

Bridge to Co-exist, Tanjung Bungah, Penang, Malaysia

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Is the project a case of...:

- State-initiated co-creation
- Entrepreneur-driven co-creation
- Grassroots-based co-creation*

**For an elaboration of the typology, please consult the GOGREEN theoretical framework p. 25.*

Integrated case analysis

Before proceeding to the scoring of the GFs, please provide a 3–5 page case analysis in which you describe the background, history, and national, regional, and local contexts of the case, the problems and goals addressed by the local collaboration, the participating actors and their relationships, the unfolding of the co-creation process, the most important governance factors (this may include factors other than those in focus in this project), and the generated outputs and outcomes. The conclusion may specify a few lessons learned from the case study.

1) Background, history, and national, regional, and local contexts of the case

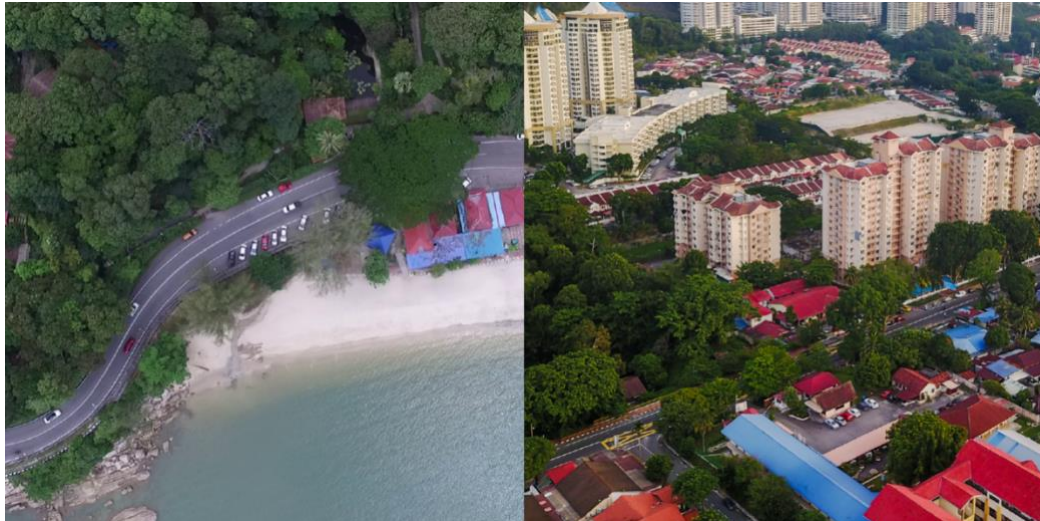
Wildlife habitats are lost as a result of urbanisation which subsequently could lead to a number of issues, including conflicts between humans and wildlife (HWC). Wildlife is exposed to road kills as they migrate into residential areas and locations with lots of roadways. Wildlife finds it difficult to migrate between fragmented habitats and faces obstacles from human development, particularly in urban contexts. To counteract the detrimental impacts of habitat fragmentation, attempts were made to design a conservation strategy for arboreal animals in urban environments. There are wildlife road bridges for terrestrial species throughout Peninsular Malaysia, but no wildlife viaducts for arboreal creatures. The arboreal crossing, sometimes referred to as the treetop crossing or the treetop canopy bridge, is an attempt to close the gap, lessen the issue of animal fatalities in trees and ultimately deal with the HWC.

The Habitat Foundation, a charitable trust with its headquarters in Penang, Malaysia, and its non-profit sister organisation, The Habitat Penang Hill, have taken over the role of area management following the declaration of Penang Hill as a United Nations Biosphere Reserve (UNBR). The two organisations' common goal of fostering human connections with nature through outreach and education makes them complementary to one another. The Habitat Foundation actively supports protected area management, conservation efforts, habitat restoration, and rainforest research through programmatic activity.

In order to link people with Penang Hill's magnificent rainforest and raise awareness of the value of environmental preservation and inspire them to adopt more sustainable lifestyles, the commercial rainforest park known as Habitat Penang Hill was founded in 2016. A BCorp-certified firm, The Habitat puts

people and the environment first. The Habitat Foundation was founded in 2019 by the founders of The Habitat Group with the aim of directly influencing biodiversity protection on a national scale. Based in Penang, the Foundation is a nonprofit trust that promotes conservation through its grants programme, alliances and cooperative ventures, and foundation-led projects. When the Foundation was first established, its main aim was to assist Penang Hill's UNESCO Man & the Biosphere Programme submission financially and technically. The Penang Hill Biosphere Reserve was formally designated on September 15, 2021. A primary emphasis of the programmes is to realise the potential of the Biosphere Reserve as a hub for rainforest research, environmental education and awareness, and advances towards sustainability. The five primary pillars of the Habitat Foundation programme are Education, Training, Sustainability, Research, and Conservation. A small number of programmes were turned into projects, one of which is a three-year project that aims to restore the infrastructure and services of a natural ecosystem.

In Teluk Bahang, Penang, Ah Lai Arboreal Crossing, the first artificial road canopy bridge, was constructed in February 2019 by Langur Project Penang (LPP). In order to help arboreal creatures securely traverse between habitat segments that were previously separated by roads and other infrastructure, the project's goal was to construct an arboreal crossing. Since its construction, there have been no fresh reports of mammal roadkill, demonstrating the extraordinary efficacy of the pilot bridge. A total of 2,128 animal crossings involving three mammal species were recorded between March 2019 and May 2021. The LPP team is currently working through an analysis of more than 5,000 newly recorded crossing incidents from video traps. As seen in Photo 1, the Ah Lai arboreal bridge project was tested between Penang Hill Biosphere Reserve's natural areas. However, as seen in Photo 2, the most recent project has been suggested for areas that are more urbanised. In this case study report, the urbanised background of arboreal crossing will be depicted as in Photo 1. This case study will centre on the arboreal crossing or road canopy bridge located in an urbanised environment.



Picture 1: On the left is the Ah Lai Crossing, the site of the Teluk Bahang pilot project within the fringe of the UNBR area; on the right is Tanjung Bungah, where the Concord Garden crossing is currently located and is the focus of this case study, within a dense urban context.



Photo 2: Left - The current Tanjung Bungah crossing (red triangle) helps connect to the larger habitat (green arrow to the Pearl Hill Park).

The newest arboreal crossing, which is situated in Concord Garden, Tanjung Bungah, Georgetown, Penang, is anticipated to indirectly extend over 1,000 metres, reestablishing connections between Pearl Hill Park and community parks and moderately dense residential areas through scattered green spaces and a nearby habitat reserved forest. One of the 1,000-meter span crossings is in Tanjung Bungah Arboreal Crossing in Penang. Over the coming years, the project is anticipated to be designed and built. The goal of public involvement is to influence how issues are defined and to suggest solutions for designing, building, and maintaining arboreal crossings that provide the best possible animal infrastructure for the region.

The Langur Project Penang (LPP) started the "Bridge to Coexist" research study effort. LPP is a Non-Governmental Organisation (NGO) that was founded in January 2016 and is a community science-based outreach and conservation project in Malaysia. It works in tandem with worldwide communities as well as governmental organisations, academic institutions, and NGOs in Malaysia. With the use of environmental education, conservation initiatives, and citizen science-based fieldwork capacity building, LPP seeks to promote cohabitation between people and urban animals.

Who played a key role in setting up the project?

In order to facilitate the crossing of roads by arboreal creatures like monkeys and rodents, LPP was instrumental in presenting the Penang Public Work Department (PWD) with a comprehensive plan for an urban firehose canopy bridge. This effort culminated in the approval of a temporary six-month permit in December 2018. The LPP was able to construct Malaysia's first urban canopy bridge thanks to this permit. International funding from the Disney Conservation Fund and The Rufford Foundation helped to finance this firehose bridge prototype. It follows Teluk Bahang, Penang's major beach road. The place was appropriately called "Ah Lai's Crossing," honouring the dominant man "Ah Lai" in LPP's accustomed langur study group at this location. This trial project's main goals are to: 1) examine how well a single firehose twisted line design can aid treetop animal crossings; 2) assess the firehose bridge's durability in a coastal

road setting; and 3) emphasise to the various stakeholders the significance of safe treetop animal crossings.

The second version of the arboreal crossing is situated in Tanjung Bungah and offers an alternative setting to the Teluk Bahang pilot project. The Tanjung Bungah arboreal crossing will use the same construction, but connecting it to the existing green space will be difficult given the residential area of Concord Garden's uneven land use, small pocket parks, and busy roadways. Different legal frameworks and jurisdictions, particularly those pertaining to endangered wildlife species, impose restrictions on these land uses. Tanjung Bungah will have a major impact on the local residential community environment, including unintentional new wildlife behaviour development that may eventually modify the ecosystem service, in contrast to Teluk Bahang, which is a one-off project. Concerns have also been expressed over how local communities, government agencies, and non-governmental organisations may collaborate to develop ecotourism in the state of Penang, as well as how best to live with arboreal crossing in the event of an overpopulation of wildlife in the chain.

2) The aims of the project and the sustainability problems that it seeks to address

The current Tanjung Bungah Arboreal Crossing Project's main objectives are to decrease the number of arboreal wildlife roadkill incidents in Penang and to collaborate with the locals to create a management plan and suggestions for potential sustainable and humane ways to lessen adverse human-primate, or HWC, interactions in Penang. SDG 11, SDG 13, and SDG 15 are the goals at stake.

The Tanjung Bungah arboreal crossing project is based on the landscape management approach, which emphasises the management of sustainability across jurisdictions based on variances in alignment with other landscapes and nature-based solutions, as well as commonality in nature and socioeconomics. While the current initiative on wildlife crossing in Malaysia is insufficient because it focuses on terrestrial crossing in natural areas, this project is built on the landscape management approach. Volunteer citizen researchers gather data on urban wildlife; through citizen science, people share and contribute to data collection and monitoring programmes, and their design input is included into the process, thereby fostering transformative citizen involvement. The Concord Garden local community should assist the local authority in operating and maintaining the facilities.

The endeavour focused on managing ecosystems through the conservation and control of urban animals. First, all relevant stakeholders were involved in the implementation of the design details and data collection. Future considerations should also include data on wildlife sightings in nearby urban areas, potential designs and constructions of wildlife facilities, and mediating the HWC within the designated region near the arboreal bridge. The second is the management of stigma as the wildlife conflict occurs. The arboreal crossing may appear to be an unneeded project that combines the intricate details of the public right and animals that are seen as a nuisance in the public space. This is a primary driver behind the landscape approach, which seeks to resolve conflict management in a way that respects the rights of living things and their ecosystem.

term. Hence, the Tanjung Bungah arboreal crossing is transforming a whole geographical area rather than just impacting the arboreal wildlife.

LPP uses a number of different platforms to interact with local and citizen researchers. The TED presentation is an internet venue, while site visits and school trips are traditional methods of reaching a larger audience. The platform's use aims to encourage interaction between people and wildlife as well as between nature and the younger generation by offering an on-site sharing session and experience.

The forms of stakeholder assessments along the LPP establishment process include reporting and site visits. The concept to proceed further and the proposed proposal at Tanjung Bungah were inspired by the previously demonstrated successful achievement (2016–2021) on Teluk Bahang crossing. The long-term objective of the Tanjung Bungah Arboreal Crossing Project, which aims to alter the local community and save the Dusky Langur, is yet unclear. The lack of precision in the legislative framework, management strategies, technological aspects, and methodologies pertaining to arboreal crossing—particularly in urban settings—causes uncertainty. However, the Penang Green Council (PGC) was founded by the State Government to create a strong, cohesive force that aims “to enable, empower, and enrich all stakeholders in practicing sustainable development that protects the environment and quality of life.

LPP addressed the subject of conventional HWC problem resolution wisdom and found that the Wildlife Department's usual approach of capturing, relocating, or culling in Tanjung Bungah's urban areas after receiving a report from the local population was ineffective. The ongoing conflict between the local community and animals was the product of conventional wisdom, and the department appeared apathetic towards resolving the issue as the conflict intensified because of a lack of staff, tight budgetary constraints, and a strict methodology. The Wildlife Department's efforts to promote wildlife were deemed successful by the LPP, but better approaches, including a more creative solution in a tiny island state like Penang, might be taken to protect endangered species like the Dusky Langur (*Trachypithecus obscurus*).

