SMART INFRASTRUCTURE: IMPROVED SOCIAL AND ENVIRONMENTAL OUTCOMES THROUGH CONSERVATION ECONOMICS

Energy and transportation infrastructure are essential backbones of economic development, augmenting competitiveness of economic activities and increasing access to healthcare, education and other services. However, traditional large-scale energy & transportation infrastructure also flood, fragment and induce conversion of ecosystems, resulting in the loss of biodiversity and ecosystem services worth millions of dollars.

Therefore, there is an imminent need to balance infrastructure development with the conservation of healthy ecosystems for short and long-term social, economic and environmental well-being. To achieve this it is necessary to better understand the economic and ecological trade-offs of specific projects and policies, asses alternatives, better share and discuss that information early in the decision making process, establish clear policies for mitigation and compensation of environmental and social impacts, and have **financial incentives** in place to ensure compliance with those policies.

Central to CSF´s Smart Energy + Transportation Infrastructure program is providing training and technical support to conduct and evaluate **comprehensive economic Cost-Benefit Analysis (CBA)** of infrastructure projects and policies. Comprehensive CBA in this context refers to analysis that assesses the economic efficiency of proposed investments by comparing their financial, social and environmental costs to their benefits. Included in these analyses are "external" costs and benefits, which are neither borne nor received by project developers. These include change in quantity and quality of water or local food sources like fish, as well as globally important services like carbon sequestration. Furthermore, this type of CBA enables the analysis of costs and benefits from the perspective of multiple groups of actors, including local communities, municipalities, companies, and countries.

Using this approach, CSF and partners have found that multiple planned roads that are worrying for environmental reasons are also economically inefficient. Some are simply too remote to generate enough economic activity to justify their costs. In other cases, we have identified alternative routes to those originally planned that do a better job of meeting both development and environmental objectives. Finally, where planned roads will indeed drive economic activity outweighing costs, CBA can be used to identify cost efficient strategies for mitigating undesirable impacts.

Likewise, through the analysis of hydroelectric projects with large negative environmental and social impacts, CSF has shown how conservation economics tools can be used to distinguish projects with poor economic performance, sometimes due to optimistic assumptions about costs, price or engineering parameters, and sometimes due to the scope of environmental impacts themselves.

Given the importance of proactive planning at the national and regional scales to ensure that infrastructure development proceeds in the right places to maximize economic returns considering financial, environmental, and social benefits and costs, CSF has developed two planning tools. The **HydroCalculator** allows users with basic project information to perform and share simple economic feasibility analysis comparing multiple hydroelectric projects, as well as calculate basic environmental and social indicators. The **Road Filter** allows users to evaluate road project risks by allowing the use of different weights to the importance of economic, social, environmental and social criteria related to major roads. This tool is currently focused on the Amazon.

Please visit **CSF Smart Energy + Transportation Infrastructure Page** for more case studies, tools, and news.

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