforms and even by sea animals that somehow came from Guanabara Bay, which is one of the most polluted areas with unbearable odours. At the same, the government denied such allegations. To summarise, what we see here is the appropriation of a place by people in pursuit of joy, seeking an escape from politisation, may it be environmental or social (Cendrero &Fischer, 1997). The photos of the place on weekends have remained the same for almost 25 years: crowded, water, sun, and many children and families (Figure 11).

**Figure 11. Children playing in the Ramos Swimming Pool. Source: Pinto, 2014.**

Street vendors sell snacks, drinks, and toys for children (Pinto, 2014). Within this narrative, it is possible to interrogate the politics of segregation further, but as far as the use by children is concerned, it can be celebrated as a giant amusement park. It is a place of imagination where people can create meaning through their own everyday stories, pretending to be on one of Rio's famous beaches that is equally celebrated through immaterial cultural heritages such as the song 'Girl from Ipanema' celebrating across all marketing instruments the city's natural beauty (Iwara & Del Rio,2004).

When applying the SPIRAL and inserting a speculative cut between stories and narratives, it becomes apparent that stories feed into a larger narrative and social construction around Ramos Pools. The SPIRAL assists not just in capturing some of the material and immaterial relationality but also between objects that inherently connects us with our mind, body and spirit to places and formative experiences that matter. Such a process creates countless ontologies of diverse social realities or different ways of understanding the world, which in turn is shaped by narratives we encounter. The bodies that experience public spaces involve human and non-human actors such as water, sun and sand, making Ramos Pool a unique case study that carries authenticity about the human condition and social encounter as part of a larger urban assemblage (Latour, 1996, DeLanda, 2019). The narrative about places such as the Pool is essential in gaining a nuanced understanding of residents' experiences and socially produced segregation upheld by the elites' social realities. Such relationality creates a sort of parallel reality – an 'improved reality' (Habermas, 1990) or an 'alternative spatiality' (Sbarra, 2020)- that is only real to those who imbue it with meaning.

## 7. Final remarks

One SPIRAL and three case studies, each one inserting and exploring a different speculative cut into our creative research assemblage related to children and health situated in three incommensurable spatial-material and socio-cultural contexts. With the above, we demonstrated that the SPIRAL integrates theories and qualitative and quantitative research, but more so, it is a post-qualitative inquiry that assists in





determining the role of highly nuanced urban visions, allowing us to think differently. Such an approach harmonises and arguably reconciles with an assumed neutral stance of the researcher, moving beyond reliance on textual methods, anthropocentric views that defy pluriversal onto-epistemologies and the ways we take part in the restitution of knowledge and reintegrate much more consciously creative, nuanced and urban visions into our designer's toolkit to overcome some of the meta-crisis by realising the regenerative and healthy cities for all humans and nonhumans. Lastly, we wish to invite the reader to examine the following questions with us:

- How can the SPIRAL approach shape our broader discourse on regenerative and healthy cities?
- What constitutes a 'quality' place for children in cities in your cultural context from a creative, more-than-human perspective?
- What are the decisive emergent properties of actors (human and non-human) to generate compelling 'alternative realities' and shape materiality in pursuit of ONE health?

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*Research Paper*

# Planning for Gender Inclusive Tourism in Kochi, Kerala, India:

## Challenges, Opportunities and Strategies

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### Abstract

*Kerala situated in the southwest corner of India is known as 'God's own country', the tagline of Kerala tourism which was coined by Walter Mendez in 1989. The place is known for its mountains, hills, coastal plains, eco-tourism initiatives and beautiful backwaters. Th New York Times selected Kerala as one of the 52 must-see tourism destinations in the world in 2023. According to tourism statistics, Ernakulam district has the highest tourist footfall with in Kerala and Kochi receives the highest number of both domestic and foreign tourists with in Ernakulam district. Kochi is rated as one of the best places to visit in Asia in 2024 by the British luxury travel magazine Condé Nast Traveler in 2023. Despite these accolades, questions remain about the gender-inclusivity of Kochi's tourism – both for tourists and those working in the tourism industry.*

*According to the 2011 census[1], the male work participation ratio is 57.12% in the Kochi corporation and 56.39% in the Ernakulam district, while the female work participation ratio in Ernakulam and Kochi is significantly lower, at 20.21% and 19.46% respectively. Among the female workforce, 45% do not commute to work, preferring to work near their homes or at home, primarily due to their dual roles at home and in the workplace. Also, women earn just half of what men earn among casual laborers in Kerala, 45.29% wage gap in urban areas and 50.47% wage gap in rural Kerala. These data indicate a significant gender disparity in Kochi and within Kerala. Kochi as a place also faces challenges with cleaner streets and better roads, as waste accumulation is commonly seen on the roads and beaches. Recent incidents highlight this issue, with Russian tourists cleaning Fort Kochi Beach before taking a dip in its unclean waters.*

*My research aims to enhance gender inclusivity in Kochi – both in the tourism industry and for tourists through targeted planning strategies and proposals. It examines gender inclusivity in Kochi's tourism industry by analyzing and identifying challenges faced by women. The study also assesses Kochi's tourism policies, planning regulations and stakeholder engagement both at state and national levels to identify key challenges and issues related to gender inclusivity. The study employed various methods to evaluate gender statistics in the tourism industry based on gender diversity rates in leadership, employment, entrepreneurship and economic participation of women in the tourism sector. Furthermore, a detailed assessment is conducted at two selected tourist locations in Kochi – Fort Kochi and Mattancherry area, considering cultural nuances and regional variations. These tourist spots were evaluated based on six principles of gender inclusivity, culminating in the calculation of a Gender Inclusivity Index. The paper advocates for strategies and recommendations to enhance gender inclusivity in the tourism sector through targeted planning proposals, policies and stakeholder engagement. The research contributes to policy development and the practical implementation of making tourist spots in Kochi gender inclusive. It emphasizes the need for collaboration between governments, the tourism industry stakeholders, tourists and local communities, thereby strengthening Kochi's position as a must-visit destination.*

1 The last census in India was in 2011 and is taken into consideration in the research paper





**Keywords**

*Gender, Inclusivity, Tourism Industry, Tourists*

## 1. Travel and Tourism

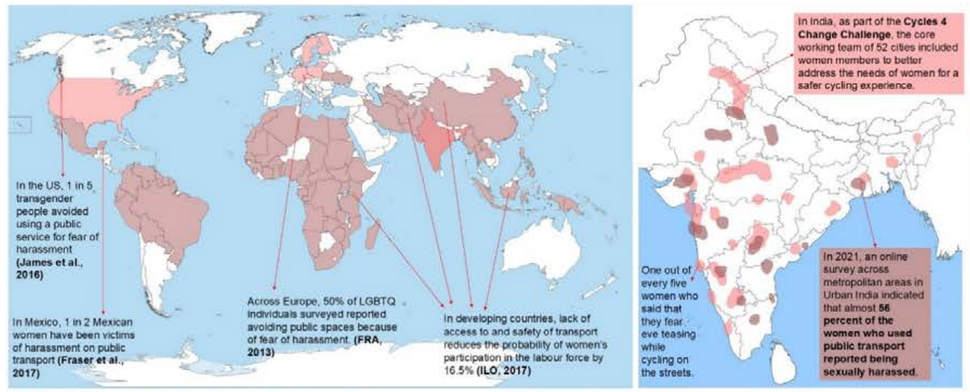
### 1.1 A Global Perspective

Every day, we travel for our needs: to the office, to buy daily necessities, and for pleasure to gain new experiences, making it an integral part of our life. Different people have different reasons for traveling; their travel patterns, preferences and concerns vary. In earlier times, travel was largely driven by necessity – for work, in search of better living conditions or food. But today, travel is predominantly driven by the desire for experiential enrichment rather than fulfilling mere necessity. Travelers want unique experiences that allow them to immerse themselves in local cultures and distinct environments.

India, a country so diverse – geographically, spiritually and experientially, makes the place a traveller's paradise. It also makes traveller's wonder whether traveling to India is safe. Like so many things about India, the country's size and diversity make it hard to provide a uniform answer. India is generally safe, but it depends on where you go, what you do and how you get from one place to another.

India is ranked 39th among 119 countries, according to the Travel and Tourism Development Index (TTDI) 2024 report published by the World Economic Forum (WEF). In 2024, the travel and tourism sector in India contributed around 9.1 percent to the country's total GDP. This amounted to over 11.10 trillion Indian rupees and represented an increase of nearly 12.1 percent compared to the previous year[2]. While its contribution to economic and social development is widely acknowledged, over the years little attention has been paid to how the tourism industry benefits women and men, as well as to the relationship between tourism and gender equality. According to the United Nations World Tourism Organization (UNWTO), tourism presents both opportunities and challenges for women, which makes the gender equality perspective highly relevant.

### 1.2 The current state of gender inclusivity in global and indian tourism




**Figuur 1: Spatial Distribution of gender-related issues in the global and Indian scenarios. Source: By Author**

The spatial distribution of gender-related issues in the global and Indian scenarios (Fig. 1) is taken into consideration. The third most significant motivator for hate crime incidents is sexual orientation. (Marzullo et al, 2009). A study conducted by UN Women, 2016 states that 35% of women have experienced physical

2 Statista Research Department

and/or sexual violence in their lifetime, 7.2% by a non-intimate partner[3]. UN Women reports that 1 in 3 women face some kind of sexual assault at least once in their lifetime[4]. The statistic in India seems to be extremely high. As part of the Cycles 4 Change Challenge in India, the core working teams of 52 cities incorporated female members to enhance the understanding of women's requirements for a safer cycling environment. The perception survey revealed a significant concern, with one in every five women expressing fear of eve-teasing while cycling on the streets. In 2021, an online survey across metropolitan areas in Urban India indicated that almost 56 percent of the women who used public transport reported being sexually harassed. All these statistics indicate a deficiency in gender-inclusive infrastructure and informed human resources at tourist destinations and throughout various aspects of tourism.

## 2.3 Case studies and best practices

Best practices were analyzed in different aspects of gender-inclusive tourism planning. In terms of accessibility, Bhuvaneshwar is gathering gender-disaggregated ticket data for evidence-based decision making. Safety audits and perception surveys were conducted on the transport infrastructure to enhance customer experience and gender inclusivity. The E-ride initiative employs exclusively women and transgender drivers. In London, initiative called Transport for London (TfL) utilizes big data analytics and conduct perception surveys to examine travel patterns and the challenges encountered by users across various communities. Implementing accessible bus stops, clearer maps, a diverse transportation workforce, prioritized seating for the elderly and women, offering real-time bus schedule updates, and designated entry doors for other vulnerable riders and pregnant women on buses represent some of their exemplary initiatives. In the City of Bolzano, Italy, Gender Task forces, Safety audits, and Walkability assessments were conducted. Pink taxis (Taxi Rosa) offer a specialized taxi service exclusively for women during the evening and night hours, providing discounted rates when public transportation is less available. Pink Parking (Parcheggi Rosa) is reserved for women around the city at easily accessible, well-lit, and near-exit garages. In terms of communications and ICT, Bogota has the SafetiPin App allows women to record where they perceive safety or insecurity within the city. Training for transit staff on women's safety concerns and plainclothes officers were implemented to visibly arrest people caught sexually harassing women on public transit. In the Khayelitsha area of Cape Town, participatory design was implemented. Women's participation was key to project design and implementation, providing high-quality overhead lighting and easy-to-maintain materials contributed to a 30% increase in pedestrian activity. In Barcelona, Spain, it serves as a notable model for integrating the perspectives of LGBT people into municipal planning. They have dedicated LGBT Resource Centers offering centralized information and guidance, specialized services, increased LGBT recognition and visibility, and public space monitoring programs to increase safety and perceptions of safety. In Vienna, Austria, the local women's commission organized night walks within an inner district to pinpoint areas of concern, resulting in enhancements such as wider sidewalks, improved lighting and ramps to enhance accessibility for people with wheelchairs and strollers[5]. They have a "Fair Shared City" initiative to highlight the importance of equality. A fairness check was created to ensure different user group's needs are addressed. Implementing gender-inclusive tourism planning best practices has fostered a safe and secure environment for both residents and tourists, ensuring that the diverse needs and perspectives of all individuals are considered in the development and management of the destination.

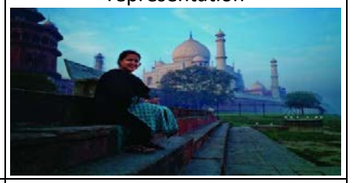
Similarly, various international and Indian case studies were also analysed for an inclusive tourism industry. The best practices revealed a variety of strategies and initiatives that aimed at promoting gender equality and women empowerment within tourism industry from leadership and decision making to entrepreneurship, education and community engagemet (Table 1). These range from comprehensive policy frameworks to localised community driven efforts.

- Leadership and Decision-Making: The Leadership Task Force for Women's Empowerment in African Tourism focuses on integrating gender issues into African tourism strategies, and improving career opportunities for women in the sector and promoting female role models. Peak DMC, India, a destination management company has implemented a robust mentoring system, a zero-tolerance policy on sexual misconduct, and flexible scheduling resulting in a significant increase in female tour leaders in tourism sector.
- Entrepreneurship: Ride 4 a Woman, Uganda is a non-governmental organisation that empowers local women struggling with poverty, HIV and domestic violence through skill development and income-generating activities. Despite several challenges, it has made significant strides in boosting women's economic independence through starting their own businesses in sewing, basket weaving, and running homestays. Also, the European Union Policies have the European Union's Small Business Act, 2008 focuses on improving access to finance for women, prioritising work-life balance, expanding entrepreneurial networks and supporting women-led enterprises in tourism sector. The Entrepreneurship 2020 Action Plan, aim of increasing the share of women-led companies, encourages members to collect sex-disaggregated data and produce annual updates on the state of women entrepreneurs nationally[6].
- Education and Training: Gender Equality in Tourism Plan of the province of Valencia, Spain is a strong example of the collaboration needed to integrate a gender perspective in tourism policy. The training covered a variety of topics – from an introduction to gender issues, gender equality and tourism at the global and local levels.
- Community Engagement: Ride 4 a Woman works with and for women in Uganda. It is a non-governmental organisation focusing on community development beyond entrepreneurship. The NGO addresses gender-based violence and provide micro-loans, training, all helps into economic empowerment of women while building their self-confidence and networking helps in psychological empowerment.

**Table 0-1: International and National Best Practices**

| Aspect | Best Practice | Key Elements | Impact |
|---|---|---|---|
| Leadership & Decision-Making | Leadership Task Force for Women's Empowerment in African Tourism | • Integration of Gender issues<br>• Role models<br>• Career opportunities | Promoted women's leadership in African tourism strategies  |

3 WHO, 2013
4 United Nations Women
5 World Bank, Handbook for Gender-Inclusive Urban Planning Design
6 UNWTO Global Report on Women in Tourism, Second Edition, 2024

| | | | |
|---|---|---|---|
| | Peak DMC, India | • Mentoring system<br>• Flexible scheduling<br>• Zero-tolerance policy on harassment | 700% increase in female tour leaders, leading in female representation  |
| Entrepreneurship | Ride 4 a Woman, Uganda | • Skills training,<br>• Income-generating activities<br>• Micro-loans | Empowered 300 women, improved economic independence  |
| | EU Policies (Small Business Act, Entrepreneurship 2020 Action Plan) | • Access to finance<br>• Entrepreneurial networks<br>• Work-life balance<br>• Increasing the share of women-led companies<br>• Encourages members to collect sex-disaggregated data | Supported women-led enterprises, improved work-life balance  |
| Education & Training | Gender Equality in Tourism Plan, Valencia | • Training for public sector workers<br>• Gender-focused curriculum | Advanced gender equality in tourism, despite challenges with LGBT integration  |
| Community Engagement | Ride 4 a Woman, Uganda | • Domestic violence shelter<br>• Gender-based violence training,<br>• Cultural activities | Enhanced women's self-confidence, addressed community-specific challenges  |

**Source: UNWTO Global Report on Women in Tourism (SECOND EDITION)**

## 3. Tourism Landscape: India

According to United Nations World Tourism Organization (UNWTO), India ranked 24th in the world for international tourist arrivals (ITAs) in 2023, with an increase of 31.9% in ITAs from 2022 to 2023. In 2024, India recorded 2,509 million domestic visits. The Table 1 explains the travel and tourism rankings of India.





**Table 0-1: Travel and Tourism rankings of India**

| Year | Ranking | Rank | Total Countries | Criteria |
|---|---|---|---|---|
| 2024 | Travel and Tourism Development Index (TTDI) | 39th | 119 | Based on five main sub-index or parameters: Enabling Environment, Travel and Tourism Policy and Enabling conditions, Infrastructure, Travel and Tourism Demand Drivers, and Travel and Tourism Sustainability sub - index. |
| 2024 | Quality of Life Index by Numbeo | 65th | 142 | Safety Index, Health Care Index, Cost of Living Index, Purchasing Power Index, Property Price to Income Ratio, Traffic Commute Time Index, Pollution Index, Climate Index derived from crowdsourced data |
| 2023 | Global Peace Index | 126th | 163 | Based on India's high level of militarization, nuclear capabilities, and internal conflicts |
| 2023 | Global Finance magazine | 91st | 134 | Rating system built around healthcare infrastructure and economic strength |
| 2022 | World's Safest Countries rankings produced by Berkshire Hathaway Travel Protection | 37th | 42 | They have tracked India's relative safety for four years. Ranking based on safety among the most popular countries for travellers. |

**Source: World Economic Forum, Numbeo, Global Finance magazine, Berkshire Hathaway Travel Protection**

### 3.2 Kerala: A Global Tourism Powerhouse

Kerala has gained significant recognition in the global tourism sector within India. Tourism in Kerala constitutes 10% of Kerala's GDP. It also contributes to 23.5% to the total employment in the state. Table 1 below show the rankings and recognitions of Kerala in tourism sector.

**Table 0-1: Travel and Tourism rankings of Kerala**

| Year | Ranking | Rank |
|---|---|---|
| 2023 | The New York Times | Kerala as one of the 52 must-see tourism destinations in the world |
| 2022 | Time magazine | Kerala among 50 'extraordinary destinations' across the globe to explore in 2022 |
| 2019 | CNN Travel | 19 best places to visit in 2019 |
| 2012 | Travel and Leisure Magazine | Kerala among "One of the 100 great trips for the 21st century" |

**Source: The New York Times, Time magazine, CNN Travel, Travel and Leisure Magazine**

According to district-wise tourist arrival data 2019, Ernakulam district had the highest footfall of both domestic and foreign tourist arrivals[7]. Destination-wise tourist arrival data from 2018 shows that Kochi city and Fort Kochi had the highest number of tourist footfall in Ernakulam district[8].

**Table 1- 1: Travel and Tourism rankings of Kochi**

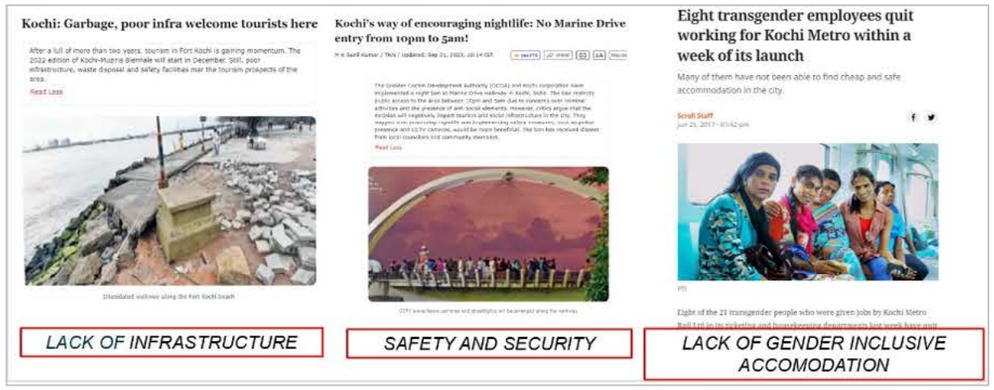
| Year | Ranking | Rank |
|---|---|---|
| 2023 | The British Luxury travel magazine Condé Nast Traveler | Kochi as one of the best places to go in Asia in 2024. |
| 2019 | Lonely Planet | Kochi among the top 10 cities to visit in 2020 |
| 2018 | Centre for Public Policy Research (CPPR) | Kochi as a World tour destination in Kerala |

7 District wise Tourist Arrival 2019
8 Destination wise Tourist Arrival in Ernakulam District 2018

| | | |
|---|---|---|
| 2015 | World Tourism Cities Federation (WTCF) Council | Kochi selected as the first city in India to join the Beijing-headquartered World Tourism Cities Federation (WTCF) Council |

**Source: Condé Nast Traveler, Lonely Planet, Centre for Public Policy Research (CPPR), World Tourism Cities Federation (WTCF) Council**

Despite all these rankings, questions remain about the gender inclusivity of Kochi's tourism sector. Recent newspaper reports suggest there are deficiencies in Kochi's tourism offerings.




**Figuur 2: Newspaper clippings highlighting the lack of infrastructure and inclusive measures in Kochi for both residents and tourists. Source: Media**

Consequently, there exists a pressing need for research within the tourism sector on gender inclusivity in Kochi.

### 3.4 Research Methodology

The research begins with an extensive background study, covering four key areas: understanding the concepts of gender, inclusivity and tourism, analysing the tourism policies, schemes, guidelines and therefore gender inclusive planning for tourism development in a city, aassessing current gender issues in planning for gender inclusive tourism with special reference to space, infrastructure and human resources and finally exploring good practices on policy and regulatory framework for gender inclusive tourism in Indian and International case studies. The background study culminates with the preparation of a conceptual framework for both tourism industry and for tourists and tourist spots. To better understand Kochi's tourism scenario, both primary and secondary data collection methods were employed. The study examines gender inclusivity in Kochi's tourism industry by analyzing and identifying challenges faced by women. The study also assesses Kochi's tourism policies, planning regulations and stakeholder engagement both at state and national levels to identify key challenges and issues related to gender inclusivity. The study employs various methods to evaluate gender statistics in the tourism industry based on gender diversity rates in leadership, employment, entrepreneurship and economic participation of women in the tourism sector. Furthermore, a detailed assessment is conducted at two selected tourist locations in Kochi – Fort Kochi and Mattancherry area, considering cultural nuances and regional variations. These tourist spots are evaluated based on six principles of gender inclusivity, culminating in the calculation of a Gender Inclusivity Index. This paper advocates for strategies and recommendations to enhance gender inclusivity in the tourism sector through targeted planning proposals, policies and stakeholder engagement. The research contributes to policy development and the practical implementation of making tourist spots in Kochi gender inclusive. The research emphasizes the need for collaboration between governments, its stakeholders, tourism industry, tourists and local communities, thereby strengthening Kochi's position as a must-visit destination.





## 4. Kochi

Kochi is situated on the southwest coast of India, in the southern state of Kerala, is known for its cultural diversity. According to 2011 census, Kochi is the only first-order urban agglomeration in the state, with a population of 602,046, and with 296,949 males and 305,097 females[9]. With an area of 94.88 square kilometers, Kochi has a population density of 6,346 persons per square kilometer. Kochi had a sex ratio of 1,030 females per 1,000 males. The overall literacy rate is 97.36%, with a female literacy rate of 94.72%. While the workforce participation ratio shows a significant gender disparity, with 19.46% for females compared to 57.12% for males[10].


**Figure 1: Regional Setting of Kochi City and Ernakulam District Tourism map. Source: Tourism Department**

### 4.2 Tourism Significance

Fort Kochi is considered as the most visited tourism destination in the state. Kochi city though doesn't have designated tourist circuits, but it acts as a base for five regional tourism circuits that are spread across Ernakulam district and are interconnected to tourist attractions in neighboring districts.

### 4.3 Transportation Network

Kochi is well connected by air, road, rail, metro, and water. The Cochin International Airport (CIAL), the largest and busiest airport in Kerala, is situated 28 km north of Kochi city. Kochi acts as a major node in the North - South Corridor of the National Highway (NH) system. The city is connected by NH-66, NH-544, NH-85, NH-966B, NH-966A, State highways (SH)-15, SH-41, SH 63, and SH 66. Kochi has two major railway stations within its corporation limits: Ernakulam Junction and Ernakulam Town. Kochi Metro Rail Limited currently has 21 stations in phase 1, out of which 12 stations are within Kochi city. There are passenger boat jetties and the Water Metro project is developing 15 identified routes connecting 10 islands along a network that spans 78 km, plying to 38 jetties. Despite this comprehensive network connectivity, there is a lack of integration among the different modes of transport, making it challenging for tourists to navigate easily.

[9] The last census in India was in 2011 and is taken into consideration in the research paper
[10] Master plan for Kochi Municipal Corporation Area-2040

### 4.4 Cultural Significance

The Kochi-Muziris Biennale is India's first international contemporary art biennial, primarily held in Fort Kochi's historic quarters across nine venues. The inaugural 2012 edition showcased works from 89 artists representing 23 countries. The 2018 statistics revealed significant economic impacts: 60% of Biennale visitors were new to Kerala, local traders experienced a 50% increase in business, and both inbound tour operators and the hospitality sector saw rising demand.

## 5. Status of Gender Inclusivity in Kochi's Tourism Industry Sector

### 5.1 Entrepreneurial Landscape

Gender-responsive policies and frameworks are important for empowering women in Tourism industry. Policies promoting entrepreneurship in India and Kerala from 1988 to 2023 were analysed, showing progress in promoting women entrepreneurs. To better understand this progress, a few specific schemes were examined.

The gender-wise distribution of benefeciaries in the Assistance Scheme for Handicrafts Artisans (ASHA) from 2018 to 2023 shows 67% female and 33% male beneficiaries. However, there have been only three beneficiaries of the ASHA Scheme in Ernakulam over the past five years (2018-2023), despite the abundance of handicraft units and artisans. The low number of beneficiaries in Ernakulam could be attributed to several reasons: lack of awareness about the ASHA scheme, stringent eligibility criteria, challenges in accessing the scheme, and inadequate implementation and monitoring.

