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and sustainable future through the
power of environmental education*

CASE STUDY

Dusky Langur Conservation Through Environmental Education and Citizen Science in Penang, Malaysia

CONTRIBUTOR

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Geep is a partnership of the U.S. Environmental Protection Agency, the Taiwan Ministry of Environment, and the North American Association for Environmental Education.



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[United Nations Sustainable Development Goals](#) addressed

Overview

The Langur Project Penang (LPP), a primate conservation project in Malaysia, integrates zoology and environmental education (EE) to support dusky langur conservation efforts. Recognizing EE as an important conservation tool to help people and wildlife coexist, LPP has evolved from a traditional conservation project to integrate EE into its scope. Since 2016, LPP has been building capacity by training volunteers as citizen scientists who contribute to conservation by actively participating in fieldwork and EE.

LPP establishes collaboration and partnership with residents, authorities, and various other stakeholders to enhance EE activities to effectively educate the public about the importance of dusky langurs and urban biodiversity. This is done through a variety of innovative education approaches, such as citizen science, community engagement, and outdoor activities. LPP hopes to use EE as a catalyst for successful grassroots wildlife conservation projects in Malaysia.





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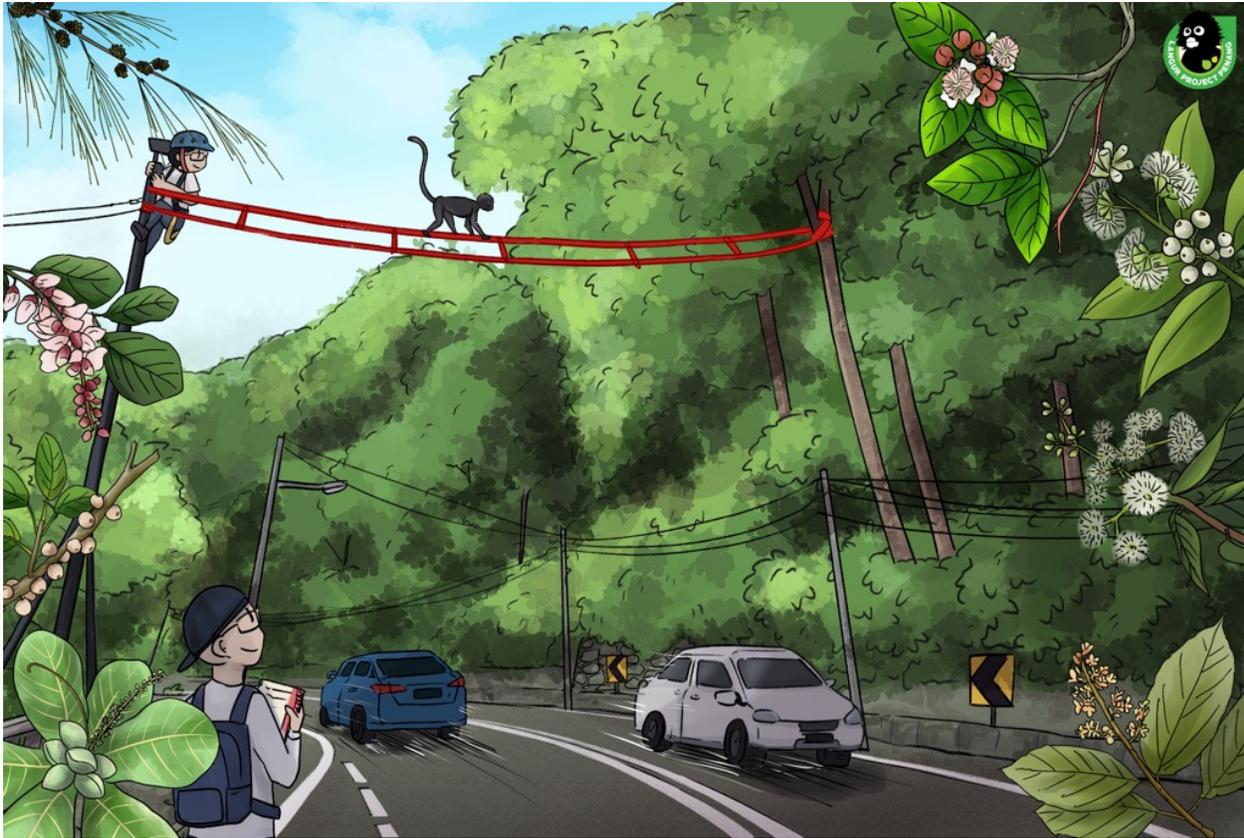


