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Review of global development trends in road and rail sectors and challenges for biodiversity conservation

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Biodiversity Conservation and Infrastructure Development

Conflicting Scenarios*

- A United Nations report states '*Investments in infrastructure are crucial to achieving sustainable development and empowering communities*'
- We know that all ancient civilizations expanded and fell, in part due to the imbalances they created in the natural habitats and ecosystem that fed and fuelled them…
- Conservation of biodiversity underpins that no long term development can be envisaged unless the diversity of natural habitats and ecosystems is systematically included in the development, industrial and innovation policies….

** CBD-CoP 14, 2017 (WWF-IISD Report)*

Road Developments…

Key Facts

- 21st century is witnessing unprecedented expansion of road network. Atleast 25 million km of new roads are expected world wide by 2050 – enough to circle earth over 600 times.
- 90% of all road construction is occurring in developing nations having megabiodiverse status
- Road network is causing species and habitat loss and environmental degradation

VIDEO
Hidden Challenges Trans-Papuan Economic Corridor

VIDEO
Development dangers for Borneo

Source: www.global-roadmap.org

more…

Road Developments…

- Roads ecology was mentioned in scientific journals nearly 20 years ago by Forman, 1998 and Forman and Alexander, 1998
- This discipline is to understand the interactions among roads, traffic and the surrounding environment

Our Learning objective

- Build capacity for *'development of ecologically sound; economically efficient and socially equitable infrastructure'*

more…

Road Developments…

- Roads have diverse and systematic effects on many aspects of terrestrial and aquatic ecosystems

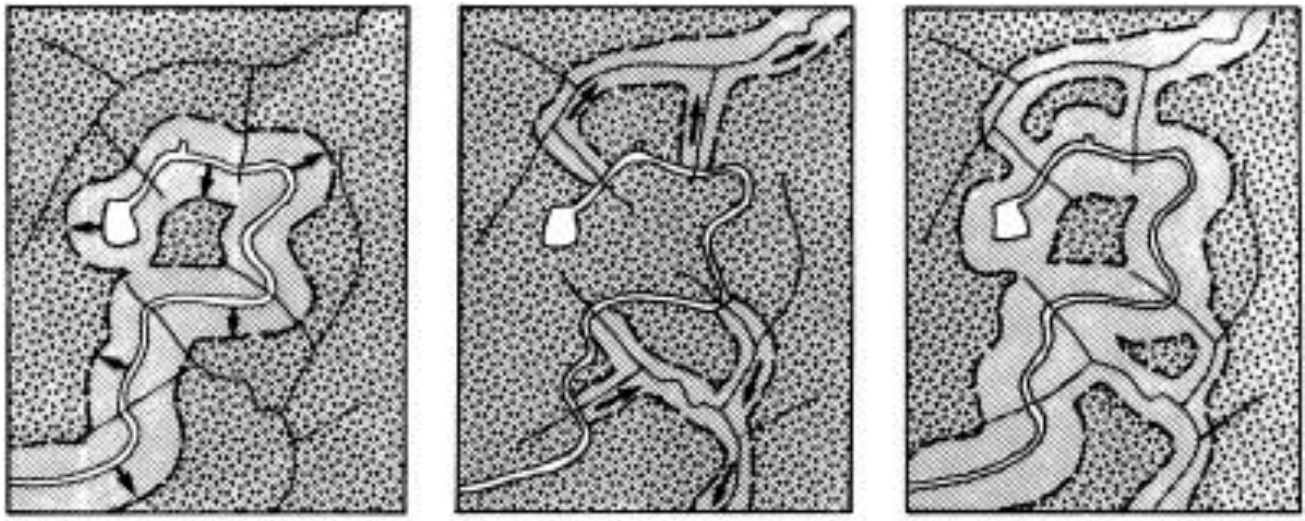
more…

Key Ecological Impacts of Roads

- Increased injury/ mortality from collision with vehicles
- Alteration in both physical and chemical environment
- Increased habitat and population fragmentation
- Spread of Invasive/ Exotic species
- Modification of animal behaviour
  - *Home range shifts*
  - *Altered movement patterns*
  - *Altered reproductive success*
  - *Altered escape routes*
  - *Altered physiological state*

Hyperfragmentation*

- A term to describe the multidimensional view of ecological fragmentation and habitat loss that emerges, when the consequences of roads in terrestrial and aquatic ecosystems are considered simultaneously
- It is the result of a spatial footprint of ecological effects that propagates across the landscape differently in freshwater and aquatic ecosystems than in terrestrial systems



*Source: *Trombulak and Frissell, 2001*

Trends in Global Passenger and Freight Travel*

- Over the next four decades, global passenger and freight is expected to double over 2010 levels, with non-OECD regions accounting for nearly 90% of the global travel increase
- Over 3,35,000 rail track kilometers will be added by 2050
- Global transport spending on rail, road, BRT, HSR and parking is expected to reach nearly USD 120 trillion by 2050 or roughly USD 3 trillion per year over the next 40 years.

Source: OECD/ IEA 2013

Challenges in Rail Transportation…

- Fewer studies have been undertaken to evaluate the biodiversity impacts including consequences of vibration and noise of railways and efficacy of mitigation measures.
- Better estimates of wildlife mortality on rail tracks are needed
- Need better understanding of how barrier and fragmentation effects operate in the context of railways
- Need to know how rail-induced mortality translates into population declines
- How to develop site-specific and species-specific mitigation measures for rail impacts

The Way Ahead…

Mainstream biodiversity in infrastructure planning throughout the infrastructure development cycle through

- **Pragmatic assessment of infrastructure needs (Retrofitting *viz-a-viz* New)**
- **Integrating environmental and social safeguards**
- **Adopting master planning approaches**
- **Investing in nature-based infrastructure development**

The Way Ahead…

- **Build capacity of a range of stakeholders to understand the need, rationale and process of designing, implementing and monitoring measures that help to harmonize conservation and development.**

VIDEO

Connectivity_CLLC_
and_partners


Dubi Shapiro
Nature Nurtures...
Conserve Nature
Together we can build a frame work that
nourishes and not depletes our natural assets...
Thank You !