

Inception Report

*Nature-based Climate Adaptation
Programme for the Urban Areas
of Penang Island, Malaysia*

Penang, Malaysia
6 September 2022



IMPLEMENTING
THE NEW
URBAN AGENDA



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Implementing Entity



National Designated Authority



Executing Entities



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Background

Overview of the project

The main goal of the programme is to enhance urban resilience and reduce human and ecosystem health vulnerability to climate change impacts and extreme weather events by implementing nature-based solutions (NBS) to reduce surface temperatures and storm water runoff. The programme also seeks to increase social resilience and build institutional capacity.

Supported by an extended collaboration between stakeholders at local, regional and national levels (including government agencies, scientific support institutions and civil society), the programme has a strong community-focused approach, engaging with the most vulnerable groups of society in order to assess their main vulnerabilities in a collaborative effort.

The programme will pioneer the use of NBS solutions in Malaysia. It is designed to be demonstrative / proof of concept with a strong knowledge codification component so that it can be scaled in Malaysia and elsewhere in the region. It is structured around the following components:

- **Component 1:** Adaptation to the urban heat island effect through urban greening (USD 3,175,000)
- **Component 2:** Built projects for storm water and flood management (USD 2,725,000)
- **Component 3:** Comprehensive vulnerability / baseline assessment and action plans in targeted communities (USD 160,000)
- **Component 4:** Strengthening social resilience programme (USD 975,000)
- **Component 5:** Institutional capacity and knowledge transfer platform (USD 1,381,977)

Project / Programme Objectives:

The main goal of the programme is to enhance urban resilience and reduce human and ecosystem health vulnerability to climate change impacts and extreme weather events by implementing nature-based solutions in order to improve stormwater management to reduce flooding, as well as improving microclimatic regulation, reducing the urban heat island effect and overall temperatures. The programme seeks also to improve social resilience (with a particular focus on the most vulnerable communities) and to build institutional capacity.

Adopting a comprehensive approach in which a diversified set of components (i.e. urban greening, urban agriculture, public health) is implemented in one specific location reflects the acknowledgement of the complexity and interrelation of the multiple coexisting environmental and social dimensions. It will also allow to develop the programme as a pilot project which can be scaled in other cities in Malaysia and Southeast Asia. The main objectives of the project as below,

1. Community-level

- a. To support the implementation of nature-based solutions to reduce flooding and the urban heat island effect (UHI) and overall temperatures.
- b. To strengthen the capacity of local Social Risk Screening communities to respond to extreme weather events by raising awareness and capacity development training.

2. Ward-level

- a. To support the implementation of resilience concrete actions that target women, youth and other vulnerable communities.
- b. To promote urban agriculture and food security at different levels, including training.

3. City-level

- a. To reduce overall temperatures (due to reducing the UHI effect).

4. National level

- a. Development of the first municipal climate change adaptation programme, providing reference and methodology (as well as specific tools), for other cities in Malaysia to adopt, via the knowledge transfer platform.
- b. Development of the list of climate-resilient street trees for Malaysia (developed together with Jabatan Landskap Negara, the National Institute of Landscape Architecture and Botanical Experts).
- c. Development of a public health programme which will include a pilot project to monitor heat related illness in selected hospitals in Penang (as there is no systematic identification of heat related illness in hospitals in Malaysia) providing reference and methodology (as well as specific tools), for other cities in Malaysia to adopt.



Opening Session

Welcome and acknowledgements

**Mr. Neil Khor, PhD, Acting Chief of Staff and
Special Advisor to the Executive Director, UN-Habitat Headquarters**

Offering thanks to the City Council of Penang for hosting the Inception Workshop, Mr. Neil Khor, highlighted that the work being undertaken in Penang could serve to be a good practice globally for climate adaptation. Through efforts by the Ministry of Environment and Water, Climate Change Division, Malaysia is demonstrating strong leadership. Meanwhile, the project itself will also contribute to the existing efforts of Penang to be a family-focused green and smart state.

Sharing the example of the devastating floods in Pakistan as an example, impacting over 33 million people, Mr. Khor emphasized the magnitude of challenges as huge and local government often being the first responders. Underscoring the disparity in terms of greenhouse gas emitters versus those impacted by climate change, many countries such as Pakistan are disproportionately affected, paying the consequences for actions of others. Recalling the major floods in Penang from 2017, where a year of rainfall came down in only a few days, he conveyed the message from Under Secretary-General and UN-Habitat Executive Director, Ms. Maimunah Mohd Sharif, that Penang must brace itself and be prepared for what is still to come.

Informing an estimated a USD \$3 trillion a year climate infrastructure development gap exists, only 10% of climate financing is aimed at adaptation. For this reason, UN-Habitat launched the Rise-up program, to aid those least responsible for climate change and most vulnerable to its impact. Through the Global Covenant of Mayors for Climate and Energy, more than 10,000 cities across the world have committed to reducing carbon dioxide emissions by 24 billion tons by 2030.

Recognizing that beyond financial resources, tackling the climate crisis will demand collaboration and partnership, more expertise, more local engagement, Mr. Khor shared his aspirations for the project to involve as many youth and women and that it would be essential for the project to build on the capacities of the local community and harness local knowledge in the process. Through examples of other projects, he shared that UN-Habitat have been striving to demonstrate the one-way ticket to planetary destruction is not the only game in town and further encouraged everyone to sit down and really think and ensure a developmental model that is inherently sustainable and without compromising future generations.

Finally, Mr. Khor expressed his sincere appreciation to all the Implementing Partners who helped to organize the Inception Workshop, welcoming all the participants both online and in-person for dedicating their time, giving greater meaning and purpose to the project and its objectives. Adding “multi-level climate action” was discussed all the down to the city level at COP26 and enshrined in the Glasgow Climate Pact, he shared that Malaysia would be actively participating in COP27 in Egypt helping to galvanize the project in Penang with global principles. To conclude, he reminded the partnership to avoid as much as possible any overly bureaucratic ways of doing things, embracing the spirit of Penang to expand opportunities.

