Kratié Province

Development Plan

for Urban Wetlands of Krong Kratié

2024 - 2035

Approved by His Excellency, the Governor of Kratié Province

Implementation Partners

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Preface

In August 2023, the Royal Government of Cambodia (RGC) adopted the Pentagon Strategy, Phase 1. This strategy is aimed at laying out Cambodia's pathway to becoming an upper-middle-income economy by 2030 and a high-income economy by 2050 through the modernisation of the government and stimulating future economic growth. It outlines five key objectives: build human capital; diversify the economy and enhance competitiveness; develop the private sector and employment opportunities; promote resilience, sustainability, and inclusive development; and strengthen the digital economy and society.

The RGC's aim is to fully integrate Cambodia into the regional economic network by promoting improved infrastructure connections and addressing the climate change risks to urban areas via multi-sector approaches to urban development.

As with the other provincial capitals of Cambodia, Kratié is undergoing a comprehensive urban transformation. After thirty years of steady growth and infrastructure development, the capital of Kratié Province is tasked with redefining its urban role in line with the economic and social developments occurring across Cambodia.

For Krong Kratié to harness its potential mainly in transportation, agriculture, mining, and tourism, it requires urban development that enhances livability and quality of life for its inhabitants, while also presenting itself as an attractive location for businesses and a city that ensures good livelihoods for its communities. Capitalizing on its rich biodiversity is strategic for realizing its tourism potential while contributing to improving the livability of the 'Krong' for its residents.

The vision for Krong Kratié focuses on both modernizing and greening the city and aims to make it a more attractive place to live, visit and do business, contributing to the Krong's long-term sustainable development.

This vision is in line with the most recent version of the Government's NSDP (2019 to 2023) that indicates its strong commitment to the implementation of the SDGs and in line with the National Strategic Plan on Green Growth 2013 to 2030, which focuses on promoting economic development and is based on green growth principles and environmental sustainability.

The vision encapsulates the following strategic dimensions:

- Krong Kratié sustainably manages and develops its rich natural and water resources to the benefit of its citizens;
- Krong Kratié sustainably develops its urban areas, contributing to the creation of a more convenient and conducive business environment, encouraging forms of investment in the Krong;
- Krong Kratié becomes famous for its green spaces and its recreational infrastructure that promotes a comfortable urban life for its citizens and local and international visitors; and
- Krong Kratié provides good quality basic-needs services that protect public health and the environment.

This **Development Plan for Urban Wetlands of Krong Kratié 2024-2035** (DPUW) complies with the vision because it contributes

- to improve infrastructure and basic needs services of the overall city and its sangkats.
- to enhance the resilience of the city and its sangkats against flooding and climate change impacts.
- to contribute to the position of Kratié as an attractive tourist destination with its rich natural environment and its abundant biodiversity.
- to improve livelihoods of the local communities.

This DPUW aims to study and identify strategies to develop and manage the Urban Wetlands as strategic assets for the sustainable development of Krong Kratié and its sangkats.

Krong Kratié is home to several wetland ecosystems, including marshes, swamps, and floodplains. The Urban Wetlands comprise the lakes and wetlands primarily to the East and South of the built-up municipal core, referred to here as the "Lake Area". This encompasses a variety of water bodies, such as Boeung Romleach in close proximity to the urban area, and Khos Sorkrom, Boeung Pralit, Udom Rath, and Boeung Pouthi outside of the municipality.

The DPUW acknowledges that the Lake Area in Krong Kratié performs a crucial role in the local ecosystem as a natural flood control system. Owing to their unique geographical and biological characteristics, they help manage water levels and reduce the risk of flooding, serving as a protective barrier for the surrounding communities and ecosystems. Furthermore, the Lake Area's wetlands, due to their high content of organic matter, play a crucial role in greenhouse gas mitigation, acting as carbon sinks.

The DPUW must contribute to the sustainable urban development of Krong Kratié adhering to its economic, social and ecological dimensions. The DPUW has been set out based on **2 basic approaches**

1. Sustainable development of the settlement area of the Krong Kratié and its sangkats covering the Lake Area.
2. Sustainable Management of the Lake Area to ensure its eco-system services.