Women's tourism entrepreneurship is often held back by lack of access to technology, information, business skills, education, and training. Additionally, markets for women's tourism products are often small and insufficiently diversified. As these sectors are characterized by limited growth, women entrepreneurs are unable to grow from micro and small enterprises into medium-sized or large productive businesses. Consequently, women entrepreneurs are concentrated in low-productivity and informal sectors. The graph below shows the participation of male and female employees in different job sectors under the Prime Minister Employment Generation Programme (PMEGP), data from 2018 to 2023.

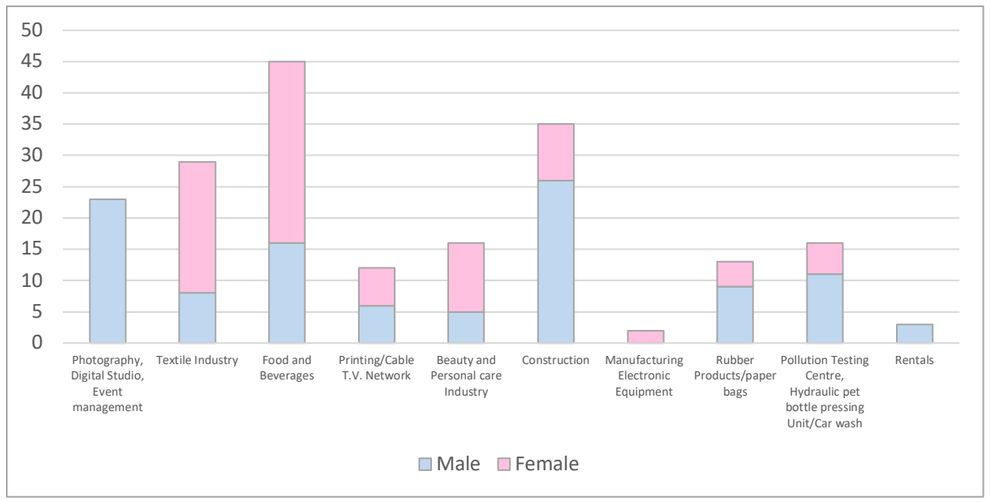



**Figure 2: Empowering women: a graphical representation of kochi's diverse entrepreneurial landscape – PMEGP Scheme. Source: Industries Department**






**Figuur 3: Empowering Women in Kochi's Tourism Sector. Source: By Author**

### 5.2 Community Engagement

Community-based programs by Kudumbashree[11] have been crucial in empowering women in Kochi through training and skill development, providing loans, and business support, though there are gaps persisting in tribal and coastal areas. Initiatives such as the Snehitha Calling Bell Weekly Celebration[12] and the Sthreepaksha Navakeralam campaign[13] have seen high female participation, contributing to both economic and psychological empowerment of women[14]. However, broader outreach is needed to include underrepresented and gender diverse groups. Gender diversity in these programs is strong, with Snehitha Calling Bell and DDU GKY[15] classes achieving 66% and 61% diversity rates, respectively, demonstrating effective gender inclusion in community engagement[16].

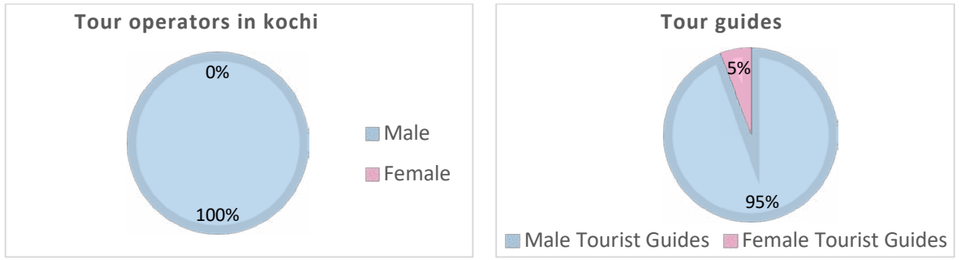
### 5.3 Employment Sectors

Kochi's tourism sector shows significant gender disparities in employment, with women notably underrepresented in various areas. Male dominance is evident in transport services like taxis and auto-rickshaws, while female participation remains minimal. The Kochi Metro Rail Limited (KMRL) is an exception, with an 80% female workforce, in contrast to sectors like Kerala State Road Transport Corporation (KSRTC), where women's participation is much lower. The KSRTC opened the position of conductors and drivers for women candidates in 1992. But till 2023, only 5 women KSRTC Drivers are there in Kerala. There is a decreasing trend of women's participation within the transport sector which could be attributed to unsafe working conditions, operational tiredness, differing working hours and lack of gender inclusive infrastructure within organizations.

Women are also underrepresented as hosts in accommodation, largely due to societal and safety concerns. While KMRL shows good gender diversity, with an 80% diversity rate, other sectors like Auto Drivers, Tour

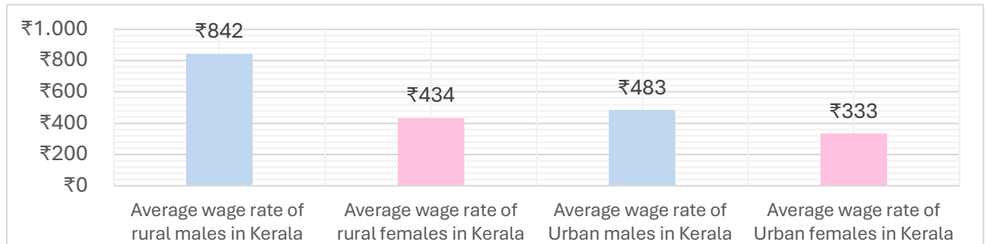
[11] Poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala.
[12] The scheme aims to ensure the protection and security of individuals living alone or in isolated places
[13] The scheme aims to address the issues of dowry and oppression of women
[14] Kudumbashree, Ernakulam
[15] The scheme focuses on providing vocational training, capacity building, and employment-related skills to empower beneficiaries for better livelihood opportunities.
16 Kudumbashree, Ernakulam

Operators, Tour guides and Women Bartenders have poor representation, some with 0% diversity, highlighting the need for greater efforts to achieve gender parity in tourism employment.[17]




**Source: India Tourism Kochi**

Kochi exhibits gender disparities in workforce participation, with males at 57.12% and females at 19.46%. Among women workers, 45% prefer working near home or at home, primarily due to their dual responsibilities. Additionally, women in casual labour face a 46% wage gap compared to men[18].




**Figuur 4: Gender Pay Gap in Kerala 2023. Source: National Statistical Office Survey**

## 5.4 Education and Training

Kerala's tourism sector benefits from strong educational institutions like the Kerala Institute of Tourism and Travel Studies (KITTS) and Food Craft Institutes (FCIs), which offer specialized training and skill development. However, programs like the Yuve Weave Training Scheme reveal a significant gender imbalance, with predominantly female participants. This trend of high female enrollment highlights the need to address gender imbalances in training and promote diverse representation in skill development programs for a more inclusive tourism workforce (Figure 5). While training and education opportunities are available, the ownership distribution index in industries based on the Prime Minister Employment

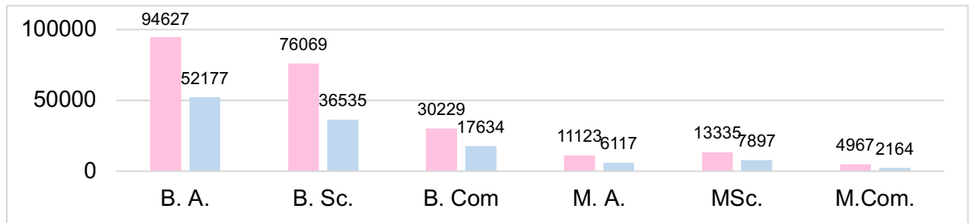



**Figure 3: Enrollment of students in Arts and Science Colleges in Number. Source: Directorate of Collegiate Education**

17 Gender-Sensitive Reforms in Public Transport, A Case of Kerala, 2021
[18] National Statistical Office Survey

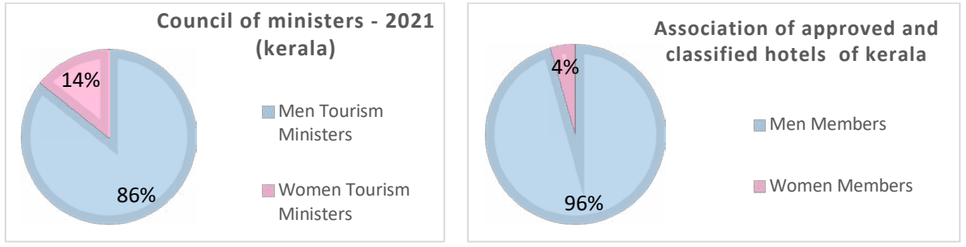




Generation Programme (PMEGP) shows moderate gender diversity, indicating very few female ownership but also highlighting a gap in translating these skills into ownership roles, leaving room for more balanced distribution.

## 5.5 Leadership, Policy, and Decision-Making

Leadership, policy, and decision-making in Kochi's tourism sector show significant gender disparities. Gender representation in leadership roles within this sector is notably low. Historical data reveals that no women have held ministerial positions related to tourism in Kerala over the past 50 years[19]. As of 2021, only 14% of government ministers in Kerala were women; their most commonly held portfolios are Health, Woman and Child Development, Higher Education and Social Justice, and Animal Husbandry and Dairy Development. This stark underrepresentation underscores systemic barriers and gender discrimination, emphasizing the need for policies that promote greater female leadership and decision-making in the sector. The Association of Approved and Classified Hotels of Kerala has only 4% representation of women among its committee members (2021-2022)[20]. Gender diversity in leadership roles remains poor, with only 17% of women representation on the Kerala Tourism Infrastructure Limited (KTIL) Board of Directors. The tourism association for travel operators has zero representation of women in leadership positions and 9% on the Kerala Travel Mart Society's Managing Committee, indicating substantial gender disparity in decision-making positions[21].




**Source: Information and Public Relations Department , Website of Association of Approved and Classified hotels of Kerala**

**Tabel 1: : Gender Diversity Rates Across Various Sectors in Kerala's Tourism and Related Industries**

| ASPECTS | INDEX | SECTOR | SUBSECTOR | GENDER DIVERSITY RATE (Out of 100) | | |
|---|---|---|---|---|---|---|
| | | | | Percentage | Gender Component | Gradation as per range |
| Entrepreneurship | Entrepreneurship Equality Index | Schemes supporting Entrepreneurs | Entrepreneurship Support Scheme | **57%** | | Moderate |
| | | | Assistance Scheme for Handicrafts Artisans (ASHA) | **67%** | | Good |

[19] Information and Public Relations Department
[20] Website of Travel Operators Association Kerala
[21] Website of Kerala Tourism Infrastructure Limited

| | | | | | | |
|---|---|---|---|---|---|---|
| Leadership, Policy and Decision-Making | Leadership Representation Index | Organisations under Government of Kerala | Board of Directors (KTIL) | **16%** | | Poor |
| | | | Managing Committee - Kerala Travel Mart Society | **9%** | | Poor |
| Employment | Representation Index | Travel and Transportation | Auto Drivers | **0%** | | Poor |
| | | | KSRTC Employees | **7%** | | Poor |
| | | | KMRL Employees | **80%** | | Good |
| | | Accommodation and Food Services | Homestays | **21%** | | Poor |
| | | Handloom Weavers | Employees of Paravoor Cooperative Society | **98%** | | Good |
| | | Tour Operators | Tour Operators in Kochi | **0%** | | Poor |
| | | Tour Guides | Tour Guides in Kochi | **5%** | | Poor |
| | | Safety and Security | Women Police Personnel | **6%** | | Poor |
| | | Hospitality Industry | Women Bartenders | **0%** | | Poor |
| Community Engagement | Community Engagement Index | Gender Programmes by Kudumbashree | Snehitha Calling Bell Weekly celebration | **66%** | | Good |
| | | | Class for DDU GKY beneficiaries | **61%** | | Good |
| Economic participation | Ownership Distribution Index | Industries | Based on PMEGP Scheme | **48%** | | Moderate |

**Index**

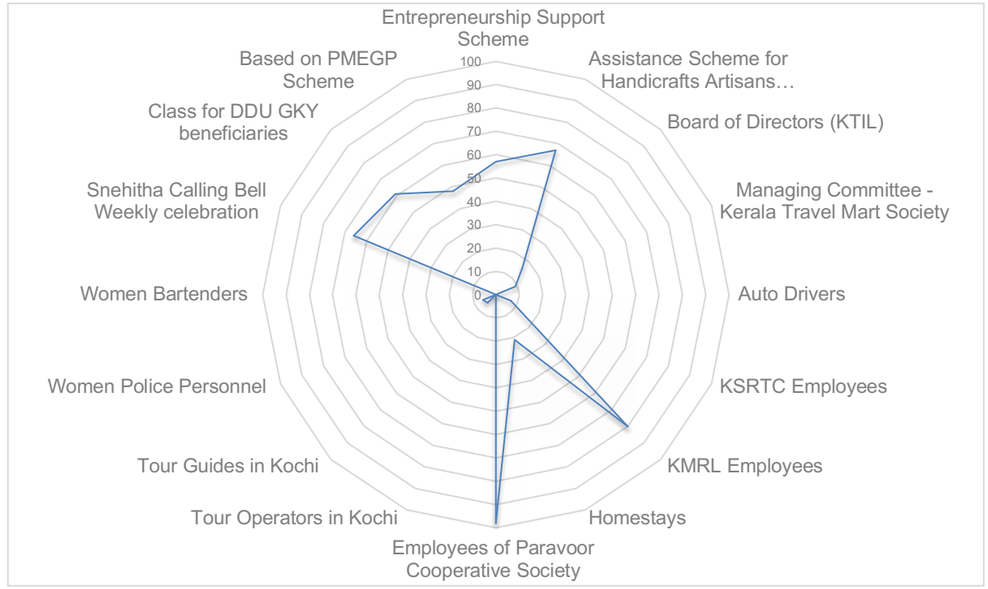
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Female** | | **Male** | | **Good (>66%)** | | **Moderate (34 -66%)** | **Poor (<33%)** |

**Source: By Author**





The analysis reveals significant disparities in gender diversity across Kochi's tourism industry and related sectors. While certain entrepreneurship schemes and community engagement programs show promising gender diversity, leadership representation remains notably low, with women severely underrepresented in key decision-making roles. Employment representation is highly variable, ranging from complete absence in some subsectors to near-total female participation in others, highlighting an inconsistent approach to gender inclusivity in employment across the industry. Gender-sensitive policies and frameworks are vital for empowering women in Kochi's tourism sector.




**Figuur 5: Women in Tourism Industry in Kochi – Current Scenario. Source: By Author**

## 6. Planning for Gender Inclusive Tourism in Kochi: An Analysis of Policies, Regulations, and Stakeholder Engagement

### 6.1 Tourism Policies and Their Evolution

Kochi's tourism policies have evolved significantly since the 1970s, reflecting a growing awareness of the sector's importance and the need for inclusive development. The Tourism Development programme established in 1976 marked the beginning of organized tourism planning in the region. Subsequent policies, such as the First Tourism Policy in 1995, emphasized the importance of public-private partnerships. The Kerala Tourism Vision 2025 Strategy Document, introduced in 2000, focused on sustainable tourism development. Recent policies have shown an increased focus on gender inclusivity and social responsibility. The Kerala Tourism Policy of 2012 aimed to deliver a quality visitor experience while being sensitive to the natural environment and local communities. The 2016 Green Carpet Initiative and the 2023 Kerala Responsible Tourism Policy demonstrate a commitment to inclusive social experience and equitable tourism development.

To provide inclusive and accessible transportation services for tourists, in 2014, She-Taxi initiative was introduced by the Kerala State Women's Development Corporation. But this initiative ceased its operations

in 2018 due to financial constraints faced by many women. To provide accessible accommodation facilities, Ente Koodu (My Nest) project was started in 2015, where women and children can avail free night shelter facilities from 5pm to 7 am. In 2022, the idea of 'She Lodge' was introduced to provide safe, affordable lodging in Kochi for traveling women started by the Kochi Municipal Corporation. But She Lodge has a ban on senior women over 60 years old, as incidents have occurred where they are abandoned at She Lodge by their children. This limits senior women tourists' access to the facility. In 1973, pink police patrol and pink police control room were introduced under Kerala Police and CCTV cameras were installed. But it was found that the number of Pink Police patrols deployed is found to be inadequate according to the safety audit of streets conducted by SafetiPin in 2017.

While there are various policies aimed at promoting gender inclusivity, their effective implementation remains a challenge. Crime data indicates that women's safety in public spaces continues to be a significant issue, potentially deterring female tourists[22]. The complex institutional framework involving multiple agencies at different government levels also leads to coordination challenges in policy implementation.

## 7. Assessing Gender Inclusivity in Kochi's Tourism: A Focused Study on Two Tourist Destinations

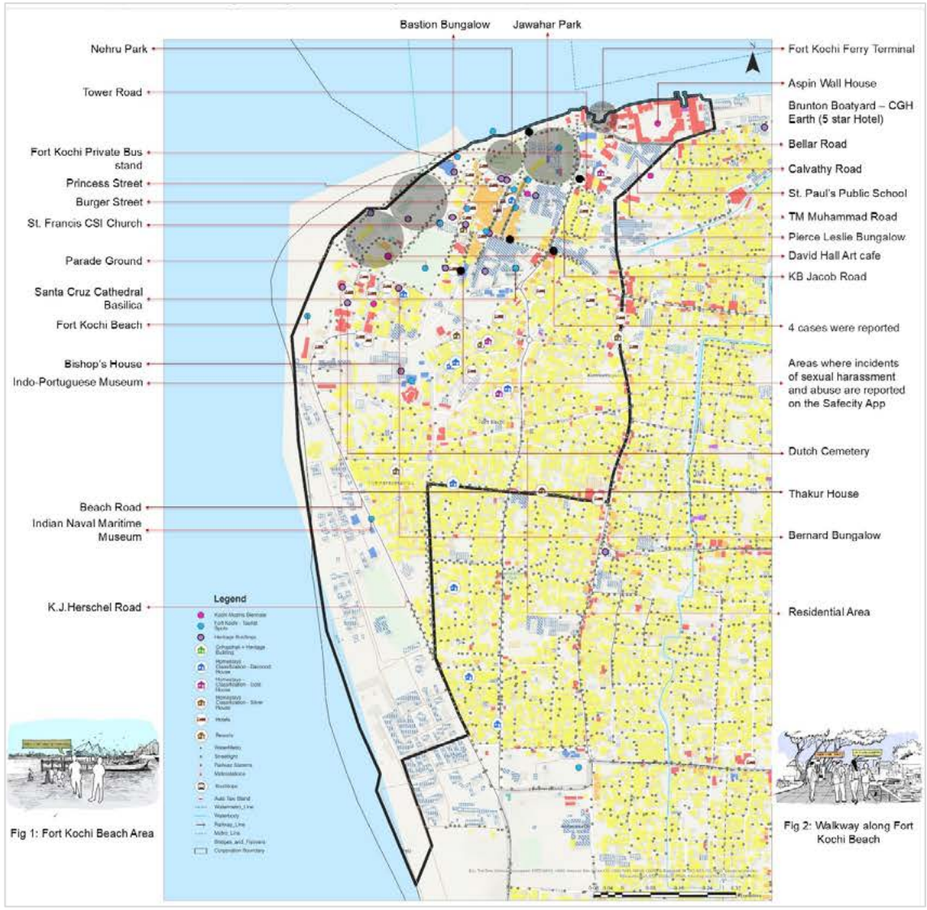
The early settlements of Kochi originated in the Fort Kochi and Mattancherry areas. These regions are distinguished by their historic buildings, both tangible and intangible heritage, and their unique cultural significance.

Fort Kochi, a historic urban settlement in Kerala has long been a popular tourist destination, attracting visitors with its rich cultural heritage and picturesque coastal setting. It serves as the primary hub for the Kochi-Muziris Biennale. Fort Kochi also hosts a diverse range of tourism activities, encompassing heritage walks, open street festivities, and various other festivals. While Mattancherry presents a tightly woven urban fabric composed of settlement patterns from various communities of the Indian subcontinent. The area boasts significant historical landmarks, including the Jew Town with its iconic Clock Tower, the Cutchi Memons Hanafi Masjid, and the Mattancherry Palace. These sites reflect the area's multicultural heritage and serve as key attractions for tourists.

[22] Crime in India-Github








**Figuur 6: Map of Fort Kochi. Source: Author**

Tourist surveys, infrastructure assessments at tourist spots, availability and quality of public amenities and safety analysis were conducted to obtain a comprehensive overview of the challenges and oppurtunities faced by tourists at Fort Kochi and Mattancherry.

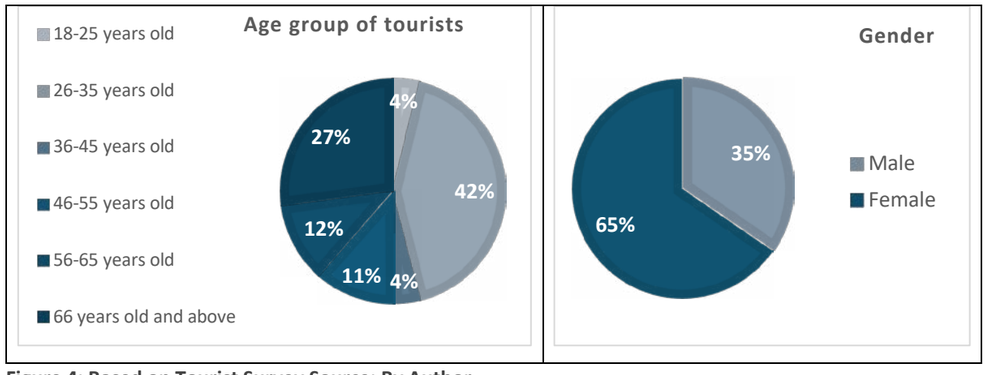



**Figure 4: Based on Tourist Survey Source: By Author**

The tourist survey employed a random sampling approach to ensure a diverse and representative sample of visitors, with a sample size of 25. The survey spanned 7 days. The tourist demographic in Fort Kochi and Mattancherry is diverse, with visitors spanning various age groups and nationalities. According to the tourist survey, majority of the tourists falls within the age group of 26-35 years, accounting for 42% of tourists, followed by 4% of tourists within the age group of 36-45 years indicating a significant presence of young to middle-aged adults.

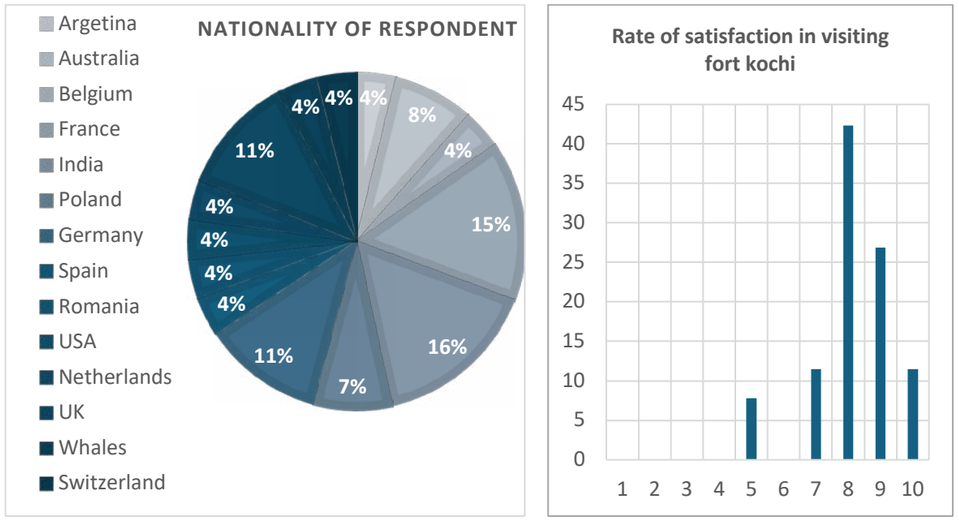



**Figure 5: Based on Tourist Survey Source: By Author**

In terms of nationality, the survey reveals a broad international appeal. India leads with 16% of tourists, followed by France at 15% and the Germany and UK at 11%. This diverse international mix of respondents highlights Fort Kochi's and Mattancherry's global attraction as a tourist destination, with 55% of the tourists surveyed were male and 45% were female tourists. The survey provides valuable insights into tourist behaviour and preferences. 65% of surveyed tourists are visiting Fort Kochi for the first time, underscores the destination's continuing appeal and the importance of creating positive first impressions. The remaining 35% are return visitors, with many on their second or third visit. This repeat visitation trend indicates a level of satisfaction and attachment to Fort Kochi and Mattancherry among a significant portion of tourists. Most tourists (65%) plan to stay in Fort Kochi for just 1-3 days, with 27% staying for a week, and only 8% planning extended stays of 1-3 weeks. This short average duration of visit suggests an opportunity to develop strategies to encourage longer stays and deeper engagement with the destination. An overwhelming 73% of visitors come for leisure, indicating the area's strong appeal as a recreational destination. Homestays are the preferred choice for 54% of tourists, followed by hotels at 31%, and 15% in hostels, suggesting a demand for diverse lodging options. In terms of Travel Patterns, solo travel dominated at 58% followed by Group travel at 19%, and family travel at 23%, highlighting the need for accommodations and activities suitable for various group sizes. The survey reveals that 62% of tourists do not use public transportation, preferring private taxis as a mode of travel. Within Fort Kochi and Mattancherry, the other primary modes of transportation are: Auto-rickshaws (19%), Bus (11%), Water ways (4%) and Cycling (4%). This data suggests a need for improved public transportation options and infrastructure to enhance mobility for tourists. Another challenge that tourists face during their visit is the shortage of professional tour guides. Tourists mentioned a lack of awareness regarding attractions such as the Kerala Kathakali Centre, Kathakali performances in Fort Kochi, art cafes, kayaking on the backwaters, and wildlife preserves before visiting the destination. It was only upon reaching Fort Kochi that they





became acquainted with these offerings. Tourists show a strong interest in cultural activities. 38% participate in cultural events or performances during their visit. The most popular activities include backwater tours (15%), Kathakali/Kalaripayattu performances (58%), and historic tours (27%). Kochi has transformed into a highly tourist-centric destination, with visitors now favoring smaller, less commercialized locations. This shift has led to Kochi losing its heritage value and becoming overly focused on tourism. The absence of nighttime activities and the commercialization of cultural experiences are notable aspects of this trend. Public spaces often suffer from a lack of cleanliness, with dirty fishing nets being a common sight. Furthermore, the view of the industrial area, including the Vallarpadam


**Figuur 7: Map of Mattancherry. Source: Author**

International Container Transshipment Terminal and Cochin Port, detracts from the scenic beauty of Fort Kochi.