Given that the Penang state maintained the Penang Hill Biosphere Reserve and that the reserve was surrounded by densely populated residential areas, the creative attempt would be more enticing. The concept of coexisting with the endangered wildlife progressed to a more sustainable solution through the participation of citizen scientists in data collecting and analysis, as well as the installation of an inventive arboreal bridge with feedback from the local community. Additionally, it strengthens the arboreal crossing's sense of community. Other difficulties include the long-term behaviour of the wildlife as it becomes accustomed to the neighbourhood, the habitats that cross through the large trees that encircle the region, and the HWC that may emerge.

The LPP presents a flow diagram with numerous interrelated variables based on a moderate exploratory scenario (Svenfelt et al., 2010). The LPP is currently scaling positive experiences from the commune level to the district level of Georgetown, based on an exploratory scenario.

3) The participants and their interaction and communication in and between meetings

The Arboreal Crossing “Bridge to Coexist” **participants** are:

a) The original MoU's **core actors** take part in Steering Group meetings where they exchange expertise, create strategies, and oversee projects:

1) **Langur Project Penang (LPP):**

A primate conservation enterprise driven by citizen science, LPP aims to promote coexistence between people and wildlife through field research based on citizen science, conservation (road

canopy/arboreal crossing bridge), environmental education, and capacity building. It also serves as a platform for students and the local community. They go by the title of project leader as well.

2) **Citizen scientist/Local researcher:**

Using this methodology, citizen science refers to the process through which members of the public collaborate and participate in scientific research to advance scientific understanding. LPP is using this method in the arboreal crossing project. People share and participate in data gathering and monitoring initiatives through citizen science. In particular, citizen scientists maintain biological variety and increase public understanding of the natural system, which helps society in addition to the environment. LPP specifically recruited volunteer citizen scientists to serve as Dusky Langursighting officers. They trained them in a basic mapping format that included the species, date, time, coordinate position, number of members of a group, and activities during sighting. Through on-site wildlife data collecting and observation, the volunteers are assisting the LPP in reaching and supporting communities' transition to sustainable human-animal coexistence.

3) **Concord Garden:**

Concord Garden, referred to in this project as the local community, is a representation of the community, which is primarily made up of retirees and older residents of Tanjung Bungah, Penang, a neighbourhood with seaside properties. The hamlet is situated in the island portion of Penang state, midway between the Straits of Malacca and northeast of Penang Hill UNBR.

4) **CIMB Islamic and The Habitat Foundation:**

The arboreal crossing is funded locally by the Rufford Foundation and the Disney Conservation Fund, among others. The foundation supervises the arboreal crossing project's progress and solution in close collaboration with LPP. The project has aided in the management of wildlife facilities and transportation between Concord Garden's residential area and the Penang Hill UNBR's edge.

5) **Department of Wildlife and National Parks Peninsular Malaysia:**

The government organisation in charge of protecting Malaysia's peninsula's wildlife. The department is legally authorised to manage urban wildlife, including the removal, capture, or culling of animals, using a conservative wildlife approach. LPP's fresh suggestions for advancements and improvements could be used to those techniques. The department will ask the LPP to assist in managing the Dusky Langurin Concord Garden if wildlife is in danger of extinction.

6) **Local Government/Authority:**

The Town and Country Planning Act 1976 (Act 172), which governs green space, and the Local Authority Act 1972 (Act 171), which governs public space, are managed by the Penang City Council (MBPP), a local authority. The PWD and the local government own and maintain the offset land space of the road at Tanjung Bungah (the second ongoing project) and Teluk Bahang (the first arboreal crossing). Acts 171 and 172 give this group the authority to create a framework for planning, building, and overseeing the wildlife facility, which is still lacking.

7) **Public Works Department of Malaysia:**

The largest technical agency under the route Branch shares management of the wildlife facility and provides permissions and letters of approval on behalf of the government for project completion along the route. In addition, PWD created and executed Road Guidelines, such as the Green Procurement (GP) Manual for Roadworks, for the purpose of building requirements.

8) **Animal Projects & Environmental Education (APE):**

This Non-Governmental Organisation supplies and uses used firehose obtained from the Malaysian Department of Fire and Rescue as the primary material for wildlife crossing at both Teluk Bahang (first pilot project) and Concord Garden (second and current project), with the goal of encouraging responsible use of waste. The company is also an expert in primate research, crossing details, and on-site installation.

THB Maintenance:

The maintenance team working with LPP developed a traffic management plan prior to the installation of arboreal crossing facilities on site.

b) **Other actors** that are mostly involved in the implementation of projects but are also participating in Steering Group meetings, seminars, events and bilateral meetings:

1) **Tropical Spice's Garden:**

deconcentrated ministerial agencies that help channel resources to local projects. The organization also helped install the arboreal crossing pilot project at Teluk Bahang.

2) **Malaysian Primatological Society (MPS):**

Provides expertise and facilitates cooperation among scientists of LPP engaged in primate research and promotes the conservation of all primate species.

3) **Forestry Department:**

Grouped with the Wildlife Department from the same ministry, the department involved indirectly and a support stakeholder to the Wildlife Department.

4) **Disney Conservation Fund:**

Cofunds activities

5) **The Rufford Foundation:**

Co-fund activities

6) **State Assembly Representative:**

Assist LPP by leveraging permit application.

The **number and range of participants** in The Langur Project Penang (LPP) has expanded from one project to a few projects. This needs funding for a certain length of arboreal crossing installation.

Only core actors are **members** of the Steering Committee while other actors are merely **invited on occasion**. However, they are all participating in meetings, exhibitions, and seminars at an equal footing.

4) How often do they meet, and do they communicate between meetings?

All of the involved parties gather twice a year for the official but reasonably open Steering Group meetings, where expertise is exchanged, problems and issues are brought up, and solutions are discovered.

A secretariat made up of officials from the Malaysian Public Works Department, the Department of Forestry, the Department of Wildlife and National Parks Peninsular Malaysia, and the leadership of the LPP Project supports the Steering Committee. These delegates have decision-making authority. The time is ideal for conservationists and practitioners to share knowledge and improve the effectiveness of solution implementation.

Extensive communication occurs outside of scheduled sessions. Sensitive topics will be covered at special meetings. In both bilateral and international interactions, the LPP project leader seems to be central to the action.

The participating organisations decided on a purpose statement for the current initiative and shared a shared interest. Project groups facilitate information sharing, collaboration, and cooperative problem solving concerning a particular problem, goal, or assignment. The representatives were separated into informal groups by the project according to the sub-goals of each group. They appear to offer a flexible and modular method for carrying out common tactics and responding to expanding problems and demands.

Overall, the regular formal and informal meetings between the participants and their high degree of trust suggest that LPP is a close-knit partnership.

5) The role and forms of knowledge sharing, coordination and joint problem-solving

In addition to strategic planning, coordination, and knowledge sharing, the charter creating the Steering Committee also lists monitoring and reporting of results as crucial tasks. In order to avoid gaps and overlaps in the implementation of solutions, coordination is necessary. This promotes collaboration and synergy in the process of solving problems.

The activities of the LPP can be divided into stages from preparation to implementation.

Among the activities in Stage 1 are the sampling of Dusky Langurs' behaviour and an ethnographic survey; in Stage 2, a stakeholder report is developed; in Stage 3, a community forum is organised and a permit is applied for; in Stage 4, the canopy bridge is installed, and ongoing maintenance and community involvement are carried out, as shown in Photo 3.

CURRENT TARGETED STUDY SITE

Taman Concord & Lembah Permai, Tanjung Bungah

Methodology

- ✓ Stage 1: Dusky Langur behaviour sampling & ethnography survey
- ✓ Stage 2: Development of stakeholder report
- Stage 3: Application for canopy bridge permit & Organize community forum
- Stage 4: Installation of canopy bridge and continuous maintenance and community engagement



Photo 3: The stages in LPP in Concord Garden of Tanjung Bungah, Geogetown.

Policy-related activities include a) measurement, proposal of installation and prototype, evaluation, reporting and feedback; b) strategic management: baseline studies, housing assessment, problem exploration, goal setting, strategy formulation, planning and multilevel governance; and c) financing:

budget, commitments and agreements. **Implementation activities** include a) support letters from various government agencies b) Concord Garden residential area.

LPP operates at three levels: at the meso-level of networking it aims to integrate relevant and affected actors in a shared effort to build an innovative construction project management team; at the micro-level it aims to reach out to the local community of Concord Garden to get them to change their stigma on human-wildlife conflict based on persuasion and data driven proof; and the macro- level it aims to influence state and local government policy and regulation.

LPP was founded as an independent educational organisation that brought together community involvement and science-based behavioural research techniques to promote improved coexistence between locals and Dusky Langurs through environmentally friendly initiatives like the "Bridge to Coexist" Project.

6) The relation between consensus and conflict and the handling of the latter

Founded as an independent educational organisation, LPP combined scientific behavioural research methods with community involvement to promote better coexistence between locals and Dusky Langurs through eco-friendly projects like the "Bridge to Coexist" Project.

According to a number of respondents, there are rarely any disagreements during meetings. The steering committee meeting's minutes also convey a positive sense of the meeting's conclusions. Thus, when organising a meeting, LPP has very specific goals and purposes, according to the informants. Based on the prior project, LPP has produced an appropriate flow chart. The meeting's agenda includes a list of all the necessary paperwork as well as the procedure for applying for permits.

The informants claim that APE, who has expertise choosing firehoses, gave them advice on the materials guideline. The straightforward and lightweight single hose design was strengthened for the design and installation procedure in 2020 (first project) and was incorporated into the second prototype (ongoing project). Setting up separate small-group pre-meetings to resolve conflicts prior to the large partner meetings improves the process of reaching consensus. Meetings that establish common ground and identify solutions that satisfy the needs of all parties are aided by this.

It's been stated that LPP occasionally runs into issues when conducting interviews with Concord residents. Senior and retiree populations make up the majority of the neighbourhoods. By establishing a connection and using effective communication to find common ground, they have been able to resolve the concerns and demonstrate sincere interest in the experiences and viewpoints of the Concord community.

7) The role and form of leadership: lead actor, steering group and/or collective leadership

As time went on, a core group of participants in the informal committee developed collective leadership. In summary, while a lead actor model is prevalent, core group leadership and collective leadership both have significant components. As part of its Corporate Social Responsibility (CSR) initiative, The Habitat Foundation launched the project in collaboration with CIMB, a local bank. Since the foundation funds the LPP, which is situated near to the implementation site, LPP became involved early on. As soon as the

project gained momentum, the local authority representative, the major contractor on site, the representative from the political grassroots, and the LPP leader all worked together as leaders in the community.

According to multiple informants, the LPP leader was essential to the success of the initial pilot project and has remained so until Tanjung Bungah's present iteration. Many respondents think that the Tanjung Bungah arboreal crossing is still a developing project that uses a different strategy than the other infrastructure project related to human-wildlife conflict (HWC). Subsequently, unofficial gatherings were conducted in an unorganised manner, particularly among the local community members, the contractor, the LPP, and political grassroots representatives. There is a steering committee, but it lacks the government project's level of management.

8) The temporal unfolding of the co-creation process: major shifts and ups and downs

The unfolding of the LPP can be divided into **two different phases** with other phases to come:

a) Pilot project with impressive result 2016-2021 at Teluk Bahang

First pilot project: The Teluk Bahang arboreal crossing demonstrated several key elements of the wildlife infrastructure project's experimentation. These elements included (i) location identification, (ii) hiring an arborist to assess the viability of using mature trees already present along the road as part of the main vertical structure, (iii) choosing the primary material for the wildlife crossing—a used firehose from the Fire Department—and arranging for regular lab testing to determine the material's long-term usability, and (iv) submitting a permit application to the local government and PWD with insurance for the structure and public liability, (v) The Penang Hill UNBR cable connecting the metal post to the trees. Applying these components individually as a subphase and subpilot helps with regulating, developing, and building on public property at a protected site.

b) New consolidation of LPP 2023-2024 at Tanjung Bungah

Second LPP project: Although the regulating procedure is somewhat different from that of the pilot project, the Tanjung Bungah arboreal crossing is distinctive in and of itself. The current government agency team members have shifted, therefore the implicit knowledge needed for previous projects' teamwork is lost. The iteration project has been adjusted to fit within a residential neighbourhood. In accordance with road safety laws and guidelines, the proposed route between a park and a larger green area, the new pole design beside a river with a bridge to the opposite side of the road, the new crossing line design with the new rope prototype bridge design, and the location of the pole are all included. By 2025, it is expected to bridge patches of green spaces at the other ring of the Penang Hill UNBR.