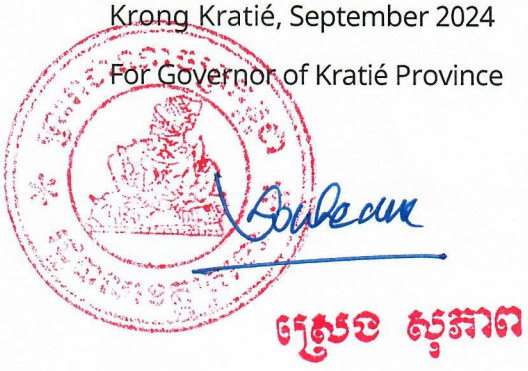
The DPUW is based on 2 timelines:

1. Set out **short-term recommendations (2024-2026)** with the introduction of urgent measures to ensure ecological functions of the lake area and pilot activities for green development of Krong Kratié.

2. Set out **medium-term (2027-2030) and long-term (2031-2035)** recommendations to introduce longer-term measures for a comprehensive water sensitive transition of Krong Kratié and its sangkats for sustainable management of its wetlands and as a sustainable tourism destination.

Krong Kratié, September 2024

For Governor of Kratié Province



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Introduction

Located roughly 240 km to the northeast of the Cambodian capital, Phnom Penh, lies Krong (municipality) Kratié. Encompassing an area of 88.6 km^2, the city has a strategic position along the banks and floodplains of the Mekong River. With accelerated market integration in the region, investments, job creation, migration from rural areas, infrastructure development, tourism and new urban lifestyles, the characteristics and functions of Krong Kratié are changing.

With the urban development of the last thirty years, public services and infrastructure (road construction, electricity supply, water supply, etc.) have been substantially improved and further improvements are underway and planned. This has provided good foundations for the Krong's future development. Decision-makers have acknowledged that Krong Kratié still falls short of comprehensive coverage of infrastructure development and comprehensive basic needs services, despite subnational authorities and stakeholders working to overcome challenges.

The municipal and provincial government of Kratié are challenged to use "water" as a strategic element of its redefinition and modernization as a livable city, attractive tourism destination and a place to run successful businesses. Especially with regard to a balanced urban development, water is of strategic importance. Further significant improvement, such as water supply, drainage, sewage, waste management, and the development of green infrastructure are crucial for enhancing the livability and attractiveness of the city.

Krong Kratié's location on the Mekong River and its elongated riverbank geography result in regular flooding of extensive parts of the existing urban area and the area intended for future urban development. The area's vulnerability to hazardous flood events might increase due to upstream developmental changes, climate change impacts, land use alterations, especially in the area around Krong

Kratié's Lake Area, and fragmentary characteristics of the existing and future-planned developed infrastructure.

Krong Kratié is home to several wetland ecosystems, including marshes, swamps, and floodplains. The lake and wetlands area East and South of the built-up municipal core, referred to here as the "Lake Area", encompasses a variety of water bodies. The Lake Area in Krong Kratié performs a crucial role in the local ecosystem as a natural flood control system. Owing to their unique geographical and biological characteristics, they help manage water levels and reduce the risk of flooding, serving as a protective barrier for the surrounding communities and ecosystems.

This Development Plan for Urban Wetlands of Krong Kratié 2024-2035 studies and identifies strategies and action plans to develop the Lake Area as a strategic asset for urban development, not only for its role in flood management, but to value it as a source of abundant biodiversity, a livelihood base for communities, and an essential natural cooling system for the urban climate. Additionally, its prospective significance as a leisure and tourism destination is recognized and exploited.

The Development Plan for Urban Wetlands of Krong Kratié will serve as a strategic instrument to unlock the developmental potential of Krong Kratié while effectively tackling both current and emerging challenges related to urban development and water management. This Plan is scheduled to be in effect from 2024 to 2035.

1. Vision

The vision for Krong Kratié focuses on both modernizing and greening the city and aims to make it a more attractive place to live, visit and do business, contributing to the Krong's long-term sustainable development**.**

2. Objectives

The strategic objectives of the Development Plan for Urban Wetlands of Krong Kratié 2024-2035 is to transform the Lake Area and the associated sangkats into a strategic asset for the sustainable development of Krong Kratié. Here the plan follows economic, social and ecological dimensions for the further modernisation of the city. By these means, Krong Kratié may become a best practice for how secondary and tertiary cities of Cambodia can integrate their urban wetlands into their infrastructure development resulting in improved livability while ensuring the livelihoods of their communities and strengthening their resilience to extreme weather events by contributing to effective adaptation to climate change impacts.

The Development Plan for Urban Wetland of Krong Kratié 2024-2035 sets 03 complementary strategic objectives: 1. Urban modernization that is based on the sustainable management of the Krong's natural resources; 2. Effective infrastructure development by systematic integration of the lake area with its eco-system services 3. Socio-economic development that valorizes the lake area as a strategic asset for community and tourism development.

