



**USAID**  
FROM THE AMERICAN PEOPLE



# BUILD

**Biodiversity Understanding in  
Infrastructure and Landscape Development**

*Four years of success using economics to influence infrastructure  
development in support of biodiversity conservation*





# + SMART ENERGY TRANSPORTATION INFRASTRUCTURE

Energy and transportation infrastructure are essential to economic development, increasing productivity and efficiency in private and public sectors, and providing vital access to healthcare, education, and other services. However, large-scale infrastructure investments can transform landscapes and watersheds, unleashing irreversible, destructive damage to biodiversity and other ecosystem services that are worth millions of dollars, and disrupting community stability and human well-being in the process.

Projects' impacts vary considerably and their approval is usually dependent on small groups of public decision-makers. Large-scale infrastructure investments, especially in remote areas, are often economically inefficient and usually have unnecessarily large environmental and social impacts. These characteristics - variable quality, concentrated decision-making, economic flaws and design shortcomings - add up to a big conservation opportunity, one in which good economic analysis can be decidedly influential.

Conservation Strategy Fund (CSF) recognizes the need to balance transportation and energy infrastructure development with conservation of healthy ecosystems for the benefit of society in both the short and long-term. To achieve such a balance, understanding the economic and ecological trade-offs of projects and policies is essential. From an ecological perspective, it is clear that building new roads in pristine regions is bad. From an economic perspective, it is a matter of doing the numbers right to determine if a project's benefits are enough to cover its financial, social and environmental costs.

Having concrete numbers in hand allows stakeholders and decision-makers to assess alternatives, share and debate information about tradeoffs early in the process, establish clear policies for project approval, mitigation and compensation, and have financial incentives in place to ensure compliance with those policies.

CSF's approach to the unique challenges of infrastructure development centers on providing training and technical support to conduct and evaluate comprehensive economic cost-benefit analysis (CBA) of projects and policies. Comprehensive CBA refers to analysis that assesses the economic efficiency of proposed investments by comparing their financial, social and environmental costs and benefits. Included in these analyses are "external" costs and benefits, which are neither borne nor received by project developers. These include changes in quantity and quality of natural resources, such as water or local food sources like fish, as well as globally important services like biodiversity and 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, municipal governments, private companies, and society as a whole.

The International Energy Agency predicts that by **2050** we will have **60%** more roads than we did in **2010**. That's about **25 million** kilometers of new paved roads.

Using this method, CSF and partners have found that roads with troubling environmental impacts are often also economically inefficient. Some are simply too remote to generate enough economic activity to justify their costs. In other cases, alternative routes can do a better job of meeting both development and environmental objectives. CBA can also be used to identify cost-efficient strategies for mitigating any undesirable impacts. Likewise, through the analysis of hydroelectric projects, CSF has shown how conservation economics tools can be used to distinguish projects with poor economic performance, and ultimately promote more sustainable decision-making.

# ACKNOWLEDGEMENTS

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## INTERNATIONAL

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Cambridge Resources International Inc.  
Wildlife Conservation Network  
Inter-American Development Bank  
International Union for Conservation of Nature  
Smithsonian Conservation Biology Institute  
Center for Latin American Studies, University of Florida  
International Rivers

## ANDES AMAZON

### ***Brazil***

Instituto de Pesquisa Ambiental da Amazônia  
Avina Foundation  
Instituto Socioambiental  
Imazon  
Insituto Centro de Vida  
Idesam  
The Nature Conservatory  
Associação O Eco  
Internews  
Comissão Pró-Índio do Acre  
SOS Amazônia  
Acre state government  
National Indian Foundation  
Pontifícia Universidade Católica  
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Munudurku leadership

### ***Peru***

Peruvian Environmental Ministry  
Peruvian Society for Environmental Law  
Initiative for Conservation in the Andean Amazon  
Grupo de Análisis para el Desarrollo  
Grupo de Monitoreo - Pucallpa  
Comunicadores Indigenos – Pucallpa  
Ucayali Regional Government  
Servico Nacional de Áreas Naturales Protegidas por el Estado  
Instituto del Bien Comun  
Inambari monitoring group  
ECOCIENCIA Ecuador  
Grupo FARO Ecuador  
SENPLABES Ecuador  
ECODESICION Ecuador  
Conservation International

