

# WORKSHOP REPORT:

## Designing Linear Infrastructure for Sustainable Outcomes

12-14 February 2020  
Nairobi, Kenya



Hosted by: African Wildlife Foundation



**AFRICAN  
CONSERVATION  
CENTRE**



## Summary

Across Africa there is an unprecedented increase in linear infrastructure development including roads, railways, pipelines, and transmission lines. Although infrastructure development is good for markets, economies, and human wellbeing in most cases, it can have significant negative impacts on natural ecosystems. Functioning ecosystems provide numerous services, such as water storage and filtration, which are critical to sustaining the health and wellbeing of African communities and economies. This workshop explored ways to make linear infrastructure development more ecologically sustainable. Presentations and discussions focused on ways to plan, design, and build infrastructure to avoid, minimize, and mitigate environmental impacts and promote both sustainable ecosystems and socio-economic development.

## Introduction

Economic development across the African continent is currently focused around “development corridors”, made up of urban, coastal and agricultural nodes as well as linear features such as highways, railroads, pipelines, and energy transmission lines. The ultimate goal of these infrastructure investments, as per the African Union’s Programme for Infrastructure Development in Africa (PIDA), is to promote integration, socioeconomic development, and cooperation. Across the continent, there are over 30 development corridors in various stages of planning and implementation. In total, these development corridors will have a massive footprint, traversing 38 African countries, measuring over 53,000 km in length, and transecting protected areas and other areas with high conservation and cultural value.

These roads, rails, and energy infrastructure will provide Africa’s growing human population, expected to increase by 1.3 billion people by 2050, with new socio-economic opportunities for growth and prosperity. However, these types of linear infrastructure are also associated with negative impacts on natural habitats, ecosystem services, and biodiversity. Impacts include: habitat loss, degradation, and fragmentation; isolation of previously connected wildlife populations and migrations; wildlife mortality due to collisions; introduction of invasive species, and providing legal and illegal access to natural resources resulting in increased pressure from mining, harvesting of forest products, and poaching. Combined, these impacts will have implications on the ability of ecosystems to provide the services on which people and economies depend.

Historically, conservation efforts have been focused on protected areas and individual species conservation, but through research and advancements of our understanding of ecosystem functions and wildlife population dynamics over the past few decades, that approach is no longer sufficient. Isolated patches of habitat, such as protected areas, are not sufficient to maintain wildlife populations. In Kenya, for example, over 65% of large wild herbivores rely on habitat outside of protected areas either permanently or seasonally. Expansion of human activities has created shifts in land-use, and caused widespread habitat loss and fragmentation, in some cases increasing human-wildlife conflict, and wildlife population declines. Maintaining and restoring habitat connectivity within and between protected areas and other core habitat areas is critical to maintain healthy resilient ecosystems and wildlife populations.

In many countries across Africa biodiversity forms the basis of the tourism industry, with people traveling from all over the globe to experience Africa’s unique, diverse, and charismatic array of wildlife and landscapes. In Kenya, tourism has contributed 10%, or approximately \$6 billion to the Kenya GDP, and other countries have a similar revenue. Both wildlife populations and accompanying infrastructure development are major economic drivers of revenue and employment within the tourism industry. Infrastructure development is key to enabling tourism development and revitalizing economies. Therefore, balancing infrastructure development implementation with natural processes and the needs of ecosystems is a high priority so both sustainable growth and protection of natural assets can occur simultaneously.

Africa's development corridors are primarily funded through bilateral and multilateral investment, with development finance institutions playing a major role. Most of these institutions have existing and robust environmental and social safeguard policies, however, issues related to data availability and access, minimal cross-sectoral dialogue, and limited access to best practices/effective mitigation solutions affects the quality of planning and implementation. Effective environmental policy implementation at the governmental level is similarly hindered by these issues and in a context in which the pace and scale of developments can overwhelm existing capacity.

This workshop was therefore designed as a step towards strengthening skills, and cross-sectoral communication/coordination as an essential foundation for designing linear infrastructure for sustainable outcomes.

## **Event Details:**

From 12 to 14 February 2020, nearly 70 participants from over 5 countries gathered for a workshop in Nairobi, Kenya to advance ecologically-friendly linear infrastructure practices on the African continent. Africa is currently experiencing an explosion of development, with the number and extent of roads, railways, and transmission lines rapidly expanding. In order for this development to result in a net benefit to the economic and social well-being of Africa's citizens, measures must be taken to ensure that road, railway, and energy transmission infrastructure is carefully designed to avoid, minimize, and mitigate damage to the ecological and cultural resources on which both people and the economy depend. Workshop participants were from diverse backgrounds and represented a variety of stakeholders including: industry practitioners, agencies, conservation and community groups, universities, and multilateral financial institutions.