Dato Ir’ Rajendran A/L P. Anthony, City Secretary,
City Council of Penang Island (MBPP)

Demonstrating the earnest commitment by the City Council of Penang Island to the project, Mr. Rajendran Anthony confirmed the strong participation of 6 Directors of Engineering, having worked extensively, and being prepared to give presentations, partaking in discussions during the Inception Workshop. He highlighted the project followed a diversity of projects by the City Council to improve the living conditions for those choosing to live and work in Penang. Some of these projects including the changing of over 34,000 streetlights to more energy-efficient LED lights in the past few years, along with the replacement of lights in council operated buildings to help minimize the environmental effects and reduce long-term costs.

Elsewhere, Mr. Rajendran put a spotlight on the over 210 kilometers of cycling tracks being installed at the present time, alleviating traffic congestion and bringing cars off the streets. Facilitating conditions for green building, MBPP was also embarking on construction of project site supporting low-cost affordable housing with the maximum rating by Green Building Index. Welcoming participants to the Inception Workshop and the Adaptation Fund project to Penang, Mr. Rajendran recapitulated the desire to help partners to realize the implementation of the project.

Special remarks and messages

YB Zairil Khir Johari, State Executive Councillor
for Infrastructure and Transport, Penang State Government

Offering appreciation to all the participants and everyone involved in nature-based climate adaptation project, namely Executing Entities who contributed to making the proposal successful, and particularly Think City for the ideation of the programme, YB Zairil Khir Johari, shared that we collectively look forward to the implementation with full support of the State. Reflecting lightheartedly that “old habits die hard”, he added that engineering designs can often be a lot of concrete, however, State officers, departments and agencies in recent two years have been gradually moving towards, opening their thinking to “more green than grey” and nature-based solutions learning from other countries. Seeking to ensure the success of the implementation, State Executive Councillor, YB Zairil, had kindly extended the help of the State to facilitate any assistance or overcome deadlocks, which they would be happy to assist in collaboration with MBPP.

Ms. Karima El Korri, United Nations Resident Coordinator in
Malaysia, Singapore, and Brunei Darussalam



Highlighting the great conservation efforts in terms of environmental and cultural heritage led by Penang, Ms. Karima El Korri extended thanks to YB Zairil Khir Johari, State Executive Councillor for Infrastructure and Transport for taking on the role of Chair of the Adaptation Fund project and the Ministry of Environment and Water for shepherding the proposal along with Chief Minister Incorporated. Congratulating the City Council and fellow Implementing Partners including Department of Irrigation and Drainage and Think City, Ms. El Korri shared her delight to hear that the project was successfully approved for USD \$10 million contributing to Penang and its peoples, being the maximum permissible for any proposal to a single city.

Appreciating over 75 per cent of the total population of Malaysia live in urban areas with this growth expected to continue and the increasing migration of people from rural to urban areas to seek employment and economic opportunities, Ms. El Korri recognized the leading efforts by Penang such as through the establishment of the Bayan Lepas electronics cluster, growth of airline travel routes serviced by Penang International Airport and the expansion of port functions. Ensuring a just, inclusive, and green future for Penang, will depend strongly on our collective ability to effect nature-based solutions to reduce the threat of climate change to human life and infrastructure, as being coordinated through the project.

Commending the team for their foresight to anchor this project in comprehensive vulnerability and baseline assessments in targeted communities, addressing those that might be marginalized and potentially left behind, Ms. El Korri, shared that she was encouraged to hear of the intention to develop action plans in these communities, as well as platform for institutional capacity-building and knowledge transfer. Finally, she expressed her gratitude to those participating in the Inception Workshop for lending their energies, and experiences to tackle the threats of climate change and aspiring for cities globally to learn from Malaysia.



Background to the Inception Workshop

Mr. Tam Hoang, Sustainable Urbanisation Specialist,
UN-Habitat Regional Office for Asia and the Pacific (ROAP)

The primary purposes of the Inception Workshop were to ensure the effective setup of governance arrangements for the Adaptation Fund project, monitoring and reporting mechanisms, and facilitate discussion on the implementation of the project with duration of up to five (5) years. Recognized as the official commencement date by the Adaptation Fund Board, it is anticipated that subsequent consultations will be held related to the components specified below:

- **Component 1:** Built projects for greening Penang
- **Component 2:** Built projects for stormwater and flood management
- **Component 3:** Comprehensive vulnerability / baseline assessment and action plans in targeted communities
- **Component 4:** Social resilience programme
- **Component 5:** Institutional capacity and knowledge transfer platform

Selected to proceed by the Adaptation Fund Board on May 2022, intensive meetings and exchanges were held towards a preliminary Kick-Off Meeting held on 12 August 2022 which supported the sharing of knowledge among Implementing Partners and exchange of experiences with discussions conducted at the working level to help establish common arrangements addressing preparation for the Inception Workshop and subsequent consultations. Marking this occasion, a Letter of Intent was further signed between UN-Habitat and the City Council of Penang Island, witnessed by the Under Secretary-General and UN-Habitat Executive Director, Ms. Maimunah Mohd Sharif and Mayor of Penang, Hon. Dato' Ar. Yew Tung Seang.

Implementation of the project builds on an existing Memorandum of Understanding between UN-Habitat and Chief Minister Incorporated, Penang State Government, in effect to 16 October 2023 including development of projects on effective adaptation of communities and infrastructure to climate change. This project also builds on an existing Memorandum of Understanding between UN-Habitat and Think City, in effect to 23 October 2024 including collaboration to develop projects and jointly mobilize resources to implement initiatives in urban regeneration.

Organization of the Inception Workshop was preceded by preparatory consultations with each of the Implementing Partners and a consultative meeting with the National Designated Authority, the Ministry of Environment and Water.