## ALBERTINE RIFT

### ***Democratic Republic of Congo***

L'École Régionale post-universitaire d'Aménagement et de gestion Intégrés des Forêts et territoires Tropicaux  
Parc National des Virunga  
Wildlife Conservation Society  
Avocats Verts – Democratic Republic of Congo

### ***Rwanda***

Rwanda Development Board Authority  
Rwandan Environment Management Authority

Wildlife Conservation Society

### ***Uganda***

National Environment Management Authority of Uganda  
Uganda Wildlife Authority  
Wildlife Conservation Society  
International Gorilla Conservation Programme  
Uganda National Road Authority  
Hoima District Government  
Bulisa District Local Government  
Kasese District Local Government  
Ministry of Finance, Planning and Economic Development of Uganda  
Ministry of Works and Transport of Uganda  
Ministry of Water and Environment of Uganda  
Ministry of Energy and Mines of Uganda  
Uganda Chapter of Poverty and Conservation Learning Group  
Advocate Coalition for Development and Environment  
Economic Policy Research Centre  
Environmental and Natural Resources Advisory Council  
STAR program Uganda

Makarere University  
Bwindi Mgahinga Conservation Trust

## HIMALAYAS

### ***Bhutan & Nepal***

Ugyen Wangchuck Institute for Conservation and Environment  
World Wildlife Fund  
Ministry of Physical Planning and Work of Nepal  
Ministry of Science, Technology and Environment of Nepal  
Ministry of Forest and Soil Conservation of Nepal  
Ministry of Physical Infrastructure and Transport Nepal  
Asian Development Bank  
World Bank  
South Asian Network for Development and Environmental Economics

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**BUILD** Biodiversity Understanding in Infrastructure and Landscape Development  
**CBA** Cost-benefit analysis  
**COP20** Conference of Parties 20  
**CSF** Conservation Strategy Fund  
**DRC** Democratic Republic of Congo  
**ELAW** Environmental Law Alliance Worldwide  
**GIS** Geographic Information System  
**HCT** HydroCalculator Tool  
**ICAA** Initiative for Conservation of the Andes Amazon  
**IGCP** International Gorilla Conservation Program  
**MINAM** Ministerio del Ambiente – Peru (Peruvian Ministry of Environment)  
**MW** Megawatt  
**NEMA** Uganda National Environmental Management Authority  
**SPDA** Sociedad Peruana de Derecho Ambiental (Peruvian Society for Environmental Law)  
**TNC** The Nature Conservancy  
**Ug-PCLG** Uganda Chapter of the Poverty and Conservation Learning Group  
**UNESCO** United Nations Educational, Scientific, and Cultural Organization  
**UNFCCC** United Nations Framework Convention on Climate Change  
**USAID** United States Agency for International Development  
**UWA** Ugandan Wildlife Authority  
**WCS** Wildlife Conservation Society  
**WWF** World Wildlife Fund

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In 2011, **Conservation Strategy Fund (CSF)** launched a comprehensive global initiative through the Biodiversity Understanding in Infrastructure and Landscape Development (BUILD) program of the **United States Agency for International Development (USAID)**.

The overall goal of CSF's BUILD program was to encourage and support the development of ecologically sound, economically efficient and socially equitable infrastructure policies and investment decisions. Recognizing the economic, institutional, cultural and legal barriers to the adoption of biodiversity-friendly infrastructure policies, we focused on leverage points that have the potential to bring about systemic change.

