An Introduction to Addressing Linear Transportation Infrastructure in Asian Elephant Landscapes

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Introduction and context

The rapid expansion of linear transportation infrastructure (LTI) in Asia – roads, railways, and canals – if not developed sensibly, has the potential to continue to further impact elephant landscapes causing increased direct mortality as well as habitat loss and fragmentation. Also, of concern, are the adverse impacts of expanding LTI on ecological connectivity and wildlife movement. All of these impacts, if poorly addressed, will exacerbate human-elephant conflict.

To address these concerns, the International Union for the Conservation of Nature (IUCN) had two of its groups – the Asian Elephant Specialist Group under its Species Survival Commission, and the Connectivity Conservation Specialist Group's Transport Working Group under its World Commission on Protected Areas, jointly form the Asian Elephant Transport Working Group (AsETWG) to address LTI issues in Asia's elephant landscapes.

The first product of the AsETWG's efforts was the publication of an introductory report that summarises the issues, policies, practices and available resources surrounding this subject. At the end of the report are 10 recommendations the experts hope will help to further address elephant- LTI conflict. Entitled, Protecting Asian Elephants from Linear Transport Infrastructure, the Asian Elephant Transport Working Group's Introduction to the Challenges and Solutions, or the Asian Elephant LTI Primer, for short, was published by the IUCN in 2021 (Fig. 1). It will be followed by a second publication, currently in production, that will be a handbook on how to effectively mitigate roads and railways in elephant landscapes.

Impacts of linear transport infrastructure

The report introduces the reader to the various direct and indirect impacts of roads, railways and canals. Such impacts include morality, aversion, movement barriers, sensory disturbances, chemical effects, habitat loss and fragmentation, and attractants. Some of these impacts by roads are illustrated in Figure 2 in the document.



Figure 1. The cover of the first publication by the IUCN's AsETWG.



Reducing Asian elephant – transport conflict

Another section of the document is dedicated to a variety of tools that are available to diminish the impacts of transport systems on elephants. They range from published guidelines describing safeguards for biodiversity for LTI, as well as policies and laws developed by Asian countries.

Another section reviews the mitigation hierarchy and emphasises the need to practice avoidance either by route selection or to forgo LTI development if it is too impactful.

It also has a chapter dedicated to promising new technologies, such as animal detection systems. These technologies have been poorly studied regarding their ability to reduce train and vehicle strikes of elephants and many are in the early stages of research and development.

Case studies of highway and railway mitigation measures

Although there were very few projects to draw upon for case studies, the report provides some early examples of mitigation measures that were implemented for highways or railways to protect elephants in Asia. Seven case studies are highlighted from five different range states, giving the reader an opportunity to review some of the first efforts on the continent.

Recommendations for future endeavours to protect elephants from LTI

Lastly, the final section of the IUCN's introduction to reducing LTI conflict with Asian elephants enumerates future steps to be taken to facilitate improvement in policy, practices and research. The experts emphasise avoidance as a key strategy, push for the adoption of an agreed upon nomenclature for wildlife crossing structures used for mitigation to reduce confusion (e.g., viaducts, flyovers, bridges, overpasses, underpasses) and make other suggestions to improve various technical aspects of LTI mitigation. Other areas covered in their advice include economics, research and the need to develop and support a professional network across the range states.

Citation

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Protecting Asian Elephants from Linear Transport Infrastructure: The Asian Elephant Transport Working Group's Introduction to the Challenges and Solutions

AsETWG (Asian Elephant Transport Working Group); IUCN WCPA Connectivity Conservation Specialist Group/IUCN SSC Asian Elephant Specialist Group.



Figure 2. Summary of some key direct and indirect impacts of a highway in an elephant landscape.