### 7.1.3 Major Issues Affecting Tourist Experience and Gaps identified

There are several critical issues that impact the quality of the tourist experience in Fort Kochi and Mattancherry. The Vypin-Fort Kochi Jankar Ferry is the shortest route to get to Fort Kochi from Ernakulam. The Jankar Ferry operates like a shuttle service, with 20-min frequency, starting from 6.30am to 9.30pm.

However, the ferry's limited capacity and frequency lead to congestion, particularly during peak hours. The narrow roads surrounding the ferry terminal worsen this problem, creating difficulties for both pedestrians and vehicles.

**Figuur 8: Vypin-Fort Kochi Jankar Ferry and nearby Bellar Road, Source: By Author**

The Belar road surrounding Vypin-Fort Kochi Jankar Ferry are narrow and lack proper footpaths making it difficult for the tourists to navigate safely, especially when cars and bikes wait for the ferry, it creates congestion. This is particularly a concern for elderly visitors or those with mobility limitations. The Fort Kochi Ferry Station is a crucial gateway for passengers and tourists to Fort Kochi, but is in poor condition due to inadequate maintenance, with issues like lack of seating facilities while waiting for the ferry, lack of drinking water facilities and poor lighting. There is a lack of informative boards that highlight the heritage and cultural significance of these places for tourists. There are hard pavements near Nehru Park and along the beachside, which make access difficult for tourists with mobility needs and wheelchairs in these places.

**Figuur 9: Images of Fort Kochi Ferry Station, Lack of informative boards and Hard pavement near Nehru Park, Fort Kochi**

There are inactive and deserted alleys and cul-de-sacs in Fort Kochi become hotspots for safety concerns along with lack of proper lighting and maintenance make these areas feel unsafe for both residents and tourists. The Shrinking of Fort Kochi Beach is another major issue. A decade ago, the width of Fort Kochi beach was around 300m, the width has reduced to a maximum of 30 m due to various factors such as sea incursion, coastal erosion, and human activities like dredging and construction. The shrinkage not only affects the aesthetic appeal of the beach, but also raises concerns about the long-term sustainability of beach-related tourism activities. Fort Kochi and Mattancherry also face challenges with cleaner streets and better roads, as waste accumulation is commonly seen on the roads and beaches. Recent incidents highlight this issue, with Russian tourists having cleaned Fort Kochi Beach before taking a dip in its unclean waters. A JCB cleared waste from the beach area after a group of tourists cleaned the beach, which garnered media attention.

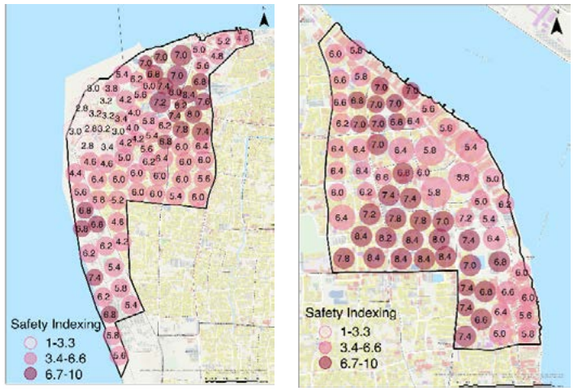
**Figuur 10: Inactive and deserted alleys and cul-de-sacs at Fort Kochi, Shrinking of Fort Kochi beach and Lack of seating at the beach front**

There is a lack of adequate seating facilities and CCTV cameras near the beach walkway. The stretches of road in Mattancherry lack adequately sized and continuous footpath, posing challenges for pedestrian movement and accessibility. The Jewish Cemetery and other heritage buildings are neglected, highlighting an urgent need for preservation efforts to protect these cultural and historical landmarks. New constructions are altering the character of the streets, neglecting the maintenance of existing heritage buildings. This impacts the city's imageability and its ability to create a strong sense of place. There is an





absence of adequate public rsetrooms and changing facilities for tourists. There is a lack of safe, women-friendly nighttime activities for tourists in Fort Kochi and Mattancherry. There is a noticeable lack of year-round cultural activities in Kochi, with events primarily confined to the months of October to March, leading to fluctuations in revenue and employment within the tourism industry. The peak tourist season puts increased pressure on the existing infrastructure, particularly in certain areas of the city. This imbalance between geographical spread of tourism assets amd tourism development led to uneven urban development.




**Figuur 11: Safety Indexing of Fort Kochi and Mattancherry area**

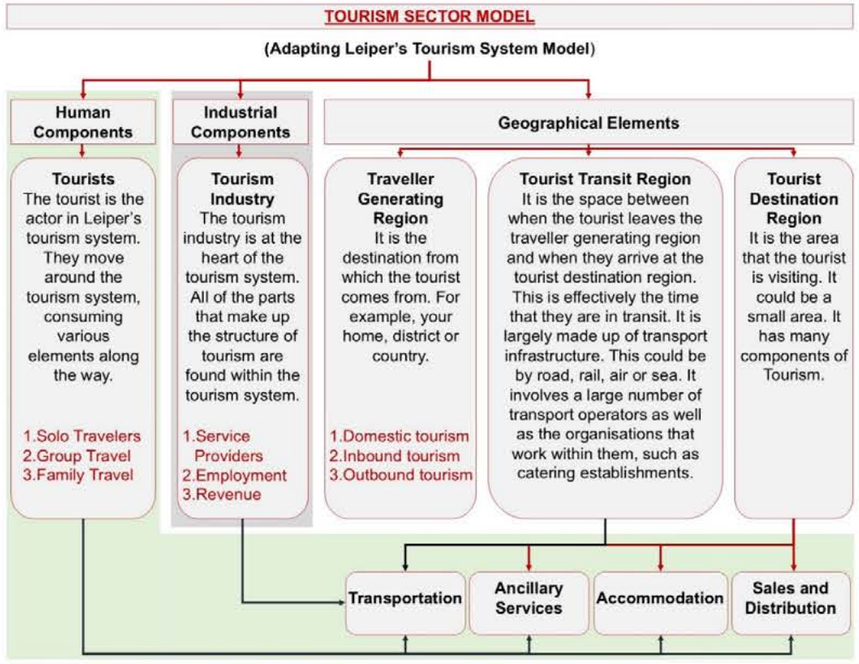
'My Safetipin' is a personal safety app designed to navigate urban enviroenments more safey. The app provides safety ratings for different areas based on nine parameters, including lighting, visibility, security presence and walkability. In Fort Kochi, the safety indexing of residential area is in a range of 6.6 to 8.0 while the safety indexing of tourist spots and pubic spaces is in the range of 2.8 to 5.4. Mattancherry has a safety indexing of 6.6 to 8.4 in residential areas, while tourist spots and pubic spaces have a safety indexing of 5.4 to 8.4.

Another challenge that tourists face during their visit is the shortage of professional tour guides. Tourists mentioned a lack of awareness regarding attractions such as the Kerala Kathakali Centre, Kathakali performances happening in Fort Kochi, art cafes, kayaking on the backwaters, and wildlife preserves before visiting the destination. It was only upon reaching Fort Kochi that they became acquainted with these offerings. All these shortcomings need to be addressed to make Kochi a better tourist destination.

## 2. Strategies for Gender-Inclusive Tourism Planning

### 2.1 Components of Tourism

Leiper's Tourism System Model is considered to better understand the components of tourism sector. This model encompasses human components, industrial components, and geographical elements. A gender lens was applied to Leiper's Tourism System Model, and two conceptual frameworks were developed – one for the Tourism Industry and another for Tourists and Tourist Spots.



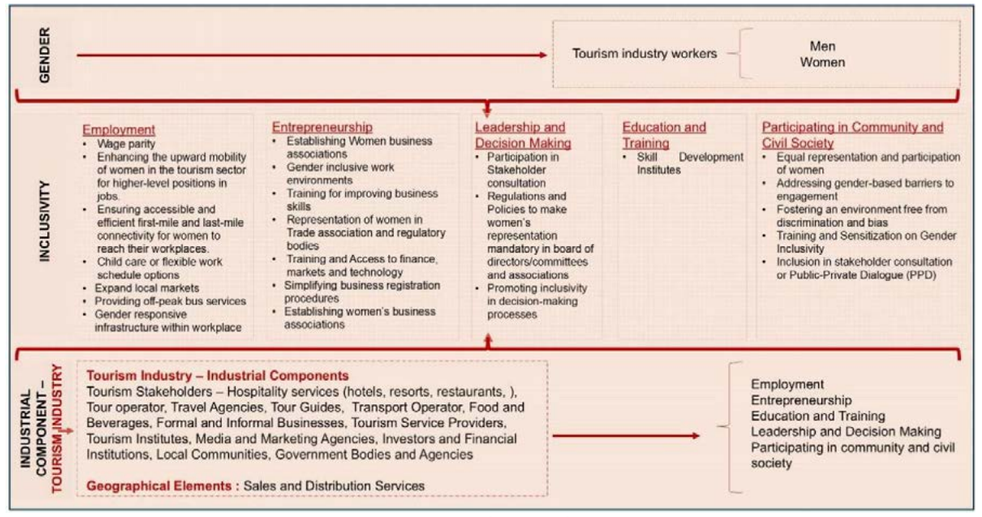

**Figuur 12: Leiper's Tourism model. Source: Source: Unit 6, Tourism system: Components, elements and models, IGNOU**

## 2.1 Conceptual Framework for Service Industry (Tourism)

A conceptual framework has been developed for the tourism industry by applying a gender lens to Leiper's Tourism System Model. This framework is based on four key principles: Awareness, Equity, Empowerment and representation of gender diverse individuals within tourism industry. The idea is to have an increased representation of women and gender diverse groups within the tourism industry. This can contribute to a more diverse and empathetic workforce, leading to a greater understanding of the unique needs and perspectives of tourists. Thus enhancing the overall safety and inclusivity of tourist destinations. Based on the framework, the tourism industry can be broadly categorised into five sub-segments: entrepreneurship, participation in community and civil society, employment in the tourism sector, education and training, and leadership and decision-making. An inclusive and diverse urban workforce can be achieved by implementing workplace flexibility to help women balance both work and home responsibilities. There should be internal committees to address sexual harassment and conduct regular awareness programs to promote a safe working environment. Policies must be developed to eliminate the gender-pay gap, particularly among the casual labourers in Kerala. Regular training programs should be implemented to help women in Kochi to develop business skills, access technology, develop leadership qualities and diversify their businesses. Regular monitoring and implementation of entrepreneurship schemes should be conducted, along with awareness programs about various schemes for the public. Safe commuting should be ensured by improving last-mile connectivity and the integration of different modes of transport. Gender-responsive infrastructure should be provided at the workplace, including adequate sanitation facilities and public amenities like proper street lighting, well-maintained footpaths, CCTV surveillance and visible police presence. Bystander intervention should be increased so that every citizen is aware of their rights and is socially conscious enough to intervene and prevent crimes from taking place.

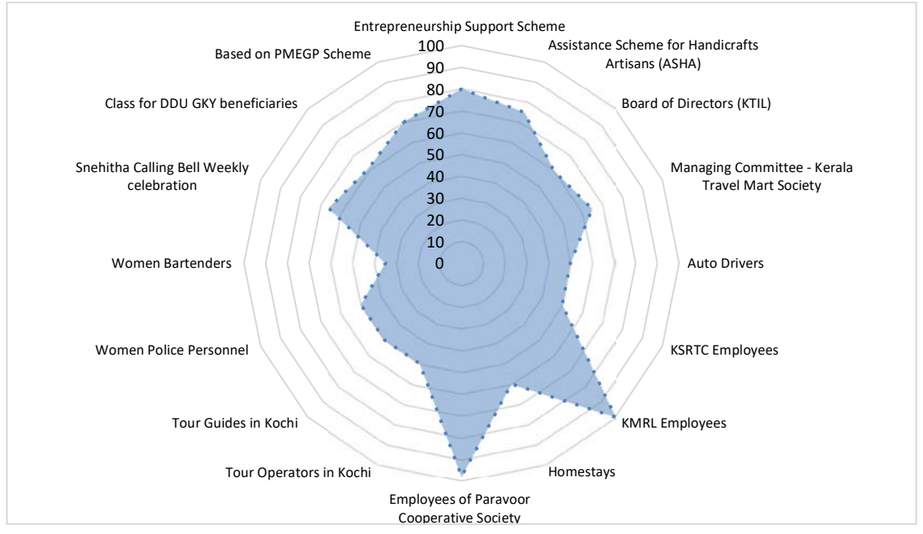







**Figuur 13: Conceptual framework for service industry (Tourism). Source: By Author**

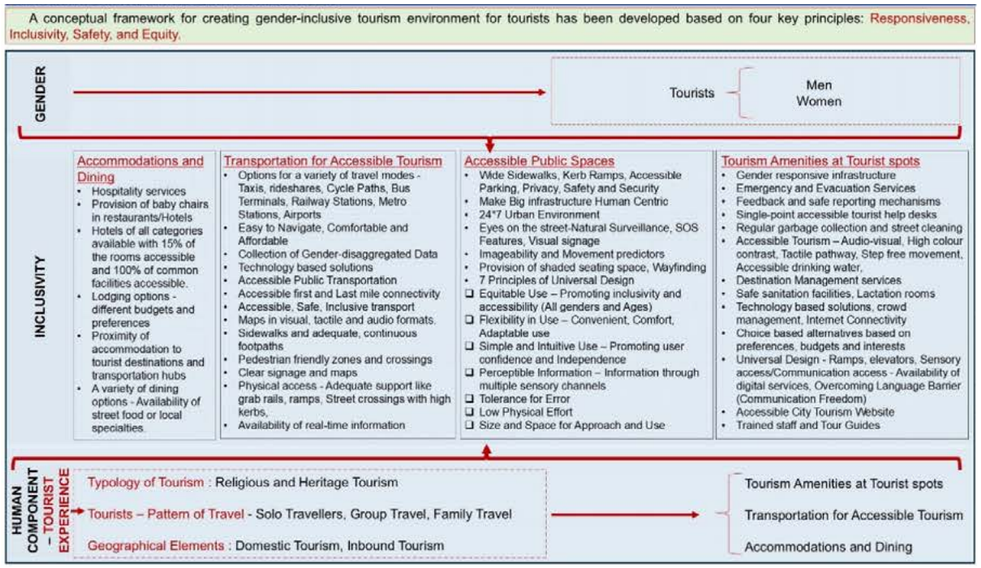
Women-owned tourism businesses should be provided access to finance through credit, subsidies, loans and financial incentives. Networking platforms should be provided to empower women entrepreneurs through capacity building and skill development. Purchase preference policies favouring women-led tourism enterprises should be developed, and partnerships with e-commerce platforms should be established to boost marketing. Local government participation should be strengthened by mandating women's inclusion in decision-making processes. Women's representation and participation in tourism boards, associations and ministerial positions should be increased. These strategies will create a more inclusive and supportive environment for women in Kochi's tourism industry, working toward a tourism sector where women are equally represented and empowered, actively contributing to tourism growth and development in Kochi.




**Figuur 14: Women in Tourism industry in Kochi - Proposed Scenario. Source: By Author**

## 2.2 Conceptual Framework for Tourists and Tourist Spots

Similarly, a conceptual framework for creating a gender-inclusive tourism environment for tourists has been developed.




**Figuur 15: Conceptual framework for Tourists and Tourist spots. Source: By Author**

This framework is based on four key principles: responsiveness, inclusivity, safety, and equity of tourist destinations. The framework is broadly categorised into four sub-segments: accommodation and dining facilities within tourist spots, transportation options and accessibility, quality of public spaces and tourism amenities at tourist spots for a better visitor experience.

The infrastructure improvements in Kochi include the upgradation of transportation systems, including ferry terminals and road networks. Increased lighting, security patrols and emergency response systems are needed to enhance the safety and security of public spaces. Regular safety audits must be conducted to resolve the challenges faced by women while traveling, staying at accommodations and visiting tourist spots. Diverse accommodation options should be provided to cater to the preferences of all tourists, with female-only floors or sections in hotels and women-friendly homestays. Targeted marketing strategies should be developed to attract more female travelers and to promote Kochi as a safe and inclusive destination for all genders. Year-round cultural programming will be implemented to attract tourists during off-peak seasons. A comprehensive urban design strategy will preserve heritage buildings while accommodating new developments, to ensure the place's unique character remains intact. Tourist information services will be enhanced through multilingual signage and well-trained tour guides, making navigation easier for international tourists.

## 10. Conclusion

Kochi currently lacks comprehensive tourism planning from a gender perspective. To enhance the tourism sector, Kochi must take decisive steps towards creating an inclusive environment for all tourists and integrate women ad gender diverse individuals into the tourism industry, prioritizing gender-inclusive measures across all age groups. There exists a positive correlation between increased gender diversity and





enhanced business performance. By adopting a gender lens in tourism planing, Kochi can contribute to India's overall ranking in the global tourism sector, while improving the quality of life of its residents.

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*Research Paper*

# Cities and Fertility: Timing Health in Urban Lifestyles

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## Abstract

*Urbanization is inevitable in today's world. With the growing population and development comes the responsibility to maintain the quality of life for its people. The economic growth and cost of living created an urgency and aspiration in people to keep up with the maximum level of prosperity that an urban city can offer. This gave birth to the phenomenon of 24-hour cities to tap into the potential of a night life, characterized by night-time activities, round-the-clock entertainment and services.*
*When comparing the fertility rate and trend of urbanization in the world, it is observed that the fertility decline has accelerated from mid-1900s which coincides with the time of rapid urbanization. Thus, the study tries to understand the indicators of a 24-hour city and its effect on fertility. Although this trend is associated with economic growth, and development, its effects on fertility and population decline are concerns that has not been researched to its full extent. The study tests this hypothesis with case studies of New York, London, Bangalore and Tokyo. The study analyses the complex relationship between urbanism and fertility in a 24-hour urban environment.*

## Keywords

*24-hour cities, fertility, reproductive health, urban environment, population*

## 1. Introduction

The emergence of "sleepless cities" or 24-hour cities is a recent phenomenon in the modern urban environments which is characterized by night-time activities, round-the-clock entertainment and services. Literatures provide several indicators but do not define 24-hour cities judiciously hence this project attempts to provide the same.
This study tries to understand the indicators of a 24-hour city and its effect on fertility through four case studies, New York, London, Bangalore and Tokyo, considering factors such as work-life balance, lifestyle, mental and physical health, access to healthcare services, noise and light pollution, social and cultural influences, infrastructure, and economic opportunities.(Khorsand et al., 2020) Although this trend is typically associated with economic growth, prosperity, and development, its effects on fertility and population decline are still very real concerns. Women play a significant role in metropolitan economies and communities, and as such, they may face particular possibilities and problems in 24-hour settings that affect their decisions about personal, familial, and professional lives. Fertility is a multi-faceted essential criterion to be studied for any environment as it alters the demographic characteristics of a region as well as affects the nucleus of a family (Tadesse & Headey, 2011). The study tries to understand the concept of fertility from the city level perceptive, while also considering the fertile female population.



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The study analyses the complex relationship between urbanism and fertility in a 24-hour urban environment. This study can form a foundation for further urban planning initiatives, policy interventions and legislatives for the stakeholders involved.

### 1.1. Need for the Study

With the growing population and development comes responsibility to maintain the quality of life and livability of its people. An ultra-urbanized phenomenon which has been sought after is the 24-hour cities. The concept of "sleepless cities" refers to urban environments where activity and services are available around the clock, blurring the distinction between day and night. This trend is more prevalent in major metropolitan areas and is often associated with economic vibrancy, cultural richness, and increased convenience for residents and visitors. 24-hour cities provide economic growth and opportunities. The cities often offer a vibrant social and cultural scene, with numerous entertainment options and nightlife activities. Also, 24-hour cities tend to attract diverse populations and offer a wide range of employment opportunities across different industries (Costa, 2001).

Overall, while 24-hour cities offer numerous benefits and opportunities, the impact on fertility is influenced by a complex intermix of social, economic, environmental, and cultural factors. Further research is needed to better understand the relationship between urban environments and fertility outcomes, and to form inform policy interventions aimed at supporting reproductive health and sustainable population growth in urban environments.

Fertility in men and women has frequently been analyzed in a biological and anatomical sense from the medical community. There are multiple definitions for fertility and infertility in today's world. One of which defines fertility as the capacity to conceive and produce offspring (Ki Yoon & Young Youn, 2005). While the perceptions are true, for an urban planner it is imperative to understand fertility from a demographic annotation. This study has defined fertility as the phenomenon that has the potential to cause demographic changes in a region with a population surge and which can lead to physical, mental and environmental alteration in the society and its inhabitants.

The total fertility rate (TFR), defined as the number of children born per woman living to the end of childbearing years (15–49 years), has been decreasing dramatically for decades in many countries. By 2050 and 2100, respectively, 77% of predominantly high-income countries and 93% of all countries will have a TFR below the replacement level of 2.1 children per woman. (Vollset et al., 2020; Dao et al., 2021). This evolution of the world population growth rate will cause demographic changes with profound societal implications. The dramatically increasing ratio between elderly people and young adults already affects historical social norms with major economic ramifications (Mester, 2018).

While comparing the total fertility rate projection graph, it is observed that the decline has accelerated from 1970s which is around the time of rapid urbanization began and the pattern of growth is nearly inversely proportional to the TFR. Hence, it is worth studying the relationship between rapid urbanization brought in from 24-hour environments and the factors causing the decline of fertility.

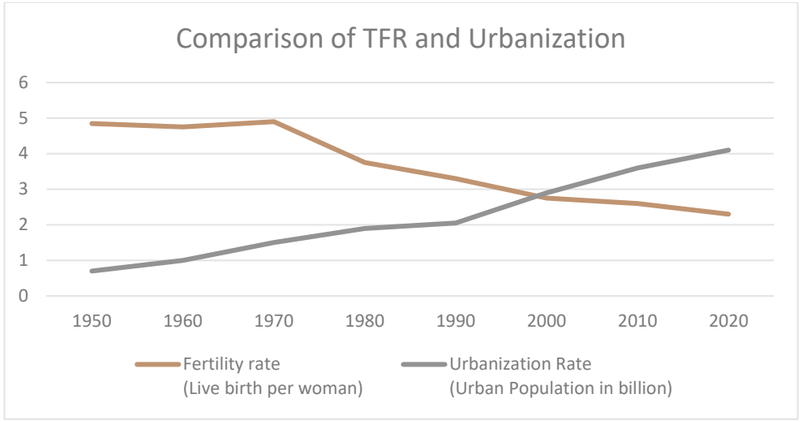


**Figure 1. Comparison of World Total Fertility Rate and Urbanization. Source: Author (Derived from data by Department of Economic and Social Affairs, Population Division).**

## 2. 24-Hour Cities

The term '24-hour city' is not a new concept. In the 1980s, the American sociologist Murray Melbin drew an analogy between the scarcity of land and the scarcity of time, turning the latter into the new development in the urbanization process (Khorsand et al., 2020). After a few more years, this phenomenon was simultaneously witnessed and studies in different parts of the world.

Beyond the economic boost that they provide to the city, it has a social dimension that has been relatively unexplored in the urban planning realm (Costa, 2001). This project tries to provide a definition for the 24-hour city with that in mind and also studies real-life cases to tabulate its economic, social, environmental and physical characteristics.

### 2.1. Features of a 24-hour city

The 24-hour city has positive and negative attributes to its name. Some positive features include better educational facilities and literacy rate, greater career growth, greater gender ratio in the workplace even though it has negative impacts like delayed marriage for both genders due to personal and professional needs, disturbed family planning with parents becoming pet parents, decreased human relations and interactions and also increasing crime rates. The rate of living and expenditures also increases in a 24-hour urban environment (Bala et al., 2021).The area also gives way to greater traffic and congestion, higher levels of noise and air pollution and consumption of alcohol and other drugs (Gaskins et al., 2019).






**Figure 2: Features of a 24-hour city. Source: Author (derived from literature).**

### 2.2. Case Regions

The case studies of London, New York, Tokyo and Bangalore has been conducted to understand the concept of 24-hour cities better and evaluate the indicators of a 24-hour city. Further, other indicators have been identified through general reading and tabulated for analysis. Three well-established and an emerging 24-hour city are considered to include a diverse set of indicators to analyze. They have been exhibiting 24-hour city characteristics since the introduction of urbanization. The cities have been selected in such a manner that the areas are spread out across the globe. The cities have higher quality of life and are well-known economic hubs of commercial activities.

#### 2.2.1 New York

New York emerged as a 24-hour city in the early 20th century and earned its reputation as one in the mid-20th century. By the end of 1980s, New York was advertised as an all-nighter. The city organizes a plethora of cultural events and performances during the night-time for entertainment which garners youth attention. This increases the tourists in the city, leading to economic growth. This increases job opportunity and higher living expense in the city (Laquatra & Boggess, 2004).

#### 2.2.2 London

London came to be known as a 24-hour city from the 1990s. The rise of parties, clubs and pubs in areas like Soho contributed to a fuller night-life. The number of people who enjoy London at night is increasing and the market is growing steadily as during the day. The changing lifestyle in London increases the demand for economy and infrastructure to work 24-hours (Greater London Authority, 2018).