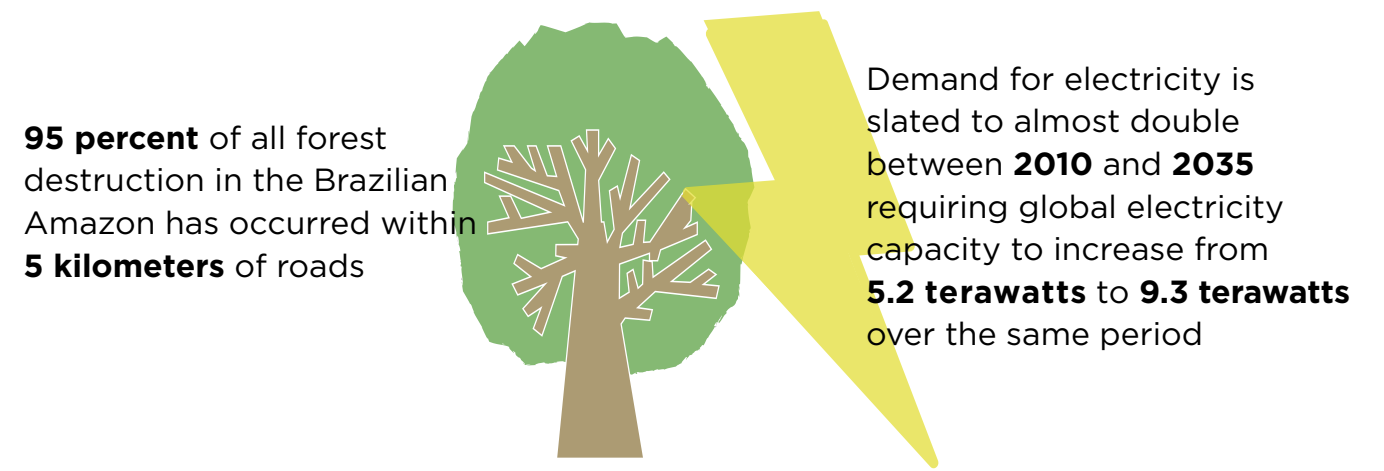
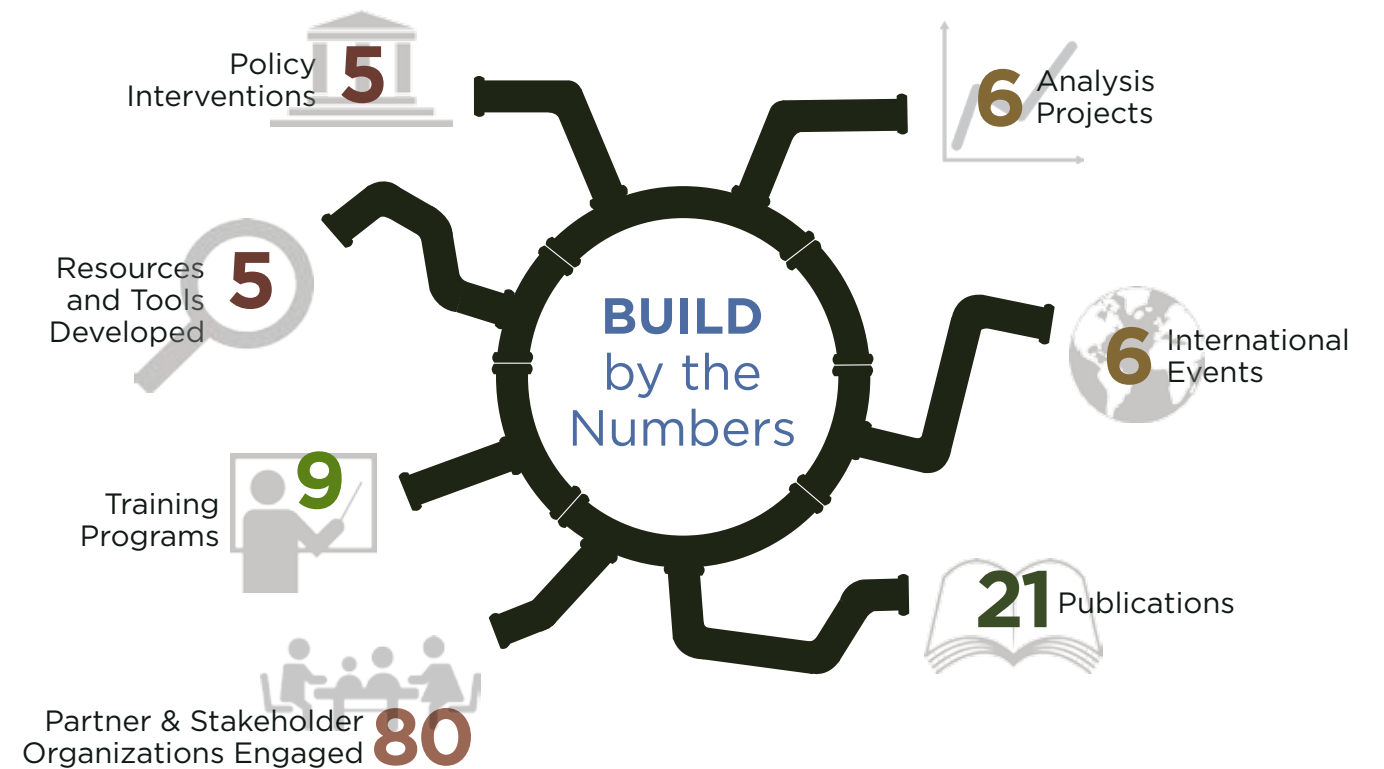
Over the four-year program, CSF focused on building capacity and spreading information to people working on environmental or policy issues related to infrastructure in three focus regions: the Andes Amazon, the Albertine Rift, and the Himalayas. These regions were selected from USAID's more extensive list of areas because of their high-biodiversity value, imminent threats posed by infrastructure, and potential for policy change.