3. Goals

To achieve the above mentioned objectives, the Development Plan for Urban Wetlands of Krong Kratié 2024-2035 defines 06 strategic goals:

1. **Improving Livability**: Enhancing the quality of life for all residents by improving urban amenities, services, and the overall urban environment.
2. **Mitigating Flood Vulnerability**: Reducing the city's risk and exposure to flooding through improved water management and infrastructure development.
3. **Ensuring Community Livelihoods**: Supporting the economic and social well-being of local communities, ensuring that development benefits are widely shared.

4. **Strengthening Climate Resilience**: Enhancing the city's resilience to climate-related hazards through adaptive urban planning and design.

5. **Preserving Ecosystem Services**: Protecting and enhancing the natural functions provided by the Lake Area, ensuring its continued contribution to the city's environmental health and citizens' well-being.

6. **Enhancing Governance**: Strengthening governance structures that foster sustainable development, emphasizing participatory approaches to ensure attractiveness for investors and a broad-based community involvement and ownership.

4. Priority strategies

To achieve the Vision, Objectives and Goals, the Development Plan for Urban Wetlands of Krong Kratié 2024-2035 is based on 07 priority strategies:

1. **Flood Management:** Implementing measures to improve the hydrological functionality of the Lake Area, including enhancing drainage systems, restricting impervious surface development in critical areas, and increasing the land's natural infiltration capacity.

2. **Wastewater Management:** Adopting a mixed approach to wastewater management that combines both centralized and decentralized systems, alongside practices to reduce and manage fertilizer runoff, thereby protecting water quality.

3. **Urban Expansion and Green Development:** Guiding urban expansion in a manner that adheres to green development principles, ensuring new development areas contribute positively to the city's resilience, do not adversely affect the Lake Area's natural flow regime, and remain attractive to both residents and investors.

4. **Green Space Development:** Expanding and enhancing urban greenery across the city and Lake Area to improve the local micro-climate, support biodiversity, and provide recreational spaces for residents and visitors.

5. **Recreation and Tourism Development:** Integrating the lake area into the city's broader recreational and tourist infrastructure plan, making it a key attraction that contributes to Krong Kratié's economic and social vitality.

6. **Capacity Building:** Strengthening the capabilities of local and provincial government structures in planning and implementation through cross-sectoral cooperation and coordination, ensuring effective implementation and management of the plan's initiatives.

7. **Participatory Planning:** Engaging relevant stakeholders in the planning and decision-making process through participatory planning and awareness campaigns, fostering active participation of communities, the private sector, and civil society development.

Chapter 1: **An overview and analysis of Krong Kratié's water challenges, the relevance of the Lake Area for Urban Development, and Development Scenario's for the period 2024-2035**

Part 1: **Analysis of the existing and emerging water challenges in the context of urban development and climate change in Krong Kratié**

Part 2: **Analysis of the Relevance of and Development Challenges for the Lake Area for the Sustainable Development of Krong Kratié**

Part 3: **Development Scenario's for Krong Kratié's Lake Area**

Part 1: Analysis of the existing and emerging water challenges in the context of urban development and climate change in Krong Kratié

Trends in urban development and infrastructure:

1. Despite considerable infrastructure improvements, Krong Kratié still falls short of comprehensive coverage of infrastructure development and comprehensive basic needs services. Additional significant improvements, such as water supply, drainage, sewage, waste management, and the development of green infrastructure, are crucial for enhancing the livability and attractiveness of the city.

2. Krong Kratié's location on the Mekong River and its elongated riverbank geography result in regular flooding of extensive parts of the existing urban area and the area intended for future urban development. The area's vulnerability to hazardous flood events might increase due to upstream developmental changes, climate change impacts, land use alterations, especially in the area around Krong Kratié's Lake Area, and from inadequately developed infrastructure.

3. Krong Kratié lacks well-developed green spaces and green infrastructure. The riverside, Promenade (Preah Soramarith Quay), while lined with trees, primarily serves as a public gathering and leisure space for the local population. Urban greenery is mainly restricted to private and public building plots, which are facing increasing pressure due to building densification. Overall, there is a lack of green public spaces, which are vital for a pleasant urban climate, the development of an urban society, and high-quality tourism.

4. Increasing urban sealing and densification are likely to intensify 'urban-heat islands', especially given the current increase in average temperatures due to climate change, and the lack of well-developed private and public urban green

spaces. The so-called heat-island effect could be further amplified by unplanned filling of the Lake Area, which currently serves as a natural cooling system.

