Executive Summary

State of the Apes

Infrastructure Development and Ape Conservation





CAMBRIDGE

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Introduction

Achieving the United Nations 2030 Agenda for Sustainable Development, and the Sustainable Development Goals (SDGs), adopted in 2015, will depend largely on the global human population's consumption and utilization of resources, and the ability of humanity to protect the earth's natural resources while simultaneously pursuing economic objectives. The aims of the Agenda, and particularly the emphasis on people, planet, prosperity, peace and partnership, depend on a balance of action across three dimensions: economic, social and environmental. However, investment in economic growth and prosperity does not always take into account the needs of the most vulnerable people, nor all the environmental impacts. Estimating accurate and appropriate costs of ecosystem services, as well as the costs of ecosystem degradation or destruction, is very difficult, and not always desirable. It is equally challenging to assess the time scale in which these costs need to be calculated, and thus to attribute responsibility to users regarding payment. SDG 9 commits UN member states to strike such a balance with respect to infrastructure. It calls on them to develop and facilitate sustainable, resilient infrastructure, including through regional and transborder development, with the aim of securing affordable, equitable access to staples and services, such as water, food, energy, transportation and economic opportunities for all people. In practice, however, developers of roads, dams and other large infrastructure projects often fail to consider their projects' negative impacts on both people and the environment.

Given the international push for infrastructure development and the burgeoning global population, this failure is taking on critical proportions. An estimated US$90 trillion in infrastructure investments are to be mobilized to meet the SDGs and the commitments of the Paris climate accord of 2016. Meanwhile, unsustainable consumption levels are expected to soar as the human population swells—from 7.6 billion today, to nearly 10 billion in 2050. This will inevitably increase demand for water, energy, food and other commodities. The drive to meet growing demand is increasingly being used to justify ever-deepening encroachment into locations that were once off-limits to infrastructure developers, such as protected areas and World Heritage Sites, areas that are home to indigenous populations, high levels of biodiversity, fragile ecosystems and/or endangered species, including apes. Indeed, the majority of ongoing and planned large-scale infrastructure projects are in biodiversity-rich developing nations, threatening critical habitats.

This volume of *State of the Apes* explores avenues for reconciling infrastructure development with ape conservation. In view of the significant role they play in maintaining tropical forests in Africa and Asia, the book presents great apes and gibbons as indicator species—or proxies—for diagnosing the effects of infrastructure development on the health of specific ecosystems, as well as biodiversity and the environment in general. In so doing, it identifies methods, tools and strategies for protecting habitats while reaching beyond the "do no harm" principle to ensure net environmental and socioeconomic benefits, including access to energy, markets and services.

Infrastructure Development in Ape Habitats

Global modeling exercises indicate that industrial activities will have disturbed more than 90% of African ape ranges and about 99% of Asian ape ranges by 2030—up from 70% in 2002, due to global and local pressures from agriculture, extractive industry and infrastructure development. In large part, these hikes reflect a worldwide boom in current and planned road construction. The International Energy Agency foresees the construction of an additional 25 million km of paved roads by 2050, with development agencies and governments expected to invest US$33 trillion. Almost 90% of the new roads are to be constructed in developing nations, including in areas that deliver vital ecosystem services and harbor exceptional biodiversity.

Often built to support larger fixed infrastructure projects, roads pose an enormous threat to biodiversity and ecosystems. This is not just from the direct threat through loss of forest cover and herbaceous vegetation, but also from the indirect threats brought by people, who use the increased access that roads provide. Increased human access to forests enables crop cultivation, hunting, pollution and the potential spread of disease.

Ape habitats are also being affected by the rapid growth of hydropower. Each year, the sector attracts about US$50 billion in global investment, such that leading analysts expect global capacity to increase by 53%–77% between 2014 and 2040. In ape ranges, planning is under way for the construction of hundreds of hydropower projects, all of which will require power transmission lines and road infrastructure. Six hydropower dams have already been installed in African great ape habitats, and another 64 are anticipated, along with 200 km of associated roads. In gibbon habitats across Asia, 55 dams are in operation, while 165 more are planned, along with 1,100 km of roads.

Justifications for road construction tend to focus on the provision of access or links to mining sites, energy-generating projects, wider transportation networks, ports and urban areas. Arguments for hydropower typically highlight dams as reliable sources of renewable energy and stress functions such as flood control and irrigation services. Infrastructure promoters often advance such claims while downplaying or concealing the harm their projects are likely to inflict on critical habitat and the people who depend on them. As discussed in selected case studies in this volume of *State of the Apes*, applicable environmental and social standards are often ignored or flouted in the name of political expediency or in pursuit of financial gain. In many cases, developers do not allocate

Arcus Foundation. 2018. *State of the Apes: Infrastructure Development and Ape Conservation*. Cambridge: Cambridge University Press.

Arcus Foundation. 2018. *Negara Kera: Pembangunan Infrastruktur dan Konservasi Kera*. Arcus Foundation, Cambridge UK.

Arcus Foundation. 2018. *La planète des grands singes: Le développement des infrastructures et la conservation des grands singes*. Arcus Foundation, Cambridge UK.

Download the book in English, Bahasa Indonesia, French, and at a later date, Chinese, at www.stateoftheapes.com.

the time, budget or real expertise required for the effective application of mitigation and avoidance measures, relying instead on biodiversity offsets as compensation for environmental degradation.

Impact on Apes

Infrastructure projects have direct and indirect impacts on apes, both of which can result in significant population declines. Even small declines can have catastrophic effects on numbers, as apes have slow reproductive rates and prolonged periods of dependency on maternal care.