#### 2.2.3 Tokyo

The evolution of Tokyo is gradual and came later compared to London and New York. From the early 21st century, Tokyo began to grow as a strong economic power utilizing its night-activities. The city has attracted several businesses and owns a strong transportation network. The commercial businesses and stores also run 24-hours to provide the basic utilities for its all-nighters (Dimmer, 2017).

#### 2.2.4 Bangalore

Bangalore is a new addition to the 24-hour city world. Bangalore started developing from the mid-21st century into an IT agglomerate. The city outsourced into a cosmopolitan with a diverse economy and night-life. The data regarding family planning, education and effects of shift work and job pattern are more

profoundly discussed for Bangalore compared to the other 24-hour cities. This might be due to the recent development and knowledge gain in this niche (Saba.I & Kishore, 2014).

**Table 1: Indicators of 24-hour city. Source: Author (derived from literature).**

| New York ([21]) | London ([8],[20]) | Bangalore ([16],[22]) | Tokyo ([6],[11]) |
|---|---|---|---|
| Economic growth | Consumption | Job Pattern | Recreation |
| Tourism | Pubs and Bars | Shift Work | Public Spaces |
| Reduction of green space | Food Consumption | Recreation | Domestic Capital |
| Increase of activities | Waste generation | Public Spaces | Development |
| Housing Unaffordability | Domestic Capital | Restaurants | Increased income |
| Increased living expense | Economic Boost | Green Space | Public Services |
| Diverse group of people | Transport networks | Increase of activities | Taxis |
| Cultural diversity | Public Services | Air pollution | Walking space |
| Interaction of people | Decreased Security | Mental Health | Delivery of errands |
| Education | Night Crime | Work Pressure | Traffic |
| Entertainment | Physical Health Problems | Family planning | Pubs and Bars |
| Pubs and Bars | Air pollution | Reduced children | Alcohol Consumption |
| Alcohol Consumption | Noise pollution | Delayed marriage | Food Consumption |
| Food Consumption | Increased infrastructure | Physical Health Problems | Waste generation |
| Waste generation | Traffic | Increased healthcare cost | Increase of activities |
| Air pollution | Road Crowd | Noise pollution | Commercial businesses |
| Noise pollution | Parking space reduction | Disruption | Entertainment |
| Family planning | Job Pattern | Consumption | Recreation |

A total of 52 major indicators of the 24-hour case cities were selected and each indicator was studied in detail and scored based on occurrence, relevance and similarity to select 11 core features of a 24-hour city. They were noted to be job pattern, consumption pattern, physical health detriments, mental health detriments, public Services, family planning views, increased traffic, security, environmental degradation and affordability and quality of life.

## 3. Fertility

### 3.1. Trend of fertility in case regions

The fertility rates of the four case regions are not overtly discussed in literatures. Reports and articles published by established sources are referred to understand the trends of fertility.

For the case of New York, there have been several studies published for the declining fertility rates in the U.S. The United States has witnessed around 50% of decline in birth rates between 1950 and 2021, from





25 births per 1,000 people to 12. This is true for New York, with a TFR of 1.6 in 2021. (Center for Disease Control and Prevention, 2021)

Like all developed countries, London has also been facing with a declining birth rate since the 2000s. The total fertility rate fell to 1.49 children per woman in 2012 from 1.55 in 2022. (Revisiting the Fertility Transition in England and Wales, 2020)

Japan has been under scrutiny for decreasing young population since 2000s. The total Japanese population has fallen by about 250,000 every year since 2010. In Japan, Tokyo has the lowest TFR at 1.13 (Dimmer, 2017).

In Indian context, there has been a decline in the female fertility in Bangalore city since 2010. As per the National Health Survey, Bangalore city has a fertility rate of 1.7 while Karnataka has a rate of 2, which is lower than the national average.

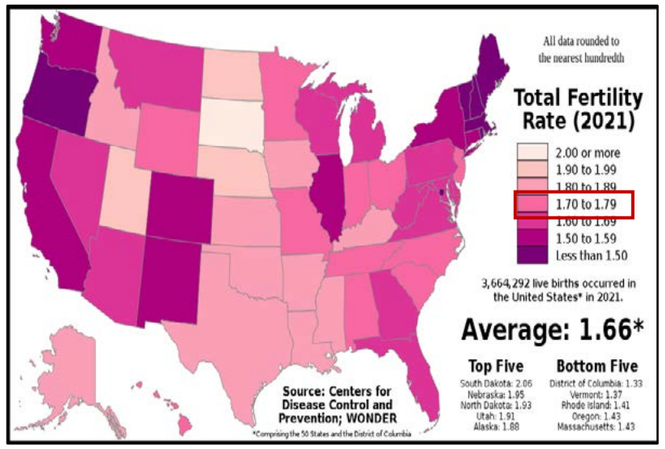


**Figure 3: Map highlighting lower fertility in New York. Source: Center for Disease Control and Prevention, WONDER.**

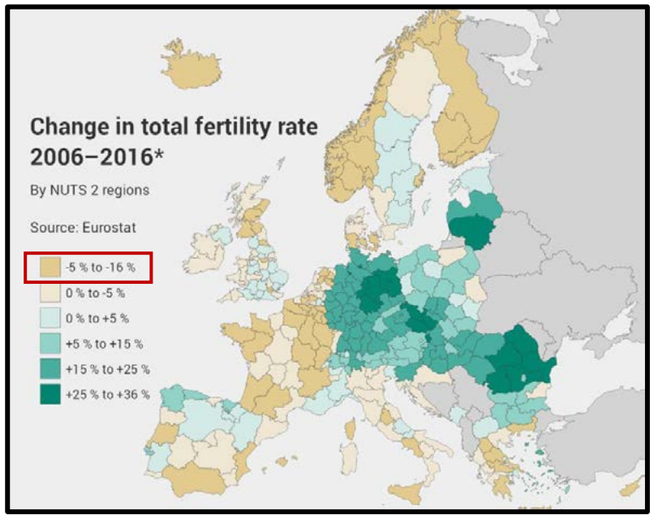


**Figure 4: Map highlighting lower fertility declining fertility in London. Source: Financial Times.**

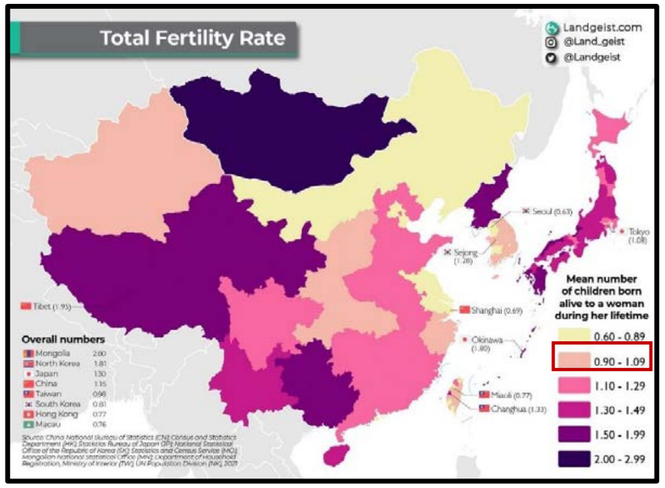


**Figure 5: Map highlighting lower fertility declining fertility in Tokyo. Source: The Japanese Pregnancy Rotation System.**

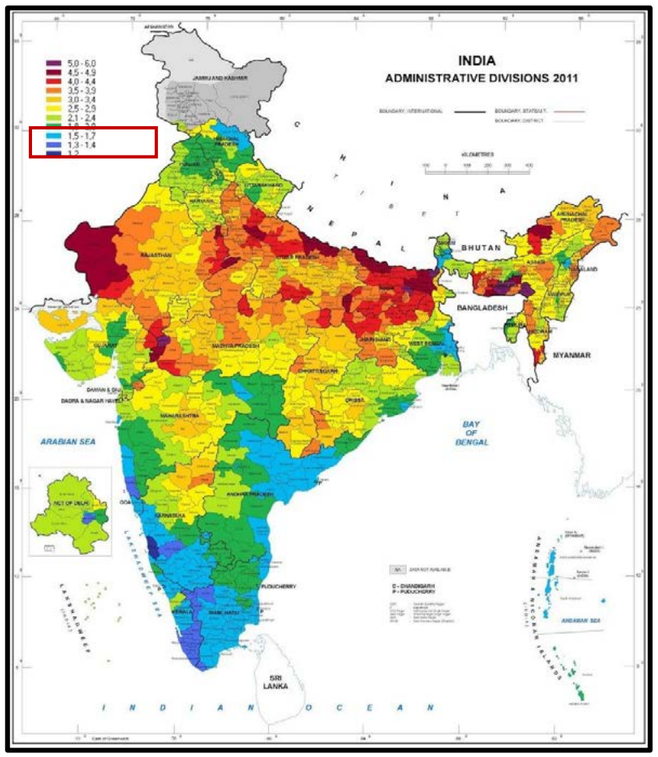


**Figure 6: Map highlighting lower fertility declining fertility in Bangalore. Source: Statista.**





From the literatures, it is evident that the case regions have lesser fertility rate compared to other cities around it. This can be indicative of lowering fertility as the urbanization evolves into a 24-hour city. The factors contributing to the declining fertility in the case regions have been studied and tabulated.

**Table 2: Factors causing fertility decline in case regions. Source: Author (derived from literature).**

| New York ([15]) | London ([9],[10]) | Bangalore ([22],[24]) | Tokyo ([11],[13]) |
|---|---|---|---|
| Delayed parenthood | Cost of living | Work-life balance | Delayed parenthood |
| Job opportunities | Lifestyle | Job opportunities | Delayed marriage |
| Work-life balance | Work-life balance | Work pressure | Work-life balance |
| Education | Family planning | Alcohol | Job opportunities |
| Cost of health care | Better health care | Junk food | Work pressure |
| Changing social norm | | Lifestyle | Reduced need |
| | | Family planning | Migration |
| | | | Family planning |

Through a similar procedure, the factors effecting the decline of fertility can be summarized as stress levels, quality of life, family planning, reduced reproductive health, urban lifestyle and other environmental factors.

## 4. Relationship between 24-Hour Cities and Fertility

The relationship between cities and female fertility is a complex and multifaceted topic. They cannot be addressed in a two-dimensional scope, but an attempt has been made to understand and correlate the indicators of a 24-hour city from case studies of New York, Tokyo, London and Bangalore.

Through the mapping, each indicator is found to have a direct or indirect relation to the factors identified, this strengthens our hypothesis. The mapping clearly suggests a connection between indicators of a 24-hour city and factors affecting fertility. The lifestyle, working hours and air quality were found to be the most repetitive connection from the literature review.

Further, environmental factors like particulate matter, noise pollution and air pollution were also considered an important feature of a 24-hour city that affects its fertile residents. From analysis, mental stress and work-life balance go hand in hand, with one increasing the other and leading to poor quality of life.

In 24-hour cities, consumption, decline of mental health, traffic and domestic capital are also severe characteristics that contribute to the factors affecting female fertility.

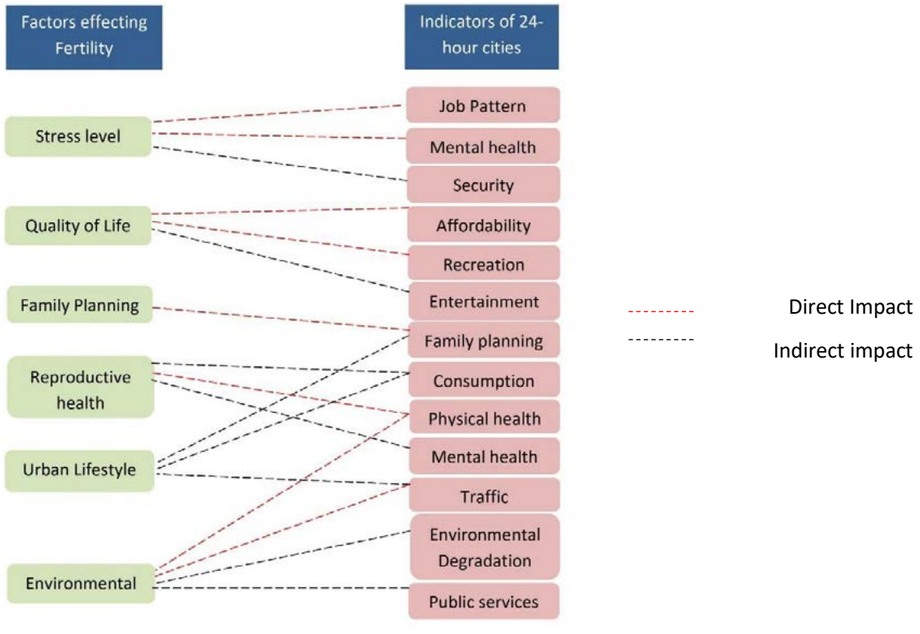


**Figure 7: Mapping of 24-hour cities and fertility. Source: Author.**

## 5. Conclusion

The study underlines that the changes in dynamics in an urban setting has impacts on fertility. A 24-hour environment provides several positive impacts on people and development but there are underlying impacts that need to be addressed for the inclusive and sustainable development of a city.

The study shows that all the four case regions considered of 24-hour environments demonstrate a lower fertility rate compared to less urbanized cities. The factors effecting the depleting fertility rates are found to follow a similar pattern in all case regions. The mapping of the indicators of a 24-hour city and fertility is comprehensive but solidifies the hypothesis of its effect on declining fertility rates.

There has not been enough research on the 24-hour environments beyond its economic impacts and its social implications has to be discussed further to form informed policy interventions in appropriate stages. There needs to be an in-depth study to suggest policy interventions through studies with case regions of varied characteristics for intersectionality. This project can form a foundation for further research and study on urban environments and their effect on fertility.

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*Research Paper*

# Economic, Physical and Social Landscape Reshaped by Musical Instrument Industry: Evidence from a Saxophone Village in China

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## Abstract

*Since China's reform and opening-up in 1978, rural industrialization has transformed the economic structure, environment, and social life in many villages. "Musical Instrument Villages", such as Sidangkouzhong Village in Tianjin, specializing in saxophone production, exemplify this shift. Despite research on other industrialized villages, studies on Musical Instrument Villages are limited. This paper analyzes how internal and external factors have driven the growth of Sidangkouzhong's musical instrument industry and its impacts on the village's economic, physical and social landscape. Key drivers include technological innovation, policy reforms, and local talent leadership. However, the village's industrial upgrading has been hindered by talent shortages and disordered competition. The local protectionism have led to social gap between locals and outsiders, preventing the formation of a cohesive village culture and resulting in new spatial divisions. These issues highlight the need to adjust development strategies, with a focus on enhancing talent attraction to drive the village's progress.*

## Keywords

*Industrialization of Rural China, Musical Instrument Villages, Social Gap, Spatial Differentiation, Sidangkouzhong Village*

## 1. Introduction

Since 1949, the process of rural industrialization in China has steadily progressed, becoming a key driver of the country's economic development. In particular, following the introduction of reform and opening-up policies in 1978, changes in land tenure, labor force and production management have fueled the rapid expansion of township enterprises, further accelerating the rural industrialization. By 2021, the total industrial GDP of rural industries in China exceeded 11 trillion yuan (National Bureau of Statistics of China), accounting for approximately 30%(National Bureau of Statistics of China) of the national industrial output, highlighting its crucial role as one of the major engines of China's economic growth.

Despite accounting for 36%(National Bureau of Statistics of China) of the population, rural areas have not fully realize their potential as a key hinterland for the "dual circulation" strategy. Rapid urbanization and industrialization in the 21st century have posed significant challenges to rural China, including resource reallocation, structural adjustments, and functional transformation(Gong, Yang and Yang, 2021).





Intensified urban-rural competition has exacerbated the divide, leading to industrial decline and a hollowing-out crisis. In 2017, the Chinese government introduced the Rural Revitalization Strategy to promote urban-rural equity and revitalize rural areas. This highlights the need to refocus attention on vast rural areas and seek opportunities for the revival of rural industries.

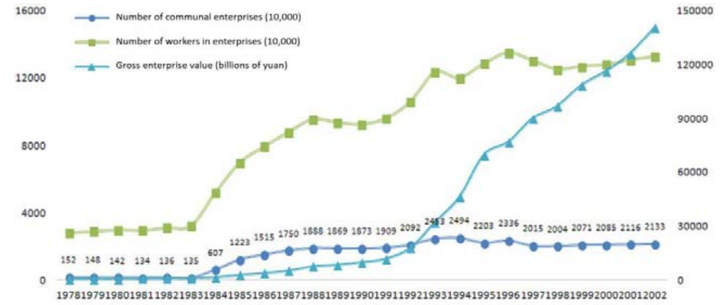


**Figure 1. Development trend of China's township enterprises, 1978-2002. Source: Ministry of Agriculture of China, Statistics on Township and Village Enterprises in China: 1978-2002.**

Among rural industries, the musical instrument manufacturing sector stands out for its cultural and artistic value. Its growth has fostered clusters of small and medium-sized enterprises, primarily located in villages and towns such as Lankao County in Henan and Caigongzhuang Town in Tianjin, and these enterprises have established strong positions in domestic and global markets(Ma and Wang, 2012). In 2019, Tangwu Town accounted for about 36% of China's electric guitar production(Zhang, 2022), while Sidangkouzhong Village in Caigongzhuang produced over 50% of global saxophone output(Tianjin Radio, 2021). Despite this substantial market share, the industry and its villages receive limited attention. A lack of academic insight into their challenges hampers planners' ability to provide effective long-term strategies for these regions.

This paper takes Sidangkouzhong Village, a renowned Saxophone Industry Village in China, as a case study. Using statistical yearbooks from Tianjin and Jinghai District, government data, semi-structured interviews, field photographs, and Google satellite imagery, it investigates how internal and external factors have driven the village's musical instrument industry. The study further explores how this industry has reshaped the village's economic, physical, and social landscape, and identifies the unique challenges in its rural industrialization process. The research aims to offer insights for the sustainable development of other specialized industrial villages, especially those in musical instrument production.

## 2. Theoretical Background

### 2.1. Rural industrialization in China

Since 1949, China's rural industrialization has progressed through four phases: initial rise, rapid rise, concession to cities, and gradual revival(Li and Yang, 2021). Initially, planned economy policies established a foundation for rural industry but resulted in structural rigidity and market disconnection, leading to slow development. A breakthrough occurred in 1978 with the reform and opening-up policy, which facilitated large-scale land use, released surplus labor, and led to government support for township enterprises, spurring rapid industrial growth. China's accession to the WTO in 2001 further expanded international markets for rural industries, including the musical instrument industry. However, after 2000,

industrial growth accelerated urbanization, concentrating industries in urban areas and driving labor migration tocities, thereby constraining rural development and leading to the collapse of many township enterprises. With rising urban land prices and environmental degradation, the Chinese government re-evaluated the importance of rural areas and launched the Rural Revitalization Strategy in 2017, marking a new phase of rural industrial rejuvenation.

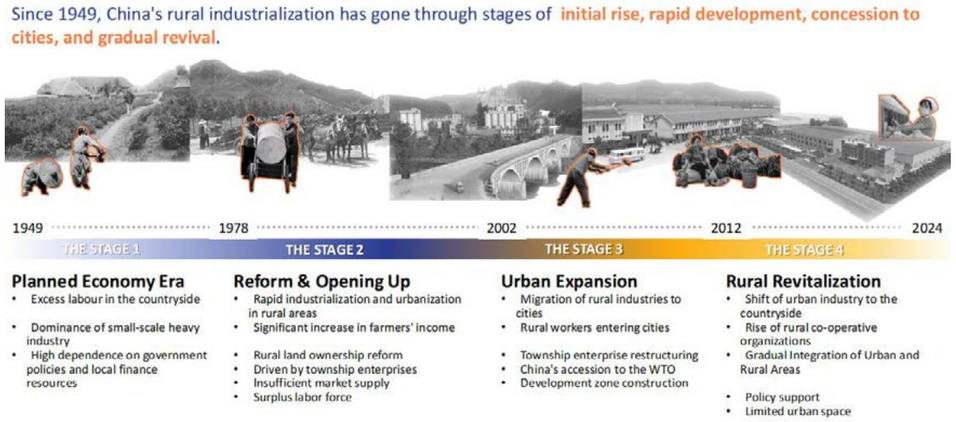


**Figure 2. Visualisation of the industrialisation process in rural China. Source: Author's own drawing.**

Throughout this process, policy has been a critical factor. While early urban-rural dualism policies hindered rural progress, advancements in rural industry have closely followed precise policy adjustments. The Chinese government's top-down industrialization approach distinguishes its rural industrialization from that of Western countries(Xie et al., 2022). Moreover, township enterprises, which acted as the pioneers of rural industrial growth, warrant particular attention. Scholars from economics, sociology, and urban planning, including Fei Xiaotong, have identified "four models" of rural industrialization in China: South Jiangsu, Jinjiang, Wenzhou, and Pearl River Delta Models. Due to differences in location, policy, capital, and market conditions, these models exhibit notable variations in enterprise systems, industrial categories, production methods, and spatial organization(Zhu and Chen, 2020; Zhu and Chen, 2023; Ye, Zhang and Wu, 2014; Zhang and Gu, 2002; Fan, 2015; Zhang, 2018; Fei, 2013). However, existing literature primarily emphasizes the driving forces and development models of rural industrialization, with less emphasis on how this process has reshaped rural structures. This results in unclear insights from the examination of village transformations, particularly regarding the negative impacts that certain development models have had on the economic, social, and physical landscape of villages—issues that must be addressed in future village revitalization planning.

## 2.2. Specialized Village and Musical Instrument Village

Specialized villages are rural areas dominated by a single industry, involving most villagers in related production activities(Li, Luo and Fan, 2009). These villages effectively promote rural industrialization and regional economic development(Xiao et al., 2024). Research on various types of specialized villages in China, including agricultural processing, traditional handicrafts, and manufacturing, has gained attention. For instance, Cao,. He and Huang (2023) explored the agricultural processing industry's role in rural revitalization. Zhang and He (2021) examined the evolution of traditional handicraft villages amid social changes, and Xu and Yang (2016) analyzed the development of industrial chains and spatial integration in tea-processing villages.





However, research on specialized industrial villages, such as Musical Instrument Villages, is limited despite their high product value, potential for cultural industry chain development, and blend of handicrafts and mechanization. Musical instrument villages, centered on the production and sale of instruments, exemplify rural industrialization. Geographically, representative musical instrument villages/towns in China (Figure 1) are concentrated in the Yangtze River Delta, Beijing-Tianjin-Hebei region, and Xinjiang Uygur Autonomous Region. The types of instruments produced align with regional characteristics: Xinjiang focus on ethnic minority instruments, the Yangtze River Delta on traditional Chinese instruments, and Beijing-Tianjin-Hebei on Western instruments. Driving factors for these villages can be categorized into three types: ethnic culture, resource dependency, and policy-market dynamics (Table 1). For instance, Xinjiang villages preserve local instrument-making techniques, and Xuchang Village in Henan benefits from high-quality paulownia wood for instrument production. Other villages, like Dongheng and Daliuhe, have grown due to government planning and market demand. Current studies primarily address the evolution and upgrading of the musical instrument industry and the cultural heritage of instrument-making(Hu and Shang, 2023; Han,2021; Zhang, 2020; Li and Wei, 2019; Aikede, 2023), but the multidimensional impacts of this industry on rural economic, physical, and social landscape remain underexplored.

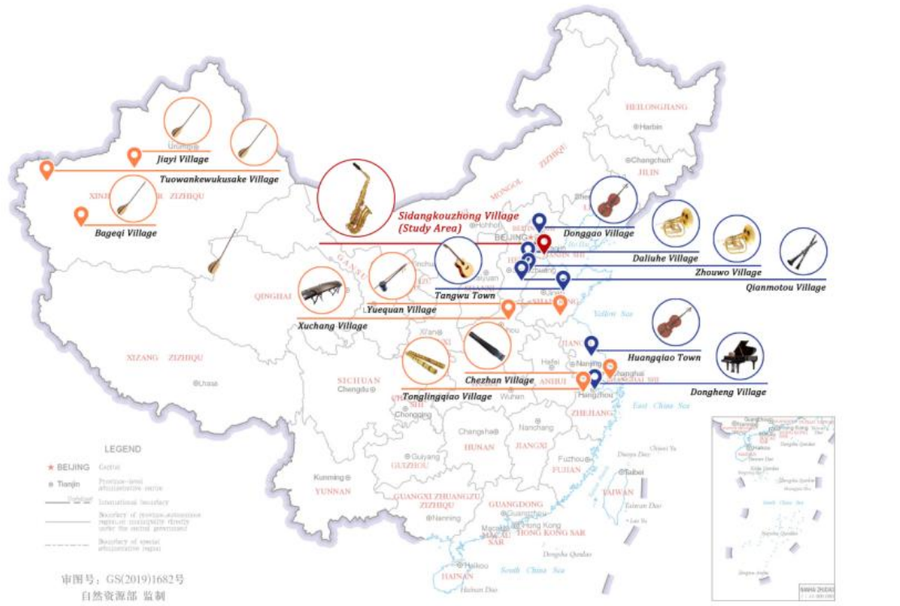


**Figure 3. Spatial Layout Diagram of Representative Instrument Villages and Towns. Source: Author's own drawing.**

Table 1. Information of Representative Instrument Villages and Towns. Source: Author's own drawing.

| Driving Forces | Village | Location | Representative Instruments | Instrument Types |
|---|---|---|---|---|
| Ethnic Cultural Type | Wukusake Village | Xinjiang Uyghur Autonomous Region | Dutar | Musical Instruments of China's Ethnic Minorities |
| | Jiayi Village | | Dutar | |
| | Bageqi Village | | Dutar | |
| Resource-Dependent Type | Xuchang Village | Henan Province | Gu Zheng, Pipa | Traditional Chinese Musical Instruments |
| | Tonglingqiao Village | Zhejiang Province | Dizi | |
| Policy and Market-driven Type | Chezhan Village | Shanghai City | Guqin, Erhu | Traditional Chinese Musical Instruments |
| | Yuequan Village | Shandong Province | Erhu | |
| | Tangle Town | Shandong Province | Guitar | Western Musical Instruments |
| | Huangqiao Town | Jiangsu Province | Violin | |
| | Zhouwo Village | Hebei Shandong Province | Orchestral Instruments | |
| | Donggaozhen Village | Beijing City | Violin | |
| | Daliuhe Village | Hebei Shandong Province | Orchestral Instruments | |
| | Qianmotou Village | Hebei Shandong Province | Clarinet | |
| | Sidangkouzhong Village | Tianjin City | Saxophone | |
| | Dongheng Village | Zhejiang Province | Piano | |

## 3. The evolution of the musical instrument industry in Sidangkouzhong Village

### 3.1. 1960-1979: Limited natural conditions promote the budding of industry

The agricultural development conditions in Sidangkouzhong Village are extremely poor due to its location in a retreating coastal zone characterized by low topography, which has led to significant land salinization and frequent flooding, resulting in persistent economic stagnation. In the 1970s, the village acquired the technology for producing "chain links"(Liu, 2019), thereby improving the villagers' livelihoods and laying the ideological foundation for handicraft development. In 1974, village leader Dong Fengshan seized the opportunity to send some villagers to Tianjin Wind Instrument Factory to learn the technology for producing instrument components(Liu, 2019). This technology enabled the establishment of the village's first instrument components factory, "Yonghong Key Factory", supplying components to Tianjin Wind Instrument Factory and generating the first industrial wealth for the village.