9) The most important governance factors (may include factors other than those in focus in this project)

Respondents keep bringing up eleven (11) governance factors, which they regard as the most important among many other governance factors.

a) The first governance factor; perceived importance of biosphere conditions

For the Tanjung Bungah co-creation initiative, the first governance aspect is shown to be among the most crucial. For the majority of stakeholders, biosphere circumstances have served as a driving force toward collaboration. The local community, government agencies, NGOs, and

fundings are aware of the concept and exhibit a great deal of concern for the Penang Island environment. The strong emotional bond between the Malay, Chinese, and Indian groups and their historical reliance on the environment for daily resources, as chronicled in numerous histories of Malaysia, may also have something to do with their rich cultural heritage. This perceived importance is strengthened by the Penang Hill UNBR recognition which covers almost one third of the Penang Island and boosts their sense of pride and place in the surrounding area including the Concord Garden.

- b) The second governance factor; national and international legislation, program, and common goal
The second governance factor is identified to be among the most important governance factor. Although at national level, policies and strategies by the Ministry of Natural Resource, Environment and Climate Change highlighted the conservation effort including HWC, it only covers the terrestrial animal aptly Malayan tiger and elephant, but not arboreal wildlife and does not mention local collaboration. The direct support comes from the Penang state government which highlighted the importance of conserving the Dusky Langur in their Penang Green Agenda policy. This policy was translated by the local government of Penang Island which later established the informal stage for permit application for the local collaboration project. The stages for permit application are the first ever bespoke procedure for Teluk Bahang and Tanjung Bungah projects enabled by the PWD with constant involvement in the project. Furthermore, the Concord Garden local community is empowered and tries to co-exist with the Dusky Langur through citizen scientist approach with stakeholders. The local community also gained support from government agencies and LPP for the common goal of the co-creation project in the long-term.
- c) Seventh governance factor; construction of narratives about successful multi-actor collaboration
The pilot project narrative increases the participants' motivation after the arboreal crossing at Teluk Bahang, which proved to be successful. Heightened motivation as a result of the local government's informal creation of a previously unestablished permit application process, the assemblyman's support, and the community's welcoming attitude towards the young citizen scientist during their in-person engagement for the purpose of gathering observational data. As a result, a large number of project participants were shown to voluntarily devote time and effort to the initiative.
- d) Eighth governance factor; building or harnessing institutional platforms and arenas
Through focused information distribution and capacity building for a specific group, the combination of online platforms especially during the Movement Control Order of COV19 and physical location reveals a number of stages of local collaboration. The Tanjung Bungah project successfully improved the project's collaboration process by utilising a variety of platforms for a range of purposes, targets, and objectives.
- e) Ninth governance factor; provision of access to blended financing
The utilisation of a combination of foreign and local funding sources has demonstrated benefits in terms of information distribution for the project's capacity building. These include funding for the construction of arboreal crossings, public liability insurance, and a platform for knowledge dissemination fees. A few of the funds demand the creation of a specialised conservation action plan for an as-yet-unexplored setting, such as the Tanjung Bungah project (the Dusky Langur co-exist project). In the co-creation initiative, "in kind" contributions from the local community,

including observational data, are valued as "gold" since they represent a method of embedded knowledge transmission by the community at large.

- f) Tenth governance factor; the capacity to leverage support from authorities to enable local collaboration

The local government and assemblymen members provided bureaucratic, administrative, and technical support in order to enable local collaborative capabilities. Assembly members have been very supportive of reducing red tape when applying for permits for arboreal crossings; the local government has been supportive of creating a non-formal process for project approval that differs greatly from that of common building projects; and PWD has been supportive of the local community in establishing a series of site selection consultancy.

- g) Eleventh governance factor; inclusion and empowerment of relevant and affected actors

The project empowers the local population, which primarily consists of senior citizens, instead of convincing them. By gathering data in real time at Concord Garden, the citizen scientist and the LPP were able to both enhance and motivate the local community to participate in the co-creation project. In order to strengthen their sense of project ownership and prepare them for the challenge of coexisting with the Dusky Langur, the local community also participated in the consultation process for the arboreal crossing site selection.

- h) Twelfth governance factor; clarification of interdependence vis-à-vis common problem and joint vision

The participants in the arboreal crossing project appear to be aware of one another's abilities and resources despite coming from various backgrounds—both lay and professional. The local people do, however, appear to enjoy the coexistence of the species, and they are aware of which organisations to contact in the event of conflict. Governments and non-governmental organisations alike are aware of their roles, constraints, and limited resources in relation to the HWC resolution on legislation. It appears that every project stakeholder is aware of their responsibilities, capabilities, and resources.

- i) Fourteenth governance factor; Use of experimental tools for innovation

The Tanjung Bungah project serves as an example of how the usage of test and preliminary solution input in the project solution-building process has benefitted the project cooperation process. The key areas where experimental instruments are employed for innovation are the building site, the main structural design, and the installation and design of canopy ropes. The local community and government agencies conducted experiments with one another.

- j) Fifteenth governance factor; Ongoing critical self-reflection and learning (i.e., process and/or developmental evaluation):

The use of data from project assessments, which concentrate more on the technical than the administrative components of cooperation, has helped the project's collaborative process progress. While developing a systematic assessment, the Tanjung Bungah project has so far depended on participant observation, interpretation of their subgroups, and retrospective analysis.

- k) Sixteenth governance factor; Exercise of facilitative leadership:

Most respondents said that LPP plays a crucial leadership role as the main organiser and facilitator for all parties involved. No particular words are used to characterise the LPP team, but respondents had nothing but positive things to say about the way LPP ran the meeting, managed

the site investigation, gathered information, applied for a permit, and explained the construction process with APE Malaysia. LPP is the networking nodality for the project. The observations made during meetings and site visits, which indicate that the LPP's role is essential to the project's success, support this interview point. In lieu of the LPP, the local government and community were unable to assume the lead and conflict-resolution roles.

10) The generated outputs and outcomes

The arboreal crossing project connected an urban and a nature area's overlapped land management area through a sustainable landscape approach, as demonstrated by the reasoning behind the outcome variable's scoring. This approach is not taken into account by the majority of environmental policies and guidelines at the national, state, and local government levels in Malaysia. In order to achieve Penang's long-term sustainability and the green aim, a Public Private Partnership (PPP) was established between an NGO, social business, private companies (The Habitat and CIMB Islamic), and the local community. This partnership has encouraged creativity and innovation. Additionally, it is Malaysia's first urban arboreal crossing.

11) Lessons learned about the conditions for co-creating green solutions

Since co-creation is still relatively new in Malaysia, most of its concepts are still centered on business management over wildlife conservation. Over the course of the many projects, local collaboration dictates that the role of the end user or final customer is equally important to all project participants. Such a project must have a distinct implementation and thought process that is both original and easily understood by all parties involved.

Making the shift to a green economy and managing its implementation will necessitate upending many established norms in the areas of politics, democracy, and the free market. However, the eastern civilization has been around for hundreds of years and has a different history and experience with the western civilization; as a result, different governance or democracy altogether must be viewed with caution in many instances of politics, democracy, and market mechanisms. It is yet unknown how the current economic and political systems, which were adapted to many Asian countries, particularly after World War II, may affect the shift to a green economy or local co-creation.

Eastern civilization tends to associate the environment and greenery so closely that they get ingrained in daily beliefs and religion. Adopting modern politics and democracy while contending with many aspects of liberal market mechanisms—for example, the construction industry is heavily dependent on liberal market economics—requires a thorough comprehension of the why and how of ideologies, particularly in a nation with a mixed racial population like Malaysia.

Many nations' construction industries are implementing sustainable procurement practices with constrained ecosystems as part of their shift to a greener economy. Different green rating systems were discussed, but this is not seen as co-creation; rather, it's among the project team professionals. The local community will, at most, participate in several town hall meetings where input may not result in co-creation. Remarkably, the smallest step towards going green—planting a tree, for example—would not be viewed as an investment in terms of wildlife protection. Since it is a difficult effort to govern the shift from

the global to the local and back again, local collaboration must begin at the grassroots level with the local populace as the Langur Project Penang.

Seeing how Mintzberg (2019) compares Bows and Carlin's (2019) Triangular Space in the New Sustainable Economic Model to the Public Private Plural Partnership (PPPP) model for a solution is intriguing. Mintzberg and Bows and Carlin could have similarity where, the government and private sector's pendulum swing in many areas of policy and the market in postmodern market mechanisms is still trapped in neoclassical economics. As such, consideration must be given to the plural sector and civil society, of which the one of the basic units is the NGO. Ultimately, our civic society will be impacted by the local collaboration through NGO who found and fill the gap of public value which is not promoted enough by both government and private sector.

12) Points of interest in subsequent studies

SDG is well received in Malaysia, but SDG 17 is argued to be translated for the next few years. The interrelated circular approach of SDG had yet to be fully implemented. Furthermore, the effort on local collaboration should have full support especially the local government and an effective strategy to rally local collaboration. As such, the motivation to co-create is crucial as a point of interest to be studied.

Another area of interest is the need to investigate how the public, corporate, and civil society sectors may have the optimal model of co-creation platform. Many of the SDGs, particularly those that deal with the environment, were initiated by the federal government; local governments, however, will interpret them in different ways. The ideal model must also consider this outdated viewpoint on federal, state, and municipal government policies while developing a platform for local cooperation.

The typical way to give back to the community is through funding from private entities or through Corporate Social Responsibility (CSR), which is very different from convincing or empowering local partnership. While persuasion might be effective in the short term, empowerment is the ideal state for co-creation. An approach that might be used by all sectors to identify solutions instead of just traditional funding or CSR is shared value could be of interest for subsequent study.

Local collaboration usually engaged the government facilities for experimentation and prototyping, but rarely local universities. Prototyping and experimentation could include local university facilities which many projects did not involve is also an interesting aspect for local collaboration networks between university and local community in the long term. There are also research institutions which have facilities for prototyping that have yet to be tapped and join the bandwagon.

Financing local collaboration has pre-good conditions in Malaysia such as tax break supported by government initiatives, but how far the limit of funding for co-creation could push the idea of local collaboration. Innovative financial collaboration is also an interesting subsequent study.

Based on the appropriate green rating tool, a one-time assessment is typically conducted for green projects in Malaysia. This green ranking system, however, is not suitable for projects involving local cooperation. Informal evaluation, such as informal knowledge management, as opposed to one-time or

ongoing assessments, may be a useful approach going forward and make for fascinating follow-up research when it comes to the integrated nature of SDG implementation.

Malaysia has a strict legal framework pertaining to the building sector. For co-creation, a follow-up study on agile management and lean accountability may be of interest to all project participants. Although a strict accountability framework is essential, it could be modified to accommodate evolving conflict situations and mediation techniques.

Ultimately, it is possible to view the eastern group as a traditional culture that adheres to its own cultural wisdom. Breaking the conventional wisdom of neoclassical economics, developing shared value instead of corporate social responsibility, and creating an ecosystem for local co-creation empowerment necessitates studying the value system at the layer level in both the public and private sectors using a different approach.

Scoring and analysis of governance factors

1. Perceived importance of biosphere conditions

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Almost all informants mention “environmental problems” as a key reason for establishing a safe arboreal wildlife crossing in Penang, Malaysia. Based on Rocha Fortes (2015), the motivating factor is the increased competition between humans and wild animals for space and resources. The population of Dusky Langurs is currently decreasing due to threats such as residential development, road construction, agriculture, hunting, and the illegal wildlife pet trade. Forest fragmentation brings Dusky Langurs out to the housing area. Concord Garden residents have seen the endangered species foraging and sheltering on rooftops, walking on electric wires, and using telephone lines. Some residents find contentment in observing them, while others are unhappy with the frequent visits of the monkeys.

The minutes and documents from the meeting forming the Steering Committee provide a whole list of biosphere problems that the LPP will aim to solve. LPP works together with related government agencies and local authorities to solve environmental problems.

LPP currently has several ongoing community science projects: 1. Bridge to Coexist: This project aims to reduce roadkill incidents involving treetop wildlife in Penang by installing road canopy bridges, which is the focus of this report. LPP also works with the community to develop a management plan and recommendations for humane and sustainable approaches to mitigate negative human-primate interactions. 2. Coexistence for all: this project tackles human feeding of monkeys, poor waste

management, and public awareness of human-macaque interactions. 3. Ah Lai's Crossing: This was Malaysia's first road canopy bridge, installed in 2019 and upgraded in 2020. It has helped over 5,000 wildlife, including primates and rodents, cross the road in Teluk Bahang safely.