5. More efficient water infrastructure for stormwater and sewage management are being implemented or are under technical and financial planning. However, there are questions about the long-term financial sustainability, maintenance, operation, and coverage of the entire urban area.

6. While urban planning guidelines exist, their implementation is limited presenting challenges to urban development. The existing Land Use Master Plan 2030 is relatively schematic and insufficiently addresses water-sensitive parameters, such as flood protection, drainage, open space development, and climate change adaptation.

SWOT Analysis of Water-related Urban Development Challenges in Krong Kratié

Table 1.1 SWOT Analysis

Strengths	Weaknesses
1. The RGC's Pentagon Strategy, Phase 1, and its strategies for localization gives Krong Kratié the opportunity to redefine its role as provincial capital in context of Sustainable Development. 2. In recent years, Krong Kratié has experienced steady growth that may accelerate with regional economic integration. 3. There have been successful individual projects that have improved stormwater and solid waste management practices in some areas. 4. With its architecture, its rich environmental resources and its recent urban developments, Krong Kratié is a pleasant city in which to live. 5. Krong Kratié and its surroundings have rich water resources that can contribute significantly to sustainable development.	1. Investments from internal and external sources for urban and economic development are still on a relatively low level. 2. Water related infrastructure does not meet the requirements of modern Cambodian cities. 3. The Krong itself has only very limited resources for its own infrastructure development. 4. Urban development and water governance structures are still not sufficiently developed to address water-related urban development challenges. 5. There are still large gaps in the regulatory frameworks to manage the urban waters and the urban development. 6. Participative governance schemes involving communities and private sector are limited in scope.

Opportunities	Threats
1. Effective management schemes can significantly contribute to exploit Krong Kratié's water resources to ensure its water security. 2. Settlement structures and space availability still give notable opportunities to develop the Krong as a more livable space. 3. Communities positively embrace public spaces for their well-being. 4. Communities and local authorities are increasingly aware of water challenges and the need for green development. 5. Krong Kratié has a significant tourism development potential that is largely untapped.	1. Uncontrolled urban development can decrease significantly the livability of Krong Kratié. 2. Dynamic urban development including densification quickly limit the scope for action for public government, communities and private sector. 3. Inadequate infrastructure development is a threat to public health and to ecosystems and can increase significantly the vulnerability to flooding. 4. Climate change impacts can result in water scarcity during dry periods, but also increased flood vulnerability throughout the Lake Area.

Part 2: Analysis of the Relevance of and Development Challenges for Lake Area for the Sustainable Development of Krong Kratié

Summary of Analysis Results

1. The Lake Area of Krong Kratié and its immediate surroundings include Boeung Romleach , Boeung Kbal Dun Soun, Boeung Khos Sorkrom, Boeung Pralit, Boueng Udom Rath, and Boeung Pouthi.

2. The Lake Area presently serves multiple key roles and features, including acting as a critical resource for community livelihoods, a flood-buffer zone, a recipient for wastewater, an urban climate regulator, and a vital biodiversity habitat.

3. These water bodies of the Lake Area combine to form a massive body of water that can remain for several weeks or even months. In particular, Boeung Romleach, a large lake within the municipal boundaries, functions as a catchment basin for floods from the Mekong River during the wet season.

4. Any substantial interruptions to its water absorption capacity, its role as a buffer zone, and its hydraulic flow could substantially heighten the risk of intense and damaging floods in Krong Kratié. Notably, increased backwater effects can lead to a considerable rise in water levels and potential increased water intrusion into urban areas.

5. The Lake Area is facing increasing threats due to landfill activities, escalating water body pollution from sewage, agriculture runoff, insufficient infrastructure development, habitat loss, and subsequently, a weakening of the basis for local community livelihoods.

6. In light of urban development and climate change, the significance of the Lake Area is expected to grow. The Lake Area serves as mitigation against escalating urban temperatures driven by urbanization and climate change, functions as a recreational space, provides protection while being a premium quality natural habitat for the growth of eco-tourism, and is considered a strategic area for comprehensive flood protection development.

7. Urban development planning and decision-making have only just started to acknowledge the value of the Lake Area for sustainable urbanization, infrastructure development, and Kratié's economic and social development.

8. Poorly controlled urban development that impedes the flow regime, coupled with inadequate infrastructure development and significant reduction in catchment capacity, could greatly increase the city's vulnerability to hazardous flood events. Increasing pollution from sewage and agricultural runoff and land use changes are exerting increasing pressure on ecosystems. These ecosystems, with their services for water quality preservation and biodiversity, are essential for the livelihoods of communities and potential tourism development.

