

Canopy bridges for the community: Implementation and education about canopy bridges for the Critically Endangered Javan slow loris (*Nycticebus javanicus*) in Java, Indonesia

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Introduction

This project set out with the goal of improving conservation outcomes for the Critically Endangered Javan slow loris while simultaneously instigating awareness and active engagement in conservation activities among local communities. The overarching vision was that direct conservation interventions, such as installing canopy bridges to link fragmented habitats, must go hand in hand with education if the species is to have a viable future in landscapes increasingly altered by human activities. By combining ecological fieldwork with the development of education materials for school aged children, the project utilised practical tools to improve slow loris survival and long-term cultural shifts in how local communities view wildlife.

Two key objectives were at the heart of this initiative. The first focused on habitat connectivity and safety through the installation and monitoring of canopy bridges. This work was designed to put into practice advanced skills in data analysis, slow loris behavioural observation, and spatial mapping, in order to test whether artificial canopy structures could help reconnect fragmented habitats and reduce the risks faced by lorises forced to travel on the ground in areas of low canopy connectivity. The second objective was an innovative education initiative, made possible by a unique opportunity to contribute conservation materials to the Indonesian national curriculum, Merdeka Mengajar. Our ambition was to create a freely available online conservation education programme for primary schools, building awareness among young learners and providing teachers with practical resources to deliver meaningful lessons about biodiversity.

Objective 1: Habitat Connectivity through Canopy Bridges

Planned Activities

Slow lorises are highly arboreal primates, reliant on connected canopies to forage, travel, and avoid predators. Habitat fragmentation due to fast moving housing development has left many populations at risk, as lorises are forced to descend to the ground to cross between patches of forest. This behaviour not only increases energy expenditure but also exposes them to threats such as dogs, humans, and road traffic and in many instances results in cases of electrocution when lorises mistake power cables as safe pathways through the landscape. Our project therefore proposed the installation of canopy bridges in carefully chosen locations, informed by spatial mapping and behavioural analysis. These structures intend to provide safe crossing points, improve access to food resources, and reduce reliance on ground travel.

First, potential bridge sites would be identified through a combination of data analysis, including mapping of home ranges, known feeding tree locations, and established loris travel routes. Once erected, the bridges would be monitored through both direct observation and camera trapping. We planned to carry out dedicated “bridge follows,” where individual lorises would be observed during their nightly activity, recording behaviours at and around the bridges. Camera traps were used to supplement this work by providing continuous monitoring, generating records of bridge use when observers were absent. Finally, data would be collected to assess whether bridge installation altered patterns of home range use, particularly in terms of access to feeding trees, distance travelled, and frequency of ground use.

Methods

To address the risks associated with habitat fragmentation, artificial canopy bridges were installed at two key locations: Cipaganti village in Garut, West Java (LFP research site) and Cikananga Wildlife Center in Sukabumi, West Java. In Cipaganti, six bridges were placed within an agroforest where slow lorises are known to move between cultivated and forested areas. These included rope-only, rope-wire, and rubber-wire designs, strategically positioned to link isolated feeding and sleeping trees across farmland (Fig. 1).

At Cikananga Wildlife Center, 11 bridges were constructed to reconnect fragmented forest patches within the centre grounds and adjacent farmland. The bridges here were designed with a combination of bamboo, rope-only, and rope-wire materials, selected to test their durability and effectiveness across varying contexts. Placement was guided by vegetation surveys and direct loris movement data, with an emphasis on areas where animals had previously been observed descending to the ground. Once in place, monitoring began immediately, with camera traps set at both ends of the bridges to capture crossing events. At the LFP field site, research team also conducted night follows, tracking individual lorises to document their behaviours in real time. Standardised ethograms were used to ensure consistency in data collection, enabling reliable comparisons before and after bridge installation.