### 3.2. 1980-1999: Reform and opening up led to the rise of the musical instrument industry

After the reform and opening-up, national support for township enterprises created unprecedented opportunities for rural industries. However, the rise of private and foreign enterprises captured significant market share, leading to a decline in orders for the Tianjin Wind Instrument Factory, which could no longer rely on a planned economy for implementing a 'unified purchase and sales' system. Confident in the promising musical instrument industry's prospects and guided by local talent, the villagers of Sidangkouzhong seized the chance to learn complete instrument-making techniques, achieving a technological breakthrough and gaining the ability to independently manufacture instruments.

By the end of the 20th century, Tianjin was the largest port in northern China. The mere 20 km distance between Sidangkouzhong Village and Tianjin Port enabled the village to easily export goods overseas. As early as the 1970s, the village recorded exports of handicrafts, and further connections with foreign





enterprises helped secure technology and investment, enabling the rapid establishment of the first Sino-foreign joint venture instrument factory in the 1980s(Liu, 2019). By the 1990s, both of the village's major instrument enterprises were Sino-foreign joint ventures, highlighting the significance of foreign capital.

Most musical instrument factories established after 1980 were collectively owned. However, in the 1990s, the government relaxed market access restrictions for private and foreign enterprises, allowing farmers to start their own businesses while reducing direct government intervention in pricing mechanisms. This significantly boosted the growth of the private economy, and Sidangkouzhong quickly followed suit. Although the transition from public to private ownership resulted in enterprises predominantly owned by local talent and their relatives, this did not impede the robust development of the musical instrument industry.

### 3.3. 2000-2007: The musical instrument industry is growing explosively

The accession of China to the WTO in 2000 provided unprecedented development opportunities for Sidangkouzhong Village, enabling it to explore overseas markets. The foundation established through previous foreign investments, combined with low pricing and high quality, became the village's strengths, leading to a surge in export orders that further specialized its musical instrument manufacturing. Large enterprises gradually established complete production lines, while rising demand stimulated the growth of small and medium-sized enterprises, significantly increasing the number and scale of businesses in the musical instrument sector in the village.

Simultaneously, the government of Caigongzhuang Town actively promoted the intensive development of the musical instrument industry by investing in the construction of a musical instrument market in Sidangkouzhong Village. The deepening corporate restructuring enhanced the competitiveness of enterprises. During this phase, Sidangkouzhong Village began to form a preliminary industrial cluster for musical instruments, with overseas exports becoming a major source of income(Liu, 2007). However, most enterprises at this stage primarily focused on Original Equipment Manufacturer(OEM) production, lacking independent brands with core technologies, which posed potential challenges for future transformation.

### 3.4. 2007-Now: Enterprises are facing development bottlenecks and begin to try to transform

With the development of China's economy, the domestic market's position has gradually improved. However, Sidangkouzhong Village has primarily functioned as an OEM for foreign saxophone brands at low prices, resulting in limited consumer recognition and brand awareness in the domestic market, leading to thin profit margins for enterprises. Starting in 2007, large companies, exemplified by Ovis, began transitioning from a low-margin, high-volume business model to a focus on high-quality products. Under the leadership of these enterprises, efforts were made to achieve technological breakthroughs, gradually establishing several independent brands and attempting to enter the premium market. However, small and medium-sized enterprises, often operating as small workshops, struggled to support their industrial transformation due to a lack of funding, technology, labor, and space, and continued to primarily operate as OEMs(Tianjin Radio, 2021).

After 2003, with the rise of e-commerce, such as Taobao, the market landscape in China was significantly transformed. In 2006, assembly worker Liu Tao became the first to operate a Taobao store, achieving sales of over one million yuan in 2007(Yin, 2024). His success encouraged an increasing number of

enterprises to establish online stores, marking the initial emergence of e-commerce sales for musical instruments within the village. However, due to conservative limitations and a lack of professional operators, the e-commerce performance in Sidangkouzhong Village has been modest, with offline sales and overseas exports remaining the primary sources of revenue(Liu, 2007).

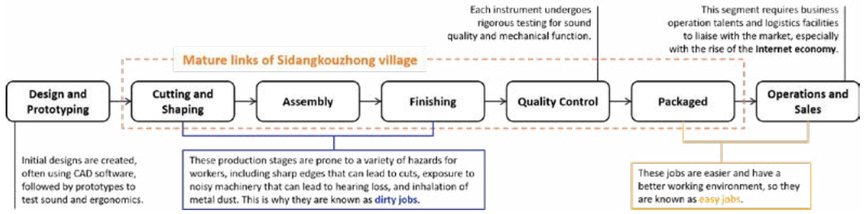


**Figure 4. Industrial processes in saxophone manufacturing. Source: Author's own drawing.**

## 4.Changes in Villages Resulting from Industrial Development

### 4.1. Industrial transformation struggles and a lack of talent are mutually constraining

After 30 years of continuous prosperity driven by OEM production, Sidangkouzhong finally faced a critical moment for industrial transformation. This transition proved to be challenging and painful, especially for the older generation with limited education. They lack insight into market trends, operational funding, and a deep understanding of instrument structure and aesthetics(Liu, 2007). While large enterprises, dissatisfied with the thin profits from OEM work, aspired to penetrate the high-end market, they represented only a minority. In contrast, despite the declining profits from saxophone OEM production, most small businesses remained complacent relying on OEM work for survival because of a lack of funds and technology(CCTV, 2021).

Moreover, the disorganized competition between large and small enterprises has overall slowed the pace of industrial transformation. The competition for talent is particularly fierce. A skilled technician requires extensive training; however, due to the hardships of the skilled work, the migrant workers are more willing to take up the job rather than the locals. However, entrenched local protectionism within large enterprises limits outsiders' opportunities for advancement, forcing them to drift to smaller enterprises and causing a fragmentation of talent. In addition, some outsiders may establish their own factories after accumulating technical expertise. Yet, lacking adequate residential land, they are forced to pay high rents for facilities and struggle to secure resources, equipment, and labor without a supportive local network. These factors hinder the development of the industrial cluster.

As mentioned earlier, the village began its attempts to develop an online economy early, but by 2020, online sales accounted for only 23.3% of total product sales. This is partly due to the influence of conservatism, as some business owners show a reluctance to invest in e-commerce development. Additionally, compared to more typical Taobao Villages in regions like Zhejiang and Guangdong, Sidangkouzhong lacks adequate logistics infrastructure, restricting the growth of its online economy. The village is surrounded by no centralized logistics or warehousing facilities, relying instead on a logistics company located about 10 kilometers away in Daqiuzhuang for goods transfer, significantly increasing the operational costs of e-commerce.

Another critical issue is the loss of talent. The industry has remained in a labor-intensive phase, with an inadequate corporate structure, leading to a significant shortage of higher-end positions such as





instrument design and brand management. Furthermore, the village lacks cultural and recreational facilities, and its unattractive landscape and outdated infrastructure do not attract young talent. Compared to urban centers with superior education, healthcare, commercial, and transportation amenities, the village appears dull to both local and external highly educated individuals, even with a low cost of living. However, developing independent brands in the instrument industry necessitates the involvement of high-level professionals, including structural designers, tuners, and even musicians. Furthermore, the loss of skilled workers also poses a significant challenge, which will be elaborated upon below. Over time, the bottleneck in industrial transformation and the lack of talent mutually constrain each other, creating a vicious cycle.

### 4.2. Social Gap Caused by Policy, Assets and Favor-based Relationships

The demand for labour in the musical instrument industry has led to a constant intake of outsiders, leading to a transformation in the village's original social structure. While to some extent, these newcomers have brought economic and cultural vitality to the village and have been accepted, the in-depth interviews still reveal that a persistent "insider-outsider" social system continued to hinder the village's overall harmony.

The number of original assets one possesses influences job expectations. Also, in an interconnected society, information and social networks are crucial for securing employment. For many locals who have already benefited from the early rise of the musical instrument industry, wage levels are no longer their primary concern when choosing jobs. Additionally, due to the pre-existing bonds of trust in rural society, factory owners tend to "favor" local workers, assigning them to less physically demanding tasks such as instrument assembly and sales. Consequently, locals can earn significant wages for simple skills, which gradually leads them to give up pursuing better education and to rarely seek job opportunities outside. Over time, they become trapped in the village, with their paths to self-development obstructed. Meanwhile, their insufficient educational qualifications further hamper the advancement of the Saxophone Industry.

In contrast, migrant workers face a different reality. Often coming from poorer regions, they have a more pressing need for employment but also encounter local protectionist barriers. As a result, they are predominantly engaged in dirty jobs that have been eliminated by locals, such as processing and polishing. These high-pollution tasks severely damage their lung health, making it difficult for them to maintain long-term employment. Moreover, under the flexible "favor-based management" system, unlike locals who have more autonomy regarding work intensity, migrant workers face much stricter work schedules. With increasing mechanization and industrial restructuring, outsiders lacking protective social connections are often the first to be laid off during downsizing crises.

A more long-term constraint is the household registration system (Hukou). For migrant workers wishing to stay long-term and address their children's educational needs, obtaining a Tianjin Hukou is essential. However, they are poorly educated and do not own property to meet the criteria of the settlement policy Consequently, when their children reach school age, many outsiders are forced to return to their hometowns in search of new opportunities, effectively cutting short their hard-earned careers. Over the past decade, the village has experienced a cyclical turnover of migrant populations approximately every ten years, slowing the musical instrument industry's transformation toward a high-end industry. This underlying division perpetuates a lack of mutual understanding between the two groups, creating a fractured reality of "one village, two worlds".

### 4.3. Differentiation of Residential, Consumption, and Public Spaces

The significant differences in asset accumulation, social networks, and housing policies between local residents and outsiders lead to varying living conditions and consumption patterns, eventually resulting in spatial segregation.

Local residents inherit assets and land from their ancestors, allowing even the least affluent to access affordable housing through local residency. In contrast, outsiders lack local household registration, preventing them from obtaining such housing. With no deep social relationships with outsiders, those locals who control housing resources can raise rents easily, controlling the cost of living for outsiders. This creates a clear residential divide: locals primarily inhabit well-maintained, newly constructed apartment buildings in Sidangkouzhong Village, rented at one to two thousand yuan per month, while outsiders mainly rent dilapidated brick houses on the village's western side, with rents often reaching three to four thousand yuan per month.

As mentioned, locals often engage in lighter work such as packaging and sales, resulting in relatively better economic conditions and more leisure time. However, the village's limited shopping and entertainment facilities fail to meet their diverse needs, prompting them to drive to nearby towns or Tianjin for recreation. Conversely, outsiders face significant financial pressures and endure longer, exhausting working hours in demanding production roles, primarily shopping at the village's commercial center, "Zhongjie", which caters to their need for low-cost, convenient options.

A significant difference also exists in the use of public activity spaces. Outsiders, especially migrant workers from Northeast China, introduce cultural practices such as "Niuyangge" (a traditional folk dance). After a long day, they gather in the village square to socialize through this dance. However, due to differences in local customs, locals do not fully embrace these activities. They often seek entertainment in the city, viewing it as a more advanced lifestyle. Gradually, locals are drawn to urban life, while migrant workers become more entrenched in the village.

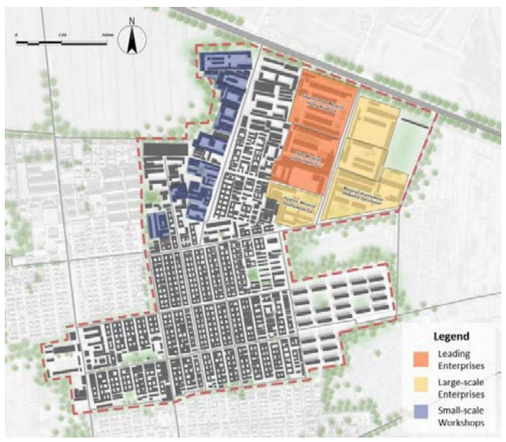



**Figure 5. Spatial Distribution of Large Enterprises and Small Workshops. Source: Author's own drawing.(left figure)**

**Figure 6. Spatial Differentiation of Living Space. Source: Author's own drawing.(right figure)**





## 5. Discussion

Sidangkouzhong Village exemplifies a specialized industrial community that transformed from a poor agricultural background into one of China's leading musical instrument manufacturing centers. This transformation was driven by the timely integration of external capital, technology, and policy support. The village's development highlights how shifts in national policies can stimulate industrial growth. For instance, while early collective ownership restricted productivity, later reforms in market and enterprise ownership significantly boosted entrepreneurial efforts. The introduction of external technology and capital also provided a foundation for the village's competitive industrial growth.

However, the industry experienced a slowdown after 2007. The high cost of upgrading puts most small enterprises in a cycle of path dependency. Despite larger firms' ambitions to penetrate high-end markets for long-term survival, they confronted the reality that the village's outdated infrastructure could not attract external talent. Meanwhile, local youth, enticed by easily attainable job opportunities, abandoned the pursuit of higher skills. The lack of talent ignited fierce competition between large and small firms, leading to disorganized competition that ultimately hindered collective development within the village's musical instrument industry.

At the same time, the development of the musical instrument industry has profoundly reshaped both the internal social structure and the external physical environment of the village. Despite the influx of migrant workers accelerating the industry's growth over several decades, disparities in original assets and social networks have made it more difficult for them to find jobs and achieve promotions compared to locals. Residency policies further obstruct the stable development of outsiders, contributing to the loss of skilled labor. The implicit "insider-outsider" division has become more pronounced in the physical environment. Local residents, holding a monopoly over housing resources, control rental prices and possess the wealth and leisure to frequent the city center for consumption, while outsiders are largely confined to the dull and declining village environment for shopping and recreation. Although the two groups do not completely segregate in daily life, the lack of deep interaction makes it difficult for them to form a unified sense of identity.

Unlike the "four models" mentioned earlier, Sidangkouzhong retains strong village-specific traits. The scale of resources it can access is clearly not comparable to that of developed regions like the Pearl River Delta. Nonetheless, this focus on small-scale development emphasizes the importance of talent for industrial upgrading. Coordinated urban-rural planning emphasize improving rural infrastructure while maintaining low rents to attract talent and rejuvenate village life. Sidangkouzhong's struggles underscore the need for talent retention, as upgrading the value chain depends on knowledge-based workers. Bridging gaps between local and migrant populations is also vital to fostering cultural identity and aligning planning policies with community's needs.

For Sidangkouzhong, attracting talent may represent a key breakthrough requiring long-term policy efforts. First, recruiting talent by partnering with music professionals and academic institutions is essential, alongside hiring marketing experts to boost brand innovation and promotion. Second, improving public service infrastructure is necessary to attract high-level talent, with a focus on government-led planning and coordination of public activities to enhance internal communication. With sustained policy adjustments, it is reasonable to expect that the active involvement of talent could drive progress toward a new phase of development.

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*Research Paper*

# Exploring the Informal Street Vendors' Substantial Benefits to University Students at the University Belt

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## Abstract

*This research explores the substantial benefits of informal street vendors to the university students in university belt Manila, Philippines. The research approach utilizes a qualitative, ethnographic approach through structured interviews, Geographic Information System (GIS), and foot surveys. The result shows that informal street vendors provide university students with accessible, affordable, and convenient food options, contributing to a vibrant and social university environment. This study also emphasized the benefits for the informal street vendors themselves, who acquire a reliable customer base and income source. This study concludes with recommendations for collaboration between NGOs, local government, and universities to support the informal street vendors through legal support, health insurance, and safety training programs. Together, these initiatives would help informal street vendors and university students develop a mutually beneficial relationship.*

## Keywords

*Informal Street Vendors, University-Belt, Geographic Information System (GIS)*

## 1. Introduction

An existing sub district of Manila, Philippines, is referred to as the University Belt, or U-Belt, informally. It refers to the area of a city where there are a lot of schools and institutions. (*Filipino de Leon*, 2012). Street vendors are an integral part of urban economies around the world (WIEGO, n.d.). They offer almost everything, including apparel, gadgets, media, souvenirs, hot and prepared food and drinks, fruits and vegetables, and keepsakes. In addition, shoe mending and shoe polishing are offered by street vendors. Many vendors set up shop in one location and come back there every day to establish a routine with their customers (Schoenecker, 2023).

Generally speaking, postsecondary education, or education beyond high school, is referred to by the term college, university, and school. As far as general postsecondary education or degree programs are concerned, it is acceptable to use all three titles equally. Colleges can be public or private, smaller in size than universities, and customized for specific demographics like genders, ethnicities, or religious groups. It offers associate's degrees, bachelor's degrees and certificates in relation to their educational pathways. While university is a four-year, private or public educational establishment that grants degrees at the undergraduate and graduate levels. Private universities typically have lower enrollment numbers, although institutions typically have tens of thousands of students enrolled (Zpace, 2024).





Street vendors are one of the obvious unique aspects of the University-Belt that have a significant impact on the daily lives of many individuals. As a result of the neighborhood's variety of goods and services, people eventually find themselves acquiring its tastes and demands. It is clear that the typical human lifestyle develops into one in which one can obtain a consistent and very accessible source for daily consumption, whether it is a delicious, cheap, or accessible meal. Somehow, these street vendors are frequently undervalued in the informal economy and the vibrancy of public areas. The street vendors are undervalued in terms of having an insecure place of work. Lack of storage, theft or damage to stock are the common issues street vendors face. In addition, many street vendors are vulnerable to harassment, confiscations, and evictions due to the unclear bylaws governing street trade and the difficulty in obtaining licenses. Undervaluing the street vendors affects their family, livelihood, contribution to the economic sector as well as the lives of the students who heavily rely on their goods and services. This study will focus and be limited only to the investigation of the informal street vendors' positive contributions and advantages to urban life and economic development. The street vendors' income and revenue from street vending will serve as the priority to look into by the researchers. In developing countries, the informal economy is essential to maintaining social well-being and economic progress. In Ethiopia, street vending is a significant source of income for urban populations (Singh,2020b).

### 1.1. Students

Informal street vendors have an impact on our daily lives, especially for students. These informal street vendors provide students' everyday needs by offering meals and snacks, which are essential for the development and growth of students because of their affordable and accessible food options (Malhotra, 2017). But it can also affect the health of the students because some informal street vendors lack proper hygiene and sanitation practices (Pratadina et al., 2017). Unsanitary food preparation facilities have been linked to food-borne illnesses caused by microbes like Salmonella, Escherichia coli, Norovirus, and Staphylococcus aureus contaminating ready-to-eat food (Lues et al., 2006). Therefore, to protect the health of the students, it is important that food choices, cleanliness, and hygiene be given top priority by educational institutions and especially by the informal street vendors (Pratiwi et al., 2018). Informal street vendors have an impact on the lives of the people in the Philippines. They offer convenient, flexible food choices close to schools and campuses, along with affordable and easily accessible meals and snacks that are essential for students' growth, it also supports the livelihoods of many low-income Filipinos and contributes to the vibrant street life and local character. Studies show affordable good options that informal street vendors can provide play a crucial role (Hidalgo et al., 2022) and contribute to the livelihood of many Filipinos by providing affordable goods and services to communities, especially those in marginalized sectors (Gonzales & Pabilando, 2023). But there are some concerns about the food safety practices of some informal street vendors, with studies showing insufficient food handling approaches and knowledge (Madario et al., 2023). It is important to prioritize the implementation of health rules, good manufacturing practices, and improving awareness of food safety in order to safeguard the welfare of vendors and consumers (Recio, 2020).

### 1.2. Environment and Health

The environment was also affected by informal street vendors, as evidenced by a variety of studies. Research shows that a lot of informal street vendors operate in unsanitary conditions that can have a significant impact on public health with a high percentage having suboptimal food handling practices, posing risks of food-borne diseases (Gichunge et al., 2023). Further, in order to address these concerns, government measures such as relocation policies are sometimes used when informal street vendors are present in metropolitan areas (Karaçar, 2022). However, they play a crucial role in a street's vitality and attractiveness by offering things at a reasonable price and enhancing the vibrancy of the city (Putri et al., 2023). The complicated relationship between informal street vendors and the urban environment is shown

by the fact that, despite possible drawbacks such as hindering pedestrian mobility, informal street vendors are recognized for their positive impact on the street life experience.

### 1.2. Factors that influence students to purchase from Informal Street vendors

There are many factors that influence students' choices during consumption (Affordability, Variety, Convenience, Unique Flavor, Creativity, Accessibility, and Support Small Businesses). By increasing the variety of goods, the informal street vendors improve their businesses. The informal street vendors have a friendly relationship with their customers, which can also be a reason to increase the profit of their business (Kumar, 2024).

The purpose of this study is to identify and emphasize the significant advantages of street vendors in the U-Belt area through answering these two (2) research questions: (1)How do informal street vendors contribute to the daily lives of university students?; and (2) How does the location of informal street vendors around university campuses in the University Belt area contribute to the vendors' business viability, profitability, and overall sustainability? The outcome of this research will add to the body of knowledge already in existence by providing insight into the importance of street vendors and how they can affect the neighborhood. Furthermore, the research aims to foster a more inclusive, vibrant, and supportive environment for all individuals in the U-belt, enhancing their overall experience and quality of life. The study's findings will be helpful for government representatives, non-governmental organizations, foreign establishments, and researchers addressing this matter.

## 2. Methodology

### 2.1. Data Gathering Techniques

The researchers used a qualitative, ethnographic approach to study the experiences and impacts of informal street vendors. This involves in-depth interviews, observations, and discussions to understand the phenomenon from the vendors' and community's perspective. The research specifically examined the beneficial impacts and contributions of these informal vendors, rather than just identifying challenges or problems. This suggested a focus on the positives and value they bring to the local area.

For the sampling population, a total of 2 to 3 students from each university in the university belt participated in the structured interview. They are asked regarding how many minutes or meters of walking to reach their preferred street vendors is walkable for the students. After acquiring their desired distance from their respective universities, the researchers utilized the GIS to map out the distance and did buffer analysis about the street vendors who are located within the desired distance. After the analysis, the researchers conducted a foot survey around the buffered areas that informal street vendors occupy.

Another set of sampling population with a count of 20 students are gathered and answered the survey questionnaires about their preference or what influences themselves for purchasing from informal street vendors. The acquired data are then analyzed using Analytical Hierarchy Process (AHP) to determine which factor influenced them the most.

#### 2.1.1 Primary Data

The researchers conducted in-depth interviews with university students in the University Belt area. The





interviews focused on how far they can travel when making purchases from informal street vendors, starting at their university, and understanding the students' interactions with and perceptions of the informal street vendors who are near their university.

The researchers utilized the geographic information system (GIS) to map the locations of the informal street vendors throughout the University Belt. This enabled the researchers to examine how the vendors' spatial distribution relates to university campuses and foot traffic from students. Researchers have been able to identify any patterns or clusters in the vendors locations that would suggest the best arrangement for benefiting the students.

The researchers conducted on-the-ground surveys by walking through the universities in the university belt area and directly observed the informal street vendors and their interactions with university students. This offered first-hand information about the kinds of products being offered, pricing, customers' traffic, and the overall dynamics of the vendor-student relationships.

#### 2.1.2 Secondary Data

The researchers also browsed peer-reviewed papers to provide further context and identify research gaps. It provided a theoretical framework and background information on the benefits of street vendors, how they influence life satisfaction and quality, economic contributions, and social factors.

### 2.2 Unit of Analysis

This unit of analysis of this research study are the informal vendors scattered around the university-belt. The key variables include the independent variable (Universities around U-Belt: National University, University of Sto. Tomas, Arellano University, San Beda University, Centro Escolar University, University of the East, and Far Eastern University) and the dependent variable (Informal Street Vendors). By using the structured interview, mapping, and direct observation, the researchers gained a comprehensive understanding of the substantial benefits that the informal street vendors offer to the community of university students in the target area.