Habitat encroachment and forest degradation, destruction and fragmentation directly affect apes in numerous ways. Apes depend on natural forests to provide them with the right quantity and quality of food, as well as nesting sites. All apes require some degree of connected canopy cover and each species has specific needs with respect to the territories within which they range. Roads, open spaces and reservoirs are barriers to movement. Crowding in limited spaces can lead to conflict, stress, starvation and death. Fragmentation of forest, therefore, can result in significant declines in numbers.

In some cases, the indirect impacts of infrastructure development are more severe than the direct ones. Such impacts on apes are generally associated with human settlements and access roads that emerge near project sites. They include habitat loss due to increased agricultural cultivation and logging in formerly remote areas; hunting by people seeking to supplement their food sources or income; and the illegal killing and capture of apes for sale or personal ownership; pollution of watercourses through human waste, chemicals and other contaminants; wounding and killing of apes in vehicle collisions; electrocutions as a result of contact with power lines; the transmission of human diseases to apes; and increased human–wildlife conflict, including fatal incidents.

Towards Sustainability

Key to ensuring that infrastructure projects meet the objectives of sustainable economic and social development, while also protecting and safeguarding the environment and biodiversity, is a greater emphasis on the engagement of all stakeholders at the earliest project stages and the adoption of integrated strategic plans that reconcile economic, social and environmental objectives, in line with the principles of good governance. To be effective, this approach requires the informed participation of local indigenous communities; the ratification and implementation of relevant laws and regulations; and the sanctioning of individuals and organizations for failure to comply with applicable legislation, standards and practices.

National and landscape-level land-use plans can serve to identify the least harmful spatial configurations for an infrastructure project—as long as its short-, medium- and long-term effects over time and across social, environmental and economic dimensions are well understood. Effective tools for gathering such information and minimizing adverse impacts are the mitigation hierarchy and, when carried out methodically and comprehensively, environmental and social impact assessments (ESIAs) and environmental and social management plans. Experts with specialized knowledge and experience are best placed to integrate all of these factors into cumulative and strategic environmental assessments, which can serve to inform project design and siting, but it is essential that the right, and appropriately qualified, experts are involved, as the expertise is often specialized, and well-designed assessments can help control financial and reputational risks to project backers and investors.

Avoiding the displacement and relocation of forest-dependent and forest-dwelling populations is essential to avoid loss of livelihoods, breakdown of communities, loss of land, access or assets, disruption of cultural practices and norms, resettlement-related expenses and grievances.

Specific actions that can help safeguard forest habitats, biodiversity and apes in specific include preserving or creating natural corridors between forest fragments; constructing aerial bridges across roads; and insulating power lines and transformers. For planning measures to be effective at a wider scale, however, they need to be underpinned by high-level policy decisions and practice. Such actions include: reducing the number, length and width of roads and ensuring that new roads are sited well outside of protected areas and away from critical habitats; siting large-scale hydropower projects so that they will not inundate protected areas and forest habitats; and investing in decentralized renewables for the provision of electricity. These have the potential to meet a significant proportion of Africa's rapidly growing energy needs.

Several emerging digital technologies have demonstrated real potential in the protection of habitats, biodiversity and the livelihoods of indigenous communities dependent on forests. These include near-real-time forest monitoring by satellite, 3D landscape modeling and advanced landscape mapping. Such tools can be applied on a project basis to a) limit the costs and risks of infrastructure development; b) facilitate strategic land use planning by identifying critical habitat areas; c) undertake cost–benefit analyses to ensure environmental and other costs do not outweigh economic and social benefits; and d) support conservation activities and law enforcement.

This volume of *State of the Apes* provides civil society, decision-makers, the media, researchers, and policy, finance and industry experts with information and tools designed to reconcile the goals of economic and social development with those of wildlife conservation. By recognizing and protecting critical habitats and areas of high conservation value—and by ensuring that these areas remain off-limits to development—governments, lending organizations and the private sector can help to sustain the ecosystems on which all life depends.





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Infrastructure development in Africa and Asia is expanding at breakneck speed, largely in biodiversity-rich developing nations. The trend reflects governments' efforts to promote economic growth in response to increasing populations, rising consumption rates and persistent inequalities. Large-scale infrastructure development is regularly touted as a way to meet the growing demand for energy, transport and food—and as a key to poverty alleviation. In practice, however, road networks, hydropower dams and "development corridors" tend to have adverse effects on local populations, natural habitats and biodiversity. Such projects typically weaken the capacity of ecosystems to maintain ecological functions on which wildlife and human communities depend, particularly in the face of climate change.

This volume—*State of the Apes: Infrastructure Development and Ape Conservation*—presents original research and analysis, topical case studies and emerging tools and methods to inform debate, practice and policy with the aim of preventing and mitigating the harmful impacts of infrastructure projects on biodiversity. Using apes as a proxy for wildlife and ecosystems themselves, it identifies opportunities for reconciling economic and social development with environmental stewardship.

This title is available as an open access eBook via Cambridge Books Online and at www.stateoftheapes.com.

"*State of the Apes* is one of those rarely seen, truly groundbreaking publications. Through keen analysis and vivid research, the series considers the survival of the world's ape species in light of both long-standing and newly emerging threats, such as mineral extraction, energy exploration, agricultural expansion and land conversion—forces that will continue to shape not only the future of wild apes, but also of all remaining blocks of wild habitat and the extraordinary biodiversity they contain. By examining the complexity of development forces across range states, *State of the Apes* offers an informed and realistic assessment of the prospects for ape conservation, as well as outlining the potential of policies that may spell the difference between destruction and survival of these extraordinary beings."

Matthew V. Cassetta
Facilitator, Congo Basin Forest Partnership
U.S. Department of State

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