CSF's diverse approach included extensive engagement with local stakeholders, government and civil society through tailored training programs to build economics knowledge and skills, in-depth analysis of key infrastructure projects, and technical support to develop better and innovative policies. We also gathered, tested, and disseminated information about infrastructure best practices globally, and presented the results of that research and our analyses at local, regional, and international events. A key component of our program was to develop a set of online, open-access economic analysis tools and resources that can be used to improve project and policy outcomes around the world.

CSF's commitment to outreach and communication was the glue that bound all of these specific activities together. We participated in regional infrastructure working groups, met with key local stakeholders throughout our analysis projects, convened national and regional policy forums, and participated in international conferences. We took every opportunity to share our results and promote balance between economic development and biodiversity conservation through smart infrastructure decisions.

In the following pages, we will shine a light on a few key moments in our BUILD story. In addition to these successes, we undertook many other activities in order to meet our program objectives; please see the Appendix for a full list.

*We believe that by improving selection, design and mitigation of key infrastructure projects, CSF's BUILD program had a direct positive impact on biodiversity conservation in the focus regions. In the long-term, BUILD has left a legacy of positive change by spreading economic knowledge, building technical skills and creating better policies, which together will improve infrastructure decisions in favor of biodiversity over the coming decades of economic growth.*



**BUILD's three key objectives:**

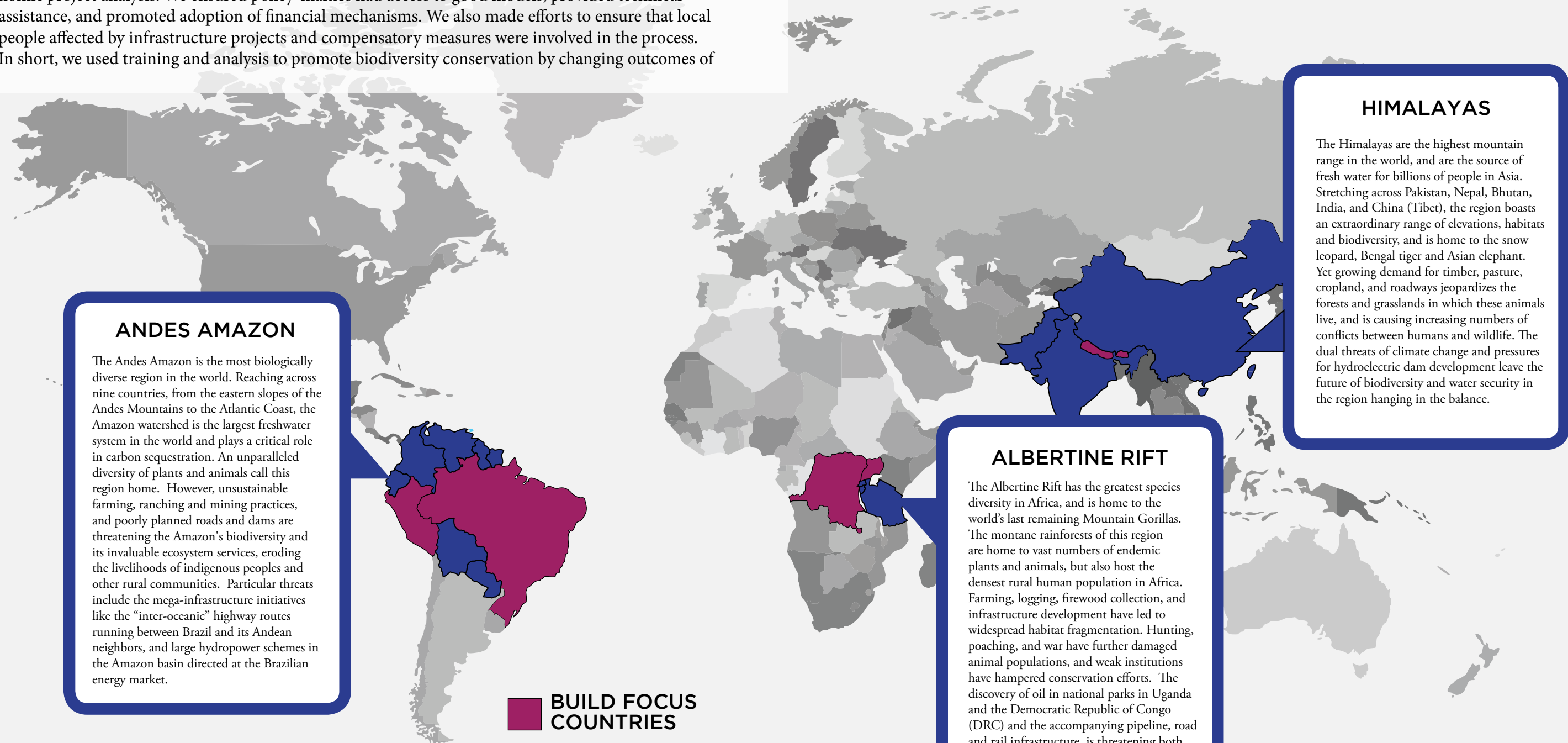
1. Government and civil society understand and discuss the real economic and ecological tradeoffs of infrastructure projects.
2. Clear policies and procedures exist to govern project selection, as well as mitigation and compensation.
3. Financial mechanisms are in place to maximize compliance with environmental requirements.