2021

- ◆ **Aug 9** – Proposal was submitted to Adaptation Fund
-

2022

- ◆ **Feb 23** – Proposal was announced as selected




2023

Consultation on Final Component

- ◆ **Sep 5** – Project Performance Report due
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Nature-based Climate Adaptation Program Urban Areas of Penang Island

Adaptation Fund overview

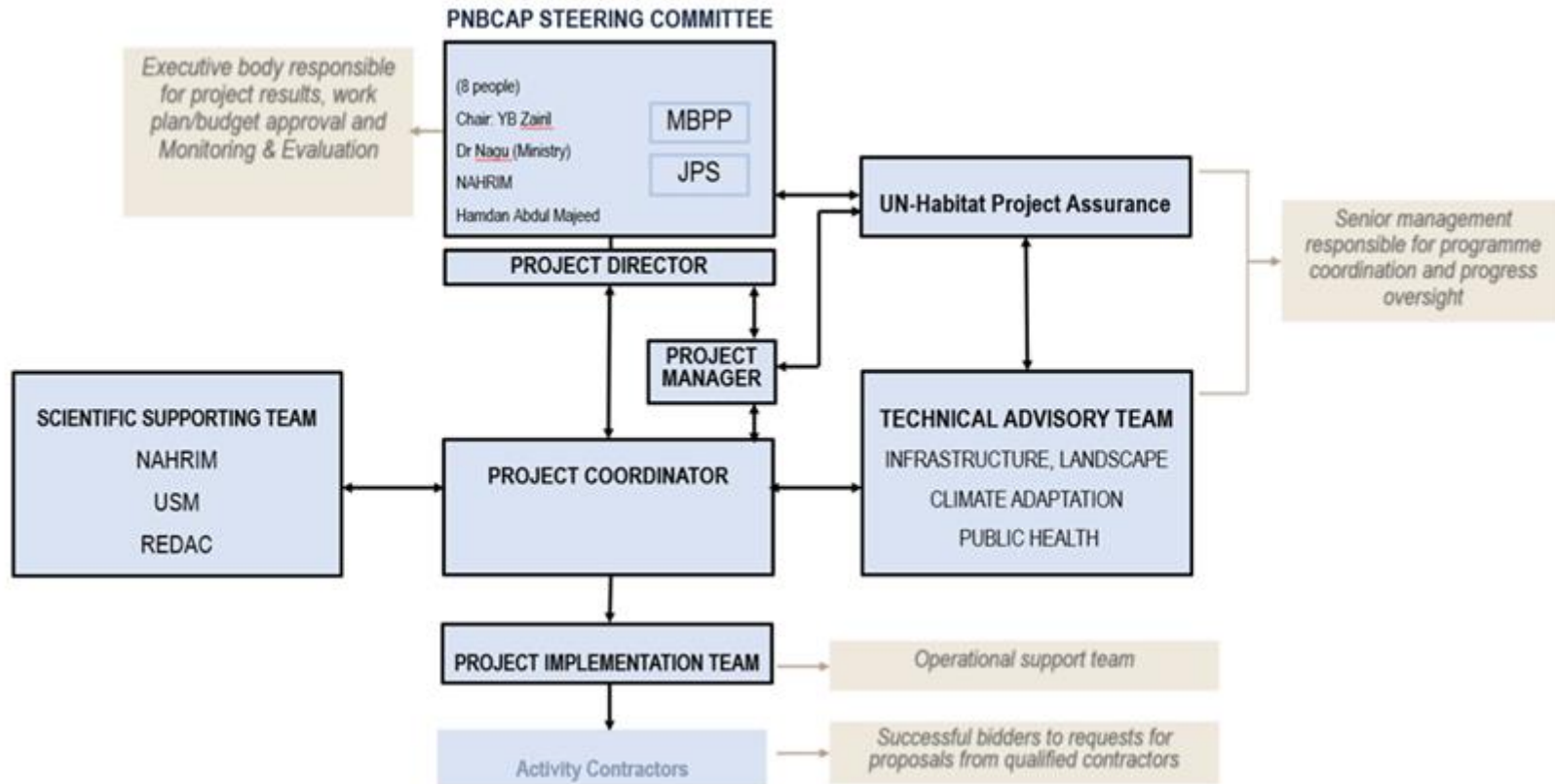
Global update

Mr. Laxman Perera, Human Settlements Officer,
UN-Habitat Regional Office for Asia and the Pacific (ROAP)

Presenting on the outcome of the project to enhance urban resilience and reduce human and ecosystem health vulnerability to climate change impacts and extreme weather events by implementing nature-based solutions (NBS) to reduce surface temperatures and storm water run-off, Mr. Laxman Perera reiterated the importance of the project in terms of enhancing climate adaptation. Considered as timely in light of the onset of natural disasters and huge climate impacts displacing many people, the project will be pioneering the use of NBS in Malaysia.

Elaborating on the objectives of the Inception Workshop, 1) to officially inform and launch the project to the key stakeholders; 2) foster high-level commitment and leadership to support the project; 3) create opportunity for the key stakeholders and actors to deliberate on the project activities; and 4) get practical feedback to the project document and work plan, Mr. Perera shared the lengthy project preparation and extensive consultations with communities that had already taken place since the Agreement was signed with the Adaptation Fund Board.

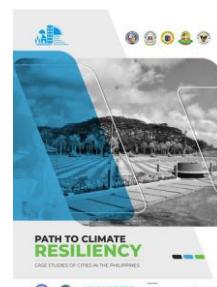
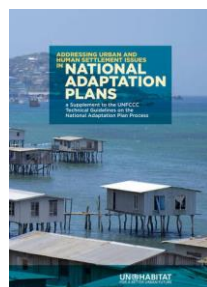
Mr. Perera continued to offer an overview of the Executing Entities comprising of the City Council of Penang Island (Malay: Majlis Bandaraya Pulau Pinang (MBPP)); the Department of Irrigation & Drainage (Malay: Jabatan Pengairan Dan Saliran (JPS)); and Think City, with support from the Ministry of Environment and Water (Malay: Kementerian Alam Sekitar dan Air (KASA)), along with Chief Minister Incorporated, Penang State Government. Providing transparency on the disbursement of funding to each of the Executing Entities, further details were then shared on the governance of the project including Steering Committee and coordination.