2. Legislation, programs, and formal goals

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Existing sustainability legislation, programmes, and formal goals have supported the sustainability aspects of the co-creation project at Tanjung Bungah. Although Malaysia has a generally robust legal framework for safeguarding primates and their habitats, there are a few gaps in the law regarding primate trade that are currently being reviewed by the government. Enforcement is sometimes ineffective due to insufficient personnel and funding to monitor vast areas, combat poaching, or infiltrate numerous social media platforms used by syndicates. Respondents through interviews also keep mentioning "the importance of legislation to support the collaborative effort," but mismatches in policy exist as HWC in Malaysia generally focuses more on terrestrial animals such as elephants and tigers than arboreal animals.

Sustainability legislation, programmes, and formal goals have supported the collaborative problem-solving processes of the project through different types of support within the Tanjung Bungah project, politically, financially, and legally.

In the political support aspect, it could be observed during the interview that the respondent from the NGO is closely connected with assembly representatives throughout the site visit and informal meetings. It is also recorded during a series of town hall sessions in Concord Garden and the nearby community of the assemblymen representative support and attendance. The political support for the Tanjung Bungah project is focusing more on the state and local government levels than the federal government. However, there is no written document directly reporting the political support for local collaboration.

The financial support comes from the lead government unit responsible for coordinating and implementing the Sustainable Development Goals (SDGs) across ministries, which ensures the integration of SDGs into the national budget. The support extended by both the federal and state governments includes the establishment of the National Conservation Trust Fund (NCTF) for natural resources. The NCTF is tasked with conducting various activities related to conservation efforts, such as communication, education, public awareness, research and development, management, protection, and climate change mitigation and adaptation. According to a respondent, The Habitat Foundation received funds to administer the programme, and the LPP secured a grant from The Habitat. This is the result of the Penang Green Initiative wildlife conservation effort by the Penang state government. The innovative collaboration in and around the arboreal crossing of LPP seems to be facilitated by the national government's embrace

of a public-private partnership (PPP) approach in infrastructure projects through the introduction of build, operate, and transfer contracts with private companies under the National Privatisation Policy.

Legal support to enable local collaboration efforts at Tanjung Bungah is the establishment of informal stages for permit approval at the local government with the advice of the Public Work Department. The series of approval applications was initiated earlier on from the pilot project of Teluk Bahang and revised at the Tanjung Bungah local collaboration project.

In addition to external support, LPP is actively engaged in organising the Langur Fun Run and Fair, utilising its own efforts and initiatives. This event aims to raise funds to cover the additional expenses of the upcoming January 2024 canopy bridge and to allocate resources for maintenance in line with their commitment to conservation efforts.

Overview of relevant government institutions at state, provincial and district level:

a) Federal level

1. Ministry of Finance
 - i. Green Investment
2. Ministry of Housing and Local Government
 - i. Low Carbon Cities Framework (LCCF)
3. 5 Ministry involve: Ministry of Defense (MinDef), Ministry of Health (MoH), Ministry of Home Affairs (MOHA), Ministry of Rural and Regional Development (KKLW), Ministry of Urban Wellbeing, Housing and Local Government (KPKT)
 - i. Green Procurement
 - ii. Green Building Initiatives
4. Ministry of Public Work (administrative), Department of Public Work (PWD) (administrative and technical)
5. Ministry of Natural Resource, Environment and Climate Change (administrative)
 - i. Act-795- Access to Biological Resource and Benefit Sharing Act 2017
 - ii. Renewable Energy
 - iii. Green Technology Master Plan (GTMP)
 - iv. Forest and Biodiversity Conservation
 - v. Waste Management Initiative
 - vi. Climate Change Adaptation

b) State level

1. Penang State Government (political)
 - i. Penang Green Council
 - ii. Penang 2030
 - iii. Waste Management
 - iv. Sustainable Transportation
 - v. Green Building Initiatives
 - vi. Forest and Biodiversity Conservation
 - vii. Climate Change Adaptation

- viii. Renewable Energy
- ix. Environmental Education and Awareness
- 2. Penang Department of Public Work (PWD) (administrative and technical)
- 3. Penang Department of Wildlife and National Parks (administrative)

c) **District level**

Penang City Council (administrative) also known as the local government

3. Relative openness of public governance paradigms

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The local and regional governments are open to input from societal actors in solving perceived local problems. It is proven that the local and state governments of Penang are committed to the Penang Structure Plan (state government) and Penang Local Plan (local government) documents, as these are the statutory documents. The documents become the guiding strategy, providing a channel for civil society input that is heavily focused on physical development rather than balancing the conservation effort, thus providing an appropriate channel for input from societal actors.

An informant claims that since 2018, the government of Penang State has become more open to participation and collaboration with citizens and stakeholders. An example is the involvement of LPP in the first road canopy bridge project in 2018 that aimed to reduce roadkill incidents of arboreal wildlife in Penang and to work with the community to develop a management plan and recommendations for potential humane and sustainable approaches to mitigate negative human-primate interactions in Penang. LPP was invited to do a presentation about the proposal, plan management, and way forward of the project. A letter of request was sent to the Public Works Department of Penang to get permit approval. Regular meetings were held with various government agencies and local governments, such as the Wildlife Departments and National Parks of Pulau Pinang (PERHILITAN), the Forestry Department of Pulau Pinang (PERHUTANAN), and the City Council of Pulau Pinang (MBPP). Animal Projects & Environmental Education (APE Malaysia), Tropical Spice Gardens (TSG), Malaysian Primatological Society (MPS), and Malaysia Nature Society (MNS). One of the informants we interviewed says that the feedback was positive and that the local government staff was very helpful in helping them with their permit applications. However, workers from government agencies and NGOs were also very helpful during meetings and discussions on prototypes, designs, and installations.

Usually, if the local government actively participates in the project, it is already an indication of openness to inputs on a fundamental level. Through observation and respondent interviews, the assemblymen were actively involved in the project's progress, but only to help the progress of the Tanjung Bungah project

rather than focusing on capacity building over the long term for local collaboration. On the other hand, the local government is developing the stages for approval specifically for the Tanjung Bungah project, which opens up opportunities for future local collaboration efforts for different projects.

The representative of the Public Work Department also indicated that they are committed to their own strategic initiatives at the federal government level, such as the PWD Strategic Plan 2030 on energy conservation management rather than wildlife conservation. However, the Tanjung Bungah project reflects that the PWD openly considered the input from the Concord Garden local community and NGO on proposing an arboreal crossing location, a detailed structure proposal, advice on the details of the cable, and safety measures for road users.

There is no indication from the interview that the Wildlife Department will openly change the approach in urban HWC soon. However, the agencies will actively participate in the Tanjung Bungah project, or generally local collaboration effort, with an unchanged method of capturing, culling, and relocating urban wildlife.

4. Formalized institutional channels for citizen participation and community mobilization

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The existing formal institutional channels are integrated with the Tanjung Bungah project, shaping the collaboration. However, the channel does not discernibly improve the collaborative process or familiarise the process with the local community.

The quantity of formal institutional access points in Malaysia can influence a community's capacity to engage residents and public actors in co-creation processes. Having numerous official avenues like elections, citizen committees, referenda, and public hearings can enhance inclusivity and participation in the decision-making process.

One of the informants interviewed said that public hearings are held by government agencies and bodies to gather input from citizens on proposed projects and future developments. The hearings allow citizens to express their views and concerns directly.

There are various citizen committees and councils established by the government at the federal, state, and local levels. These committees are tasked with receiving advice from the government on various issues and policies, and they often include representatives from different sectors of society.

Volunteering and community service activities are active where citizens are allowed to contribute to their community, whether it is through educational and environmental programmes, mentoring programmes,

or community events. The Penang City Council has a specific grant for citizen participation in green space maintenance, which could boost local collaboration.

While referendums are not common in Malaysia, Malaysians are still significant in traditional ways, such as informal meetings where citizens are asked to vote on specific issues or create new policies. Another popular approach is through social media platforms, which serve as informal channels to share ideas, concerns, and feedback on various issues. These platforms can be used to mobilise support or provide space for citizens to engage in discussion and dialogue.

5. Mechanism for ensuring top-down government and bottom-up social accountability

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The Tanjung Bungah project routinely accounts for the work, progression, and results of the project with the local government and community. The top-down accountability structure is seen in how decisions are made and communicated. Referring to this case study, top-down accountability is that the project gives account to Penang Public Work Department, local government, and funders to oversee the project. In Penang Green Agenda, regulation and standards are seen to promote the development of new technologies. Local government sets the strategic goals and objectives which are then cascaded down through the chain of command through the Georgetown Local Plan. Local governments in Penang have a crucial role in issuing permits for road canopy bridges to help arboreal animals' crossroad safely, which could be pivotal in reducing roadkill incidents involving wildlife in the future. Local government is overseeing the design, LPP and the team will organize the meeting and invite the steering committee. Based on Project leader, there are two reports produced based on the project progress submitted to the Work Department Penang and the same stakeholder. Therefore, frequent follow-up on cases is a must and becomes a weekly norm for LPP.

Bottom-up accountability played a crucial role in ensuring the success and sustainability of the arboreal crossing initiative. As for bottom-up social accountability involved actively engaging with local communities, NGO's and wildlife experts to gather data, feedback and support throughout the project lifecycle. The community engagement part of the project involves communicating with the residents living in Taman Concord and Taman Lembah Permai. Community-based approaches that involve local communities in decision-making and conservation actions have shown promising results in mitigating human-non-human primate negative interaction. Engaging communities helps foster understanding, empathy, and a sense of ownership in finding sustainable solutions.

A financial report about the allocation and use of funds to The Habitat Foundation then only delivered to the LPP into grant. LPP has its own financial reporting system, in this case, every year LPP needs to submit

their financial report to the Commerce International Merchant Bankers Berhad (CIMB) and a third-party auditor examines the financial statement of the Habitat Foundation.

The local community informant interviewed says they are working together for data collection and findings while simultaneously fostering connection and engagement. Local community engagement sessions were held to gather feedback and address any concerns or suggestions from residents living areas. The combination of both approaches enables individuals to propose sustainable strategies to the authorities. Local knowledge and expertise were also leveraged to identify potential hot spot wildlife and ensure that the crossing was strategically located to maximize their effectiveness. The proposed road canopy bridge will be situated along Jalan Lembah Permai, a location chosen due to our observation of frequent Dusky Langur crossings, feeding, and resting activities in the vicinity of the selected coordinates: 5.457545206830266, 100.28724589633558 (Photo 4).

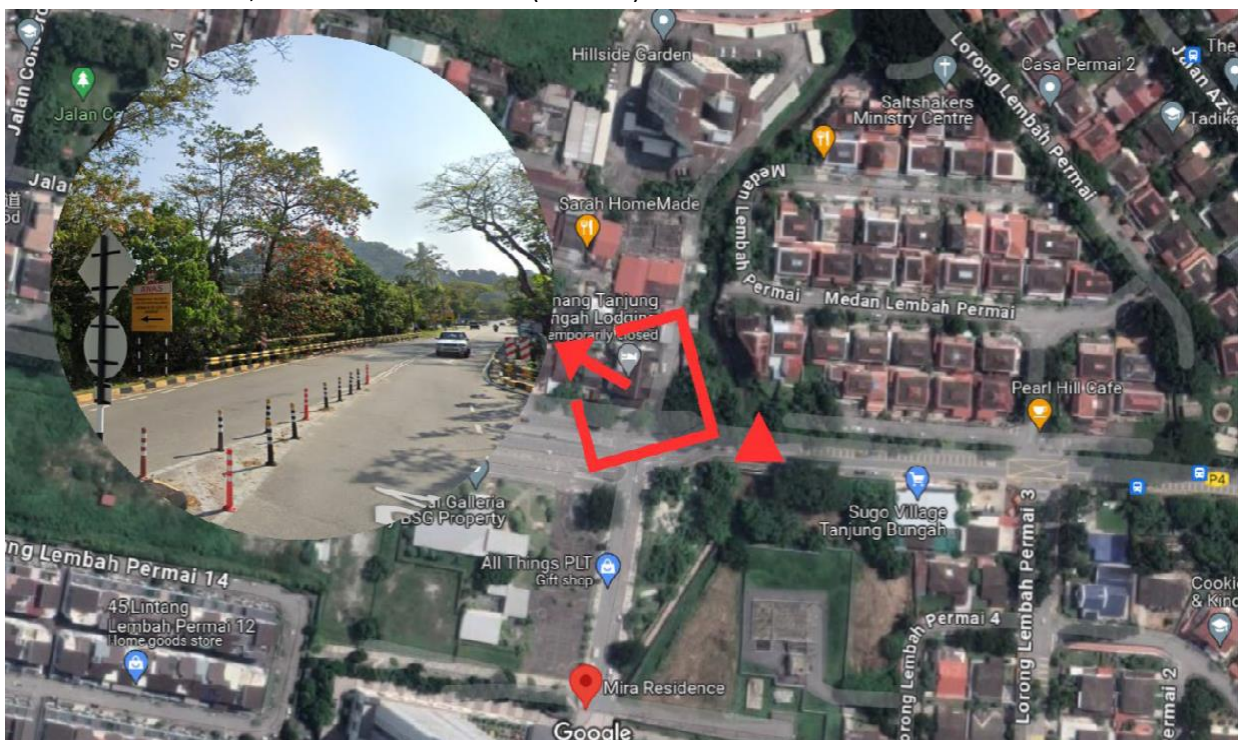


Photo 4: Proposed canopy bridge location at Jalan Lembah Permai, Tanjung Bungah

According to a member of LPP, from the day the survey was initiated, a total of 90 trips and 450 hours was spent, and data collection is still on-going for long term conservation monitoring purposes.