Dusky langur infant holding on while its mother leaps. *Creative Common 4.0 license*

Background

Langur Project Penang (LPP) is a citizen science-based dusky langur (*Trachypithecus obscurus*) outreach and conservation project in Penang, Malaysia. As of 2024, dusky langurs are classified as endangered species under the IUCN Red List. This primate species can be found in forest habitats, as well as in anthropogenic habitats. Nonetheless, the dusky langur population is decreasing due to urbanization and habitat fragmentation. Though the species can be easily spotted in several sites across Penang, few residents know about their existence due to the dusky langurs' predominantly arboreal lifestyle and a general lack of environmental awareness within the community.

LPP aims to cultivate coexistence among humans and urban wildlife through community-based conservation action and EE. LPP works on three main pillars which involve EE: 1) fieldwork in the forest to gather ecology and behavior data of the dusky langur; 2) utilization of the fieldwork data for conservation action, such as establishing a road canopy bridge to assist arboreal wildlife to cross safely; and 3) rainforest programs to nurture understanding and empathy of adults and children through learning about their surrounding habitats. These three pillars include science communication, innovation, and creativity in order to produce relevant content and activities—videos, photos, infographics, presentation slides, and programs—to educate participants and stakeholders on the importance of dusky langur conservation. The educational content developed not only provides participants with knowledge and skills, it also raises awareness among various stakeholders.



Road canopy bridge illustration. *Langur Project Penang*

Approach

LPP provides a platform for community members to take part in primate ecology and behavior study, where they learn about the importance of safeguarding primate habitat around their urban areas through various EE activities. LPP volunteers are trained to be stewards of dusky langurs and to serve as environmental educators and citizen scientists, engaging with the public during outreach events and fieldwork.

- Primate field study.** The ongoing primate fieldwork data collection and scientific analysis provides insights for LPP's EE activities and curriculum planning. Ecology data, such as diet, home range, and habitat quality, help researchers better understand the environment in which these primates live. With understanding of behavioral aspects, such as activities, ranging movements, and social manners, the team disseminates the information through training new citizen scientists and conducting primate ecology games for children. Citizen scientists learn how to use binoculars to observe dusky langurs in the forest, use a handheld GPS to record the species' traveling routes, collect samples of food plant species for identification, conduct transect surveys to estimate population size, carry out vegetation plotting for habitat parameter study, and much more through hands-on non-invasive primate fieldwork training. Learning through fieldwork can be an impactful approach since the experiences are much more exciting and engaging than in the classroom. LPP's project demonstrates that EE and scientific fieldwork can be integrated to educate individuals with non-science backgrounds.

- **Fieldwork guidelines.** To ensure that the volunteer residents are well-trained and guided by LPP team members as citizen scientists, LPP developed fieldwork guidelines and a list of desired goals for both the trainer and the trainee. This guideline is a framework for conducting fieldwork on primates, with different training stages.

Stage	Ecology	Behavior	Observation Skill	GPS Navigation Skill
1	Familiarization within the study site Introduction to basic botany knowledge related to dusky langurs	Identifies dusky langur species and their characteristics Identifies dusky langur position and types of movement	Familiarization with the use of a pair of binoculars Locates wildlife and plants with a pair of binoculars	
2	Learns behavior data collection Understands the forest's habitat quality parameters	Identifies the age-sex classes among dusky langurs Identification of social behavior of the dusky langur	Uses binoculars to watch the dusky langurs' behavior	Learns how to operate a GPS and log coordinates
3	Practices data collection on behavior Understands the interaction between dusky langurs and other sympatric species	Observes the dusky langurs' behavior and different age-sex classes	Uses binoculars to observe the plant parts that dusky langurs consume	Conducts home range data collection
4	Individual data collection on dusky langur behavior	Identifies individual dusky langurs	Same as above	Same as above