Going over the project execution responsibilities of the i) Project Manager; ii) Project Coordinator; and iii) Project Implementation Team, Mr. Perera stressed on the need to create synergy among Implementing Partners and leveraging the experiences of stakeholders to ensure activities possessed a larger perspective. First following the formation of the Project Implementation Team comprised of those from Executing Entities, he shared that it would be the role of this group to facilitate the day-to-day management of the project activities, overseeing the implementation of the relevant project activities and developing the technical specifications.

Most importantly, activities of the project would also be complemented by a i) Scientific Supporting Team, proposed to include at a minimum, the National Water Research Institute of Malaysia (NAHRIM), Universiti Sains Malaysia (USM) and the River Engineering and Urban Drainage Research Centre (REDAC). This would also be supplemented by a Technical Advisory Team, proposed to feature experts from disciplines including infrastructure, landscape, climate adaptation and public health. Overall project assurance would then be carried out by UN-Habitat in consultation with the eight (8) member Project Steering Committee.

Sharing the breadth of Adaptation Fund projects for which UN-Habitat are engaged totaling over USD \$70 million, Mr. Perera elaborated on the diversity of focus areas for the various projects ranging from policy guidance; vulnerability mapping; support to increasing national capacities to contribute to global commitments; to small-scale climate resilient infrastructure such as related to water and sanitation, housing and livelihoods, and flood control. Information was also shared on the vast repository of knowledge for public use (further details available [HERE](#)).





Component 1

Built projects for greening Penang

Dato Ir' Rajendran A/L P. Anthony, City Secretary,
City Council of Penang Island (MBPP)

Mr. Danny Koay Hock Hsiang,
Director of Heritage Conservation, City Council of Penang Island (MBPP)

Presenting on the proposed George Town Urban Green Corridor intended to be situated at Weld Quay, Mr. Danny Koay Hock Hsiang anchored the discussion on extreme heatwaves being experiences around the world which were also happening quicker than expected given the onset of global warming. In Penang in particular, he highlighted that rapid urbanization, industrialization and the increasing number of motorized vehicles had made the city more vulnerable. Through Component 1 being led by MBPP on “build projects for greening Penang”, the strategic planting of trees and introduction of green spaces would help to reduce temperatures.

Sharing a comprehensive background to many of the other green and connectivity initiatives led by MBPP, Director Danny also made reference to the Penang Green Agenda helping to enrich and maintain bio-diversity in Penang. Initiatives highlighted encouragement of active mobility including Penang Bicycle Lane Master Plan which featured 205 km of shared and dedicated cycling lanes; bike sharing systems such as through “Link Bike”, Greed Road Sharing Concepts along with Bicycle and Pedestrian bridges or “Spiral Bridges”. In terms of public transport, a free service within the city precinct referred to “Central Area Transit” operated between KOMTAR and the Ferry Terminal to promote convenient city travel. Meanwhile, a Business Improvement District Scheme (BIDS) has also served to implement universal design in public amenities and ensure accessibility and mobility.

Elsewhere sharing on the 9km of rejuvenated backlane and 10 acres of safe green spaces secured for walk and cycle in George Town World Heritage Site, Director Danny further updated on the Retrofit Energy Management Scheme (REM) for street lighting in Penang Island, that had saved RM 4.2 million per year and resulted in a reduction of close to 9 million kg of Co2 per year, thanks to the replacement of over 33,100 streetlights in Penang, coupled with the installation of solar systems on the selected council premises using a Zero Capex business model.

Homing in on the programme aspects to be undertaken as part of the Adaptation Fund project by MBPP, he expanded on the i) new tree-line streets and connected canopies to be constructed; ii) pocket parks and vacant spaces; iii) green parking spaces; and iv) urban agriculture programme initiated. Adopting the boundaries of Weld Quay, King Edward Claimant, Beach Street, and Chulia Street Ghaut, being a length of 1.8 km and area of 36 acres, public space would be reclaimed from the vehicular traffic lanes, converting local streets to a one-way flow system, promoting more green corridors and proper pedestrian walkways. Reconfiguring intersections to improve green mobility, concepts were put forward for addressing the street scape towards pedestrianized local streets in the implementation area.

Discussion, Comments and Feedback

Dr Ng Shin Wei, Penang Green Council – on the topic of greening, expressed hopes the project would serve to enrich and maintain the biodiversity on plants in Penang. Suggesting the use of heritage plants or usable traditional plants may help improve acceptance. Elaborated further by *Ms. Sofia Castelo*, there has been discussion on specific grants for urban greening which may include farming, possibly in support of local restaurants. Additionally, the introduction of green spaces has the goal of temperature reduction of 2 to 8 degrees Celsius, while 8 degree is ambitious, 5 degrees is achievable. While *Ar. Ahila Ganesan*, added a “Resilient Urban Trees” nationwide research for Malaysia has to be developed to identify tree species able to withstand climate change.





Ms Ong Bee Leng, CEO of the Penang Women's Development Corporation (PWDC) – advised how MBPP have been implementing gender-responsive and participatory approach such as in pocket-parks to engage with the community as part of the implementation. While the project will help achieve a cooler place for the community, she emphasized that for a more sustainable process, it was essential communities are involved to ensure ownership and sustainability of the parks.

Ms Lavanya Rama Iyer, Head of Policy and Climate Change, WWF Malaysia – raised a question on how the project outcomes could be monitored, suggesting the SDGs as a framework to measure bio-diversity and social impacts. This was kindly responded to by *Ms. Sofia Castelo*, that an annual monitoring approach with remote sensing surface temperatures could be applied with support of Malaysian Remote Sensing Agency now under the Malaysia Space Agency (MYSAs). Also elaborating that there are many different types of targets and indicators.

Mr. Andrew Han, Vice-President of Ecology and Climate Network (Malay: Jaringan Ekologi dan Iklim (JEDI)) – spoke on need to maintain an inventory on the number of trees which could further be supported with the monitoring. Secondly, Andrew shared a concern and feedback on the community involvement, especially in areas such as George Town World Heritage site where the main inhabitants are business owners renting shopfronts, rather than residents.