Based on Project Executive of LPP, “We are working with the local community and governmental and non-governmental stakeholders in developing science-backed management plans and recommendations for humane and sustainable approaches to mitigate negative human-primate interactions at a national level. It’s a big project that needs time, money, and effort, but it’s crucial to make Malaysia a role model as a country that promotes wildlife-friendly development to prevent cases of roadkill accidents and local extinctions of wildlife.”

In collaboration with THB Maintenance Sdn. Bhd., LPP and THB had developed a comprehensive Traffic Management Plan (TMP) (Photo 5) and signage design to ensure the safety of road users and the Dusky Langurs during the road canopy bridge installation process.

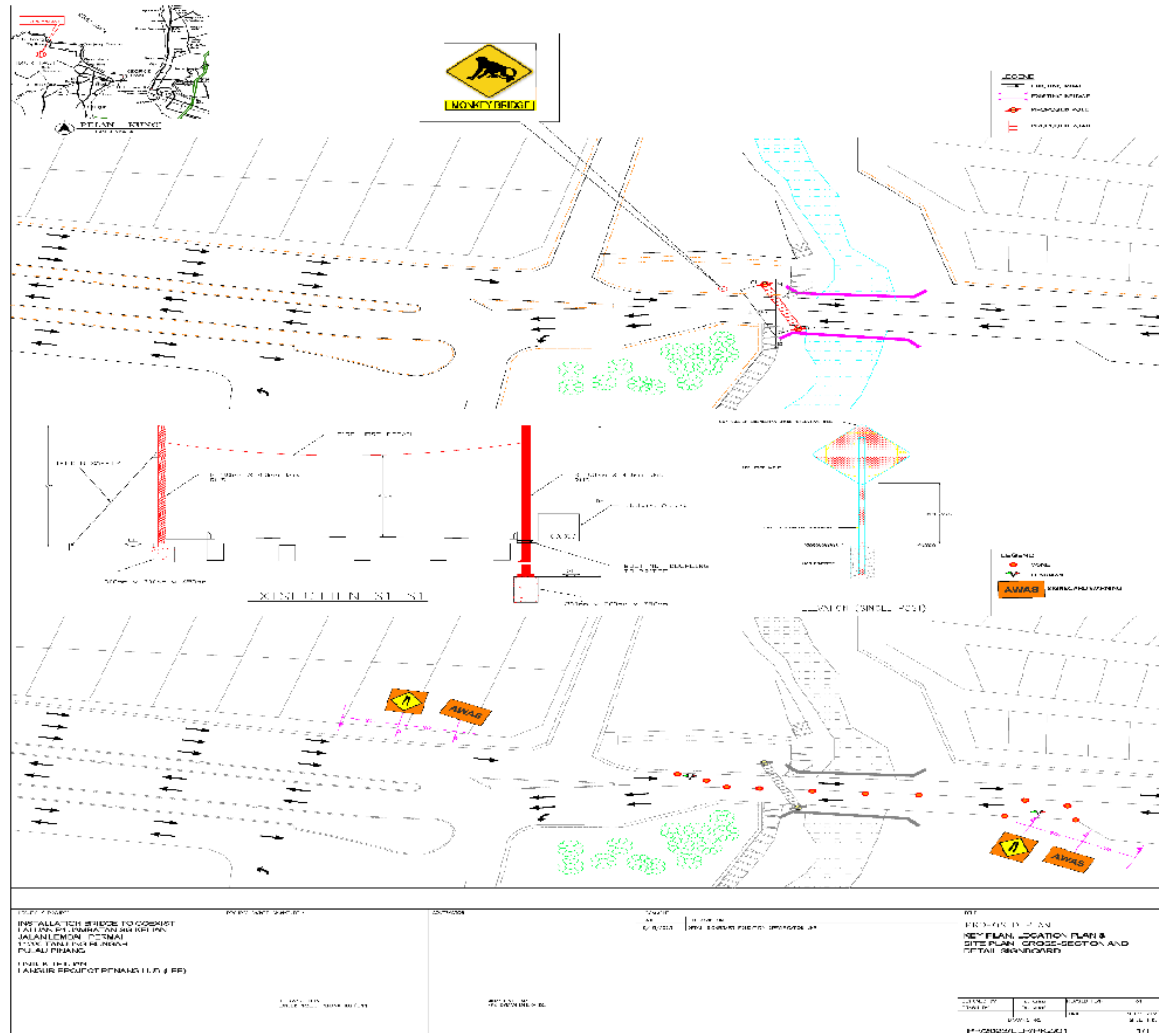


Photo 5: Traffic Management Plan developed for JKR approval on the road canopy bridge design.

6. Strategic agenda-setting by means of translation

QCA score:

- 0
 0.33
 0.66
 1

Scoring confidence:

- Low confidence
 Medium confidence
 High confidence

Data sources:

- Interviews
 Documents
 Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The SDGs have been redefined to better match the local problems and goals. The Ministry of Economy has an overall view and is able to monitor implementation. Critically, the inclusive and participatory approach used in this governance structure is in line with the 12th Malaysia Plan, which focuses on a paradigm shift towards more participatory government by citizens, including NGOs/CSOs, as partners in service design and delivery. Greater engagement of NGOs/CSOs thus is envisaged.

Local government at the heart of the SDGs has played an important role in influencing the definition of the SDGs. SDGs are not only about achieving the national averages but about ensuring that everybody enjoys the development gains. Governance is a key priority in the reform agenda in Malaysia. This makes state and local governments an indispensable partner which means active engagement is needed to accelerate progress on the SDGs.

In recent years, a report from the Wildlife Department shows that there has been an increase in Dusky Langur sightings in urban areas of Penang, including residential areas and city parks. This is due to deforestation, habitat loss, and the building of human settlements near forested areas. The co-creation efforts reported to be initiated as earlier in February 2023, LPP met with representatives of governmental agencies and the community of Taman Concord, Lembah Permai, Tanjung Bungah to discuss the negative interactions between humans and urban langurs in their neighbourhood. Dusky langurs have been frequent visitors to the area over the past four to five years, often utilising rooftops and cable wires for movement and feeding on garden plants. This has led to some concerns among residents about the potential negative impacts. In other words, the Tanjung Bungah project was reinterpreted through the lens of SDGs agenda.

The aim is to reduce roadkill incidents of arboreal wildlife in Penang by installing three new canopy bridges around the Penang UNESCO Biosphere Reserve's residential areas from 2023 to 2025. The first newly installed bridge is located along Jalan Lembah Permai, a busy road in Tanjung Bungah, Penang This reframes the initiative by the SDGs, state of Penang in Green Agenda, The Primate Action Plan Strategy at international level to be plan, implemented in local context.

One of the citizen-science working groups had mentioned that one of the representative Department of Wildlife Penang approached their Project leader and linked them to the community in Concord Garden. During that time, LPP was surveying the first site for the Bridge to Coexist project and happened at the same time and right timing.

Since then, LPP has been studying the Dusky Langur groups in Lembah Permai to strategize for suitable mitigation measures. In collaboration with APE Malaysia (Animal Projects & Environmental Education Sdn. Bhd., a local social enterprise), and with the support of members of the State Assemblyman of Tanjung Bunga, YB. Zairil Khir Johari, LPP submitted its detailed proposal for urban firehose canopy bridges in Penang to Penang PWD. Finally, the permit was approved in October 2023 and allowed LPP to build Malaysia's first residential road canopy bridge on 6 February 2024.

7. Construction of narratives about successful multi-actor collaboration

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Referring to the previous project in Teluk Bahang (Photo 1), the arboreal crossing project was an enormous success, significantly reducing the arboreal wildlife roadkill with unique multi-actor collaboration along the way. The arboreal crossing in Teluk Bahang is also the first ever to be built in Malaysia, which challenges conventional construction procedures on reserved land. The Teluk Bahang project was highlighted by international media such as the British Broadcast Channel (BBC) and National Geographic. As such, the Teluk Bahang project is well known. The positive experience with multi-actor collaboration became the source of collective motivation for the collaborative problem-solving process of the Tanjung Bungah project.

Constructing a new story of successful multi-actor collaboration in Concord Garden (Photo 2), an urbanised area, presents few challenges but turned out to be a positive experience among the multi-actor collaboration actors. Examples include:

- a) Although support from the authorities is paramount, the regulatory framework for urban wildlife infrastructure is insufficient among local governments and government agencies in dealing with HWC. Comparing to the pilot project at Teluk Bahang related to UNBR land, a state government-owned land that mostly involves intergovernmental agencies cooperative efforts, the Concord Garden is a private property that needs to include various private stakeholders. Private land such as Concord Garden requires complex regulatory readiness for the project but was observed to be successful and motivating to the respondents. Based on observations and interviews with respondents, it appears that the MBPP local government, the Public Work Department (PWD), Concord Garden, and LPP have worked together to create a new, informal legal application process for the Tanjung Bungah project. As such, the procedure developed would ease future collaboration in nearby areas for other arboreal crossing construction.
- b) Proposing a new design for a longer crossing cable and a new location passing through various landowners is challenging. However, the local community and state assembly representatives of the Tanjung Bungah project have increased in their motivation as they are willing to go on a series of site visits with the local government and PWD to revise the location and design suitability.
- c) The citizen scientist started out with a small number but increased in participation as the project progressed from secondary school students to university students during school break and semester break. The volunteer work of citizen scientists in collecting data from the local community is positively recognized. During the interview, the respondent mentioned an increased level of trust and informality with the citizen scientist in the project while studying the environmental behaviour of the Dusky Langur.

d) The respondent believed that the future iteration of this project in other close-by areas within Georgetown district will be easier as the related government agencies are supporting the effort and familiarising themselves with the peculiarities of the project requirements apart from the common facility of urban wildlife that they initiated. The local community representative mentioned during the interview that they were “looking forward to future prospects for the first ever HWC ecotourism in Tanjung Bungah.”

8. Building or harnessing institutional platforms and arenas

QCA score:

- 0
 0.33
 0.66
 1

Scoring confidence:

- Low confidence
 Medium confidence
 High confidence

Data sources:

- Interviews
 Documents
 Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The use of digital platforms and physical arenas has the capacity to enable or support the problem-solving process. Within the project, social media is the specific online platform used including WhatsApp, Facebook, Online Meeting (Zoom), Instagram, and website to promote the activities done in gaining citizen researchers and disseminating knowledge at large. Among the examples are:

WhatsApp for informal discussion with the funder and the local community. Funding details, reports, and design detail discussions are among the subjects of discussion. Respondents from the funder had repeatedly mentioned that “informality of progress reports through WhatsApp is practical.” Often, informal decisions are made on the platform before they are confirmed during meetings with stakeholders.

Facebook provides a journal entry platform for the project. Any activities on arboreal crossing will become entries for the LPP “online journal,” including the Concord Garden local community and the future communities that shall be engaged for future arboreal crossing locations. Most of the stakeholder’s engagement was recorded and announced through this online platform.

Instagram is the social media platform that caters to the younger generation of the LPP. The posting is more simple but attractive, which also aims to encourage young citizen scientists to volunteer to join the Tanjung Bungah project and generally disseminate knowledge to a younger audience. The platform has successfully increased the project's exposure as more citizen scientists volunteered for the project. This would help increase the capacity for knowledge exposure and make data collection and engagement with the local community more effective.