The purpose of the workshop was to:

1. Increase the understanding of the ecological impacts of linear infrastructure (such as roads, railways, power lines, and fences) and their related economic implications;
2. Advance the design and implementation of ecosystem-friendly solutions for linear infrastructure in Africa;
3. Catalyse coordination and collaboration between government agencies and their partners.

## Day One: “The Big Picture”- Economic and Ecological Implications of Linear Infrastructure

Day one of the workshop was focused on the ecological and economic implications of linear infrastructure. The day started with presentations on “The Big Picture: ecological connectivity and what it means for ecosystem services, economics, and climate change adaptation”, followed by talks on both transport (roads and rails) and powerline/energy transmission infrastructure. Then an expert panel discussed the status of ecological connectivity, linear infrastructure, and related policy. This was followed by a breakout session, where all workshop participants were asked to gather in small groups (around 12 per group) to explore and record what they felt were the biggest challenges and threats of linear infrastructure in Africa.



### ❖ **Key Results from Breakout Session 1:**

#### *“Exploring the Threats and Challenges of Linear Infrastructure”*

- Lack of trust, coordination, and communication between and across sectors
- Rapid speed of development – stakeholders feel it is impossible to keep up
- Lack of involvement of all stakeholders at the planning stage! Don’t just ask for comments on plans that are already through the design and budget stages when changes are less likely to be made – all stakeholders need to be part of the planning and development of projects from the beginning to ensure an efficient and effective process
- Current EIA process shortcomings: political influence, corruption, funding, capacity, compliance, and enforcement
- No reliable central repository on biodiversity data for agencies and decision-makers; lack of data sharing among agencies and organizations; need adequate data and analyses to evaluate the impacts of projects and make appropriate mitigation recommendations
- Poor implementation of proposed mitigation; standards from financial institutions need to be more robust and assured “on the ground”





The afternoon included presentations, expert panel discussions, and Q & A sessions with representatives from financial institutions such as World Bank, African Development Bank (AfDB), International Finance Corporation (IFC), and United States Agency for International Development (USAID). These sessions provided an overview of financing considerations and performance standards for linear infrastructure projects from the perspectives of major financiers, giving workshop attendees invaluable insight into the processes of these institutions and how major projects are selected, planned, and assessed. Day one wrapped up with presentations introducing high-level overviews of mitigation strategies to increase economic and ecological resiliency for both the transport and energy sectors.

## **DAY TWO: “Practical Solutions”- Efforts to Address Ecologically Friendly Linear Infrastructure**

On day two workshop participants dug deeper into practical solutions to plan and implement ecosystem-friendly infrastructure. The morning began with a panel discussion on “Efforts to address ecologically-friendly linear infrastructure” and continued with concurrent sessions for the energy and transportation sectors to focus on their respective challenges, potential solutions, and technical training on mitigation measures including case studies of best practices from around the world. In the afternoon, participants were again asked to engage in a Breakout Session, where smaller groups were asked to discuss and come up with their top opportunities/actions for implementing sustainable infrastructure development.

### **❖ Key Results from Breakout Session 2:**

#### ***“Identify Opportunities for Implementing Sustainable Infrastructure Development”***

- Building Relationships: develop an engagement strategy to build trust and increase coordination between and within sectors at a variety of scales (ministries, agencies, industry, finance, communities, conservation groups, etc.)
- Involve communities and other stakeholders at the beginning of project planning to avoid conflicts
- Create a diverse Task Force/Working Group/Network of Practitioners devoted to tracking and engaging on infrastructure projects

- Develop data sharing agreements and/or a data sharing platform for biodiversity and other ecological information to be used in planning and decision-making
- Build off successful models from other places; experiment and monitor to ensure/increase effectiveness and efficiency
- “Follow the Money”- work with financial institutions to create more robust and enforceable standard practices/guidelines to ensure that biodiversity and ecosystem services are not harmed by development projects

Day two wrapped up with an announcement that the second African Conference for Linear Infrastructure and Ecology (ACLIE) will be held in Kenya in 2021, and an invitation for all of the workshop members to get involved! Finally, participants developed a set of Next Steps and Action Items to continue to engage collaboratively on this topic and find practical solutions to ensure infrastructure development that promotes both economic and ecological well-being across the continent. These items included:

1. Creating a listserv of participants for future engagement
2. Developing a workshop report
3. Attending and contributing to ACLIE 2021
4. Identifying champions to support ACLIE/ develop a Task Force or Network of Practitioners
5. Celebrating Successes!