# GLOBAL STRATEGY

We used training and analysis to protect biodiversity by changing outcomes of infrastructure projects.

CSF's BUILD program took a comprehensive approach to the threats that infrastructure development poses to biodiversity. We improved access to information required to analyze and compare infrastructure options, and trained key people inside and outside government to perform environmental-economic project analysis. We ensured policy-makers had access to good models, provided technical assistance, and promoted adoption of financial mechanisms. We also made efforts to ensure that local people affected by infrastructure projects and compensatory measures were involved in the process. In short, we used training and analysis to promote biodiversity conservation by changing outcomes of



## ANDES AMAZON

The Andes Amazon is the most biologically diverse region in the world. Reaching across nine countries, from the eastern slopes of the Andes Mountains to the Atlantic Coast, the Amazon watershed is the largest freshwater system in the world and plays a critical role in carbon sequestration. An unparalleled diversity of plants and animals call this region home. However, unsustainable farming, ranching and mining practices, and poorly planned roads and dams are threatening the Amazon's biodiversity and its invaluable ecosystem services, eroding the livelihoods of indigenous peoples and other rural communities. Particular threats include the mega-infrastructure initiatives like the "inter-oceanic" highway routes running between Brazil and its Andean neighbors, and large hydropower schemes in the Amazon basin directed at the Brazilian energy market.

**BUILD FOCUS COUNTRIES**

## ALBERTINE RIFT

The Albertine Rift has the greatest species diversity in Africa, and is home to the world's last remaining Mountain Gorillas. The montane rainforests of this region are home to vast numbers of endemic plants and animals, but also host the densest rural human population in Africa. Farming, logging, firewood collection, and infrastructure development have led to widespread habitat fragmentation. Hunting, poaching, and war have further damaged animal populations, and weak institutions have hampered conservation efforts. The discovery of oil in national parks in Uganda and the Democratic Republic of Congo (DRC) and the accompanying pipeline, road and rail infrastructure, is threatening both wildlife and local communities.

## HIMALAYAS

The Himalayas are the highest mountain range in the world, and are the source of fresh water for billions of people in Asia. Stretching across Pakistan, Nepal, Bhutan, India, and China (Tibet), the region boasts an extraordinary range of elevations, habitats and biodiversity, and is home to the snow leopard, Bengal tiger and Asian elephant. Yet growing demand for timber, pasture, cropland, and roadways jeopardizes the forests and grasslands in which these animals live, and is causing increasing numbers of conflicts between humans and wildlife. The dual threats of climate change and pressures for hydroelectric dam development leave the future of biodiversity and water security in the region hanging in the balance.