Websites provide more detailed information on LPP and knowledge dissemination. This platform includes past programmes, aspirational photos, a list of collaborators, and documents for download. Other than the online platform, a physical venue for collaborative design and construction discussion among all

stakeholders was held at the residential community centre, the MPKK Hall, Tanjong Bungah, within the area of Concord Garden. Usually, the meeting will be followed by site visits to the proposed location of the arboreal crossing. At the same time, wildlife activities were spotted if the stakeholders encountered them. Design and construction solutions were suggested informally during site visits with NGOs and government agencies.

9. Provision of access to blended financing

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

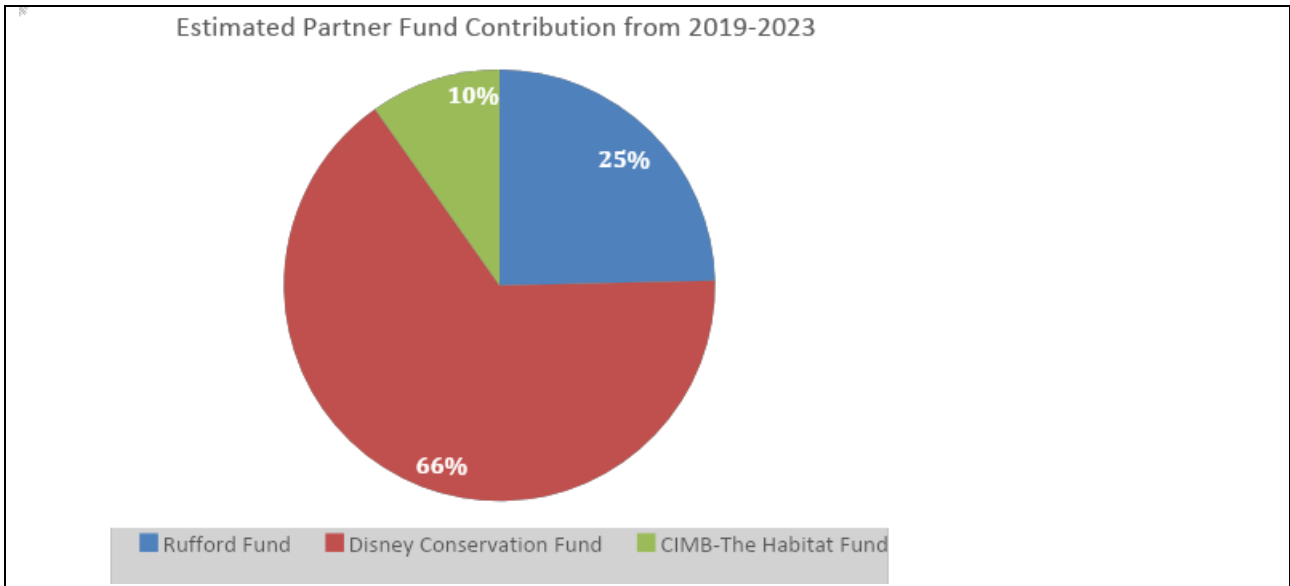
- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The adjustment of the Tanjong Bungah project according to the requirements of the funding has a supportive influence on the collaborative problem-solving process. The blended financing for the Tanjong Bungah project comes from international (Rufford Fund, Disney Conservation Fund) and local grants (CIMB Islamic-The Habitat). Direct engagement between LPP and funders founded on trust has allowed the financial management of the project to be adjusted accordingly.

There are straightforward deliverables and costs associated with the grant given to the LPP. The proportional contributions from the local and foreign grants were 20% and 80%, respectively. After a few years (two to three years), these foreign monies must be reapplied for. The Rufford Foundation requires the project to create a "Langur Conservation Action Plan" in Penang, which takes into account 1) primates ecology, 2) anthropogenic influences, 3) eco-tourism, and 4) nature education, which helps expand the knowledge dissemination to the local community. A public finding was identified within the project. However, the exact value was not enclosed, and so the expenditure entails. The public funding was given to Habitat and indirectly channeled to the LPP. LPP and partners periodically create yearly work plans with particular funds for grant applications or renewals. For this reason, the funding is project- and time-based.

The local community of Concord Garden did not contribute monetarily but was considered to be 'in kind' which is referred to as another form of contribution. The local community contributes information and statistics about wildlife hotspots found in residential areas, as well as observations of Dusky Langurs' behaviour and on-location images. The goal of this volunteer effort, which calls for time and energy investment, is to increase the variety of outdoor activities available to seniors at Concord Garden. The citizen scientist may conduct the observation in their backyard, on the street, or even inside their house if they notice strange noises or anything peculiar. Real-time data collection is made possible by the Volunteer Act, which will eventually yield a forecast of the Dusky Langur's hotspot within the Concord Garden area. The pie chart below visualized the blended financing gained for the arboreal crossing project from both international and local funds.



10. The capacity to leverage support from authorities to enable local collaboration

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Data sources have identified that a higher level of authority has, on request, helped stakeholders overcome challenges in the project.

Generally, the Malaysian government supports the efforts made by the LPP, especially at the state and local government levels. The Tanjung Bungah project did solicit help from all levels of government and received it, as many respondents during interviews had mentioned. There is also a strong presence of assembly representatives observed in meetings and site visits to mitigate red tape.

The recent article by a local newspaper (The Star) highlighted such support from the government: “New Bridge a Lifesaver for Langur on February 8, 2024, mentioned the role taken by all stakeholders, including government agencies that “detail proposals approved by the Public Work Department,” universities, assemblymen, local communities, and fellow NGOs.

The leader of LPP, Dr. Yap, is the main individual who leverages the support of the main stakeholders of the project, including the proposal of the location and detailed structure design with the local community. Nonetheless, different levels of government have different capacities for supporting the LPP.

- a) Huge capacity support was given by the local government. However, what has been learned from the first pilot project in Teluk Bahang was also a learning curve for the local government on the process and permit approval for the wildlife facility that is about to be designed, built, and

constructed within this Tanjung Bungah project. As such, the local government is being careful in dealing with approvals and permits for such projects.

- b) The higher level of government support, i.e., the state government, is the Penang Green Agenda document, which clearly states the “conservation of Dusky Langur as one of the agendas.” However, it does not mention specific wildlife infrastructure, such as the arboreal crossing or treetop crossing provision, or strategy, including financial provision.
- c) There is also a limited, clear example in that the other government agencies (federal government) at the highest level, such as the Wildlife Department and Public Work Department, are aware of the state government's aspirations for wildlife conservation other than Malayan tiger conservation. No exact policy strategy exists in the implementation process, especially in the project involving a new approach to wildlife management, specific facility installations connecting different landowners, and patches of habitat or green spaces. In many instances, green initiatives are considered as energy management-related strategies, but wildlife conservation seems to be another area due to the different perspectives of professionals and policymakers.

11. Inclusion and empowerment of relevant and affected actors

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Throughout the process of participating in the arboreal crossing detail design and the ongoing data collection of the Dusky Langur at Concord Garden, the local people were empowered rather than persuaded. The local community of Concord Garden consists mainly of Malaysian Chinese seniors and pensioners. As such, they are considered generally vulnerable. However, the other marginalised and vulnerable group has yet to be identified in the project.

In order to empower the pertinent and impacted parties in this project, ongoing awareness-raising, engagement in data gathering, and attention to the arboreal crossing's design details are required.

Creating early awareness of the HWC and its potential effects on the local community's way of life, together with a document that provides recommendations on how to handle animal encounters both up close and far away, In dealing with HWC in the area, the local community—mostly senior citizens—contributes to the observational data within the Concord Garden, providing them a sense of belonging. The sense of belonging makes the arboreal crossing effort and wildlife encounter meaningful. The ongoing work of the LPP's volunteer citizen scientists makes direct engagement feasible. There was no specific technical training given to the local community to engage with the wildlife and help design the details of the arboreal crossing, but there was direct informal communication with young citizen scientists.

The citizen scientist engaged with the local community at every home and presented the observational data to the local community to the extent that the local community acknowledged the effort of the citizen scientist. The representative of the local community said during the interview:

“The young girls are recognised by most of the local people now; as before, they were not recognised, and some of the homeowners closed their doors during direct engagement.”

12. Clarification of interdependence vis-à-vis common problem and joint vision

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

Many informants agree that each project stakeholders play a huge role in understanding ‘what is happening’ with the installation of the arboreal crossing and how it will affect the local community in the long term.

The project does not allow for an exit strategy. Most respondents valued the Dusky Langur’s existence and thought that wildlife conservation initiatives are important. Positive feedback from the local community and political representatives indicated that there is no exit strategy when it comes to managing endangered species.

The participants in the arboreal crossing seem to be aware of each other's skills and resources within different professional and layman backgrounds. The local community, however, seems to enjoy the wildlife coexistence, but if conflict exists among them with the wildlife, the local community knows which organisation needs to be engaged. The organisations, be they governments or NGOs, would know their roles and limitations in the HWC resolution on law and their limited resources. It seems that each stakeholder in the project knows their roles, skills, and resources.

a) The NGO (LPP) and funder on project financing

Continuous financial support from the funder and available public fund.

b) The NGO (LPP) and local community of Concord Garden on data, structural design, and maintenance input.

Continuous observational data collection of Dusky Langur behavior, the design detail input of the arboreal crossing structure and indirect maintenance after construction.

c) The NGO (LPP) and local government (the Pulau Pinang City Council) and agencies (Public Work Department, Wildlife Department) on policies and legal aspect

Continuous advice on legal aspects of the land law, stages of permit approval, structure location advice, public liability insurance, public realm technical guidance and wildlife management.

- d) The NGO (LPP) and assemblyman on political support
Continuous support in the town hall or informal engagement session with Concord Garden local community, especially community at large in Tanjung Bungah district.
- e) The NGO (LPP) and Contractor (APE Malaysia) on on-site construction, material specification and testing.
Construction and site management during construction, periodical material test and specification and public liability insurance.
- f) The NGO (LPP) and volunteered citizen scientist on general data collection and engagement with local community
Continuous data collection on-site and collect observational data from the local community and direct engagement with the local community.

The interdependence between different actors seems to linger around the question of how to coexist with wildlife, what is the interaction dynamic between local community and wildlife engagement that led to conflict, and who to call from what issue that occurred on site to resolve. Most of the respondents claim both the public and private sector recognized the need to collaborate not just during the design and arboreal crossing construction, but the long term of how to live together with the wildlife.

13. Trust-building and conflict mediation

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The Tanjung Bungah project has taken steps to build trust and mediate conflict in the form of reports that there have been instances of conflict that project leader has proactively mediated. Conflict mediation is not really obvious as all parties take careful measures in making sure the conflict only needs to be dealt with the wildlife and not the stakeholders. Any foreseeable circumstances are dealt with in advance.

One component that was established even before the project's start is the establishment of trust. Since its initial pilot project, which received extensive coverage on social media and from prominent outlets worldwide, the LPP has built a solid reputation. The Habitat Foundation, a local founder and facilitator, has established a positive reputation for overseeing Penang Hill's UNBR, which is unique on the Malaysian Peninsula. When these originations get together to work together, there is already a great deal of trust between them, and the likelihood of negative conflicts is minimized by expert monitoring and the creation of checks and balances between each party. Witnessing a proactive team with positive interactions amongst project stakeholders is encouraging.

The local community response expresses great satisfaction in seeing that the LPP and APE team is made up of young individuals, including citizen scientists, who have a clear direction and are contributing to the community. Since both generations get along well with one another, cooperation between the younger and older generations therefore grows organically.

As a result, in both in-person and virtual meetings, trust and transparency are increased. The government representative did not appear to be unhappy with the level of detail created in the design solution or the preparedness to maintain the facilities over time, despite the fact that there was no informal discussion with them during the conference. Even in the unlikely event that there is a confrontation between the local population and wildlife, the LPP is trusted to handle it. Thus far, these have demonstrated that distrust is eradicated between the stakeholder groups and that cooperation is inherently driven to reduce conflict.

There are two forms of conflict that must be mediated by the project leader namely the conflict between human and wildlife and the conflict between project participants. The approach taken for conflict resolution as mentioned by respondent to be “trial and error” and “early expectation of conflict” before it happens.

a) Conflict between human and wildlife

It was only five years ago that the Dusky Langur began to make its way into the neighborhood. The HWC is more about the nuisance caused by the Dusky Langur than any mortality to the local residents. Common examples include odd noises coming from home rooftops, relaxing on porches, indulging in edible plants within residential compounds, straggling across roads, and animal excrement in public areas. The local community would report this conflict to the Wildlife Department so that appropriate action might be taken. Every now and then the Wildlife Department assigned an LPP to attend the report. Such collaboration between governmental and non-governmental organizations shows that there is faith in conflict resolution. The participant would have the opportunity to interact with the Dusky Langur and watch their behavior during a meeting in a physical location, which would be followed by a site visit. There was no activity or engagement planned; rather, it was connection-building exposure to wildlife behavior through observation.

b) Conflict between project participants

Trust building also was needed during the early engagement of LPP with the Concord Garden for the project. Series of town hall with the local assemblyman representative help ease the trust issues between the LPP and local community as the assemblymen representative was the mediator. Among the local community, there was no data from the interview mentioning conflict among them nor any exercise engaged for the purpose of trust building and conflict resolution.