### DAY THREE: Fieldtrip

On Day Three a group of participants went on a field trip to do a site visit and on-site briefing of new (semi) parallel infrastructure in Salama (south of Athi River) with local experts. The infrastructure visited included the Mombasa highway, the standard gauge railway, a pipeline, powerlines, as well as a site along the routing of a prospective new super-highway. This site provided a perfect example to view and discuss cumulative impacts, planning and implementation processes, possible and existing mitigation measures, introduction of damaging invasive species along linear infrastructure during construction and operation, and issues related to community engagement in the planning process.



# WORKSHOP AGENDA

DAY ONE			
Wednesday, 12 February			
Time	Topic(s)	Lead(s)	Notes
8:30-9:00	Registration		Patrick Bergin Foyer
9:00-9:10	Welcome and Introductions	Lucy Waruingi (ACC)	Patrick Bergin Hall
9:10-9:20	Workshop Overview	Sarah Chiles (EL/GZT) and Elizabeth Fairbank (CLLC)	
9:20-10:00	Presentation 1 - The Big Picture: Ecological connectivity and what it means for ecosystem services, economics, and climate change adaptation <ul style="list-style-type: none"><li>Connectivity Conservation: an International Challenge</li><li>Transport Ecology: Science and Practice</li><li>Powerline and Energy Infrastructure</li></ul>	Melly Reuling (CLLC), Rob Ament (CLLC), and Lourens Leeuwner /Constant Hoogstad (EWT)	
10:00-10:30	Presentation 2 - Status of road ecology research in Africa: What do we know so far?	Wendy Collinson (EWT)	
10:30-10:45	BREAK: Coffee, tea, etc. will be served		
10:45-11:45	Panel Discussion 1 - Country perspectives: The state of ecological connectivity, linear infrastructure, and related policy <ul style="list-style-type: none"><li>4 – 6 case studies @ 5 min each</li></ul>	Lucy Waruingi (ACC),Amadou Matar Diouf (OMVG), Alex Ngari (Birdlife), Yohoannes Almaw (Ethiopian Electric Power)	Patrick Bergin Hall
11:45-12:30	Facilitated Breakout Session 1- Exploring the threats and challenges of linear infrastructure development in each country	Facilitated breakout into small groups	
12:30-1:00	Plenary Session 1 - Reporting and discussion of findings from breakout groups	Facilitator: Elizabeth Fairbank	

	1:00-2:00	LUNCH		Dining Room
FINANCING CONSIDERATIONS	2:00-2:20	Presentation 3 – Introduction to IFC Performance Standards	Conrad Savy (IFC)	Patrick Bergin Hall
	2:20-2:40	Presentation 4 - Reviewing MDB-financed projects: What happens when investments don't meet expectations?	Alexis Erwin (USAID)	
	2:40-3:00	Presentation 5 - Optimizing utility performance through improved wildlife management: The Partnership Model	Lourens Leeuwner/Constant Hoogstad (EWT)	
	3:00-3:30	Panel Discussion 2 - Financing Considerations for Ecosystem-friendly Linear Infrastructure	Edith Kahubire (AfDB), Robert Ochieng (AfDB), Jennifer Richkus (RTI International/EAEP), Chris Trimble (World Bank)	
INTRODUCTION TO MITIGATION MEASURES	3:30-4:00	Presentation 6 - If you can't avoid impacts, what's in the road and railway mitigation toolbox: Review of the effectiveness of mitigation measures and examples from around the world	Rob Ament and Elizabeth Fairbank (CLLC)	Patrick Bergin Hall
	4:00-4:30	Presentation 7 - A global overview of bird collision and electrocution mitigation measures for distribution and transmission lines	Lourens Leeuwner/Constant Hoogstad (EWT)	
	4:30-4:45	Wrap up day one	Lucy Waruingi	
	4:45-5:00	BREAK: Coffee, tea, etc. will be served		Dining Room



	DAY TWO	Thursday, 13 February		
	Time	Topic(s)	Lead(s)	Notes
	8:30-9:00	Registration		Patrick Bergin Foyer
	9:00-9:10	Welcome and Recap from Day One		Patrick Bergen Hall
	9:10-10:00	Panel Discussion 1 - Efforts to address eco-friendly linear infrastructure in Africa <ul style="list-style-type: none"><li>Endangered Wildlife Trust: Mitigation Study for Kruger National Park</li><li>Ewaso Lions and Grevy’s Zebra Trust: Mitigating the impacts of LAPSET</li><li>Save the Elephants: Prioritizing Locations for Crossing Structures Using GPS</li><li>Peregrine Fund: Mitigating energy infrastructure in Kenya</li></ul>	Wendy Collinson (EWT), Sarah Chiles (EL/GZT), Ben Okita (STE), Timothy Mathenge (TE Connectivity)	Patrick Bergin Hall
	10:00-10:15	BREAK: Coffee, tea, etc. will be served		Dining Room
**BEGIN TRANSPORT AND ENERGY SECTORS PARALLEL SESSIONS**				
TRANSPORT SECTOR PARALLEL	10:15-10:25	Introduction to Ecological Road Assessment	Rob Ament (CLLC)	Patrick Bergin Hall
	10:25-11:10	Presentation 1 - Data Needs for Ecological Road Assessments <ul style="list-style-type: none"><li>What data is needed?</li><li>Who will collect it?</li><li>When should it be done?</li></ul>	Wendy Collinson (EWT)	