**Figure 1. Area of Study.This is the University-Belt in Sampaloc Manila which is the area of the study.**

**Source: Google Earth**



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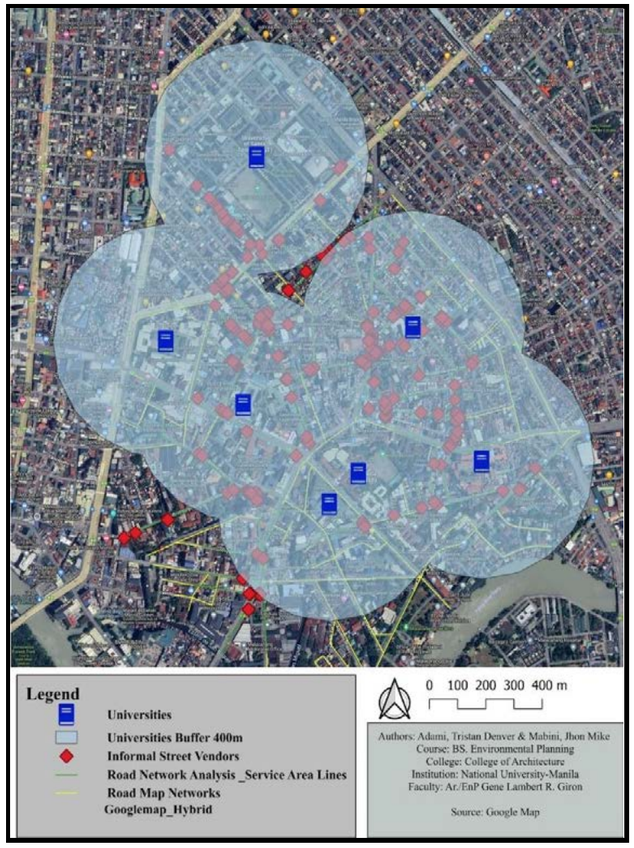
## 3. Results and Discussion

**Figure 2**. Buffered Universities with Informal Street Vendors in University Belt




### 3.1 Students

#### 3.1.1 Tolerable Walking Distance

After conducting structured interviews among students from the different universities at the university-belt, the researchers determined which distance is the tolerable walking distance for the students. From the four different distances (100 meters (1-minute walk), 200 meters (2-minute walk), 300 meters (3:30-minute walk), 400 meters (5-minute walk), the average distance which the majority of the students preferred is 400 meters or five-minute walk. Therefore, the researchers used the 400 meters as a basis of distance for the buffer analysis shown in figure 2. The various informal street vendors within the 400-meter area around each of the universities at the university-belt are located and identified in the buffer analysis.

#### 3.1.2 Goods and Services

The majority of university students, according to the interview's findings, regularly buy and eat "tusok-tusok" foods, including kikiam, fishballs, and kwek-kwek, with siomai being second. When it comes to street

food, "ihaw", which comprises grilled foods like barbecue and isaw, is the second most popular option among students.

### 3.1.2 Basis for patronizing informal street vendors (Analytic Hierarchy Process)

**Table 1**. Pair-wise Comparison Matrix

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses |
|---|---|---|---|---|---|---|---|
| Affordability | 1 | 9 | 1/9 | 1/7 | 7 | 1/9 | 1/3 |
| Variety | 1/9 | 1 | 1/9 | 1/7 | 7 | 1/7 | 1/5 |
| Convenience | 9 | 9 | 1 | 5 | 7 | 1/7 | 5 |
| Unique Flavors | 7 | 7 | 1/5 | 1 | 3 | 1/7 | 1/5 |
| Creativity | 1/7 | 1/7 | 1/7 | 1/3 | 1 | 1/9 | 1/7 |
| Accessibility | 9 | 7 | 7 | 7 | 9 | 1 | 5 |
| Supporting Small Businesses | 3 | 5 | 1/5 | 5 | 7 | 1/5 | 1 |

**Table 2**. Scale of Relative Importance

| | |
|---|---|
| 1 | Equal Importance |
| 3 | Moderate Importance |
| 5 | Strong Importance |
| 7 | Very Strong Importance |
| 9 | Extreme Importance |
| 2,4,6,8 | Intermediate Values |
| 1/3,1/7,1/9 | Values for Inverse Comparison |

**Table 3.** Pair-wise Comparison Matrix

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses |
|---|---|---|---|---|---|---|---|





| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Affordability | 1 | 9 | 0.11 | 0.14 | 7 | 0.11 | 0.33 |
| Variety | 0.11 | 1 | 0.11 | 0.14 | 7 | 0.14 | 0.2 |
| Convenience | 9 | 9 | 1 | 5 | 7 | 0.14 | 5 |
| Unique Flavors | 7 | 7 | 0.2 | 1 | 3 | 0.14 | 0.2 |
| Creativity | 0.14 | 0.14 | 0.14 | 0.33 | 1 | 0.11 | 0.14 |
| Accessibility | 9 | 7 | 7 | 7 | 9 | 1 | 5 |
| Support Small Businesses | 3 | 5 | 0.2 | 5 | 7 | 0.2 | 1 |
| Sum | 29.25 | 38.14 | 8.76 | 18.61 | 41 | 1.84 | 11.87 |

**Table 4.** Pair-wise Comparison Matrix

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses |
|---|---|---|---|---|---|---|---|
| Affordability | 1/29.25 | 9/38.14 | 0.11/8.76 | 0.14/18.61 | 7/41 | 0.11/1.84 | 0.33/11.87 |
| Variety | 0.11/29.25 | 1/38.14 | 0.11/8.76 | 0.14/18.61 | 7/41 | 0.14/1.84 | 0.2/11.87 |
| Convenience | 9/29.25 | 9/38.14 | 1/8.76 | 5/18.61 | 7/41 | 0.14/1.84 | 5/11.87 |
| Unique Flavors | 7/29.25 | 7/38.14 | 0.2/8.76 | 1/18.61 | 3/41 | 0.14/1.84 | 0.2/11.87 |
| Creativity | 0.14/29.25 | 0.14/38.14 | 0.14/8.76 | 0.33/18.61 | 1/41 | 0.11/1.84 | 0.14/11.87 |
| Accessibility | 9/29.25 | 7/38.14 | 7/8.76 | 7/18.61 | 9/41 | 1/1.84 | 5/11.87 |
| Support Small Businesses | 3/29.25 | 5/38.14 | 0.2/8.76 | 5/18.61 | 7/41 | 0.2/1.84 | 1/11.87 |
| Sum | 29.25 | 38.14 | 8.76 | 18.61 | 41 | 1.84 | 11.87 |

**Table 5**. Normalised Pair-wise Comparison Matrix

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses | Criteria Weights |
|---|---|---|---|---|---|---|---|---|
| Affordability | 0.0341 | 0.2359 | 0.0125 | 0.0075 | 0.1707 | 0.0597 | 0.0278 | 0.0783 |
| Variety | 0.0037 | 0.0262 | 0.0125 | 0.0075 | 0.1707 | 0.076 | 0.0168 | 0.0447 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Convenience | 0.3076 | 0.2359 | 0.1141 | 0.2686 | 0.1707 | 0.076 | 0.4212 | 0.2277 |
| Unique Flavors | 0.2393 | 0.1835 | 0.0228 | 0.0537 | 0.0731 | 0.076 | 0.0168 | 0.095 |
| Creativity | 0.0047 | 0.0036 | 0.0159 | 0.0177 | 0.0243 | 0.0597 | 0.0117 | 0.0196 |
| Accessibility | 0.3076 | 0.1835 | 0.799 | 0.3761 | 0.2195 | 0.5434 | 0.4212 | 0.4071 |
| Support Small Businesses | 0.1025 | 0.131 | 0.0228 | 0.2686 | 0.1707 | 0.1086 | 0.0842 | 0.1269 |

$$\frac{0.0341+0.2359+0.0125+0.0075+0.1707+0.0.0597+0.0278}{7} = 0.0783$$

**Table 6.** Calculating the Consistency

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses |
|---|---|---|---|---|---|---|---|
| Affordability | 1 x 0.0783 | 9 x 0.0447 | 0.11 x 0.2277 | 0.14 x 0.095 | 7 x 0.0196 | 0.11 x 0.4071 | 0.33 x 0.1269 |
| Variety | 0.11 x 0.0783 | 1 x 0.0447 | 0.11 x 0.2277 | 0.14 x 0.095 | 7 x 0.0196 | 0.14 x 0.4071 | 0.2 x 0.1269 |
| Convenience | 9 x 0.0783 | 9 x 0.0447 | 1 x 0.2277 | 5 x 0.095 | 7 x 0.0196 | 0.14 x 0.4071 | 5 x 0.1269 |
| Unique Flavors | 7 x 0.0783 | 7 x 0.0447 | 0.2 x 0.2277 | 1 x 0.095 | 3 x 0.0196 | 0.14 x 0.4071 | 0.2 x 0.1269 |
| Creativity | 0.14 x 0.0783 | 0.14 x 0.0447 | 0.14 x 0.2277 | 0.33 x 0.095 | 1 x 0.0196 | 0.11 x 0.4071 | 0.14 x 0.1269 |
| Accessibility | 9 x 0.0783 | 7 x 0.0447 | 7 x 0.2277 | 7 x 0.095 | 9 x 0.0196 | 1 x 0.4071 | 5 x 0.1269 |
| Support Small Businesses | 3 x 0.0783 | 5 x 0.0447 | 0.2 x 0.2277 | 5 x 0.095 | 7 x 0.0196 | 0.2 x 0.4071 | 1 x 0.1269 |

**Table 7.** Calculating the Consistency

| | Affordability | Variety | Convenience | Unique Flavors | Creativity | Accessibility | Supporting Small Businesses | Weighted Sum Value |
|---|---|---|---|---|---|---|---|---|
| Affordability | 0.0783 | 0.4203 | 0.025 | 0.0133 | 0.1372 | 0.0447 | 0.0418 | 0.9856 |





| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variety | 0.0086 | 0.0447 | 0.25 | 0.0133 | 0.1372 | 0.0569 | 0.0253 | 0.536 |
| Convenience | 0.7047 | 0.4203 | 0.2277 | 0.475 | 0.1372 | 0.0569 | 0.6345 | 2.6563 |
| Unique Flavors | 0.5481 | 0.3339 | 0.0455 | 0.095 | 0.0588 | 0.0569 | 0.0253 | 1.1635 |
| Creativity | 0.0109 | 0.0066 | 0.0318 | 0.0313 | 0.0196 | 0.0447 | 0.0177 | 0.1626 |
| Accessibility | 0.7047 | 0.3339 | 1.5939 | 0.665 | 0.1764 | 0.4071 | 0.6345 | 4.5155 |
| Support Small Businesses | 0.2349 | 0.2385 | 0.0455 | 0.475 | 0.1372 | 0.0814 | 0.1269 | 1.339 |

0.0783 + 0.4203 + 0.025 + 0.0133 + 0.13273 + 0.0447 + 0.0418 = 0.9856

**Table 8.** Calculating the Consistency

| Weighted Sum Value | Criteria Weights | WSV/CW |
|---|---|---|
| 0.9856 | 0.0783 | 12.5874 |
| 0.536 | 0.0447 | 11.991 |
| 2.6563 | 0.2277 | 11.6657 |
| 1.1635 | 0.095 | 12.2473 |
| 0.1626 | 0.0196 | 8.2959 |
| 4.5155 | 0.4071 | 11.0918 |
| 1.339 | 0.1269 | 10.5516 |

$$\lambda max = \frac{12.5874+11.991+11.6657+12.2473+8.2959+11.0918+10.5516}{7}$$

$$\lambda max = 11.2043$$

$$Consistency\ Index(C.I.) = \frac{\lambda max^{-n}}{n-1}$$

$$CI = \frac{11.2043-7}{7-1}$$

$$CI = 0.7007$$

**Table 9.** Random Index (R.I)

| n | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| RI | 0 | 0 | 0.58 | 0.9 | 1.12 | 1.24 | 1.32 | 1.41 | 1.45 | 1.49 |

Consistency Ration = Consistency Index (C.I.)/Random Index (R.I.)

CR= 0.7007/1.32

CR= 0.5308

**Table 10.**

| | Criteria Weights | Percentage |
|---|---|---|
| Affordability | 0.0783 | 7.83% |
| Variety | 0.0447 | 4.47% |
| Convenience | 0.2277 | 22.77% |
| Unique Flavors | 0.095 | 9.50% |
| Creativity | 0.0196 | 1.96% |
| Accessibility | 0.4071 | 40.71% |
| Support Small Businesses | 0.1269 | 12.69% |

After analyzing the gathered data through pair-wise comparison matrix, normalized pair-wise comparison matrix and calculation of the consistency, the researchers came up with the result. The criteria that are given the most importance of the students when purchasing from informal street vendors based on the AHP is the accessibility with a 40.71% of importance. Informal street vendors' location within the university-belt is beneficial for the students as it is easier for them to access their wants and needs.

### 3.2 Informal Street Vendors

#### 3.2.1 Benefits of Informal Street Vendors to the University Students

Several substantial benefits of informal street vendors for university students are emphasized by the interview's findings. To begin with, the low cost of the food items these vendors offer greatly contributes to students saving money, which is especially crucial considering the financial hardships many students experience. Together with satisfying people's desires and snacking preferences, informal street vendors also provide a range of well-liked foods like tusok-tusok, siomai, ihaw, and fried desserts. Street vendors often become integral parts of the communities they serve, fostering social interactions and a sense of community. In addition, students who are stressed for time and want quick and reasonably priced food in between classes and other events will find these informal street vendors to be a convenient and accessible option. They are easy to locate across campus.





#### 3.2.2. Benefits that Informal Street Vendors Obtain

The strategic positioning of informal street sellers near university campuses has been shown to provide a continuous daily income due to a constant supply of foot traffic from students and staff, who served as a dependable consumer base. Most street vendors provide the main source of income for their households, bringing food to their families and paying school fees for their children with the help of street vending. Furthermore, vendors were able to customize their product offerings to the unique requirements and tastes of the university community by being close to academic institutions. Example, they were able to provide convenient and reasonably priced meals and snacks. A sense of community and cross-cultural interaction between vendors and their students/faculty customers was also developed by the lively environment that surrounds universities, bringing in vendors. The informal vendors were able to benefit from continuous customer demand and offer a useful service to the university community by locating themselves across the universities. Overall, this proved to be an advantageous location.

## 4. Conclusion

For the students, the availability of these informal street vendors gives the students an accessible, affordable, and convenient method to satisfy their needs for food and drinks, saving them the time and money that would otherwise be spent traveling to well-known businesses. Beyond the financial and time saving benefits, they also contribute to the University Belt's overall liveliness and social interaction, fostering a sense of community among students and enhancing their overall university experience. Furthermore, the research has shown how much the informal street vendors themselves benefit from the continuous flow of student foot traffic, which guarantees them to maintain their livelihoods and support their families while also improving the local economy.

The findings of this research emphasize the beneficial relationship that exists between informal street vendors and university students. Since universities strive to provide welcoming and stimulating environments, incorporating these informal street vendors should be considered as a valuable component to enhancing the overall campus experience.

## 5. Recommendation

Based on the results of this study which explored the significant benefits of informal street vendors to university students, some recommendations can be made:

### 5.1. Partnership with NGOs and Local Government

Since the study provides the factors of why informal street vendors are important to university students, NGOs and Local Government Bodies must consider partnering with the informal street vendors to design and implement programs specifically specialized to the needs of the informal street vendors. In this way, we can shift the informal street vendors into formalized vendors which can help in a three-way process including the informal street vendors themselves, the students at universities, and lastly, the government.

### 5.2. Legal Support and Advocacy

Initiate legal aid clinics to help the informal street vendors understand their rights, obtain essential permits, and handle legal challenges. Through the help of the legal aid clinics the informal street vendors may stand up to public authorities who are in charge of their eviction. Advocating for policies that protect the rights of informal street vendors, such as secure vending zones, fair taxation, and protection from harassment

may help them to continue their livelihood while providing accessible, convenient, and affordable goods and services to university students.

### 5.3. Health and Safety Programs Health Insurance

By providing informal street vendors with access to health insurance, they may get insurance for medical costs and seek care, when necessary, without having to worry about running out of money. By maintaining their health, these informal street vendors are able to run their enterprises and offer local university students convenient, reasonably priced food options.

### 5.4. Occupational Safety Training

By keeping the street food environment clean and lowering the danger of foodborne diseases for student customers, occupational safety training on issues like safe food handling and workplace cleanliness can help reduce health concerns. All in all, making investment in the health and safety of informal street vendors benefits both parties: university students continue to have access to the affordable, easily accessible food alternatives that informal street vendors in the U-belt area.

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*Research Paper*

# Transfer of Development Rights (TDR) and Urban Heritage: A Preservation Tool or a Recipe for Disaster?

## Comparative Analysis of TDR Policy Implementation and its Impact on Urban Heritage Preservation in Select Highly Urbanized Areas in Southeast Asia

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### Abstract

*Preserving built heritage in highly populated Southeast Asian countries such as the Philippines, Thailand, and Myanmar is jeopardized by social, economic, environmental, and political pressures in urban development. The lack of financial resources renders heritage conservation unprofitable, decreasing preservation efforts. Countries like Hong Kong, Turkey, and the United States have implemented urban planning policies like Transfer of Development Rights (TDR) to address conservation imperatives. Nevertheless, implementing TDR can reduce the value of built heritage since it might result in future challenges such as urban densification, instability on an urban scale, and exceeding carrying capacities. This study analyses the gray area between conservatism and liberalism in preserving urban heritage. It concludes that TDR can effectively balance urban development demands and safeguard heritage. Practical implementations in Hong Kong, Turkey, and the US prioritize establishing objectives, regulations, incentives, and active involvement of the public. Effective localization and strategic governance coordination are paramount for Thailand, the Philippines, and Myanmar.*

### Keywords

*Transfer of Development Rights, Built Heritage, Conservation, Urban Planning, Policy*

## 1. Introduction

Transfer of Development Rights (TDR) is an urban planning strategy used to regulate and balance the built environment and its growth to promote many conservation efforts, including the conservation of built heritage to preserve historically significant structures and properties. TDR involves the practice of reallocating development rights such as the remainder floor area ratio (FAR) and supposed gross floor area (GFA) from one property to another designated property, termed a sending area, resulting in a maximized development potentially exceeding its FAR and GFA designation rights while preserving the area where the developer of the sending area bought the said rights Field (Park & Lippoldt, 2008; Rist, 2014; Vichienpradit, 2024; Weiner, 2009).





### 1.1. Impacts of TDR on urban development

As a public policy, TDR has positive and negative impacts on urban development. In some cases, TDR benefits the economic sector by creating a market for conservation efforts, benefiting both developed and developing countries. In some studies, TDR proved to be an effective policy for regulating extensive urban development while preserving the environment, as it offers mechanisms for conserving land resources while permitting suitable property developments (Falco & Chiodelli, 2018; McMichael & Weber, 2020; Panayotou, 1994). TDR is also a developer- and development-friendly tool, providing incentives through tax exchange rates and shields, infrastructure improvement, and a smooth and streamlined development approval process for sending and sender areas patronizing TDR (Aken et al., 2010). TDR is also instrumental for urban decentralization and property value increase, which appraise growing neighborhoods, areas with higher household income, areas with lagging property values, and areas with limited access to public infrastructure, services, and utilities, which can result in an equitable urban development (Kopits et al., 2008; Shih et al., 2019). TDR as an urban development policy is also a potential tool to augment the conservation of privately owned built heritage by allowing owners to sell and transfer their development rights to potential buyers and gaining fair remuneration to potentially conserve their respective historically significant built heritage while still allowing new potential developments and redevelopments (Hou, 2017). However, despite its possible benefits for urban development and heritage conservation, TDR has certain drawbacks. In terms of urban development, the potential increase and appraisal of land values in some areas result in gentrification, land exhaustion, and further commercialization of land, which can influence locals to move out, induce overdevelopment, and reduce the availability and affordability of housing (Carroll et al., 2009). TDR also established a potential bias between development and conservation efforts, equitable zoning regulations, unclear property strategies, and development rights, and balancing economic growth and environmental protection (Falco & Chiodelli, 2018; Jedwab et al., 2022; Linkous, 2016). TDR has its fair share of adverse impacts regarding building height and density, resulting in uncontrolled locations where densification might occur. In contrast, such phenomena may result in the absence of human scale essential for creating comfortable and pedestrian-friendly environments and the possible devaluation of historically significant built heritage fields (Ewing & Handy, 2009; Hou, 2017; Shih et al., 2019; Ye et al., 2019; Zhong et al., 2020). There are also instances where the income generated from selling development rights is misused and diverted from its intended purpose of conserving and preserving built heritage without proper intervention from a governing body (Vichienpradit, 2024).

### 1.2. Success points of TDR policy and strategy implementation

Despite facing challenges, TDR has been successfully implemented in countries like Hong Kong, Turkey, and the United States. The success of TDR depends on the presence of a governing body, transparent regulations, and incentives. Legislation-driven TDR requires a government presence and transparent rules, while incentive-driven TDR relies on TDR banks and the purchase of development rights programs. These factors help counterbalance economic imbalances and encourage developers to adopt TDR as an urban development concept. (Aken et al., 2010; Hou, 2017). A democratic and participatory approach to planning is crucial for successful TDR implementation, promoting cooperation, technology transfer, and learning processes. This approach is critical in Southeast Asia, where human rights and social justice are crucial for cultural preservation. (Aken et al., 2010; Hou, 2017; Luthe, 2017; Yasuda, 2002; Zscheischler et al., 2018). Many nations use TDR for urban renewal, historic building preservation, and environmental protection. It benefits historic buildings through development transfer models, incentives, and market-based strategies (BenDor et al., 2022; Guzle et al., 2020; Hou, 2017; Konbul & Yanalak, 2022; Linkous, 2016).

### 1.3. Failure points of TDR policy and strategy implementation

The failure of TDR can be attributed to its complexity, ambiguity, exclusionary, and rudimentary application. The complexity of zone designations can negatively affect built heritage and environmentally sensitive areas. Moreover, ambiguity in policy drafting can lead to unequal pricing and compensation, causing conflict and abandonment of conservation efforts. Rudimentary implementation can also lead to bias and inequality in urban development (Hou, 2017; Miller, 1999).

### 1.4. Southeast Asia and Urban Heritage Preservation

Southeast Asia's heritage preservation faces challenges due to over-tourism and rapid urbanization. The lack of funding and capitalization hinders efforts to preserve built heritage sites. Tourists can sustain historic buildings, affecting their authenticity and integrity. Rapid urbanization can lead to neglect, mutilation, or demolition, erasing history traces. Despite the Hoi An Protocol, threats from modernization, lack of funding, and inadequate preservation efforts in countries like Thailand, the Philippines, and Myanmar put urban heritage, particularly historic buildings, at high risk. (Byrne, 2014; Chong & Balasingam, 2019; Miura, 2022; Sham, 2015; Stough, 2021; Tantinipankul, 2013; Tunprawat, 2010). Thailand's disregard for and lack of preservation efforts for historic provincial towns and urban communities indicates the neglect of urban heritage in Southeast Asia. Because of urban growth, these areas—which do not match traditional royal and Buddhist architecture or rural vernacular heritage—are being rapidly demolished, causing them to decay and be neglected (Sham, 2015; Tantinipankul, 2013). Urban heritage in the Philippines is primarily neglected since it is believed to have little economic worth and to indicate underdevelopment. Even with initiatives to revitalize historic downtown districts, historical preservation is sometimes disregarded unless related to financial activities. However, heritage protection is sometimes seen as a losing investment with large expenditures and few returns, so cultural apathy in the Philippines has prevented substantial investment in this field (Cruz, 2019). The challenges of preserving urban heritage in Myanmar include top-down urban policy decisions, social injustice, the exclusion of marginalized groups, gentrification, and elite-driven initiatives centered on economic development (Guenther, 2013; Sabrié, 2019).

### 1.5. Research objectives, outputs, and outcomes

The research paper aims to identify best practices in TDR policy and strategy implementation in successful Asian and North American countries. Through case studies and content analysis of conservation policies, the researchers aim to identify barriers and drivers for implementing TDR in Southeast Asian countries. The study will compare the outcomes of heritage laws and policies of selected Southeast Asian countries without TDR policies to identify potential barriers and drivers for implementing TDR as an urban planning and development concept. The findings will help address gaps in modernization and lack of funding for conservation and preservation.





## 2. Methodology

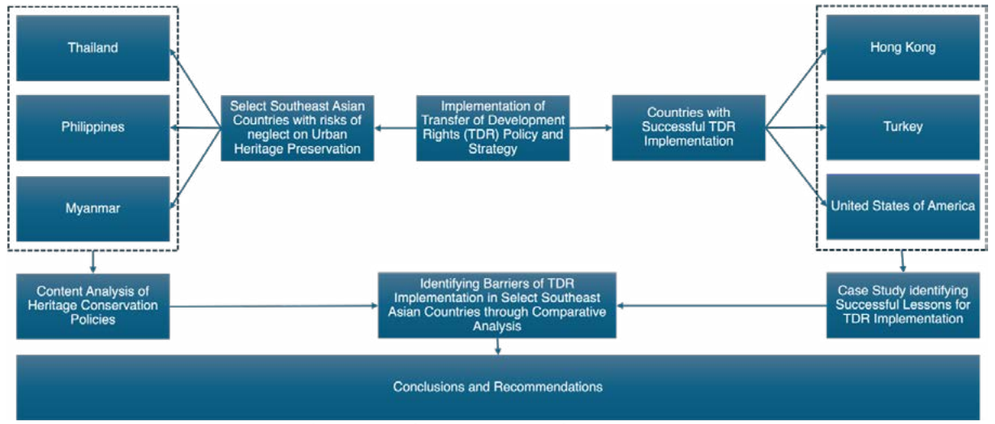


**Figure 1 Theoretical Framework of the Study (Source: Authors)**

This study uses case studies, content analysis, and comparative analysis to analyze successful and acceptable TDR implementation in Hong Kong, Turkey, and the United States and select Southeast Asian countries with risks of neglecting urban heritage preservation and their policies. The findings are compared to identify barriers and drivers for implementing TDR in these countries, aiming to eliminate potential risks.

### 2.1. Case study of successful countries implementing TDR

Using a case study approach, researchers identified three successful countries implementing TDR, two from Asia and one from North America. They aim to extract lessons and identify constraints, compare heritage laws and policies in Southeast Asian countries without TDR, and identify barriers.

#### 2.1.1. Hong Kong

In Hong Kong, implementing the TDR is mainly utilized as a conservation incentive, from a concept for urban development intended to decentralize neighborhoods from micro to macro level urban developments with appropriate government support and facilitation. To manage urban growth densities, the TDR system in Hong Kong became an enabling instrument. TDR also influenced land use and zoning laws by establishing sending and receiving zones for development rights, promoting balanced urban development. To conserve its heritage, Hong Kong established a system in which heritage assessment certification was needed before development rights were transferred. The heritage assessment certification and comprehensive assessment parameters provide standards for measuring TDR values and determining sender and receiver compensation. Through its systematic approach, Hong Kong established identified growth and preservation nodes around the country (Hou, 2017; Li, 2008).