Fig. 1: Map of all installed canopy bridges and camera trap locations at the LFP field site, Cipaganti

Results

Our research found that slow lorises adapted to the presence of bridges rapidly and incorporated them into their nightly routes. Individuals were recorded making repeat crossings, suggesting that the bridges had become reliable elements of their travel networks. Data analysis showed that lorises gained improved access to feeding trees once the bridges were available, allowing them to move into areas that had previously been inaccessible without descending to the ground. In some cases, travel routes became more efficient, with lorises able to reach resources while covering shorter distances than before.

One of the most significant findings was a marked decline in ground use. Prior to bridge installation, lorises were often forced to travel on the ground, a behaviour that places them at high risk of predation. After the bridges were introduced, the frequency of ground travel decreased, indicating that the structures successfully provided a safer alternative. This shift has direct conservation implications, as reducing time spent on the ground lowers exposure to dogs, snakes, and other terrestrial threats. Importantly, the benefits of the bridges extended beyond slow lorises. Camera trap footage and direct observations showed that other species including Javan palm civets, Sunda scops owls, treeshrews, squirrels, and bats also used the bridges to cross gaps between trees or as resting areas (Fig. 2 & 3).



Fig. 2: Wild Javan palm civet on a bamboo bridge at Cikananga Wildlife Center, Sukabumi



Fig. 3: Wild Javan slow loris using a rope-only bridge at LFP's research site in Cipaganti, Garut

Impact

This component of the project demonstrated that canopy bridges are not only feasible but highly effective conservation tools. In this research bridges directly improved habitat connectivity, enabling lorises to maintain arboreal travel and avoid risky ground crossings. The results add to the growing body of evidence that artificial structures can mitigate some of the challenges of habitat fragmentation, particularly in agricultural landscapes where forest patches are increasingly isolated. Beyond the scientific findings, the visibility of the bridges also provided a valuable communication tool with local communities, who were able to see tangible infrastructure dedicated to wildlife conservation.

The bridge initiative has therefore achieved both ecological and social impact, proving that simple, well-placed interventions can significantly improve the daily survival chances of an endangered primate.

Objective 2: Conservation Education through Merdeka Mengajar

Planned Activities

The second major objective of this project was the integration of conservation education into the Indonesian national curriculum. Due to our long-term education and outreach efforts, the Little Fireface Project was given the opportunity to upload materials to Merdeka Mengajar, a new national

platform that provides teachers with resources to deliver lessons across a wide range of subjects. The aim was to create an online conservation module tailored to primary school children, freely available nationwide, that could foster awareness and inspire future generations to value biodiversity.

The planned activities involved designing a structured education programme, translating it into Bahasa Indonesia, and piloting it with local schools. A crucial objective within this initiative was the training of teachers at participating schools, ensuring that they were equipped not only with the lesson materials but also with the confidence to deliver them effectively.

Methods

A 16-week curriculum was developed in English, combining classroom-based learning with practical activities that encouraged children to engage with nature directly. Lessons were crafted to be age-appropriate, interactive, and rooted in local ecological knowledge. Once the curriculum was completed, it was translated into Bahasa Indonesia to ensure it was fully accessible to teachers and students.

Teacher training sessions were carried out in six schools across West and Central Java. These sessions introduced educators to the structure of the curriculum, the teaching methods used in it, and strategies for integrating conservation into their broader classroom practice. Teachers were also supported in setting up Nature Clubs within their schools by providing them with activity booklets containing ideas such as tree planting, art sessions, and outdoor learning to encourage continued engagement in conservation activities after the completion of the curriculum. To further support the Nature Club activities, we created a WhatsApp group, where teachers from different schools could exchange experiences, share challenges, and receive ongoing support from the project team.