14. Use of experimental tools for innovation

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The Tanjung Bungah project demonstrates how the project cooperation process has benefited from the use of test and preliminary solution input in building the project solution. The site of the structure's construction, the primary structural design, and the installation and design of canopy ropes are the main areas where experimental instruments are used for innovation. Experimentation was done between two parties, the government agencies and the local community.

a) Experimental tool for innovation among LPP and government agencies

The APE suggested the main structural design, which LPP then thoroughly presented to the PWD representative and the local administration. It was discussed in detail the specifications for height, material, connection to the ground, and foundation detail. Before it can be built, these specifications must pass at least two rounds of in-depth discussion and be mapped with current technical guidelines from the government agencies. A permission was granted by the Public Works Department for the canopy rope to be pre-tested at a neighboring lab using used material. Before each batch of rope is installed on-site, it will go through frequent testing annually.

b) Experimental tool for innovation among LPP and local community

The trial project in Teluk Bahang, which combined steel posts and trees as a structure next to a beach, had no set position at first. Tanjung Bungah, or Concord Garden, is a residential neighborhood featuring a river and a lengthy, curved road. The Public Works Department's and the local government's guidelines for road usage and space utilization were innovated during the site selection process. A local community representative also visited the site for a few series and offered suggestions regarding the ideal placement for the installation of the structure. The citizen scientist's observational data were helpful in identifying the optimal spot for the Dusky Langur to cross the road.

15. Ongoing critical self-reflection and learning (i.e., process and/or developmental evaluation):

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The project's collaborative process has advanced because of the utilization of information from project evaluations, which focuses more on the technical than the administrative aspects of cooperation. The Tanjung Bungah project is still in the process of establishing a systematic assessment, but for yet, it has relied on participant observation and interpretation of their subgroups and retro viewpoint.

In light of the Teluk Bahang pilot project, the responder assumes that Tanjung Bungah will also be successful. Few interviewees stated that "the input on ground by various stakeholders were accounted for," which lends credence to this idea. Phased stakeholder input was obtained through a series of simulated site visits. During site visit, LPP will facilitate ideation and document the input.

The interviewee provided an example of the initial stages of the arboreal crossing project, which involved recruiting citizen scientists from every available home. The design detail was subsequently initiated by the metal post design stage, utilizing the Teluk Bahang pilot project's design; however, the location was decided upon based on feedback from the site visit participants. The local community representative's participation resulted in the selection of three sites for the metal post, as opposed to just one. The site visit simulation approach improves local cooperation.

The lab test for the firehost utilized as the bridge rope came after another design detail stage, and the results had to be submitted to the PWD representative and the local government in order to get the permission. The representatives of each participant group provided informal feedback for improvement, with minimal documentation. Numerous firehose tests were conducted, and the design was improved by the feedback provided by the PWD representative and the local government.

The staff members that work on developing the procedure via permission applications also learn from their efforts and ongoing interactions with LPP. Relying on lessons learned from the Teluk Bahang permit application, the new application was simpler, but it still included community and local government input in an urbanized region to renew a portion of the project's permit approval.

Few respondents also indicated that there were certain areas where the partnership needed to be improved. Being the first project of its kind in Malaysia, Tanjung Bungah presents unique challenges, including the mediation of human-wildlife conflict for unanticipated aspects of the conflict itself. Therefore, trust issues that are determined by introspection will always be a part of HWC at Tanjung Bungah and other nearby communities in the long run.

16. Exercise of facilitative leadership:

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this governance factor:

The significance of the LPP's established guides for animal engagement on sight was acknowledged by all parties involved. Although there isn't really any official leadership inside the local community or the NGOs team, it is expected that they would report to the local government, though the local government does not claim leadership to the project, but rather being authoritative for land matters.

The majority of respondents concurred that LPP is the primary convener and facilitator for all parties engaged, playing a pivotal role in leadership. The LPP team isn't specifically described in any adjectives, but respondents thought highly of the way LPP conducted the meeting, oversaw the site investigation, collected data, applied for a permit, and described the construction process with APE Malaysia. The project's networking nodality is LPP. This interview point is reinforced by observations made during meetings and site visits, where it is stated that the LPP's function is critical to the project's success. The local government and community were unable to take on the role of lead and conflict mediator in place of the LPP.

The combined funding that LPP was able to secure gave it some leadership but not authority because it allowed LPP to pay for facility installation on site and to grease the wheels for activities involving stakeholders.

As part of an NGO endeavor, LPP worked inadvertently on primate management with other foreign NGOs, with the assistance of nearby colleges to produce primary data and a structure that would serve as the project's groundwork.

Outcome variable: Successfully co-created green transitions

The outcome variable 'co-created green transitions' will be scored in two parts. First, 'co-creation' will be scored based on an assessment of whether the participants in the initiative, project or process engaged in collaborative problem-solving that fostered creative ideas and innovative solutions (data will consist of survey data combined with interviews and documents). Next, 'green transitions' will be scored based on an assessment of whether the initiative, project or process has fulfilled or is expected to fulfill its green goals, ambitions and aspirations (data will consist of survey data combined with interviews and internal and/or external evaluation reports, including scientific publications).

The scoring of this variable is done in two parts:

- 1. Is the developed solution based on collaborative problem-solving spurring creativity and innovative solutions?*
- 2. Does the developed solution engender a green transition?*

This scoring should be conducted based on both the survey and complementary green outcome evaluations. Please consult Sections 4.4 and 6.10 in the Research Protocol for more details.

1. Is the developed solution co-created?

QCA score:

- 0
- 0.33
- 0.66
- 1

Scoring confidence:

- Low confidence
- Medium confidence
- High confidence

Data sources:

- Survey
- Interviews
- Documents
- Observations

Please elaborate on the reasoning behind your scoring for this part of the governance factor, including the data sources used for the scoring.

A series of survey questions focus on the presence of collaborative problem-solving (1), the fostering of creative and innovative solutions (2-6), the support for process, outcomes and the level of engagement (7-12), and the attainment of goals that are robust and serve to enhance sustainability (13-15). Reviewing the table reflects the positive opinion over the minus answer with some indication of less agreement. Again, most respondents agreed or strongly agreed with all of the questions. The mean score for the survey is notably positive (above 0).

The first questions indicated a significant agreement that various efforts were invested during defining the problem and solution in this unique project context. 100% of the respondents obviously agreed with positive notes within thorough efforts among stakeholders in ideas, data collection, permit application and approvals, repurposing the material and pre-determining the location and routes. The Bridge to Coexist was a collaborative problem solving. During the physical meeting session and available documents, it can be corroborated that the effort of establishing and reviewing permit procedures with local government with the help of assemblymen representatives, detailing the bridge site selection, and the continuous data from citizen scientists is a unique task for the project respondents to take action.

The answer to question 2-6 shows that the design detail and pre-construction ideas were formulated through creative and innovative solutions, collaboratively by primary stakeholders. It is also interesting to see less agreement were noted. This could be the result of some major stakeholders that would see the solution as the same with terrestrial wildlife crossing. Some of the stakeholders might view the crossing as the same idea of 'crossing'.

Strong positive responses to the question 7-10 show the support, content, collaborative and satisfaction of the effort on process and outcome of the project. There are slightly agreed respondents might have some common or familiar with the approach and define success. Again, most respondents agreed collaborative processes were a prerequisite for success and results were innovative. As mentioned by the local government and PWD representative, "the effort is unique in that the representative must closely communicate with other related environmental agencies to consolidate the permit and detail design."

On the question 11-15, strong support mainly where the respondents claimed that the stakeholders engaged as they saw the project will definitely lead to more innovative solutions, stimulated problem solving, meet project goals, durable in long run, and improve the community sustainability. As the first project of its kind in Malaysia Peninsular populated area, it is an exemplary project in detail design solution and pre-construction process. Documented town hall sessions with other communities than Concord

garden was done with positive response shows that the engaged community is rather positive with the future prospect.

It is noted that 81% of the respondents are looking forward to the project co-created solution that would enhance the sustainability of the local community. The pilot Teluk Bahang project saw a successful effort in mitigating wildlife kill and this could lead to lowering the HWC among Dusky Langur and local community.

If possible, please insert your survey responses in the table below (in % for each response), including the mean/average % for each survey item.

n = 21	Strong. dis.	Dis.	Slight. dis.	Neither agr/dis	Slight. agree	Agree	Strong. agree	Mean
1. Problem-solving mobilized different experiences, and/or ideas and/or forms of knowledge to develop new perspectives	-	-	-	-	-	24%	76%	5.76
2. Through the collaborative problem-solving process, different experiences and/or ideas and/or forms of knowledge have been mobilized to search for unconventional solutions	-	-	-	-	10%	24%	66%	5.57
3. The collaborative problem-solving process mobilized different experiences, and/or ideas and/or forms of knowledge to search for solutions that go beyond standard/text-book solutions	-	-	-	9%	9%	29%	53%	5.23
4. The co-created solution breaks with established practices	-	-	-	9%	2%	3%	86%	5.14
5. The co-created solution disrupts conventional wisdom	-	-	-	10%	24%	43%	23%	4.80
6. The co-created solution offers new ideas to address the green transition problem	-	-	-	-	-	33%	67%	5.66
7. I'm supportive of the co-created solution	-	-	-	-	-	81%	19%	5.19
8. I'm content with the overall collaborative process of the project	-	-	-	-	19%	43%	38%	5.19
9. I feel the multi-actor collaboration process was a prerequisite for the success of the project	-	-	-	-	-	47%	53%	5.52

10. I'm satisfied by the results of the co-creation effort in terms of expected impact on the welfare of the community	-	-	-	-	19%	43%	38%	5.19
11. The collaborative interaction in the project has led to an innovative solution	-	-	-	-	-	48%	52%	5.52
12. The actors involved in the project are engaged in collaborative interaction that stimulated creative problem-solving	-	-	-	-	9%	38%	53%	5.42
13. The co-created solution meets the proposed goals of the project	-	-	-	-	9%	57%	34%	5.28
14. The co-created solution will be durable and robust in the long run	-	-	-	-	9%	62%	29%	5.19
15. The co-created solution is expected to significantly improve sustainability for the whole community	-	-	-	-	9%	67%	24%	5.14

2. Does the developed solution engender a green transition¹?

QCA score:

- 0
 0.33
 0.66
 1

Scoring confidence:

- Low confidence
 Medium confidence
 High confidence

Data sources:

- Survey
 Interviews
 Documents
 Observations

Please elaborate on the reasoning behind your scoring for this part of the governance factor, including the data sources used for the scoring:

A series of **survey questions** focus on whether the project has produced or is expected to produce a green transition aiming to avoid a worsening of the status quo, maintain the status quo or improve the status quo.

Respondents reflected that 81% think that Bridge to Co-exist by building the arboreal crossing already produced a green transition solution. It is interesting that 19% think that it is somewhat not sure about worsening, maintaining, or improving the status quo. However, it is mostly agreed by respondents that it would avoid maintaining the status quo. Reduced wildlife roadkill would also lead to lowering accident

¹ By "green transitions", we mean objectives and aspirations that correspond to at least one of the Green SDGs (SDG 6, 7, 11, 12, 13, 14, 15). The project does not have to refer explicitly to the green SDGs, but the project's green objectives

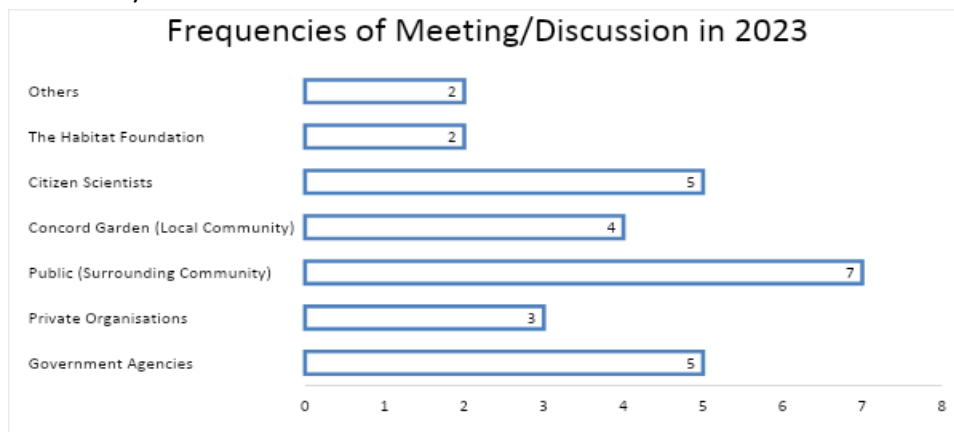
possibilities among the local community and the possible impact especially over long run when the Dusky Langur population thrive in those communities.