- **Using a participatory approach.** The findings from the fieldwork operations noted above are used to raise awareness of dusky langurs' movements in urban areas and advocate to authorities and stakeholders the need for EE and road canopy bridges, which allow this species to move safely. In 2018, quantitative data obtained in Teluk Bahang, Penang was examined and presented as part of a road canopy bridge proposal to key stakeholders, and discussions were held to guarantee partnerships and collaboration. This resulted in the authorization for the establishment of a canopy bridge and the incorporation of EE at recreational forest sites. Throughout the bridge installation planning and process, LPP was able to grow their partnership network through engagement with a variety of professionals, ranging from engineers to educators and artists to marketers. To further raise awareness of the road canopy bridge, LPP works with local artists to organize art exhibitions and activities that integrate nature and discusses opportunities with educator groups to collaborate on planning EE activities.

- **Community involvement.** EE has helped LPP with regards to community engagement and citizen science recruitment for scientific fieldwork. Thinking through an EE lens has added creativity to the production of new materials to raise awareness about dusky langurs and forest habitats.



Langur Project Penang

- **Education program: seeing through the eyes of the dusky langur.** Residents and tourists can learn about the importance of dusky langurs, canopy bridges, and forest connectivity through the rainforest programs of LPP, which LPP has been conducting for the public since 2016. The objectives of these programs are to 1) educate the community about the importance of intact forest habitat, 2) encourage the public to become involved in wildlife conservation volunteerism, 3) provide opportunities for family and social bonding activities to strengthen community and household cohesion, and 4) inspire community members to take progressive conservation actions. The rainforest programs are designed differently depending on the forest area, target audience, and client objectives. Group activities, such as plant hunts using the iNaturalist phone app, taking photos of animals and plant parts using bino-graphy (using a phone camera with a pair of binoculars), and wildlife card games, make learning more enjoyable. Participants additionally learn through sense-based learning, where they experience the dusky langurs' habitat and food plants through using the five senses (sight-seeing the dusky langurs' habitat; smell-scent in the forest; touch-texture of tree barks; taste-tasting edible, non-poisonous dusky langur food plant parts; sound-cicadas, crickets, and birds in langur habitat). The rainforest program helps cultivate appreciation towards forest habitat, which is critical for normalizing the concept of habitat connection and road canopy bridges among the community members.
- **Making EE accessible by bridging urban and natural settings.** Due to limitations and restrictions such as health allergies, transportation challenges, language barriers, and a lack of local environmental educators in the region, not everyone has the opportunity or inclination to participate in the rainforest program. LPP encourages urban residents to engage in outdoor activities such as participating in urban wildlife sighting reports where residents can directly contact LPP regarding any dusky langur and other primate sightings. This helps strengthen the network between LPP and residents, and provides further opportunities for education. EE must be tailored to be inclusive of diverse audiences. Depending on the target population, which can vary from young students to university students and adults, LPP has developed various science communication methods such as animation, storybooks, community outreach (at malls, markets, and art galleries), and virtual education programs. Since the pandemic has trained LPP to be flexible to change, the team has learned how to conduct EE effectively and creatively while distanced.

Evaluation Plan

LPP integrates EE and citizen science within their primate fieldwork study and educational activities. LPP evaluates processes and outcomes by working with both volunteers/citizen scientists trained for fieldwork and participants in LPP's EE programs.

- **Collaborative learning with volunteers.** Mentor-mentee relationships are established and monthly communication between the mentor and mentee provides an opportunity for discussion and self-reflection. The purpose of these discussions are to assist one another in identifying potential strengths and shortcomings that need to be addressed and worked on. This not only helps our volunteers grow, it also gives the LPP team insights regarding how to adapt our program processes. Task sheets were created between mentor and mentee(s) to keep track of each other's deadlines, weekly accomplishments, and progress, as well as to determine the mentee's interest in various elements of wildlife conservation work.
- **Dusky stewardship.** Participants in LPP's EE activities are given assignments and tasks in the form of games and group activities to reflect on their learning progress with LPP. The programs' intended outcomes are for participants to 1) learn about rainforest facts, wildlife, and dusky langurs in particular, 2) understand the importance of habitat connectivity and rainforest habitat, 3) appreciate wildlife through observation at safe distances, 4) understand the harm of illegal wildlife pet trade and wildlife feeding, 5) participate in citizen science conservation projects, and 6) realize individual strength in helping wildlife and people in achieving coexistence.