Component 1a

Grants for Greening Rooftops and Facades

Ar. Ahila Ganesan, Senior Director – Strategy & Development,
Think City

Focusing on two (2) areas of Penang where grants will be passed in George Town and Bayan Lepas, on issues related to adaptation to the “Urban Heat Island through Urban Greening Outputs” specifically “Green Facades” and “Greening Rooftops”. Having experience running a grants program through George Town Grants Program, Think City is well positioned to deliver through a tried and tested method with checks and balances to ensure the grants are given out in a responsible manner along with good governance. Targets of the intervention will be the reduction of heat on the streets as well as in nearby buildings. While the focus on facades has been identified as a critical need or else the streets themselves will not be habitable to walk and businesses along them will not be able to economically thrive.

Engaging the community to look at piloting projects to be run in city will be valuable to explore how the project can be scaled up to other parts of the city. Providing a timeline of the project over 5 years, efforts will be made to try and squeeze the time for implementation, although as Ar. Ahila Ganesan helped to share, “trees need time to mature”. Ideally, for the project to demonstrate outputs, she added that it would be good to be done with the planting and so that by the fifth year, before and after assessments can be undertaken comparing temperatures at the end of the project to those obtained at the time of the project proposal.

Having identified Union Street and Downing Street as pilot implementation sites, consultation with MBPP will be carried out to shorten the period time for the planting. Synergies will also be explored with \$10 million Archeotourism Grants Program with the Ministry of Finance with funds to be disbursed in 2022.

Discussion, Comments and Feedback

City Secretary, Dato Ir' Rajendran A/L Anthony – advised MBPP have already been implementing a lot of projects on tree lining the roads and pocket parks. Albeit, facing contention with business owners in the initial stages, often the businesses would see the value after some time and be more willing to accept. Ultimately, he reminded as shared by the Chief Minister that we simply need to be bold enough to try, while hearing the views of the public and bending to accommodate, helping to reassure everyone that the officers were well-informed on what to do.

Mr. Neil Khor, PhD, Special Advisor to the UN-Habitat Executive Director – added his appreciation for the feedback shared, encouraging partners to go beyond merely supporting the project to actively participating. Providing the anecdote of where locals had poured hot water on the trees to debilitate them, he gave the example of the Penang Waterfront, highlighting scaling up evolved at community level making it essential to find ways and means for the community to champion. Most especially, we will need to strike a balance between the innovation and adaptation perspective and engineering aspects that ensure the interventions work.

Ms. Joy Jacqueline Pereira, Ph.D., Professor and Principal Research Fellow at SEADPRI-UKM – emphasized on the need to harness science leadership to help ensure a robust methodology for monitoring by documenting the process in journals, so the work is not stuck in grey literature but also peer-reviewed.

Mr. Tony Yeoh Choon Hock, CEO, Digital Penang – encouraged “transplanting” instead of “planting”. This would be a faster and more accelerated way of introducing the trees that could be grown in an orchard somewhere until maturity. *City Secretary, Dato Ir' Rajendran*, confirmed that MBPP maintained a tree nursery while *Mr. Azizul Fahmi, MBPP Landscape Architect*, added the tree species introduced would be important to be considered, as not all trees can be transplanted especially in the urban areas, based on soil and other conditions.





Component 2

Built projects in stormwater and flood management

Mr. Encik Ooi Soon Lee, Deputy Director,
Department of Irrigation & Drainage Penang

Ms. Haslinda Binti Mohamad Hamran, Senior Assistant Director,
Flood Management Division, Department of Irrigation & Drainage Penang

Offering an outline of the flood resilience project to be carried out by JPS related to flood and stormwater management, the primary goals of the interventions were to reduce and if possible, eliminate the number of flooding events by implementing river improvement (blue-green corridors) and upstream retention to be actualized through three (3) essential means i) blue-green corridors ii) upstream retention and iii) swales and infiltration wells. Carried out with MBPP, the activities in the first year following the approval would feature detailed design studies on scope of work based on an engineering survey, utilities mapping and feasibility and hydro dynamic analysis complemented by stakeholder engagement with the community.

Detailing the project milestones, this would be followed by three (3) tender bids for the survey, design and construction respectively leading to implementation and then eventually surrender of the project site and ensuing maintenance. Concerning the first intervention on blue-green corridors, Ms. Haslinda shared with the participants case studies and examples of implementations of similar concepts in other countries. For Penang, three (3) river systems were assessed as being suitable for the project being, namely i) a 600 metre stretch of Air Itam River; ii) a 1 km stretch of Keluang River; and iii) 200 metre stretch of Relau River. Photo documentation was used to convey the existing condition of the respective rivers, supported by satellite imagery using Google to take into account the spatial characteristics of the area along with considering potential impacts on the surrounding neighborhood.

For the intervention on upstream retention pond, this was envisioned to take place at Air Terjun River in the Barat Daya district with land acquisition estimated spanning 4 private plots that need further clarification with the Land District Office. Being a small pond currently, the plan would also be to revitalize the area to further serve as a lively recreational park. Meanwhile, for the third intervention being on swales and infiltration wells to be implemented in the Ara River and site of an existing football field. Overall, it should be noted that full construction is not likely to start until the end of 2023 with around 2-3 years estimated for the completion of all construction works across the three interventions and conclusion by the end of 2027.

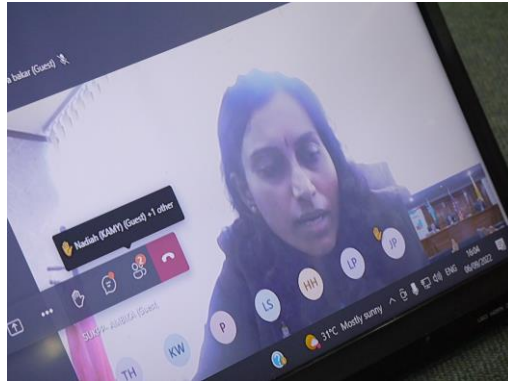
Discussion, Comments and Feedback

Prof. Joy Jacqueline Pereira, Ph.D., Professor and Principal Research Fellow at SEADPRI-UKM – encouraged the implementation to capture two essential areas on the i) cost effectiveness and ii) intangible benefits including temperature reduction in the area using remote sensing, so that the science and practice can be further synergized in the project. Offering thanks *Deputy Director, Mr. Ooi*, reassured that these aspects would be incorporated in the framework outcomes.