SWOT Analysis of the sustainable management challenges for the Lake Area

Table 1.2 SWOT Analysis

Strengths	Weaknesses
1. The primary functions of the Lake Area provide multiple ecosystem services to Krong Kratié and its communities 2. The Lake Area's function as a source for community livelihoods, a water buffer during the wet season and a natural cooling system for Krong Kratié is still largely intact. 3. The Lake Area still contributes to the impression that Krong Kratié is endowed with a rich environment.	1. Fragmented infrastructure and management practices cause water pollution, loss of biodiversity and increased vulnerability to flood events. 2. There are insufficiently developed mechanisms for the effective management of the Lake Area, including government agencies, communities and private sector 3. For infrastructure planning, the Lake Area is perceived as a space for water discharge and treatment rather than as an asset with multiple eco-system services. 4. The importance and strategic value of the Lake Area as blue-green infrastructure for Krong Kratié is insufficiently reflected in planning documents and decision-making processes. 5. Master plans for the development of new extension areas do not include criteria for water-sensitive settlement schemes. 6. Very limited investment resources are available for the development of the urban area.

Opportunities	Threats
1. The Lake Area has significant potential to contribute substantially to the sustainable modernization of Krong Kratié. 2. The Lake Area has the potential to be an attractive location for recreational activities and tourism. 3. The Lake Area as a well-developed water reservoir may significantly contribute to the robust water safety of Krong Kratié 3. Given the early stage of dynamic settlement development, there is still important scope to bring the Lake Area under sustainable management.	1. Urban development and land-filling that hardly follows sustainability standards threaten the main functions of the Lake Area, such as an effective water buffer or cooling system for the overall Krong. 2. If not developed in accordance with sustainability standards, the overall vulnerability of Krong Kratié and its communities can increase. 3. Climate change may severely affect the functions of the Lake Area, its eco-system services, its biodiversity and the livelihoods of the communities.

Part 3: Development scenarios for the Lake Area

Based on the SWOT analysis provided, two distinct development scenarios for the Lake Area in Krong Kratié can be developed: the "Business as Usual" scenario and the "Lake Area Brought Under Sustainable Management" scenario:

1. Business as Usual Scenario

Description: In the "Business as Usual" scenario, existing practices and implementation of infrastructure and management practices continue in the current manner with strategic projects being implemented but without sufficient localized cross-sector alignment that ensures urban development consistently addresses the long-term water challenges experienced by the city. In this instance, local development and planning do not fully integrate the ecological and social values of the Lake Area, focusing more on short-term goals that do not specifically support long-term sustainable practices.

Outcomes:

Infrastructure and Pollution: Fragmented infrastructure and inconsistent management practices exacerbate water pollution and biodiversity loss. The Lake Area's capacity as a natural buffer and cooling system will be increasingly compromised.

Flood Vulnerability: Improvements in infrastructure and ecological management practices will be insufficient to prevent a greater risk of flooding in some areas, significantly impacting urban areas during heavy rains and wet seasons.

Economic and Recreational Potential Underutilized: The Lake Area's potential as a recreation and tourist destination will not be achieved due to the ongoing environmental degradation and lack of facilities.

***Climate Change Impact**:* As climate change effects intensify, the already weakened ecological functions of the Lake Area will suffer further, negatively affecting water quality, biodiversity, and the overall livability of Krong Kratié.

2. Lake Area Sutainably Managed for Benefit of City Scenario

Description: In this scenario, the Lake Area is managed through a comprehensive cross-sector approach that integrates sustainable urban and environmental planning. This includes short, medium and long-term planning that enhances infrastructure, promotes biodiversity, and involves communities, the government, and private sector in effective management strategies.

Outcomes:

***Strengthened Ecosystem Services**:* Improved infrastructure and management practices will reduce pollution and restore biodiversity, enhancing the Lake Area's natural functions as a water buffer and cooling system.

***Reduced Flood Risk**:* Enhanced management of the Lake Area will improve its capacity to manage stormwater, significantly reducing the risk and impact of flooding in urban areas.

***Recreational and Tourism Development**:* With better facilities and a healthier environment, the Lake Area will become an attractive destination for both residents and tourists, contributing to the local economy and providing new livelihood opportunities.

***Climate Resilience**:* By addressing climate change impacts proactively, the Lake Area will maintain and even enhance its ecosystem services, supporting community and urban resilience and adapting to changing environmental conditions.