Outcomes/Results

The outcomes/results can be divided into several categories:

- **Environmental education programs.** LPP has organized 95 on-site and online sharing sessions, road shows, and campaigns, as well as 38 rainforest programs (between September 2016 and December 2021). Most of the programs were held in schools, ecotourism sites, and private organizations. The curated content is aimed at fostering coexistence between humans and wildlife, as well as raising awareness about the dusky langurs and urban biodiversity around the community.

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Outreach programs in public spaces. *Langur Project Penang*



Rainforest programs for children. *Langur Project Penang*



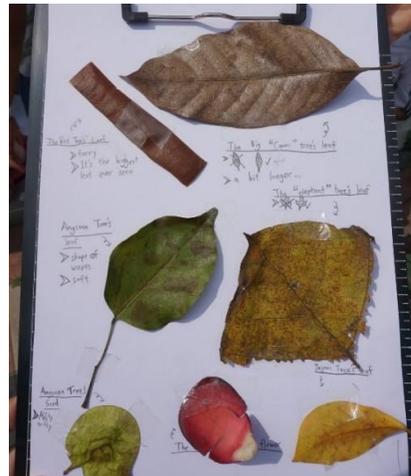
Rainforest programs for adults. *Langur Project Penang*



Family members participated in a nature scavenger hunt and then used the natural items to create a portrait of a dusky langur. *Langur Project Penang*



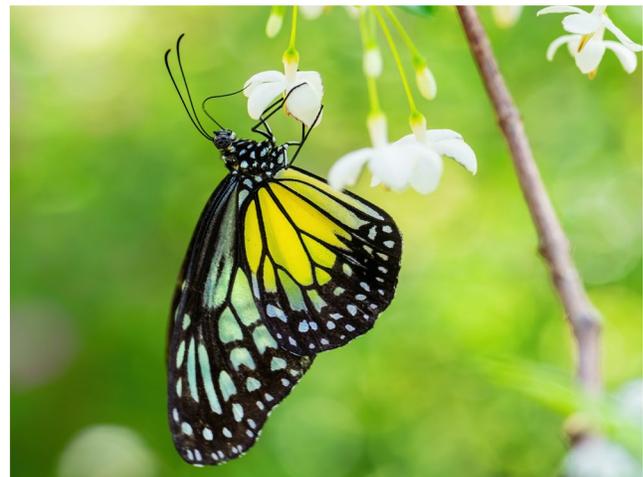
After the guided educational walk led by Langur Project Penang, participants created the artwork "Dusky Langur Home Range." *Langur Project Penang*



In addition to learning about the natural food plants for dusky langurs and other wildlife species, children collected fallen leaves, tree barks, and plant petals to create their own 'herbarium.' *Langur Project Penang*

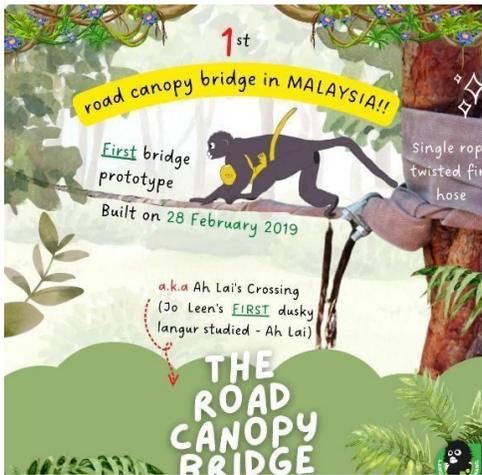


Children created their own 'road canopy bridge' by learning about the specific food plants for dusky langurs and designing their own bridge structure out of upcycled and natural materials. *Langur Project Penang*



Yellow Glassy Tiger, Malaysia. *Adobe Stock*

- **Educational content.** The diverse LPP team members provide their creative approaches to EE. Content is provided in many ways, including blog articles, videos, posters, and games.