**Figure 2 Ohel Leah Synagogue (in lower middle), a historic site in Hong Kong that utilized TDR as a measure for heritage preservation, surrounded by high-rise buildings (Source: https://images.app.goo.gl/NTTXTtUzD787BBE48)**

Hong Kong has successfully implemented TDR for historic buildings despite challenges such as high market demand, low returns, and discretionary transactions. The government and local authorities are working to improve the system, implementing stricter regulations and incentives for those who follow the policy. This has led to transparent transactions, urban developments, and public green spaces. Heritage buildings have received more funding and support, generating economic returns. One successful example is the Ohel Leah Synagogue, which sold its TDR rights to maintain its condition. (Hou, 2017; Li, 2008; Vichienpradit, 2024).

### 2.1.2.Turkey

Turkey's Culture and Cultural Heritage Law established TDR in 2004 as an alternative income source. However, the lack of regulation led to abuse and misinterpretation, making TDR an instrument for political, social, and financial pressures. The local government should establish a TDR Bank to facilitate transactions, including location, acquisition, and operation limits, subject to approval by management units and authorities. (Guzle et al., 2020; Konbul & Yanalak, 2022).





**Figure 3 The historic Kemeralti Bazaar in Izmir, Turkey (Source: Wikimedia Commons)**

To further meet the objectives of the law for maintaining a large market for conservation and development, as well as preserve essential landmarks and built heritage. Comprehensive zoning policies are envisioned to reinforce these outcomes. In the case of the Historic Kemeraltı Bazaar in Izmir (See Figure no. 3), the implementation of TDR following the Culture and Cultural Heritage Law is high time. However, implementing TDR, a complex process involving the conservation of registered historical, cultural, and natural assets, requires a comprehensive guideline specifically underscoring measures for heritage conservation. This is necessary to make the law and its objectives feasible (Guzle et al., 2020; Konbul & Yanalak, 2022; ÇİÇEK & ÇAY, 2018).

### 2.1.3. United States of America

TDR was first introduced in the USA in the 1960s, but there is no binding law or policy mandating compliance in its implementation. Successful TDR implementations in the USA include Livermore, California, Dade County, Florida, New Jersey Pinelands, and Montgomery County. A framework for assessing TDR success based on 14 U.S. TDR case studies includes political foundation, uniform regulatory process, sense of place, resources, public acceptance, suitable receiving areas, TDR leadership, mandatory programs, TDR bank, compatibility with PDR, simplicity and cost efficiency, and knowledge of development and local land use demands. TDRs are widely used in the U.S., preserving at least 300,000 acres of agriculture, natural regions, and open space across 33 states. (Aken et al., 2010; BenDor et al., 2022; Chan & Hou, 2015; Kaplowitz et al., 2008; Linkous, 2016; Vichienpradit, 2024).

## 2.2. Content analysis of Southeast Asian countries' policies for TDR implementation

Southeast Asian countries like Thailand, the Philippines, and Myanmar are working on heritage preservation policies but lack a definitive TDR policy. Content analysis of these policies can help identify potential barriers and consider TDR an acceptable tool for urban heritage preservation, comparing them to successful case studies.

### 2.2.1.Thailand

The rapid urban development posed challenges to the old urban communities and heritage sites. The market-driven real estate development and the government's prioritized mega infrastructure projects create new urban centers that are competing against the old urban centers, and the mass transit stations in old urban centers increase the land values in historical areas, leading to the new development (Siriphatthanakun, 2023). In addition to the modern development projects, the country's tourism agenda

and commercial interests usually affect the historical communities and their heritage (Tantinipankul, 2013). According to Thailand's legal frameworks, the conservation of urban heritage is generally overseen by the regulations of the Fine Arts Department, the regulations of the Office of Natural Resources and Environmental Policy and Planning, the measures from the Town Planning Act 2019, and some area specific plan for instance the "Master Plan of Conservation and Development of Krung Rattanakosin 2032" (Issarathumnoon, 2020). However, these regulations focus primarily on the landmark's heritage and are less concerned with the less valuable and ordinary buildings. And they are known for their rigid framework and lack of incentives (Issarathumnoon, 2020; Richter et al., 2020).

One of the recent attempts to pour incentives for heritage conservation is the air rights transfer (ART) program by the Planning Office of the Bangkok Metropolitan Administration (BMA) in 2017 (Pimonsathean, 2022). The program allows the owners of low-rise buildings in the heritage district or zone to sell their unused air rights above their building to another site developer who wants to build higher than zoning regulations. It tries to provide economic viability to the owners while encouraging them to protect the heritage site or the building. Yet, it is still a voluntary scheme, and details such as the sending and receiving areas were not provided.

Along with the Bangkok City Plan (4th revision), the government initiates the idea of transfer of development rights (TDR) that shall be applied on the land plots with a heritage building or the plots in rural and agricultural conservation areas (Katharangsiporn & Sangwongwanich, 2018). The TDR can be sold to developers from plots within 500 meters of mass transit stations. Vanchai Thanomsak, director-general of the City Planning Department for the Bangkok Metropolitan Administration (BMA), said, "Some landowners may not want to utilize their land to the fullest. Their plots may allow for the construction of high-rise buildings, but they only want to build houses. They can profit from the difference between their development rights and those they use" (Katharangsiporn & Sangwongwanich, 2018). This aims to provide heritage building owners with financial resources to keep their buildings from alterations or demolitions and increase land utilization. Therefore, it can be said the government's shift towards TDR is not purely for heritage preservation, and it is still unknown how much TDR sales will impact the urban heritage sector in Bangkok. Currently, the draft City Plan is under public hearing until August 2024, and the citizens are encouraged to send their opinions directly to the Bangkok Urban Planning and Development Office, making it an inclusive policy framework with a high public participation rate.

### 2.2.2. Philippines

Under the Philippines' National Cultural Heritage Act of 2009, the country's cultural properties are classified as National Cultural Treasures, Important Cultural Property, World Heritage Sites, National Historical Shrine, National Historical Monuments, and National Historical Landmarks (Republic of The Philippines, 2009). All the heritage officially declared as national cultural properties are entitled to priority government funding for their preservation works, incentive for private support, official heritage marker, and priority protection by the government in times of armed conflict or state of emergency. Specifically, sections 35, 36, and 37 of the National Cultural Heritage Act describe the incentive programs such as tax exemption on donations to the National Commission on Culture and the Arts (NCCA) and related cultural agencies, National Heritage Resource Assistance Program that provides financial assistance in the form of grant to organizations and agencies that work for the heritage preservation and research, and lastly awards and citations for unique and essential contributions and services for heritage preservation. In the case of private owners of cultural properties, the NCCA may agree to the terms, including the financial assistance provision and dispute resolutions, with the owners to preserve their properties. The provision of incentives for conservation in the form of tax relief and fund appropriation is also mentioned in the Philippine Heritage Charter's Principle 9 (National Commission for Culture and the Arts, 2022).





On the other hand, the private owners of heritage properties are prohibited from demolishing, altering, or defacing the buildings or conducting any construction or real estate developments without prior written permission from the NCCA. According to the Urban Land Reform Act, "development rights," also known as "new use rights," are defined as the right to use or implement improvements for a more intensive use or a more profitable use by increasing the density or so (Republic of The Philippines, 1978). The act provided the guidelines for land acquisitions or assembly through expropriation or negotiated purchases from individual owners and land exchange for another piece of land of equal value in government or quasi-government corporations. According to this, the landowner where the heritage building is can either sell their land and property through negotiated purchase to the government or cultural preservation agency or swap their land with another of estimated similar value under the government's corporation (Dulay, 2024). Based on the act, the development rights seem to be attached to the land, and there is no mention of a separate sale or exchange of development rights from the land. In a city like Metro Manila, where its urban landscape has drastically changed in the previous 60 years (Okyere et al., 2015), modernization has affected some of the Philippines' heritage sites by growing real estate projects or the government's prioritization for tourism, economic and infrastructural development projects (Nepomuceno, 2021). The high-rise real estate developments not only diminish the aesthetic visual of the heritage buildings but also adversely affect the authenticity of the context of the heritage site. Heritage buildings are not only negatively affected by modern developments, but the cost to preserve them is shouldered either by financial incentives allowed by the government or their funding. This calls for another intervention that can balance the growth of modern development projects and the preservation of heritage buildings in the city and share the financial responsibility of preservation expenses between the government, owners, and private developers.

### 2.2.3. Myanmar

Yangon is one of the cities in Asia with a high concentration of colonial architecture, with an estimated number of 2,000 properties dating back to the 1950s, which are principally prevented from rapid modern developments by an extended period of political and economic sanctions claimed by U Toe Aung, director of Urban Planning Division (Aung, 2015). However, much of Yangon's urban heritage has been replaced by high-rise buildings, office towers, and commercial places. In addition to the replacement by the newly developed projects, many of the city's colonial-era buildings are facing the danger of deterioration due to natural disasters and the state of abandoned, especially after the capital moved to Nay Pyi Taw in 2005 (Frauke Kraas et al., 2015).

The heritage, both tangible and intangible, in Myanmar is protected by sets of laws, primarily the Protection and Preservation of Cultural Heritage Regions Law (1998) (The State Peace and Development Council, 1998), Law on the Preservation and Protection of Ancient Buildings (2015) (Pyidaungsu Hluttaw, 2015a), the Protection and Preservation of Ancient Monuments Law (2015) (Pyidaungsu Hluttaw, 2015b), and Yangon City Municipal Law (2018) (Yangon City Development Committee, 2018). These legal frameworks mandate that government departments such as the Ministry of Culture and the department under the Yangon City Development Committee (YCDC) protect the country's heritage. Although these legal documents define the terms and highlight the hierarchy in heritage preservation, they are merely concerned with the policies and incentive programs to protect the heritage. Regarding heritage preservation, the Strategic Urban Development Plan of the Greater Yangon 2013 presented the strategy for realizing an attractive urban landscape suitable for an international city through the conservation and utilization of historic buildings. It proposed heritage protection and conservation zones in controlled urban redevelopment and urbanization control areas (Yangon Region Government et al., 2013). The zoning regulations now have imposed height regulations for the Shwe Dagon Restricted Area (SDRA) in which the

buildings in the three sub-areas under SDRA are not allowed to build with heights beyond 62 ft, 190 ft, and 417 ft, respectively (Yangon City Development Committee, 2020).

The current regulatory frameworks for heritage preservation in Yangon lack coordination among the implementing government departments and sometimes the regulations themselves. Particularly in Yangon, where the conservation zone falls into the Central Business District (CBD) with high land value, regulatory frameworks are required to accommodate both the needs of conservation and economic development. However, due to the lack of transparency in the privatization process and the weakness in the rule of law, controversial projects such as 68 Residence Luxury Condominiums in Bahan Township broke the zoning regulations (Frontier Myanmar, 2016). The current laws, building codes, and zoning regulations do not include incentives that encourage the citizens to be more cooperative and compensate the owners of buildings in restricted and conservation zones for compromising their development rights.

To foster the heritage preservation process and increase infrastructure and economic development, Yangon needs heritage-led development strategies and additional incentives such as transfer of development rights (TDR) that promote preservation but also appreciate the economic values of the heritage buildings.

## 3. Results

There are specific remarkable characteristics that Hong Kong, Turkey, and the US have in common from the effective execution of the transfer of development rights programs. The most obvious is their defined objectives. Conservation is the main reason any nation implements TDR. Other goals are also determined based on each nation's needs and environment. For example, with the conservation objectives, TDR also aims to raise urban growth densities in Hong Kong. For Turkey, it would mean finding a different source of income and legally exceeding restrictions and regulations over developments to be acceptable; for the US, it would mean simultaneously achieving both conservation and development objectives. Therefore, before beginning the implementation process, the countries should consider having the correct and explicit aims and objectives for implementing TDR. That is what Myanmar, the Philippines, and Thailand must specify. As with the heritage assessment certificates in Hong Kong and the restrictions on location, purchase, and operation in Turkey, the successful case studies also include control elements that are used to prevent the TDR from being misused. Simultaneously, they include supporting elements like attractive incentives or better public access to TDR information. Another thing in common with these countries is the presence and intervention of a governing body through TDR banks. Selling development rights is one thing. However, managing and facilitating it is another primal consideration. Hence, a mediating body might be essential in effectively executing TDR. Institutionalizing a law or policy for TDR implementation may or may not be required since a mediating body will be present. The researchers believe a TDR policy and principle may be enough for the national and local governments to institutionalize the TDR. However, with the advent of passing laws for implementation, it should not be too restrictive or too relaxed to avoid potential abuse or resentment of TDR as an urban development concept.

As already said, Thailand, the Philippines, and Myanmar have yet incentives to draw prospective TDR buyers and sellers. Except for Thailand, where their comprehensive city plan is now undergoing public hearings and requests for public comments, public recognition of the implementation of TDR could be higher. Every approach and program utilized, in the meantime, might have different outcomes. Lack of some measures could be acceptable for one nation but disastrous for another. With the obligatory rules, for instance, TDR is workable and effective in the United States, but Turkey needs more law enforcement for TDR. Thus, it is necessary for the nations implementing TDR to match the success indicators with their situations. But regardless of the problem, a governing TDR policy and principle may be a suitable course. These countries should give options for potentially safeguarding their built heritage.





## 4. Discussions, conclusions, and recommendations

TDR can be a tool to mediate the contesting demands of new urban development and to conserve the past. The comparative and content analysis of successful TDR implementation in Hong Kong, Turkey, and the United States highlights the importance of setting goals and scopes that are well-suited to the needs of the city and having adequate controls such as limitations, assessments, and certificates for TDR doable land and zones (both receiving and sending). It supports incentives, TDR banks, and public participation and awareness. They also validate that the success factors and pain points can vary depending on the local context, underlining the need to localize the international TDR standards and criteria. However, it can also be a misused disaster, risking the heritage. The definition and concept of TDR might be simple, but putting it into practice is complex and requires details. For countries like Thailand, the Philippines, and Myanmar, where TDR is not fully practiced yet, a comprehensive framework or guideline is required that is contextualized to the needs of each country with good governance coordination, transparency, and public participation.

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## SPECIAL SESSIONS

1. **Health for All: Exploring Regenerative and More-Than-Human Cities for Co-Existence and Well-Being**
   ISOCARP and Cities and Health Journal: Special Issue Workshop
2. **Building Regenerative New Cities through Landscape Architecture and Planning**
   ISOCARP and The International Federation of Landscape Architects (IFLA)
3. **Urban Café**
4. **Indonesian-Phillipines Dialogue: Enhancing The Role of Environmental Planning in Achieving National Development Vision**
5. **Empowering Women to Shape Resilient and Inclusive Cities: Diverse Perspectives on Planning for a Sustainable Future**
6. **Resilient Urban Futures: Cultivating Culturally Rooted and Adaptive Cities for Global Health and Sustainability**
7. **Nusantara: An Inauguration of Regenerative Urbanism**
8. **The METROSIM (IMF Collective Intelligence Metro Game)**
9. **Are Smart Planning Tools Failing Rapidly Urbanising Cities?**
10. **Contemporary Ambitions for International New Settlement Planning**



60th ISOCARP
1965 WORLD PLANNING CONGRESS
2024 DIAMOND ANNIVERSARY

# 1st INTERNATIONAL CONFERENCE FOR NEW CITIES

## PLANNING NEW REGENERATIVE CITIES

10-13 SEPTEMBER | NEW CLARK CITY TARLAC | PHILIPPINES

## ISOCARP and Cities and Health Journal:
### Special Issue Workshop

Following our successful first special issue with the Cities and Health Journal from the previous congress on **Planning for neighbourhoods that support the well-being of all communities,** this special session workshop explored research needs, contemporary practices and innovative approaches; that seek to transform processes and outcomes to support lasting population well-being in a rapidly changing world.

On the one hand, we as planners have a clear mandate to shape environmental conditions so that people can prosper in place. On the other hand, designing, planning, developing, and managing places for a low-carbon future is a highly complex task that often does not achieve the desired outcomes under a business-as-usual paradigm. Health inequalities and spatial in(justice) leave deep scars through cities, and the healing of such scars requires cross-sectoral collaboration between public health and the planning and design community.

The focus of the workshop was on regenerative and more-than-human cities. Participants were invited to explore the nexus and exchange their concerns and challenges with each other and experts in the field. This session was open to all ISOCARP members, from practice and academia, to co-create a call for contributions for a special issue of Cities & Health. An interdisciplinary group of city governance officials, public health and urban planning professionals and students actively contributed to the brainstorming, and many put their hand up to serve as a reviewer or contributors.

Initially, Gregor Mews and Hannah Arnett outlined the session's aim, objectives, and key concepts and aspects of the theme.

To remain at the forefront of making decisions about the future of the built environment, we started an ideation session with themes (as outlined below) to explore the scope for the next special issue:

- **Regenerative – doing**
  Recognise this is humans, animals and environmental health
- **Performativity – contextual**
  Need to soften the boundaries between humans and objects
- **Stewardship – positionality**
  Recognise we have a role to play as part of nature (stewardship) to balance socio-ecological relationships as a complex system
  Critical to safeguarding health.

As part of the refining process of the theme and the lead questions, each table reported back with rich suggestions that can be categorised into three aspects. Participants identified a need to explore the meaning of what regenerative city is in practice as ‘more-than-human’ is not a popularised term outside of the academic literature.



First, they highlighted a **need to recognise more than human/regenerative cities as a decolonial concept that captures broader understandings of health and community-led approaches.** This included the impact of colonisation on urban planning and loss of identities with historical legacy impacting mass transportation system, i.e. America’s car-centric approach disregarded the use of streets in the Philippines. In addition, the concept of health is to be considered as ‘holistic’ and needs to emphasise community-based approaches. In particular, the need to identify common health problems and causes and the need to transform social behaviours to achieve holistic lifestyles.

Second, **the development of urban blue and green infrastructure is part of performative practices.** The group found there is a need to invest in green infrastructure to support walking and cycling methods in the context of climate change, i.e. shade for pedestrians, and drainage solutions for rainy seasons. Furthermore, practical approaches are needed, which are conceived as ‘SMART’.

Third, **implementation and governance barriers in relation to the stewardship role need to be considered.** This includes the implementation of evidence and solutions that require incentivisation. Diverse participatory methods are essential, and cyclical design processes need to be recognised. Adequate statutory mechanisms are necessary for sustainable cities. Indonesia is an example of such regulation with its strategic environmental assessments. City leadership has a key role to play and must recognize that today’s decision-makers were once yesterday’s children, emphasizing the importance of educating the next generation. All of these should recognise funding needs and identify solutions to address the abovementioned matters.

# ISOCARP and The International Federation of Landscape Architects (IFLA)

## Session Description

As we envision the future of cities, landscape architecture offers a transformative approach to building culturally rooted, healthy, and inclusive new urban environments. This session explored how landscape design can foster a strong sense of community, celebrate local heritage, and cater to the diverse needs of residents within new developments. We will delve into the critical role landscape architecture plays in promoting biodiversity and creating healthy ecosystems. The session will showcased integrating nature-based solutions to improve air and water quality, manage stormwater effectively, and enhance thermal comfort in new cities.

Furthermore, the session will highlighted the importance of green infrastructure as a key strategy for mitigating climate change impacts, reducing flood risks, and fostering walkable and cyclable transportation networks, promoting a healthy and sustainable lifestyle.




# Urban Café: Interactive Discussion Room for the 1st International Conference for New Cities

## Session Description

The Urban Café was an interactive discussion room and open space for conference participants to deepen their appreciation of themes and topics covered at the '1st International Conference for New Cities'. It brought together a lean but dynamic group of city and regional planners, academics, environmentalists, and development practitioners for an exchange on key themes and critical reflections around planning new regenerative cities.

The interactive discussion was moderated by Mr Marvin Lagonera, City Advisor for Southeast Asia and South Asia at the Global Covenant of Mayors for Climate and Energy (GCoM), who brings with him a decade of experience as an urban climate change specialist working with cities in the Asian region in building climate finance readiness.

**Main objectives of the session:**

- Deepen participants' appreciation of themes and topics covered during the conference
- Provide a platform for participants to engage in conversations about planning for new regenerative cities, and explore in-depth various issues of sustainable urban development against the backdrop of the triple planetary crisis and digital transformation
- Foster collaboration, networking, and knowledge sharing among participants, enabling them to share their areas of interest and work, and engage key themes and topics covered during the event

**Main elements of the discussion:**

The Urban Café began with a structured presentation by the moderator, which outlined key themes related to the concept of a "new regenerative city." These themes were drawn from previous sessions at the conference, including the opening debate and track-specific discussions.

The following themes emerged as central to planning and shaping regenerative cities:

1. Co-existence with nature and promotion of circular economies: The importance of resource management, ecosystem restoration, nature-based solutions, and a ridge-to-reef approach was emphasized as key components of regenerative urban planning.
2. Alignment with the Sustainable Development Goals (SDGs): The SDGs were identified as central to regenerative cities. However, discussions also raised concerns about the overuse of the term “sustainability” and the potential redundancy of introducing a new concept of a “regenerative city” in relation to “sustainability”.
3. Multi-stakeholder and community-based approaches: The role of community participation and inclusion was highlighted. Questions raised included: What does a regenerative city mean for those who will be living in these new areas? How can you create a ‘sense of community’?
4. Local rights and traditional knowledge: Emphasis was placed on the importance of protecting local land rights and integrating traditional knowledge systems for effective resource management.
5. Interrogating urban density: Participants challenged the ideal urban density, exploring the balance for efficiency and resilience. Question raised included: What is the "sweet spot" for density?
6. Building disaster and climate resilience in a warming planet: Urgency around climate change was voiced, with a focus on how regenerative cities must build resilience to climate impacts such as typhoons and flooding.

The participants were then invited to share and discuss their critical reflections about these themes, and how they felt about the conference discussions. The following were the guide questions:

1. What themes or topics did you find to be particularly important to highlight?
2. Was there any insight in the conversations that surprised you?
3. What topics or gaps in the discussions would you like to explore further?

**The following describes three umbrella themes that emerged from the discussions:**

1. Principles of equity, inclusivity, and community-based participation in regenerative cities: Participants emphasized the importance of ensuring community voices are heard and that benefits are distributed equitably. Concerns were raised about the potential exclusionary nature of new regenerative cities, which may disproportionately serve elite or upper-middle-class segments. Key questions included: Who are these cities for? and What are the main goals and objectives? The need for community-based consultations, strong social integration, and active engagement of marginalized groups—such as youth, the informal sector, and the urban poor—was highlighted as essential for inclusive planning and decision-making.
2. Transforming the relationship between humans and nature: A core principle for regenerative cities is to rethink and transform how humans relate to nature. This involves not just revitalizing urban spaces through nature-based solutions, biodiversity protection, and resource management, but also positioning nature at the heart of urban development. As noted in one of the plenary sessions, a regenerative city aims to "maximize nature" by rethinking consumption and production patterns. This paradigm shift calls for a deeper reflection on how humans interact with both the natural environment and one another.
3. Resource efficiency and resilience across scales: The equitable production and distribution of resources — such as arable land, fresh water, clean water, and agricultural products — were highlighted, particularly in the context of a changing climate. Participants stressed the need to rethink the metabolic processes of cities, including how resources are consumed and disposed across scales. With growing populations and climate challenges, new strategies are required to ensure the resilience of food systems, water supplies, and urban infrastructure in the face of these pressures.

**Moving forward**

The umbrella themes highlight that the concept of "new regenerative cities" involves more than incremental changes. Rather, it calls for transformative shifts in areas such as equity, social integration, the relationship between humans and nature, and resource efficiency, with a strong focus on climate resilience.

Moving forward, the following critical questions can be considered for future conversations:

1. How can new regenerative cities benefit broader segments of the population, such as low-income families, youth, informal settlers, migrants, and other disadvantaged groups?
2. How can the concept of new regenerative cities help shift norms, practices, and mindsets, particularly regarding urban growth and development?
3. How can resilience be embedded in planning regenerative cities, ensuring their adaptability in the face of a rapidly changing climate?

## **Indonesian-Phillipines Dialogue:** Enhancing The Role of Environmental Planning in Achieving National Development Vision

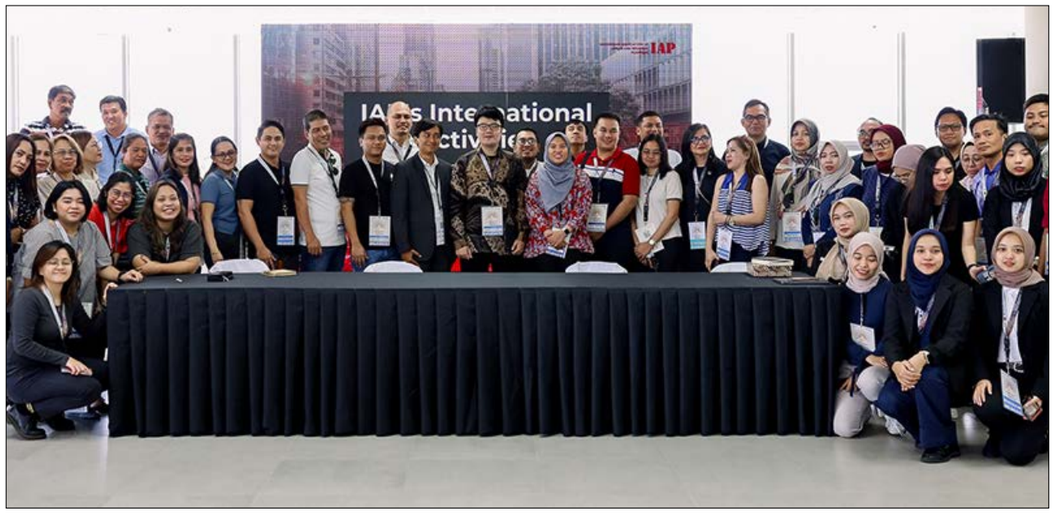
Environmental planning is vital for archipelagic nations like Indonesia and the Philippines, which face unique vulnerabilities due to their geography. In the midst of the triple planetary crisis - climate change, biodiversity loss and pollution - effective planning is key to sustainable development. Small islands are particularly vulnerable to rising sea levels, coastal erosion and extreme weather events, threatening livelihoods, ecosystems and cultural heritage. Environmental planning also underpins the achievement of the Sustainable Development Goals (SDGs), particularly those related to climate action and biodiversity. This session will focus on strengthening its role in realising the national development visions of Indonesia and the Philippines.