Ms. Sofia Castelo, Director, Climate & Environmental Resilience – elaborated that there are many ways to take account of the intangible benefits, especially with the guidance of REDAC at USM working with JPS. Think City has adapted the existing i-tree software for Penang to measure urban greening benefits, which is used in New York City Parks, which will be shared in follow-up meetings.

Prof. Dato' Dr. Nor Azazi Zakaria, Ph.D., Co-founder of REDAC & UNESCO Chair on SDG 6 – offered a background to the USM pilot project on nature-based solutions and mega-projects including 2,300 acres of a mixed development site. He continued to advise that the project should look more carefully into the flood resilience aspects and water security.





Ms. Ambika Devi A/P Daran, Head, State Disaster Management Unit, Penang State Government – introduced the team as a newly established unit working primarily on disaster risk reduction (DRR) and for collecting data on disaster management. She continued that the project would be a great opportunity to get more information for preparing blueprints for disaster management in Penang.

Dr Ng Shin Wei, Penang Green Council and Director of Global Policy Asia – queried whether the buffers of the rivers had been established or if the community would need to be relocated, encouraging the project to take consideration of river clearing and stormwater management. In particular, she hoped the project could be the basis for experimentation through either swales or upstream retention on how stormwater can be managed in a way that can support water supply. In reply, *Senior Assistant Engineer, Ms. Haslinda*, advised the blue-green corridors would focus on existing river reserve and the retention pond, would function to retain water from upstream and facilitate gradual discharge following a flood event.

Mr. Mateen Zayani bin Abu Bakar, National Landscape Department (Malay: Jabatan Landskap Negara (JLN)) – highlighted support for the project and initiatives on urban resilience, being aligned with the vision and mission of JLN to promote landscape development which in turn promotes quality living. Previously JLN had cooperated with MBPP on Landscape Master Plan during the period of 7th Malaysia Plan, worth looking back to review. Although financial support could not be guaranteed, JLN look forward to further engagement through both Technical Expertise Division and Landscape Promotion Division, subject to clarification on the role of JLN.

Dr. Goh Hin Kwang, Director, Hospital Bukit Mertajam – suggested that wellness in terms of physical activity could be measured with surrounding communities and district health offices related to development of recreational area near the upstream retention pond, assisting to assess the intangible benefits.



Component 3

Comprehensive vulnerability / baseline assessments and action plans in targeted communities

Ms. Audrey Tan Su Yin

Senior Associate - Climate and Environmental Resilience, Think City

Setting the scene, Component 3 focusses on laying the groundwork for reducing vulnerability to climate impacts in George Town and Bayan Lepas. As expected outputs, Ms. Audrey Tan shared that capacity development support for vulnerability assessment and climate-change related planning would be provided for these two specific mukims. Ultimately, the outcome would be helpful to increase the capacity for participatory and inclusive assessments and action plans, focusing on vulnerable communities to improve social resilience. Related to this aspect, Ms. Tan reminded that comprehensive consultation had previously been carried out as part of proposal development stage and that Component 3 would expand on that.

In terms of the primary indicators, these would feature the percentage of the targeted population with increased level of awareness on systems assessment, including private property, infrastructure and natural assets, and improved planning for climate adaptation, while having the hope for 50% of the vulnerable community groups in the identified areas to be more prepared for climate hazards.

Breaking down the implementation into two main spheres, she elaborated the first being development of the project brief, guidelines and quality control mechanisms. This would be followed by drawing up an inventory of stakeholders, drafting out the framework and field assessments and data analysis. Secondly, this would involve training for selected community groups, along with development of communications and community engagement tools and training workshops.



Component 4

Social resilience programme

Ms. Uta Dietrich

Advisor, Social Resilience, Think City

Beginning by emphasizing the nature of climate change as a vulnerability multiplier, Ms. Uta Dietrich, she helped to outline our obligations as a project team and society at large to provide additional support to those disproportionately affected and that will suffer more from climate change. Identifying two key target groups as the locus for programming are 1) youth and 2) women and girls. Youth, she continued would suffer more and suffer longer by virtue of their age. Conversely, young people are also more motivated to address climate impacts and gain from adaptation measures while securing a better future for themselves, made evident by the capacity of young people in prompting government to act and effect change.

Also highlighted as being more vulnerable to climate change, women and girls are often poorer, for example, single mothers with limited income, possessing a lower economic power compared to male counterparts. At the same time, cognizant of the caring roles for family members often carried by women in households, when climate impacts hit, these stresses are also exacerbated, especially in the case of injury and disease that might be potentially experienced by the family. Thirdly, considering the lack of participation in decision-making, she shared the women's voices on many committees were not well heard and needs therefore overlooked.

Outputs for Component 4 will feature a i) school-level awareness programme and ii) women and girls' programme, both with the intent to increase their resilience and reduce gender vulnerability asymmetries. Additional outcomes of the Component 4 would also serve to support a greater level of knowledge and awareness among students, teachers, and education authorities in the pilot areas.

As an overarching indicator, Ms. Dietrich advised that the intervention would seek to assess the number of schools and youths equipped with awareness and knowledge of climate change, aiming to engage at least 10,000 students from local schools. In terms of the women and girls' programme, the proposed target would be for at least 25 per cent of women and girls in the B40 income group within George Town and Bayan Lepas (approximately 16,000 women and girls) are made aware of climate-related risks and given tools to deal with gender-specific challenges. Another focus as elaborated in the presentation, would be on 6,479 single mothers to benefit from peer support network and disaster preparedness. Embedded part of Component 4 will also be conscientious efforts to achieve a benchmark allocation of 40 per cent representation in the committees of the Penang Climate Board to give enhanced decision-making power of women representatives.