Conservation of the dusky langur through canopy bridge is highlighted in a graphic (by Kimberly – reached 326 accounts on Instagram and 1124 views on Facebook). *Langur Project Penang*



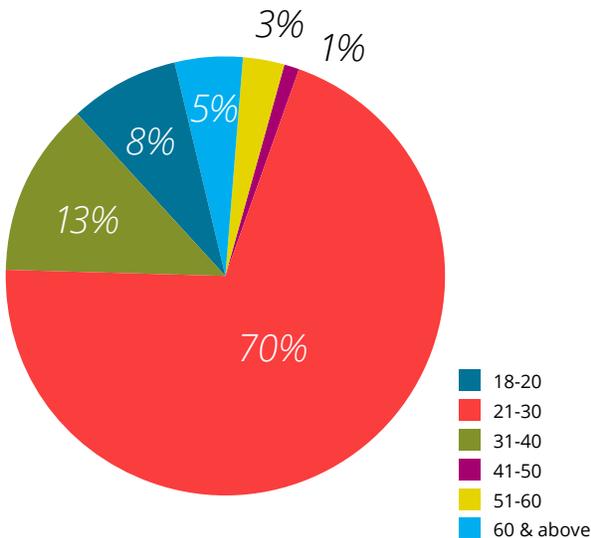
The mother-infant relationship of dusky langurs presented in a comic (by Xuan Le – reached 704 accounts on Instagram and 3126 views on Facebook). *Langur Project Penang*



Videos on the LPP YouTube channel delve into the story of dusky langurs and other primate species. *Langur Project Penang*

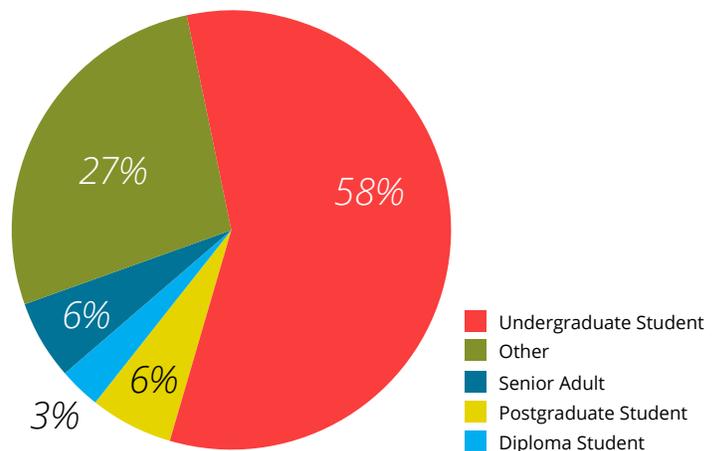
- **Volunteers and citizen scientists.** EE has enabled LPP to inspire primate conservation action among community members through citizen science manpower. As of August 2022, LPP recruited 90 volunteers/citizen scientists of various age ranges and demographics. There is a 29% re-volunteering rate after their initial participation as short-term volunteers, interns, or university students. One of the most important factors in encouraging volunteerism is to maintain and nurture relationships among team members. Mentor-mentee relationships are one way to help encourage and sustain volunteerism. This is a continuous learning process in which working relationships can be further enhanced into friendships and partnerships. LPP has observed an increase in re-volunteering in recent years, and is doing their best to continue to inspire and learn from their volunteers.

Age Range of LPP Volunteers When Starting Volunteering



The majority of LPP volunteers were aged 21-30 when they began volunteering, accounting for 70% of all LPP volunteers.

LPP Citizen Scientist Backgrounds (as of Aug. 2022)



The majority of LPP citizen scientists are undergraduate students, accounting for 58% of all LPP citizen scientists as of August 2022.

- **Citizen engagement.** LPP's EE programs have successfully inspired community interest and involvement in dusky langur conservation. Citizen-reported sightings of dusky langurs around urban areas of Peninsular Malaysia have helped identify potential locations for future environmental campaigns and primate studies.
 - Between March 2020 and December 2021, residents in Peninsular Malaysia reported 302 urban sightings and 82 natural sightings of dusky langurs to LPP.
 - There were a total of 90 contributors in the citizen science dusky langur sighting project. Thirty-four percent of project contributors have sent multiple sighting reports to LPP.