***Policy and Planning Integration**:* The strategic value of the Lake Area will be recognized and integrated into urban planning and policy-making, ensuring its preservation and role in sustainable urban development.

Chapter 2**: The main fields of action for the Lake Area for Urban Development 2024-2035**

Implementation Strategy 1: **Flood Management**

Implementation Strategy 2: **Green Space and Recreational Area Development**

Implementation Strategy 3: **Wastewater Management**

Rationale for the fields of action

The Development Plan for the Urban Wetlands of Krong Kratié 2024-2035 incorporates 07 priority strategies organized into 03 key focus areas: 1. Flood Management, 2. Development of Green Spaces and Recreational Areas, and 3. Wastewater Management. Each area addresses a comprehensive range of challenges, including planning, infrastructure, governance, and finance, tailored to align with the existing and evolving capacities of the city. This structured approach ensures a holistic and adaptive strategy to enhance the resilience and sustainability of Krong Kratié's urban wetlands, effectively integrating them into the city's broader environmental and developmental objectives.

Implementation Strategy 1: Flood Management

To address the flood management challenges faced by Krong Kratié, a strategic action plan can be developed, integrating the hydrological functionality of the Lake Area as crucial element of infrastructure development for the city as a whole.

1. **Strategic Vision Creation**

Strategic Vision: Krong Kratié effectively manages flood risks through enhanced natural water management systems, improved infrastructure, and strategic urban planning.

Implementation:

- **Assessment:** Create evidence-based comprehensive knowledge of flood vulnerabilities and their causes and identify strategic solutions.
- **Policy Integration:** Elaborate a stormwater management plan effectively integrating grey and blue-green infrastructure options.

- **Stakeholder Engagement:** Involve local government, community leaders, urban planners, water and environmental experts in building a fact-based strategic vision and commitment.
- **Communication Strategy**: Use community workshops, public awareness campaigns, and educational programs to communicate the importance of sustainable flood management and gather support
- **Timeline**: 2024/2025: Elaboration of Strategic Vision

2. Further improvement and development of drainage system

Implementation:

- **Infrastructure Upgrades and Expansion of Grey Infrastructure**: Enhance drainage systems to improve water flow and reduce stagnation, particularly in areas frequently affected by floods.
- **Restrict Impervious Surfaces**: Implement plans that limit the amount of impervious surface in critical areas, promoting permeable pavements and green roofs in urban developments.
- **Green Infrastructure**: Introduce bio-swales, green spaces, and permeable pavements to increase infiltration and reduce surface runoff.
- **Capacity Development Programs:** Elaborate a planning and management scheme for drainage infrastructure in co-production with relevant departments on Krong and provincial level.

3. **Ensuring flood absorption capacity of the Lake Area and its water flows**

Implementation:

- **Policy integration:**
    - Designate areas within and around the Lake as conservation zones where urban development is restricted.
    - Enforce strict controls on urban development near water bodies to ensure that new constructions do not alter natural water flows or increase flood risks.
- **Public Participation:** Encourage public participation and consultation in planning processes to ensure that community needs, investor interests and hydrological requirements for effective flood management are balanced.

4. **Reduce risk of drainage system blockages, which can exacerbate flooding, through effective solid waste management practices**

Implementation:

- **Improved Waste Collection Services:** Enhance the capacity and frequency of waste collection services to prevent littering and illegal dumping.
- **Waste Education Campaigns:** Conduct community awareness programs on the impact of waste on flooding and on proper waste disposal methods.
- **Community Clean-Up Drives:** Organize regular clean-up events to clear drains and waterways, particularly before the rainy season.

5. Capacity Development Programs

- **Interdepartmental Collaboration:** Strengthen collaboration between government departments, such as those responsible for public works, environment, and water resource management.
- **Community Engagement:** Educate and engage local communities and the private sector in flood risk management through workshops, training, and participatory planning**.**
- **Private Sector Involvement:** Encourage private sector investment in flood-resilient infrastructure through incentives and partnerships.
- **Funding:** Bankable projects funded by national government and international agencies, such as ADB's Fourth Greater Mekong Subregion Corridor Towns Development Project.
- **Timeline**: 2024-2025: Upgrading of Stormwater Gate in Sangkats, Drainage System along channel from White Bridge, Implementation of ADB-funded-drainage systems in Kratié Sangkat. 2025 until 2035: Continuous further development of drainage infrastructure in existing settlement areas and new extension areas, and further development of solid waste management systems and urban development guidelines and their implementation.