Results

Ultimately it was not possible to upload the curriculum to the Merdeka Mengajar online platform during the reporting period due to major changes in the Indonesian government, the team instead produced printed education packs and delivered them directly to schools through in-person training sessions (Fig. 4). This approach ensured that teachers had access to the full 16-week curriculum and were guided in how to use it effectively. Of the six schools where training was delivered, three adopted the curriculum in full during the reporting period. Teachers reported positive responses from children, who engaged enthusiastically with the lessons and activities. The establishment of Nature Clubs provided a platform for extending learning beyond the classroom, with students taking part in activities such as tree planting and nature walks. The WhatsApp group proved to be an effective support system, allowing teachers to ask questions in real time and to learn from one another's experiences. This created a peer network that has helped sustain motivation and confidence among educators.

Impact

The integration of conservation content into Merdeka Mengajar is a major step forward in securing environmental awareness a place in the national education system. By providing structured, tested, and locally relevant materials, the project has created a resource that can be scaled up across Indonesia. The early success in the pilot schools demonstrates the feasibility of the approach and highlights the enthusiasm of both teachers and students for conservation education.

The establishment of Nature Clubs and online teacher support mechanisms ensures that the programme is not a one-off intervention but rather a platform for ongoing engagement. By instilling

conservation values in children at an early age, the project contributes to the cultivation of a new generation that views biodiversity protection as integral to community wellbeing.

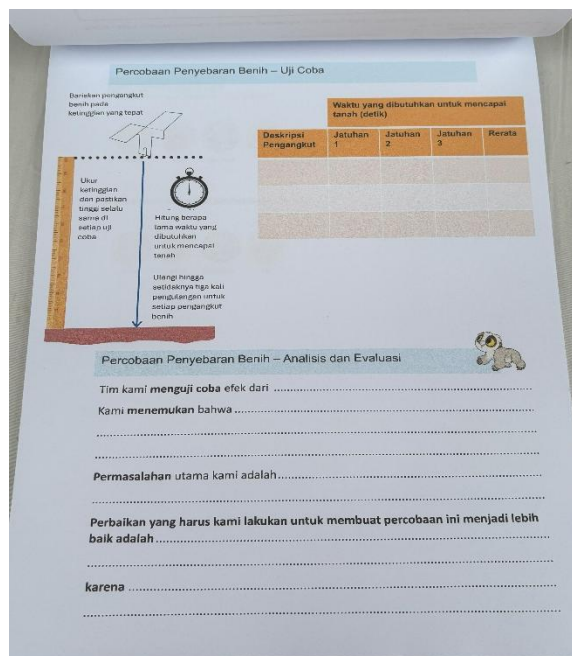
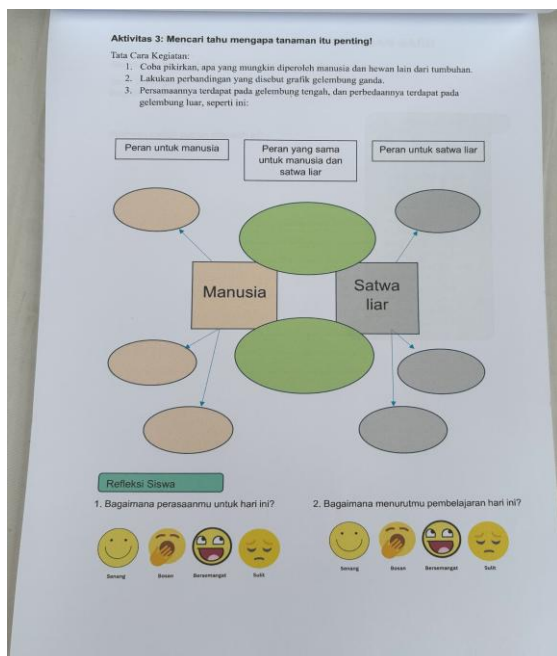


Fig. 4: Select activities from the printed Merdeka Mengajar curriculum activity packs

Conclusion

The project achieved its central aims of combining practical conservation interventions with education initiatives. The canopy bridges delivered measurable ecological benefits, enabling safer and more efficient movement for slow lorises, while the education programme embedded conservation values into primary school classrooms and created systems for sustained engagement. Together, these components demonstrate the importance of addressing conservation challenges from both ecological and social perspectives.