Tri Agustin, the first speaker, highlighted the commitment of the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency of Republic of Indonesia to sustainable spatial planning. The Ministry focuses on developing compact, green cities, protecting natural boundaries, reducing disaster risks, conserving forests, ensuring food security, and integrating strategic environmental assessments (SEAs) into spatial plans (RPs). However, challenges remain, including limited accurate data, insufficient state-owned land, budget constraints, uneven regional human resource capacity, and local leadership that often deprioritises spatial planning. In addition, issues such as the potential abuse of automated permitting systems and extensive private or corporate land holdings further hinder the effective implementation of sustainable spatial planning initiatives.

The second speaker, Erick, emphasised the critical role of environmental planning and protection in development plans, spatial planning and climate change mitigation and adaptation strategies. He highlighted the legal basis provided by Indonesia's Law No. 32 of 2009 on Environmental Protection and Management, which mandates the government to undertake environmental planning through activities such as environmental inventories, ecoregion establishment, the assessment of environmental carrying capacity, and the formulation of environmental protection and management plan. These principles serve as a cornerstone for integrating environmental considerations into national and regional development efforts.

Erick also stressed that Indonesia's environmental planning is consistent with global commitments, including the Sustainable Development Goals, Nationally Determined Contributions (NDCs) and the pursuit of net zero emissions. He called for a more robust framework to support the implementation of environmental planning, emphasising the importance of governance, financing mechanisms, and integrated information systems at all levels, from national to local government. By strengthening these aspects, Indonesia aims to achieve the 'Golden Indonesia Vision 2045', characterised by low-carbon, climate-resilient and sustainable development that balances economic growth with environmental protection.

The third speaker, Maria Cynthia, built on the insights of the previous speakers by emphasising the importance of environmental planning and its implementation at the site level. Drawing on his professional experience, She highlighted the multidisciplinary nature of environmental planning, which requires the integration of different fields and expertise. In the Philippines, for example, the profession of environmental planner is well established, with architects and urban planners also eligible to become environmental planners. He stressed that environmental planning needs to be responsive and adaptive, taking into account broader issues such as sustainable water and land management, while ensuring resilience to disasters. These approaches not only strengthen the effectiveness of environmental planning, but also promote sustainable and disaster-resilient development at all levels.




## Empowering Women to Shape Resilient and Inclusive Cities:
Diverse Perspectives on Planning for a Sustainable Future

### Session Description

This special session aimed to explore the multifaceted role of women in shaping resilient and inclusive cities, drawing on diverse perspectives and expertise. It examined the critical contributions women make in various aspects of urban planning and development, including disaster risk reduction, academia, and community engagement. The session highlighted the unique challenges and opportunities women face in the planning profession and explore strategies to amplify their voices and leadership.

**Key Themes:**

- **Women at the Forefront of Disaster Risk Reduction:** Examining the critical role of women in disaster preparedness, response, and recovery, and how their knowledge and leadership contribute to building more resilient communities.
- **The Academic Perspective:** Nurturing the Next Generation of Women Planners: Exploring the role of academia in promoting gender equality in the planning profession, providing mentorship, and fostering research that addresses the specific needs and priorities of women in cities.
- **Amplifying Women Planners' Voices and Needs:** Creating a platform for women planners to share their experiences, challenges, and aspirations, highlighting the importance of diversity and inclusion in shaping the future of cities.
- **Gender-Responsive Planning and Design:** Examining how planning and design practices can better incorporate the needs and priorities of women, ensuring equitable access to resources, services, and decision-making.




## Resilient Urban Futures: Cultivating Culturally Rooted and Adaptive Cities for Global Health and Sustainability

### Session Description

This session addressed the critical need for resilient, adaptive, and culturally inclusive cities, focusing on incorporating indigenous perspectives into urban development. It explored how urban environments can be designed to thrive amidst climatic, ecological, and societal changes. Participants examined innovative technologies, adaptive resource management, and cultural inclusivity to promote urban health and sustainability, using a transdisciplinary approach to foster sustainable development harmonized with cultural identities and local ecosystems.

Aligned with the ISOCARP's 60th World Planning Congress's focus on pioneering sustainable urban futures, this session contributes to a global dialogue on creating new urban paradigms that are adaptive and culturally resonant. The session addressed the complexities of integrating indigenous knowledge and practices into urban planning to enhance community health and resilience.

## Nusantara: An Inauguration of Regenerative Urbanism

On 17 August 2024, Indonesia inaugurated its next President, Prabowo Subianto, amidst the construction site of the nation's new capital city, Nusantara. The pomp and ceremony did not focus on the new city and the possibility that this extraordinary urban project might be about inaugurating a radically new model of urbanisation. This special session addressed the ongoing criticism and scepticism in the Western media about the environmental impact of the new capital city by suggesting that Nusantara has a historic opportunity to be the first-ever city that produced more environmental benefits than costs. The theory of Regenerative Urbanism suggests that when a city's growth and operations are conditional on restoring the ecosystem at a scale larger than the city's ecological footprint, it represents a case of 'nature-positive urbanisation. The session leaders 'current engagement with the OIKN, the new capital city authority, offers hope that this historic opportunity will not be missed.

Andy, the first speaker, stated that Nusantara is designed to connect to the other cities in Kalimantan and create an integrated city system. This strategy establishes the Trans-Kalimantan economic corridor by sizing and scoping Nusantara and projecting the development scenario for Kalimantan as a whole. He emphasized the importance of strengthening relations with existing cities like Samarinda and Balikpapan should be strengthened. He is also eyeing a Tri-Cities plan. Planning should integrate services to avoid duplication. Nusantara's realisation should not significantly disrupt Kalimantan's regional urban system and archipelagic Indonesia's national urban system.

The second speaker, Dimas, pointed out two additional projects relating to the development of Nusantara Capital City that extend beyond the boundaries of the existing master plan and construction of the city.

These include the construction of a supporting satellite city, Penajam Eco-City, to mitigate the problem of uncontrolled urban expansion and a scoping study on the livability and lovability of Nusantara.

Dimas noted that Nusantara's urban development is expected to expand, establishing a new metropolitan area with Samarinda and Balikpapan, creating a metropolitan triangular area of Nusantara-samarinda-Balikpapan. With the new airport being built and toll roads connecting these three areas, there is the likelihood of metro conurbation similar to what happens in most other cities around Indonesia. The stand-alone satellite city Penajam Eco-City, therefore, makes it possible to seek to minimise urbanisation pressure around Nusantara.

Along with this, the recent efforts in Nusantara go beyond just the aspect of making it a livable city and rather focus on making it a "lovable" city. This vision is being advocated by a project launched by the Asian Development Bank (ADB) for the Nusantara Capital City Authority (NCCA). The study advocates the need to articulate the concept of developing Nusantara as a wholly lovable city with an integrated sense of place and a sense of community.

This would promote emotional bonds amongst residents and visitors with the city and encourage shared ownership and co-development. As part of the plan, the project has also targeted major infrastructure development to speed up the transformation of Nusantara into a lovable city. This includes investment in the development of public spaces and parks, food courts, the rehabilitation of forests and botanical gardens, cultural institutions, ecotourism projects, and smart village projects.

The third speaker, Dushko, underscored that achieving sustainable and environmentally conscious development for Nusantara requires a regional perspective. He emphasized the importance of considering Nusantara's role within the broader regional context to ensure long-term success. Nusantara could become the world's first city to achieve both carbon-negative and nature-positive status (Regenerative Urbanism). However, this is very difficult since cities are parasitic and entropic. Achieving this at a regional scale is possible. By expanding the meaning of the 'sorest city' paradigm: to mean not only that such city is resembling forest ecosystem in its internal functioning - including literally nourishing fragments of forest in its midst, but also restores real forest on a vast scale, on suitable land in its peri-urban and ex-urban vicinity: REGENERATIVE URBANISM. The solution would be: Nusantara should lead by example an ambitious, long-term programme of ecological regeneration of the local forests of Kalimantan by tying its future physical and metabolic expansion to re-forestation of an adequate territory in its region. This territory ought to be larger than the physical footprint of the city by anywhere between 10 and 50 times, depending on the success of its infrastructure and building designs, as well as the behavior of its citizens, in terms of eco-efficiency and self-sufficiency of the city proper.

# The METROSIM (IMF Collective Intelligence Metro Game)

## Session Description

The METROSIM (IMF Collective Intelligence Metro Game) was a dynamic, collaborative simulation directly addressing the urgent need for metropolitan–scale solutions. It empowered participants to:

- experience the Power of Collective Intelligence: The simulation demonstrated how collaboration drives innovative solutions for complex urban challenges
- grasp the Metropolitan advantage: participants gained a firsthand understanding of why the metropolitan scale is crucial for tackling global issues like climate change, housing and health, transcending city-centric planning.
- build strategic skills: METROSIM fostered integrated thinking, spatial analysis, and collaborative decision-making, essential competencies for addressing the projected growth of urban populations

The session was organized by the International Metropolitan Fellowship (IMF), an international organization composed of more than 250 professionals and academics, spread across 8 global chapters, aims to pioneer, spread and advocate the metropolitan discipline. The session was led by its former global president and current leader of the IMF Austronesia Chapter, Mark De Castro, an Architect and Environmental Planner, who facilitated the METROSIM. Architect and Environmental Planner, Dinky Einsiedel, Honoris Cause of the IMF will be a co-convenor for the METROSIM. The Philippine Institute of Environmental Planners National Capital Region- South Chapter (PIEP NCR South) served as collaborating partner for the special session.




# Are Smart Planning Tools Failing Rapidly Urbanising Cities?

This special session was led by Pari Sen Biswas and Joshua Vargas, researchers at the Future Cities Laboratory (Singapore-ETH Centre). They critically examined whether smart city technologies are capable of revolutionising urban planning practice and making data-driven insights accessible to urban practitioners. In rapidly urbanising cities across the Global South, planning support tool (PST) integration attempts have failed and continue to face infrastructural and systemic barriers to their adoption. These cities, often with diverse needs and complex challenges, require data driven approaches to respond well to intensifying urbanisation pressures.

The presentation delved into how one digital PST, ur-scape, was developed to respond to this very need. First presented at the 55th ISOCARP WPC, ur-scape is Future Cities Laboratory's open-source PST, iteratively developed for rapidly urbanising cities through collaborations with local governments. Ms Biswas and Mr Vargas, members of the ur-scape team, presented their insights from ongoing ur-scape capacity-building efforts in India and Indonesia, evaluating the limits and opportunities of the software and its practical application.

The presentation then opened into a group discussion on the participants' aspirations for innovation in urban science. 18 participants, divided in three groups, discussed the pitfalls of existing data-driven approaches in complex urban contexts and envisioned potentials for a future digital planning tool. They agreed that data fragmentation is the key issue faced by rapidly urbanising regions and highlighted the importance of common standards in ensuring data accessibility and interoperability. They believe that software should be easy to set up and integrate into existing workflows, rather than posing barriers such as proprietary licensing and incompatible file formatting. Lastly, they expressed a desire for tools that forecast possible future outcomes of planning scenarios. Participants discussed the benefits of new approaches like AI in achieving this goal.

## SPECIAL SESSIONS

# Contemporary Ambitions for International New Settlement Planning

The Royal Town Planning Institute chose ISOCARP's inaugural conference on new city planning to announce its upcoming research project examining current and recent practice in new settlement planning internationally. This special session was the start of a conversation about contemporary new settlement planning across the context of different regions and societies.

One of the running topics of discussion was how to initiate self-generating economic development within planned settlements: it is one thing to build a set of buildings, and another thing to facilitate the flourishing of a new community. There is a serious risk that 'new city' can in effect mean large-scale gated community, and that existing rural residents are seen as an obstacle rather than as partners. Ajat Jatnika presented development plans in the Bogor Regency area of Indonesia, south of Jakarta, which helped to set the scene for the discussion of good design principles and the challenges facing development at the edges of existing communities. For Dushko Bugonovich, high-density urbanism is inflexible and results in the recurrence of exclusionary dynamics. Bogunovich provided a particularly valuable ideological anchor for regenerative urbanism (a conference theme) as ecological, decentralised, and low density, and as the only option for an increasingly disaster-prone planet. David Mountain presented his historical research on Milton Keynes, in England, and shared ambitions for the upcoming RTPI research. The presentations were followed by a wide-ranging discussion, focussing on questions of new settlement scale, location and distribution. Discussion involved various audience participants and touched on matters such as the distinction between planning as design and idealism, verses as public administration.

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# Manifesto for New Regenerative Cities

The 60th World Planning Congress Diamond Anniversary Series, held in New Clark City, Philippines, included the so-called Do-Track: a special session exploring the concept of "New Regenerative Cities." This summary delves into the Do-Track's approach, key discussions, and outcomes, with the ultimate goal of creating a Manifesto for emerging cities.

### The Challenge of New Cities

Much of the planning world increasingly focuses on regeneration, bringing nature back into existing cities, climate change adaptation, and many other topics around already existing places. But what about the cities that do not yet exist? What about all the new towns, mainly emerging in the Global South? Here, we do not want to repeat the same mistakes of the past; instead, there is an opportunity to leapfrog innovation cycles and subsequently get them right on the first attempt. We cannot afford to create cities that are not resilient anymore. Getting it wrong and fixing it can be costly and will prevent us from bringing the earth's system back into balance before time has run out.

New cities are a widespread, global phenomenon. They are centrally planned projects, typically driven by a strong vision. Yet we see a huge gap between the vision they promote and its realisation. We regard this gap as a lack of Emotional Value embedded in the plan: the meaning that people, with their stories, give to a space.

### A Manifesto in the Making

The Do-track at the conference in NCC was a first step to test Placemaking as the participatory methodology for critical thinking, capacity building, and development of planning principles for new city planning. The goal is to produce a collaborative Manifesto for New Regenerative Cities.

The Manifesto will collect a series of urban planning principles for new town projects around the world inspired by documents such as the UN-Habitat Handbook with International Guidelines On Urban and Territorial Planning, among others.

The first Do-track in New Clark City focused on creating a framework for the Manifesto, which uses the location and the nature of a place, as a planned new city in the making, to frame it within a global perspective on future-proof, new, 'well-planned' cities. New Clark City was the starting point and first case-study of the Do-track, before opening the scope to all the newly emerging cities, mainly in South-East Asia, in the Indian Subcontinent and Sub-Saharan Africa.

With the Manifesto we want to offer an inspiring image and working document for regenerative city prototyping, to be refined and expanded through new cases worldwide with input from diverse stakeholders. The goal is to kick-start a conversation and offer a platform for exchanging ideas.

### Placemaking in New Cities

The Do-Track's Planning and Placemaking Charette was inspired by the University of Melbourne's (UoM) Placemaking Sandbox. This methodology equipped the participants with intellectual and creative tools to explore multiple place-based issues to support more resilient, inclusive communities.

The Do-Track aimed to amplify the long-term benefits of placemaking by strengthening connections between place, self, community, and nature. Through a series of workshops and practical exercises, participants engaged in critical steps of placemaking. It provided a series of workshops and practical exercises on the critical steps of placemaking. Placemaking is a way of shaping spaces to create meaningful experiences.

Placemaking is a worldwide movement that presents opportunities to increase the collective consciousness towards the fundamental rights of humans and non-humans to place. It is a process of engaging, building capacity, and empowering people with the knowledge and skills to shape positive public space outcomes, cultivate place attachment, sense of belonging, and place stewardship, all linked to engaged citizenship, positive health and well-being, and safer, more inclusive cities.

The Placemaking component of the Do-track covered the topics of people in place, nature in place, place leadership and governance and community engagement, place evaluation, and the economics of place. These discussions informed the creation of a framework for the Manifesto. Different models for placemaking were explored, such as tactical urbanism, guerrilla urbanism, creative placemaking, and regenerative placemaking, offering critical insights into diverse approaches to reimagining public spaces.

# PLANNING AND PLACEMAKING CHARRETTE

## The Do-Track in New Clark City

The Do-Track at WPC60 in New Clark City consisted of a series of lectures, workshops, site visits, and debates, which unfolded over three days. A group of around thirty participants joined the sessions, hosted by Giacomo Gallo, Harold Delima and Robert Younger.

The core idea of the Do-Track is to stimulate critical thinking by combining direct experience of places with research and design explorations. Therefore, in addition to the conventional conference sessions, we stimulated active participation through immersive placemaking workshops and went on site visits, engaging with locals, asking questions, immersing ourselves into the context where the conference took place.

The programme kicked off with a lecture exploring the definition of "New Cities" through examples from history and current planning projects. The master plan for the new town New Clark City served as the starting point and main inspiration for the discussion. What values, economic reasons, environmental forces, and ideologies drive the foundation of new cities? What factors determine the failure of several of these projects? But, most importantly, what can we do, as planners Wand designers, to make new town plans more sustainable, inclusive, and aligned with nature?

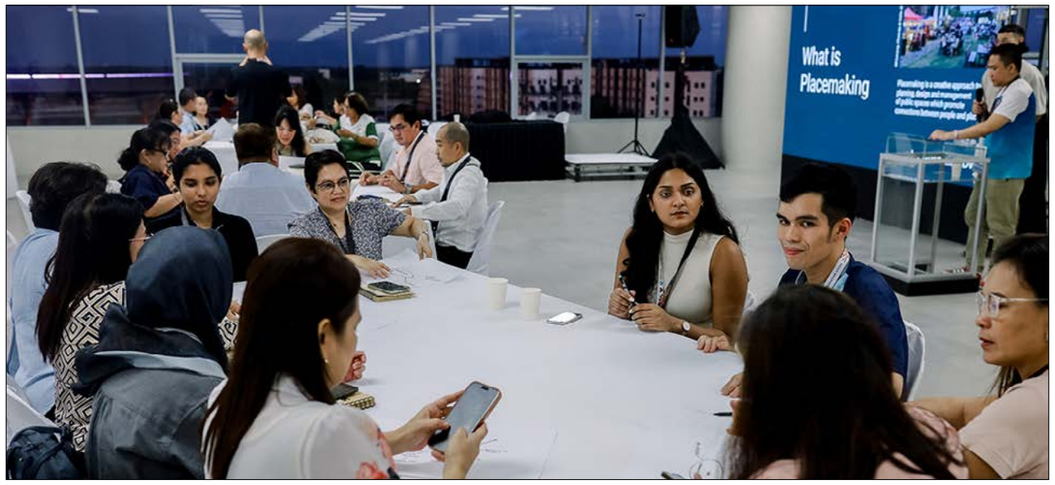
As the conference developed, two groups embarked in site explorations of New Clark City and the bordering village of Cristo Rey, a new town project on its own.

The visit to the grounds and surroundings of New Clark City focused on the border between landscape and city, exploring a river park project, as the central element in the current plan. One of the major highlights of this excursion was the understanding of the principle for regenerative city planning of "alignment with territory", emphasizing the need for the new city to respect natural borders and rhythms: a dimension that has been subsequently incorporated in the Manifesto.

The trip to Cristo Rey was of a more social nature, diving into the way people live the city in an "old new town", a planned settlement from the 1940s, now fully appropriated by its inhabitants. The group joined a meeting of the local administration (Barangay), interviewing the council and "captain". A key question was how the old settlers regarded the new city project under development next door; what opportunity they saw in it and how they were involved in the planning process.

Along the three days, several placemaking workshops took place, exploring the different dimensions of Place. Those were, namely, the workshops "People in Place", "Nature in Place", and "Place Evaluation".

Through these collective activities, we crafted an initial framework for the Manifesto, based on the four dimensions of Place: Self, Nature, Public & Private Space, Community. It is precisely at the intersections of these four dimensions that we looked for guiding principles for the Manifesto and discussed pathways for its implementation and dissemination.


# PLANNING AND PLACEMAKING CHARRETTE

The closing plenary of the conference provided an opportunity to present the results of the first Do-Track to the broader audience of conference delegates, ISOCARP, the local committee, and the Tarlac Province. We did this in a collective and festive way, engaging with the audience and marrying, in the spirit of the Do-Track, words and actions!

**Moving Forward: A Call to Action!**

Our work continues, developing the Manifesto with a group of planning and placemaking professionals, sharing knowledge at conferences and events, and testing it with stakeholders around the world.

The Manifesto for New Regenerative Cities aspires to be a living document – an inspiring framework and starting point for conversation and collaboration. The first-ever Do-Track provided a unique opportunity to test a new participatory methodology for critical thinking, capacity building, and developing planning principles for new town planning with professional planners, designers, and policymakers. After the experience in New Clark City, a core group of curators and participants is actively refining the methodology for future implementation in conferences, events, and workshops, within ISOCARP and partner organisations, such as UN-Habitat.

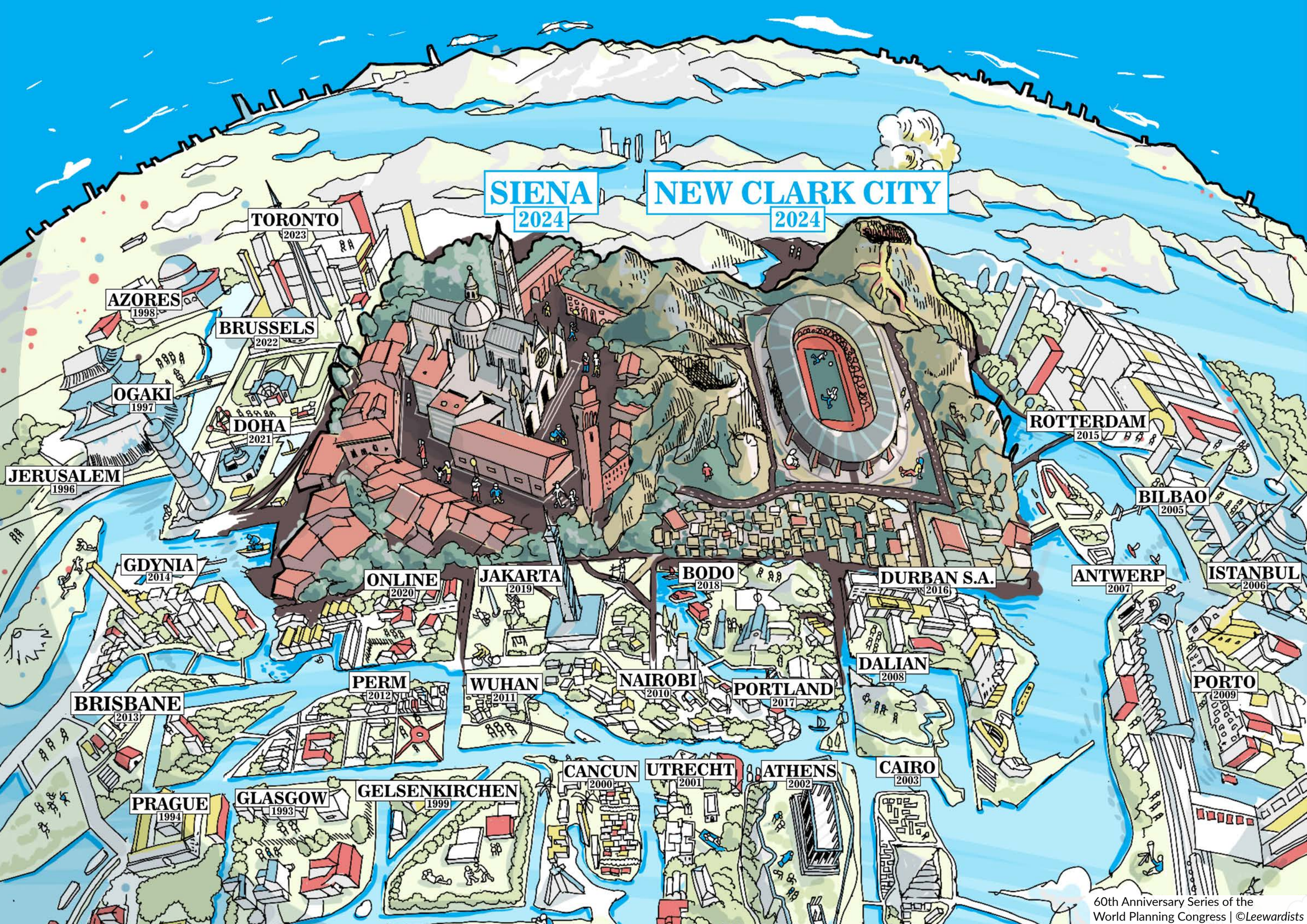
Following the experience in New Clark City, the Manifesto garnered interest at the World Urban Forum in Cairo, Egypt, and at the Eastern Regional Organization for Planning & Human Settlements (EAROPH). An updated version of the Manifesto for New Regenerative Cities will be presented by the curators at the 29th EAROPH World Congress in Islamabad, Pakistan, in December 2024.

We are planning a series of meetings with a group of interested parties in the upcoming months. The first will be an online workshop in December 2024, where we discuss how to bring the Manifesto to the next level, testing its content with a larger group of experts and looking for opportunities for publication, using the network of international organisations such as UN-Habitat and ISOCARP.

We are looking for enthusiastic urban planning and design professionals from all over the world to join the discussion about New Regenerative Cities and contribute in shaping the Manifesto. A mailing list is available for those interested in receiving updates about upcoming opportunities.

**Join the movement!**

The Do-Track is curated by a collaborative effort of NEW ENVIRONMENT, Placemaking Davao, Place Agency, with Dr Gregor H. Mews, and with the support of ISOCARP.

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