Implementation Strategy 2: Development of Green Spaces and Recreational Areas

To effectively integrate the Lake Area into the overall green space development strategy for Krong Kratié, the following detailed plan is outlined:

1. **Strategic Vision Creation**

Strategic Vision: Krong Kratié is a city integrated with nature, where green spaces are central to urban life, supporting biodiversity, recreation, and sustainable urban development.

Implementation:

- **Collaborative Planning**: Involve stakeholders from various sectors—government, community, businesses, and environmental experts—to formulate a comprehensive green space development plan.
- **Vision Communication**: Use public forums, media, and community meetings to share the vision, gathering feedback and building community support.
- **Timeline**: 2025: Elaboration of Vision

2. **Awareness Campaign for Green Private Spaces and Business Premises' Tree Planting**

Implementation:

- **Policy Integration:** Develop guidelines for maintaining and developing green spaces on private premises.
- **Capacity Development Programs:** Develop programs to educate homeowners and businesses about the benefits of planting trees and maintaining green spaces on their premises.

- **Incentives:** Offer incentives, such as recognition awards for exemplary green initiatives in private and commercial areas.
- **Financing:** Partly from landowners and private companies.
- **Timeline**: 2025-2026: Elaborate Guideline, Continuously from 2026 until 2035: Roll-out of awareness campaigns

3. Identify and Develop Five Key Green Spaces in Krong Kratié

Implementation:

- **Assessment:** Conduct a thorough assessment to identify potential locations for new green spaces based on environmental, social, and urban criteria.
- **Design:** Design these spaces to be multifunctional, catering to various age groups and activities, and incorporating native plant species to enhance biodiversity.
- **Financing:** Elaborate bankable projects to be submitted to national agencies and international organisations.
- **Timeline**: 2025: Identification of green spaces, 2026: Elaboration of bankable projects, 2027-2035: Development of green spaces, including maintenance schemes.

4. Development of Green Recreational and Tourist Infrastructure along Waterfront, White Channel, and New Expansion Areas

Implementation:

- **Waterfront Development**: Enhance existing waterfront areas with additional greenery and recreational pathways.
- **Tree-Lined Channels:** Develop tree-lined paths along water channels to improve landscape aesthetics and ecological value.

- **Recreational Pathways**: Create well-defined paths for walking, jogging, cycling and bird watching around the Lake Area.
- **Financing:** Elaborate bankable projects to be submitted to national agencies and international organisations.
- **Timeline**: 2024/25: Implementation of ADB funded Kratié Town Center Environmental Enhancement Project, 2025: Identification of green spaces, 2026: Elaboration of bankable projects. 2027-2035: Development of green spaces, including maintenance scheme.

5. Concepts of Integrating Green Spaces into New Expansion Areas

Implementation:

- **Policy Integration**: Ensure that all new urban development plans include adequate green infrastructure and mandatory green spaces and do not impede water flow through the Lake Area.
- **Sustainable Design**: Use sustainable urban planning practices to design these areas, incorporating water-sensitive urban design (WSUD) principles where appropriate.
- **Timeline**: 2025-2026: Further development of existing Development Plans incorporating WSUD principles, 2025-2035: Mandatory integration of WSUD principles in upcoming development plans as well as future Land Use Master Plans.

Implementation Strategy 3: Wastewater Management

To strengthen technical, institutional and service capacities of wastewater treatment to mitigate water pollution impacts on public health and the environment.

1. Strategic Vision Creation

Strategic Vision: With its wastewater management scheme Krong Kratié prioritizes sustainability, public health, and environmental protection, incorporating both centralized and decentralized solutions tailored to its local needs.

Implementation:

- **Stakeholder Engagement**: Hold workshops with government officials, community leaders, business owners, and technical experts to develop a shared vision.
- **Public Awareness**: Utilize media campaigns to educate the public on the importance of effective wastewater management and their role in it. This is especially important for the establishment of financing schemes for wastewater management services.
- **Timeline**: 2024/2025: Elaboration of Strategic Vision

2. Develop Sanitation Plans for Urban Areas and Lake Area

Implementation:

- **Local Sanitation Plans**: Develop specific sanitation plans for different urban areas/sangkats, including the lake area, focusing on integrating both centralized and decentralized elements.
- **Community-Based Planning**: Involve local communities in the planning process to ensure the plans meet their specific needs and capabilities.