	11:10-12:00	Presentation 2 - Pulling it all together: The utility of highway assessments <ul style="list-style-type: none"><li>• The role of transport ecologists</li><li>• The assessment process and the end result</li><li>• What a report looks like</li><li>• How to use it to set priorities and ultimately make decisions</li><li>• Cost benefit analysis</li></ul>	Rob Ament and Elizabeth Fairbank (CLLC)	
	12:00-1:00	Discussion – Transport sector policy: understanding and overcoming policy barriers	Lucy Waruingi and Rob Marchant (DCP)	
ENERGY SECTOR PARALLEL SESSION	10:00-11:00	Presentation 1 - Energy utility readiness assessment: Working towards the implementation of a wildlife management system <ul style="list-style-type: none"><li>• What data is needed?</li><li>• Necessary analysis?</li><li>• Report outcomes</li></ul>	Lourens Leeuwner/Constant Hoogstad (EWT)	Dining Room
	11:00-12:00	Energy sector session cont.	EWT	Dining Room
	12:00-1:00	Discussion - Energy transmission: understanding and overcoming policy barriers	EWT	
**END TRANSPORT AND ENERGY SECTOR PARALLEL SESSIONS**				
	1:00-2:00	LUNCH		Dining Room
FACING FORWARD	2:00-2:30	Plenary Session 1 - feedback on sectoral policy discussions	Facilitator: Lucy Waruingi and Lourens Leeuwner/Constant Hoogstad (EWT)	Patrick Bergin Hall
	2:30-3:15	Facilitated Breakout Session 1- Identify opportunities for implementing sustainable infrastructure development	Facilitated breakout into small groups	

	3:15-3:45	Plenary Session 2 - Reporting and discussion of recommendations from breakout groups	Facilitator: Melly Reuling	Patrick Bergin Hall
	3:45-4:15	Plenary Session 3: - Action items, priorities, and next steps	Facilitator: Rob Ament and Wendy Collinson	
	4:15-4:30	Wrap up, conclusions, acknowledgements and brief on field trip	Lucy Waruingi and Sarah Chiles	
	4:30-5:00	BREAK: Coffee, tea, etc. will be served		Dining Room

<b>DAY THREE</b>	<b>Friday, 14 February</b>	
7:30-8:00	Registration	Patrick Bergin Hall
8:00-8:30	Field site briefing	Peter Kibobi, Action for Cheetahs Kenya
8:30-10:30	Travel to Salama Field Site, south of Athi River	Departure in buses will be prompt
10:30-1:00	On site briefing on parallel infrastructure – highway, railway, pipeline, powerlines and cumulative impact	Action for Cheetahs Kenya, local stakeholders, EWT
1:00-2:00	Lunch	At local restaurant
2:00-4:00	Return to Nairobi	

**The workshop organizers would like to extend their appreciation to all participants for contributing their time, energy, and expertise to this innovative exercise, and look forward to future collaborations!**

**Participating Organizations include:**

Action for Cheetahs	Kenya Electricity Transmission Co. Ltd
African Conservation Centre	Konza Technopolis Development Authority
African Development Bank	Kenya Power and Lighting Company
APEC Consortium Ltd	LAPPSET Corridor Development Authority
Birdlife International	Ministry of Energy-Kenya
Born Free Foundation	Nature Kenya
CAEC Consortium Ltd	Peregrine Fund
Center for Large Landscape Conservation	Regional Centre for Mapping of Resources for Development
East African Wildlife Society	Research Triangle Institute
East Africa Energy Program	Rural Electrification and Renewable Energy Corporation
Endangered Wildlife Trust	Save the Elephants
Ethiopia Electric Utility	South Rift Association of Land Owners
Ethiopian Electric Power	TE Connectivity
Ewaso Lions	The Biodiversity Consultancy
Grevy's Zebra Trust	United States Agency for International Development
Indigenous Movement for Peace Advancement & Conflict Transformation	World Bank
Institute for Climate Change and Adaptation – University of Nairobi	World-wide Fund for Nature
International Finance Corporation	World Wildlife Fund- Kenya
KenGen	
Kenya Railway Corporation	