Internalizing Environmental Costs of Infrastructure

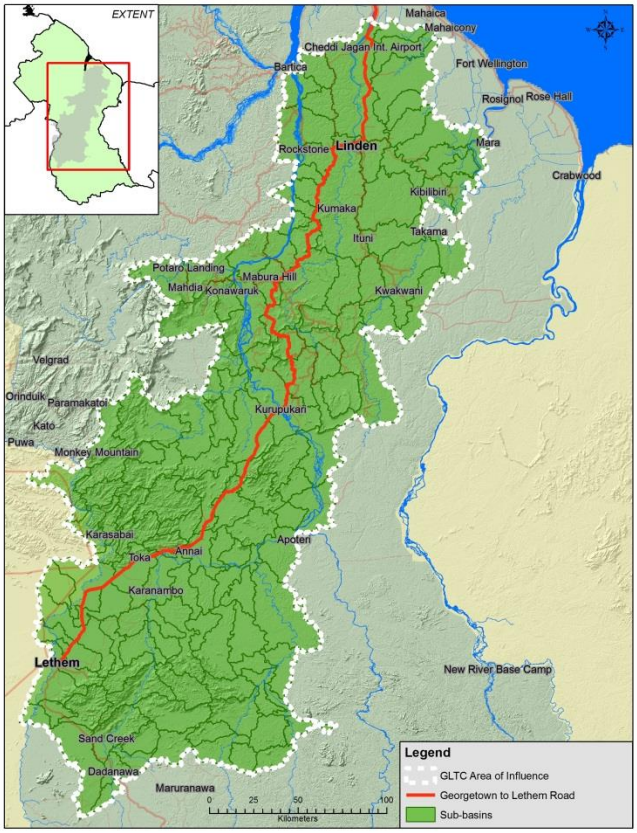
Introduction

Infrastructure, particularly for transportation and power generation, is necessary to realize improved human wellbeing. However, the potential environmental costs of these essential investments are often not factored in their design, construction and operation, leading to sometimes costly consequences (Vieira, Moura, & Manuel Viegas, 2007). This is especially the case in developing countries, like Guyana, where expansion in energy and transportation infrastructure, central to catalyzing economic growth, is not associated with sufficient information to make objective tradeoff decisions regarding environmental costs and benefits of such investments.

Biodiversity and Ecosystem Services Assessment of the Georgetown to Lethem Road

As part of the pre-investment studies for upgrade of the 553 kilometer road linking Georgetown to Lethem on Guyana's border with Brazil (Figure 1), Conservation International Guyana (CI-Guyana) conducted an assessment to quantify potential direct and indirect environmental impacts of the project (CI-Guyana and CI, 2014). The project contains the only unpaved section of road connecting Manaus – Brazil's eleventh largest city – and the rest of northwestern Brazil to the Atlantic coast, and has significant importance to both Guyana and Brazil. The study undertook a broad-scale rapid biodiversity and ecosystem services assessment to help identify and manage risks and potential impacts on ecosystem services and biodiversity that can result from the road upgrade (CI-Guyana and CI, 2014). Recommendations for addressing these impacts through application of the mitigation hierarchy – avoidance, minimization (mitigation), rehabilitation and offset (Figure 2) – were developed, and economic benefit-cost analyses were conducted for better informed decision making regarding the project.

Figure 1: Map showing the alignment of the Georgetown to Lethem road and its associated area of influence (CI-Guyana and CI, 2014).



Results/Outputs

The study identified a number of key biodiversity features and ecosystem services that require special attention to ensure that the road upgrade does not negatively affect them in irreversible ways. The most significant direct impacts identified were loss of wildlife through road-kill, hunting and trapping, and the clearing of forest and savannahs. The most important indirect impact identified was deforestation and other ecosystem changes that result from various land uses the upgraded road might induce. The assessment also determined that approximately US$ 12.4 million in annual REDD+ payments could be at risk and other quantifiable values could be lost if the

deforestation and other impacts were not addressed (CI-Guyana and CI, 2014). A number of measures to address the potential impacts, particularly deforestation, biodiversity loss, and loss of freshwater quality and quantity were recommended. It was concluded that implementation of the recommended measures is justified given the magnitude of the cost of these impacts.

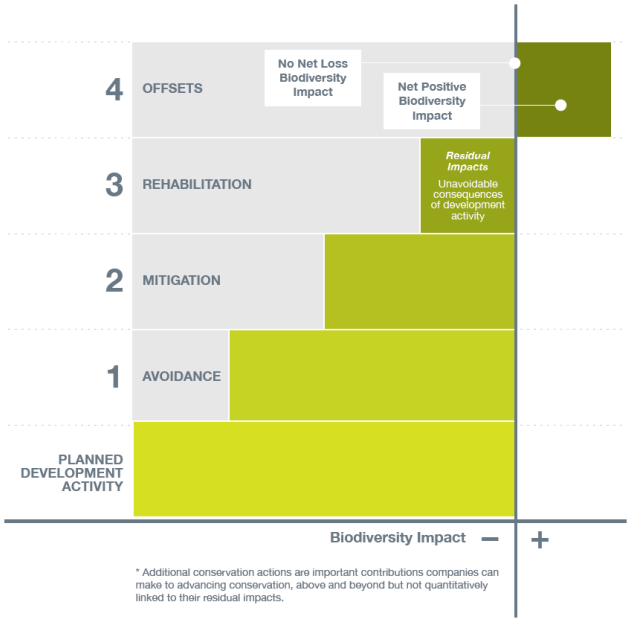
Challenges and Lessons

Rapid broad based assessment of the potential environmental costs of development projects in their design phase can be of tremendous value to minimising their environmental costs. This is true even in situations of data scarcity, as in the case of Guyana. Studies of this nature can reduce investment costs of projects by better identifying areas where more detailed studies are required. Delimitation of areas of influence of projects using ecosystem services is a good approach to fitting infrastructure more sustainably into landscapes. The quantification and valuing of likely direct and indirect impacts of infrastructure in the design phase also provide an effective means of internalizing and minimising their environmental – and potentially construction – costs.

Conclusion

This study demonstrated an effective means of internalizing and minimising the environment costs of development projects. Its approaches and findings can be of great value in improving requirements for impact assessments and compensation for impacts.

Figure 2: The Mitigation Hierarchy (Canter-Weikel, Betre, Armstrong, & Wells, 2013).



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