Funding: BORDA/BMZ

Timeline: 2024: Elaboration of Sanitation Plans

3. Centralized Wastewater Treatment

Implementation:

- Decision on final layout of centralized wastewater treatment plant financed by ADB.
- Implementation of centralized wastewater treatment system by ADB.
- Capacity building of local government and operator for long-term operational sustainability of centralized system.
- **Funding:** ADB Fourth Greater Mekong Subregion Corridor Towns Development Project
- **Timeline**: 2024/25: Decision on final layout, 2025–2027: Implementation of ADB wastewater treatment system funded by ADB. 2026–2035: Development of capacities for sustainable maintenance and operation of centralized wastewater treatment system.

4. Promote Decentralized Wastewater Solutions

Implementation:

- **Targeted Solutions for Pollution Hotspots**: Identify and implement decentralized systems at identified pollution hotspots, such as the slaughterhouse and referral hospital.
- **Enhanced Septic Systems**: Promote the installation and regular maintenance of improved septic tanks across residential and commercial properties.
- **Establish enabling environment for septage management**: Capacity development of local government for monitoring effective

implementation of decentralized system and safe fecal sludge management.

- **Timeline**: 2024/25: Identification of pollution hot spots, 2025-2035: Implementation of decentralized solutions, capacity development for effective septage management.

5. Integrate Fertilizer Management into Wastewater Strategy

Implementation:

- **Capacity building**:
    - Train farmers on precise timing of fertilizer application, using the correct amount (neither under nor over-fertilizing), and choosing the appropriate type of fertilizer for the specific soil and crop requirements.
    - Strengthen capacities of agricultural extension services on effective fertilizer management
    - Organize community and farmer meetings to exchange good practices on effective fertilizer management.
- **Timeline**: 2024-2025: Continuous capacity development disseminating latest good practices on effective fertilizer management.

Note 1: Development Framework

Vision	Modernizing and greening the city to make it a more attractive place to live, visit and do business, contributing to the Krong's long-term sustainable development.					
Objectives	1. Urban modernization that is based on the sustainable management of the Krong's natural resources;		2. Effective infrastructure development by systematic integration of the lake area with its eco-system services		3. Socio-economic development that valorizes the lake area as a strategic asset for community and tourism development.	
Goals	1. Improving Livability	2. Mitigating Flood Vulnerability	3. Ensuring Community Livelihoods	4. Strengthening Climate Resilience	5. Preserving Ecosystem Services	6. Enhancing Governance
Priority Strategies	1. Flood Management	2. Wastewater Management	3. Urban Expansion and Green Development	4. Green Space Development	5. Recreation and Tourism Development	6. Capacity Building	7. Participatory Planning
Implementation Strategies	Implementation Strategy 1: **Flood Management**		Implementation Strategy 2: **Green Space and Recreational Area Development**		Implementation Strategy 3: **Wastewater Management**	
Key Strategic Elements	1. Strategic Vision Creation 2. Further improvement and development of drainage system 3. Ensuring flood absorption capacity of the Lake Area and its water flows. 4. Reduce risk of drainage system blockages that can exacerbate flooding through effective solid waste management practices 5. Capacity Development Programs:		1. Strategic Vision Creation 2. Awareness Campaign for Green Private Spaces and Business Premises' Tree Planting 3. Identify and Develop Five Key Green Spaces in Krong Kratié 4. Development of Green Recreational and Tourist Infrastructure along Waterfront, White Channel, and New Expansion Areas 5. Concepts of Integrating Green Spaces into New Expansion Areas		1. Strategic Vision Creation 2. Develop Sanitation Plans for Urban Areas and Lake Area 3. Centralized Wastewater Treatment 4. Promote Decentralized Wastewater Solutions 5. Integrate Fertilizer Management into Wastewater Strategy	

Note 2: SWOT Analysis Methodology

The methodology for conducting the SWOT analysis consisted of synthesizing the results of four activities with the input from local stakeholders and then validated by the same stakeholders by October 2024.

- **2019 to 2023**: Research and development of the Baseline Assessment with significant input from a variety of government stakeholders and partners.
- **October 2023**: Vision building and development goal planning workshop to identify specific localized challenges.
- **March 2024:** Transect Walk and workshop to identify solutions per sangkats.
- **March 2024 to October 2024:** Drafting of the Development Plan for Urban Wetlands for Krong Kratié 2024 to 2035.
- **October 2024**: Presentation and Introduction of the Development Plan for Urban Wetlands for Krong Kratié 2024 to 2035's SWOT Analysis for stakeholder feedback and validation.

Implementation Partners