Lessons Learned

Langur Project Penang, which began as a postgraduate research project on the ecology and behavior of dusky langurs in Penang, has developed into a community science project with the goal of fostering coexistence between humans and urban wildlife. Since its inception in 2016, LPP has learned the following lessons:

1. When scientists and scholars incorporate EE into their species research and conservation tools, they can play a pivotal role in normalizing conservation and communication science for diverse stakeholders, including the general public.
2. Many Malaysians would like to contribute to the conservation of the dusky langur but are unaware of how to do so. Consequently, EE is crucial for empowering action at the grassroots level among community members. It is essential to provide the opportunity for people to participate in education and conservation activities that are curated based on the targeted audience's demographics and environment. For example, urban residents are more likely to use social media and are more likely to attend public events, whereas rural residents generally prefer a physical interaction over online sharing.
3. Collaboration and partnership between educators, scientists, conservation groups, and other stakeholders can enhance the impact of their efforts. For example, scientists should start their EE strategies by connecting with local naturalist organizations, institutions, and councils to better understand their audience and how to best reach them. Also, we found that storytelling merchandise such as handmade dusky langur plushies, children picture books, and road canopy bridge hoodies, are effective tools for raising awareness and creating funds for project sustainability.
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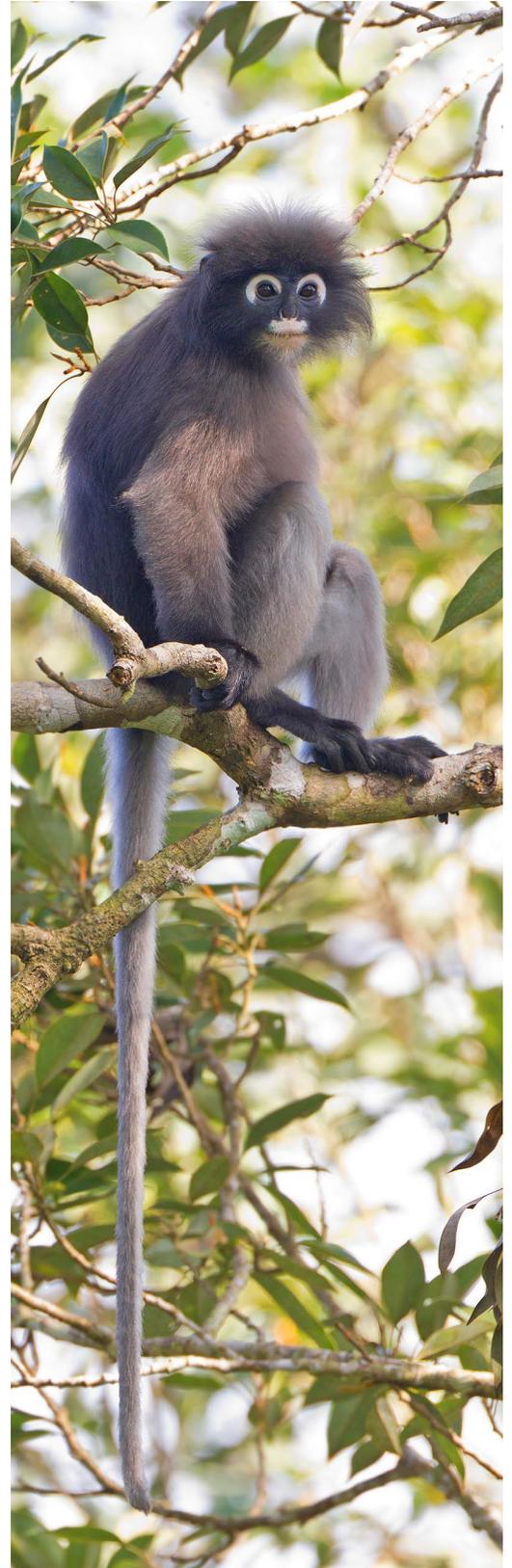
The above-mentioned lessons enable team LPP to continue to expand EE activities in a way that is effective and inclusive, enabling more community members of various demographics to experience EE in enjoyable, engaging ways. The urban population, including those who live in nearby towns and cities, is LPP's primary target audience. LPP is working to improve partnerships with private entities such as small enterprises and community leaders to advocate the use of EE to a wider audience.

Resources

- About Langur Project Penang: <https://langurprojectpenang.com/>
- A Story of Dusky Langur: <https://youtu.be/JJzWfCn6fpl>

Contacts

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