In addition to the survey data, we also have one document that supports our scoring in the recent project of Concord Garden, Tanjung Bungah. The document is the set of slides of the LPP introduction during the first meeting with LPP before we begin our engagement with the whole stakeholders. The document mentioned LPP has a **relatively significant impact to the improvement in lessening the roadkill of terrestrial animals from the Penang Hill UNBR to the other side of the road**. It has a significant contribution to the conservation of wildlife in the district. LPP understands that negative human-wildlife interaction (conflict) is a significant issue that requires urgent attention and hopes that this project will be a step in the right direction toward a more sustainable future.

The Malaysian Wildlife Conservation Act 2010 is flawed, and it is imperative that we tackle the issues to foster more substantial improvements. The key is together defining a problem and designing a solution, rather than only dealing with its outward manifestations. Creating secure environments for both humans and wildlife in urban areas begins with our actions. Individuals have the capacity to contribute to the betterment of our society by actively advocating for harmonious cohabitation between humans and wildlife.

The second document is a social media journal in the year 2023 reporting a series of discussion and meeting on site with related stakeholders to the LPP. The data shows that LPP was constantly engaging the stakeholders on site to create awareness, promote the data collection and analysis of citizen scientists, and indirectly having a series of retro perspectives in problem and design solutions.

The social media journal summarises the frequencies of meetings held that reflect the education vision of LPP in creating awareness to all related stakeholders. Constantly engagements were made with the citizen scientist, Concord Garden as local community, the public (surrounding the Tanjung Bungah) as future bridges that will be constructed with local community, and the government as the land owner of the open space under the Local Government Act. This engagement is an indirect approach to spur innovation and ideas among the future local community that shall be engaged for future arboreal crossing design and installation. Casual conversation will provide better design communication instantaneously among the engaged stakeholders while redefining the problem based on site context and possible reaction of the local community after the installation was made.



In terms of green goal fulfillment, it is not yet recorded by data as the project has yet to install the arboreal crossing for this Tanjung Bungah location, other than observation data and wildlife hotspot. However, respondents from the local community have already mentioned that they are slowly accepting the coexistence with the wildlife by practicing the guides provided. Observation on site showed that the Dusky Langur seems eager to cross the road into other larger green spaces at the edge of the local community area separated from the major collector road. Through the pilot project of Teluk Bahang, it is believed that the roadkill shall be lower but the interesting aspect is the Dusky Langur behaviour to be studied once the group is able to travel farther and get familiarised with the local community location.

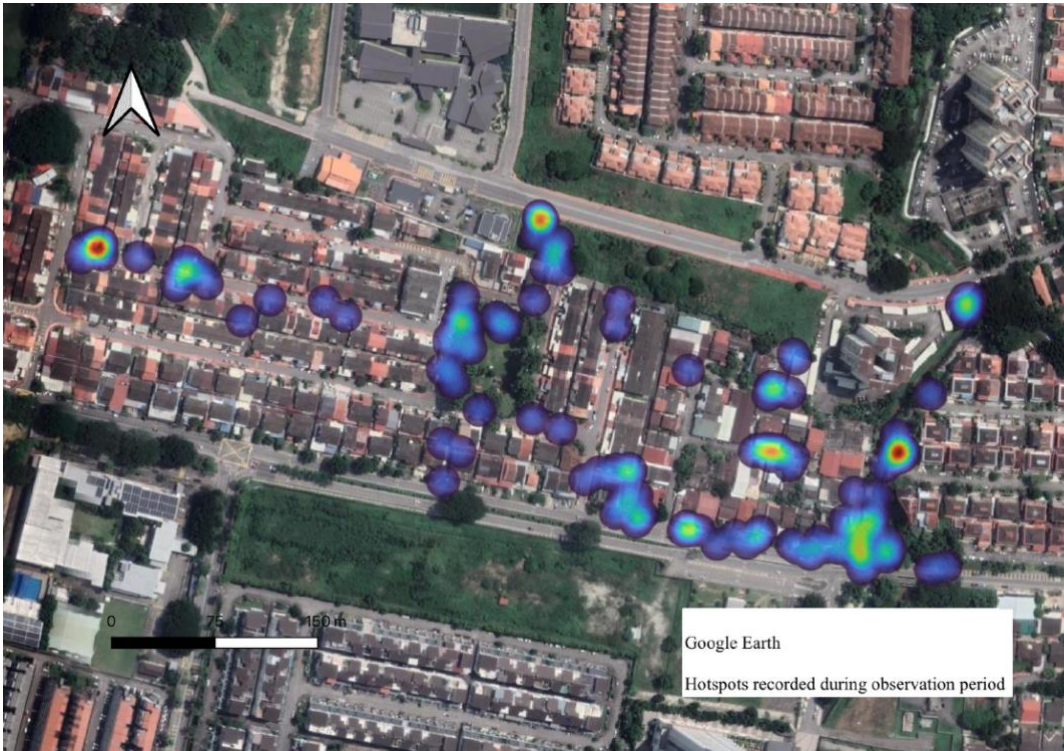


Photo 4: Hotspot identified by citizen scientist.



Photo 5: Updated Dusky Langur crossing of the main road

According to the respondent, there is a future prospect of the local community members who in a positive note would foresee the opportunity of urban ecotourism once the wildlife crossing is completed and how the uniqueness of coexisting with wildlife could be interesting. However, the business model needs to be feasible with guided enforcement by the local government and government agencies.

To date, there is low research in green space network study regarding the urban wildlife be it on biotic and abiotic aspects more or so in rewilding those green spaces as both recreational space for the community and wildlife. This would provide some answer of why some of the respondents are not sure how the project would really make the transition to a certain green goal in the long term.

Finally, through our observation and interviews, we could see the positivity of the stakeholders based on the previous data of arboreal crossing at Teluk Bahang which had reduced the treetop wildlife roadkill significantly. It is also very to see that saving wildlife and coexisting is really possible from the livelihood of the local community in Tanjung Bungah through innovative problemsolving and minimal installation on site, the application of recycled material which significantly reduces construction and maintenance cost over time.

If possible, please insert your survey responses in the table below (in % for each response).

1. The project:	Yes	No	Don't know
...did not produce any green transition solution	100% (n =21)	-	-
...is expected to produce/has produced a green transition solution aiming to avoid a worsening in the status quo	95% (n = 20)	-	4% (n = 1)
...is expected to produce/has produced a green transition solution aiming to maintain the status quo	86% (n = 18)	-	14% (n = 3)
...is expected to produce/has produced a green transition solution aiming to improve the status quo	81% (n = 17)	-	19% (n = 4)

n = 21

Please list all the informants you have interviewed for the case study (list project role + interview date):

We interviewed 21 people in connection with the study of the Arboreal Crossing at Concord Garden, Tanjung Bungah, Penang. Most interviews were in person and some were done during site visits and online sessions. About 6 interviews were conducted online due to travel distance and time constraints. All interview and data collection process was done in English except with government agencies respondents which are in Bahasa Malaysia. 2 of the interviews were conducted as focus groups on site.

All local actors were interviewed between the 22nd of May to 20th of October. all the LPP team and local community respondents were done on site and during the end session of observation in the meeting. The contractor who shall install the crossing was interviewed online.

List of informants:

Two central/regional NRECC representatives

Four representatives from The Habitat Foundation

Three local Langur Project Penang (LPP) representatives

One representative from the Department of Wildlife and National Parks Peninsular Malaysia

One representative from the Forestry Department

Two representatives from the Malaysian Public Works Department

One representative from the Concord Garden Committee

One representative from the Tropical spice's Garden

One representative from the local Politician Party

One representative from THB Maintenance

One representative from Malaysian Primatological Society (MPS)

One representative from CIMB bank

Two representatives from APE

The informants are displayed anonymously, but we have a full list of names.

Please list all the observations you have made (type of meeting/workshop/etc. + observation date):

There were a total of 21 participants involved in this case study. On the 4 August we had a meeting with a team of LPP and Concord Garden residents. On the 22 May we had our first online meeting with one of the representatives from The Habitat Foundation. On the 4 of October, we had a meeting chaired by the Project leader, who also invited a political representative, representative of Malaysian Public Works Department, Concord Garden residents, local authority, and citizen scientist. On 10 October, we had an online meeting with representatives of Animal Projects and Environmental (APE). On 20 October, we had an opportunity to have online meetings with one of the representatives of Project Coordinator from The Habitat Foundation focusing on LPP projects. There was a friendly and informal atmosphere and participants were asking questions to presenters. After the interview and meeting session, the participants were hanging around for a bit to talk and laugh. They also took group photos.

Please list all the documents you have analyzed (document name + source + year):

Penang Green Agenda 2020-2025, Penang State Government, 2020

Penang Island City Council Master Plan 2020-2025, Penang City Council, 2020

Chapter in book – The Penang Hill Biosphere Reserve (Unpublished Book), 2023

The Biodiversity of Penang Hill: Findings of the 'Penang Hill BioBlitz 2017', The Habitat Foundation, 2017

Penang Hill Biosphere Reserve (PHBR): Malaysia's 3rd UNESCO Biosphere Reserve, Perbadanan Bukit Bendera Pulau Pinang, 2021

Environmental Quality Act 1976 (Act 127)

Local Authority Act 1972 (Act 171)

Wildlife Conservation Act 2010 (Act 716)

Town and Country Planning Act 1972 (Act 172)

Tree Preservation Order (TPO)

Monkey Encounter Guide, LPP, 2020

Monkey Matters, New Straits Time Press, 2018

Urban Canopy Bridges to Mitigate Human – Wildlife Conflict, LPP, 2019

Bridging the Gap – Malaysia's First Urban Canopy Bridge to Help Arboreal Animals to Crossroads Safely, LPP, 2019

Activity Patterns and Diet of a Group of Wild Dusky Leaf Monkeys in Penang, LPP, 2016

Species Action Plan for the Conservation of Raffles' Banded Langur (*Presbytis femoralis femoralis*) Malaysia and Singapore, IUCN SSC Conservation Breeding Specialist Group, 2016

LPP (2019) Draft Memorandum of Understanding

LPP (2020) Memorandum of Understanding

Dusky Newsletter – January - October 2023

LPP (2023) Minutes of the steering committee meeting

Relevant links:

https://brill.com/view/journals/ijfp/93/3-6/article-p255_5.xml : "Ah Lai's Crossing" – Malaysia's first artificial road canopy bridge to facilitate safer arboreal wildlife crossings

<https://news.mongabay.com/2023/01/canopy-bridges-connect-forests-wildlife-and-international-researchers/> : Canopy bridges connect forests, wildlife, and international researchers

<https://langurprojectpenang.com/lets-bridge-to-coexist/> : Let's Bridge To Coexist

<https://lifeontheverge.net/2016/09/06/arboreal-crossings-abroad/> : Arboreal crossings abroad

<https://langurprojectpenang.com/2023/10/08/dusky-newsletter-september-2023/?fbclid=IwAR2-ecc22LAn2mvpEFrYHxWrMMaF47OZ5vu0LqggOu5OTV6ZmyGdEcXNQYo>
<https://langurprojectpenang.com/duskies-blogs/>
<https://langurprojectpenang.com/summary/>
<https://langurprojectpenang.com/road-ecology/>

Please note the response rate for the survey/measurement of outcome variable:

We conducted a total of 21 interviews with actors from Penang. Consequently, the survey was distributed to a total of 21 individuals, all of whom provided responses, resulting in a commendable response rate of 100%. Moreover, knowing that LPP teams are well-versed in the subject matter, providing valuable expertise. However, the local community of Concord Garden is aware with environmental knowledge but lack in technical proficiency. Despite this, the collaborative efforts between the state government and knowledgeable entities contribute to the overall advancement of Penang.

The survey was administered in person as a paper questionnaire by our interpreter Mrs Yoon Ai Chin and Mohd Sallehuddin Mat Noor.