Structuring the entirety of Component 4 around 4 key areas, Ms. Dietrich helped to detail these as 1) raising awareness 2) increase knowledge 3) building capacity and 4) facilitating empowerment, which as considered the strongest. Considering the timeline and school level awareness programme, activities related with awareness would serve to expose the school children to selected natural environments along with having climate awareness exhibitions. Around the knowledge, these would be carried out not only through lectures, but also linking nature and art to assist with storytelling competitions, as a fun way of engaging youth. Moreover, these activities would be complemented by "Makers' Workshops" for youths to unpack and address urban challenges in their cities and related energy transitions.

Incorporating a 6-month internship programme as part of the Component 4 track on capacity-building, this would help to ensure that under the other Adaptation Fund project streams, young people have the opportunity to engage in assessments such as monitoring the water level of rivers or water quality. Training is also planned to be delivered to engage youth in monitoring, sampling, and testing air, soil, water for environmental pollution, particularly at the two survey sites. This will culminate in a "Youth for Nature Forum" to give young people a voice, as a youth-oriented platform to build their advocacy skills for their work related to nature, anchored in the creation of a Penang chapter of the Malaysian Youth Delegation.

Regarding the women and girls' programme, there will be a strong communications campaign to promote the advocacy of women empowerment and their awareness of gender-specific risks. While Ms. Dietrich shared as part of the planned education programmes, these would engage with women NGOs being multiplier effect to their existing work. To ensure co-production principles, women and girls would be invited to be closely involved in the development of training modules, tools, and adaptation resources on various topics. Such thematic areas could include extreme heat, urban agriculture for community women NGOs and women leaders.

Pertaining to capacity building, Component 4 will seek to establish a flexible peer support network on mobile application, thereby linking some of the information which women already have with their fellow peers. This would further expand to support access to information, and training for women leadership in the skills needed to help influence climate discussions and related to their activism.

While in terms of activities under the empowerment track of Component 4, this would feature 40 per cent of women represented in the committees of the Penang Climate Board as previously aforementioned. A Climate and Environmental Women Activist Forum would help to foster discussion on gender-specific risks, policies, and actions, giving women and girls a voice, not just learning about the issues, but also the skills and actions to be able to do something and contribute.

Discussion, Comments and Feedback

Mr. Andrew Han, Vice-President of Ecology and Climate Network (Malay: Jaringan Ekologi dan Iklim (JEDI)) – inquired on current level of awareness following Penang Green Council studies and secondly, while going to school could be a good idea, new and engaging ways could be explored via influencers to invigorate enthusiasm to get young opinion leaders to be more engaged. Building upon this, *Ms. Dietrich* added that going to schools offers also shared knowledge with the teachers which followed with environmental interventions at the school.

Mr. Tony Yeoh Choon Hock, CEO, Digital Penang – suggested how we can leverage Penang Science Cluster to get access to the schools and that ultimately, we need to make it a fun process for the youth to learn something out of it. Complementing the discussion, *Datin Bharathi* advised that a Green Schools initiative was operated by Penang Green Council which can be a platform to be used to immediately engage with the teachers, where local council also have their own Green Schools initiative, as shared by *Dr Ng Shin Wei, Penang Green Council*.



Asso. Prof. Khoo Suet Leng, PhD, USM – regarding awareness on social resilience encouraged the intervention to look into the preparedness and readiness of the community through baseline study. When considering different stakeholder groups, the question was posed how to account for urban poor, elderly, disabled persons, and refugees, recognizing that a big chunk of M40 had slid down to B40 category as a result of the pandemic, leading to greater levels of vulnerability. Agreeing with the need for a baseline assessment, *Ms. Audrey Tan*, shared although the focus was on youth, women, and girls, reassuring that Component 3 on vulnerability assessments would feature activities where selected communities would be visited (some of which had been approached during the proposal) to explore the level of readiness and preparedness among a more diverse range of stakeholder groups. Elaborating on this further, *Ms. Uta Dietrich* advised that single-women overwhelming are made up of the urban poor. Being mindful of spreading our money too thin, we risk not being able to achieve any effect. Therefore, another way of approaching this would be to ensure representation within the youth, women, and girls' programme.

Dr Ng Shin Wei, Penang Green Council – informed that as part of the new State Disaster Management Unit, there would also be a team responsible for conducting outreach to the community to help increased preparedness. Certain groups such as APM are already engaged in assisting the community. In terms of the level of vulnerability, assessment of and actions to help vulnerable individuals/households could make sense to align with existing schemes run by the welfare department. Agreeing on this point, *Ms. Ambika Devi A/P Daran, Head, of the State Disaster Management Unit* added they are working on both engagement and empowerment, having currently appointed a person in all the districts and the related districts, coordinating with all the response agencies.

Elaborating of the desire for young people to have an experience of the adaptation work, *Ms. Dietrich* implored those leading the respective components to consider how young people could contribute to success of their programmes.



Ms Ong Bee Leng, CEO of the Penang Women's Development Corporation (PWDC) – commended that the 40:40:20 gender representation policy proposed was in line with the Penang gender inclusive policy. In terms of advocacy and awareness, she continued that we should also consider how to do so in the general public. Speaking to the inequality in society, she highlighted those contributing most to climate change are more likely to be the rich rather than already marginalized groups. This could be framed around the narrative of fatalities, which we all have a responsibility and important role to play in addressing climate change.

Prof. Joy Jacqueline Pereira, Ph.D., Professor and Principal Research Fellow at SEADPRI-UKM – agreeing with comments shared, advising that it would be ideal for the final implementation plan to clearly specify who will carry out engagement and support beyond the project duration. In this sense, building the partnerships at the onset is critical to ensure the legacy can be handed over.

Ms. Ili Nadiyah Dzulfakar, Co-founder, Klima Action Malaysia – shared a question regarding the gender inclusion intervention, wondering if there were considerations made with regards to the conventions to which Malaysia is a signatory and ratified, such as CEDAW General Recommendation 37, which speaks directly to disaster risk reduction, encompassing the impacts on women and children, as well as, those recommendations and frameworks associated with the CSW. Highlighting that many of these instruments themselves maintained monitoring frameworks within them, she offered that this could be an opportunity to put forward aspects of the project to the CEDAW General Assembly and Malaysia's reporting to CEDAW due in 2023, providing an opportunity to include adaptation efforts achieved and perhaps the first reporting by Malaysia to CEDAW on DRR and gender. Informing it had not yet been considered, *Ms. Sofia Castelo* reassured it would be considered in first consultations of women and girls' programme for Component 4. *Mr. Tam Hoang, UN-Habitat* – updated during a meeting of the Executive Director with UN Country Team, there had been strong offers to support from UNICEF, UNFPA and ILO, recognizing how these issues might relate to their respective mandates.





Component 5

Institutional capacity and knowledge transfer platform

Ms. Sofia Castelo

Director, Climate & Environmental Resilience, Think City

Sharing the unique nature of Component 5 focused on Penang, Ms. Sofia Castelo highlighted that it also extended beyond Penang. Comprising 3 main components, the first being a public health programme for which there is a dedicated health team led by Prof. Jamal Hisham, with detailed aspects relating to climate change impacts, heat stress, vector and water borne diseases. Building on comments by *Prof. Joy*, the project outputs will further become a focus of peer-reviewed literature which is scientifically reviewed. With initiatives already initiated, Ms. Castelo informed the Penang programme had won the award for best urban global climate adaptation programme in 2020 by Climate KIC, a European body for climate change related to knowledge and innovation. With the monetary award, MBPP was kind enough to sponsor the Climate Resilient Urban Tree Species study for Malaysia, which was developed by Think City. On the cusp of being published, this study and its methodology are aligned with methodologies by IUCN for climate resilient forest tree species for Indonesia and Borneo. The first of many studies which will come out, Component 5 will facilitate the creation of a Penang Climate Board, relying as equal partners on the Penang Green Council with plans to support a learning programme. Seeing more and more the increased frequency of disasters around the world, a slightly greater allocation will be set aside for DRR and readiness adapting to what we are seeing to happen in real-time. Related to this, further discussions have also been initiated with Penang Green Council on technical mapping to monitor potential disasters that may be incoming. Finally, a communications and knowledge transfer platform will be created including both online websites to share the assessment of impacts, ideally global knowledge networks could be established to share knowledge, meeting once a year to share learnings, including with local councils.

Adding further for the knowledge transfer component, the programme will also rely strongly on potential cooperations with Digital Penang, while hoping to see organisations such as KAMY come on board for executing different activities along with other key organizations that were invited but unable to attend the Inception Workshop. Underscoring that Component as a whole should remain as a learning programme, she shared that consultation would be at the heart of delivering a strong project and outputs.

Discussion, Comments and Feedback

Prof. Jamal Hisham, UNU-IIGH – recently returning from Penang where he has been involved in another climate change adaptation project under UKM looking at the assessment of inputs to global warming on water balance and socio-economic implications in the Kelantan and Muda River Basin (having related implications on Penang). For the dedicated health team associated with the project, they will be focusing on heat illness, morbidity, and hospital admissions, along with climate-sensitive communicable diseases, such as those comprising vector-, water- and rodent-borne diseases. Meanwhile, another health component is proposed on air pollution related diseases that may be a consequence of drought and dry weather being the extreme opposite of heavy rainfall and flooding.

From this stream of work, it is planned to come up with a workforce plan for capacity development of health professionals, administrators, scientists, and researchers. Offering as an additional feedback, Prof. Jamal shared that it was enlightening to listen to the other components, presenting an opportunity now to synchronize on the learning outcomes with other components. For example, related to Component 1 on green facades and roofing to reduce heat island effects, the health programme can then focus on the surrounding community in respect to what they have experienced in relation to heat-related illnesses. Preparing the before and after documentation, it will be possible to assess the effectiveness of interventions.

For Component 2 on flood mitigation focusing on several river basins, examination of these high-risk flooding areas to consider what they have encountered in the past in relation to the flood-related illnesses and what would be potential aftereffects of improvement in water flow and similar areas. While considering the climate impacts on vulnerable groups, it could also be possible to work closely with these groups such as youth, women, children, and girls, to ensure institutional capacity and knowledge transfer is integrated into associated activities. To this, **Prof. Joy** also suggested to engage with the Academia of Sciences, now coordinating research grants given via the Ministry of Higher Education and the Ministry of Science and Technology, so that MBPP can leverage ongoing projects within Penang, linking with practitioners and build on the synergies as part of the roll-out.



Dr Ng Shin Wei, Penang Green Council – regarding institutional capacity building, she shared the suggestion to ensure that this was mainstreamed not only to both the engineering and landscape departments, but to the whole of MBPP, facilitating understanding together and among other departments. While considering the project from the perspective of institutional innovation, it would also be important to ensure a way to capture responses and feedback from stakeholders, stemming from all the community consultations with different groups. Such a system to capture feedback quickly and in-time, generating so much information and knowledge, might require for the creation of a database to be used going forwards.

Ms. Sofia Castelo, Think City – highlighted as the programme is 5-years long, we should initiate activities with a consultation with vulnerable communities. Sharing insights from the development of the programme in 2019, she added that consultation had commenced with local experts in focus groups on the impacts of climate change. All local experts and local leaders opined that the biggest impact Penang was feeling was floods and that heat was not a problem. Thereafter, going to the vulnerable communities to conduct on-site engagements, whereupon their answer was exactly the opposite. Here it was shared that heat being a much bigger concern, notwithstanding the impacts of flooding, but since flooding occurrences were only once a year while impacts of heat were felt every day.

This revelation, served to demonstrate that any person from the middle class had a distorted view of impacts. As such, the most accurate assessment of climate impacts can only be achieved by engaging with the most vulnerable. Of course, this is a model that we are beginning to develop requiring further consultation. Adding to this, *Mr. Neil Khor, PhD, Special Advisor to the UN-Habitat Executive Director* – with regards to language, reminded that we should definitely have information offered in national language, but in some places in Penang also Mandarin.



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