# TIMELINE of ACTIVITIES

Global	Analysis	Outreach
Tools	Training	Policy

## BUILD program launches

- Information gathered on infrastructure information bottlenecks, infrastructure policy and innovations around the world
- Hydrocalculator upgrades launched
- Analysis of Inambari dam in Peru shows higher costs than benefits to Peruvian society
- Analysis of Pucallpa-Cruzeiro do Sul Road between Peru and Brazil begins
- In-house training in partnership with Peru's Ministry of Environment of Peru (MINAM) begins
- Economic Tools for Conservation and Infrastructure Planning course in Peru
- Economic Tools for Conservation and Infrastructure Planning course in Brazil
- Economic Tools for Conservation and Infrastructure Planning course in Uganda
- Roads Filter developed and launched
- Cost-benefit analysis of road in Bwindi Impenetrable National Park, Uganda, project launched with IGCP
- Cost effectiveness analysis of Oil Pipeline Construction in Albertine Rift project launched with WCS
- Analysis of environmental and biodiversity costs of planned oil pipeline in Albertine Rift project launched with NEMA & UWA
- Media Training delivered in Puerto Maldonado, Peru

- Final report completed by ELAW reviewing best practices and innovations in infrastructure policy in the 3 focus regions
- Participation in international symposium at James Cook University in Australia *"Impacts of Roads on Ecosystems & Livelihoods"*
- Draft Ministerial Resolution on environmental compensation circulated by the Peruvian Ministry of Environment for comments
- Results of the Inambari dam analysis in Peru presented to Inambari stakeholder monitoring groups and government officials in Peru and Brazil
- In-house training with MINAM continues with guided readings, weekly virtual discussions and 3 in-person workshops in Lima
- Economic Tools for Conservation and Infrastructure Planning course in Democratic Republic of Congo
- Data gathering & fieldwork continues in Bwindi & Albertine Rift
- Key stakeholder meeting with Hoima, Bulisa & Kasese District Governments in Albertine Rift
- Technical meeting on the Murchison Falls Oil Pipeline study (Uganda)
- Infrastructure Media Training in Brasilia *"Obras de infraestrutura na Amazônia: desafios da cobertura midiática e ferramentas de apoio e ao diálogo"*

- Presentation of the Peruvian compensation policy development at Yale's International Society of Tropical Foresters conference: *"Forests as Capital: Financial Mechanisms for Tropical Forest Conservation"* with SPDA
- Public launch of CSF's Infrastructure & Biodiversity section of website
- Develop guidelines with NEMA for economic analysis of environmental impacts
- Animated CBA video lessons launched
- Peruvian government officially cancels the Inambari hydroelectric dam project
- Himalayan Policy Forum in Kathmandu, Nepal
- Himalayas regional training course on economic tools and infrastructure analysis in Bhutan
- Two-day workshop in Rio Branco, Acre, Brazil, to present the Pucallpa-Cruzeiro project and general CBA concepts to government and civil society organizations
- National Policy Forum on environmental economic analysis and infrastructure in Kampala, Uganda and launch of national analysis guidelines
- Asked to contribute to *A global strategy for road building*, published in the journal Nature
- MINAM officially passes landmark resolution on compensation and mitigation policy. Agreement signed with MINAM to design & develop compensation pilot studies.
- Presented results of the Pucallpa-Cruzeiro do Sul road and railway analysis at UNFCCC COP20 in Lima, in collaboration with TNC

- MINAM launches official national guidelines for environmental valuation
- Results of Pucallpa study presented to the Pucallpa monitoring group, indigenous group representatives, and the Ucayali Regional Government
- Launch of economic valuation study of ecosystems impacted by the proposed São Luiz do Tapajós hydroelectric dam in the Tapajós Basin in Brazil
- University of Florida's *"Envisioning a Sustainable Tropics"* Conference. Presented showcase of road and dam infrastructure examples, including BUILD analyses
- International Association for Impact Analysis Conference in Florence, Italy with WCS-Uganda. Presented results of WCS oil pipeline analysis, Bwindi road analysis, and Pucallpa-Cruzeiro do Sul projects.
- In-house training for USAID staff
- "Dams on the Tapajós River"* workshop at the Pontifícia Universidade Católica in Rio de Janeiro, Brazil
- Convened high-profile forum in Lima *"Challenges for sustainable interconnection in the Ucayali region."*
- Compensation policy test cases in Peru launched: Hidrovía Amazonas and Mazán hydroelectric projects, and the Interoceanica Sur road and Hunt oil concession in Madre de Dios launched
- Documentary video about Pucallpa project released
- Presented Tapajós study in Brasilia and South Africa
- CBA video series reach 80,000 views

2012

2013

2014

2015

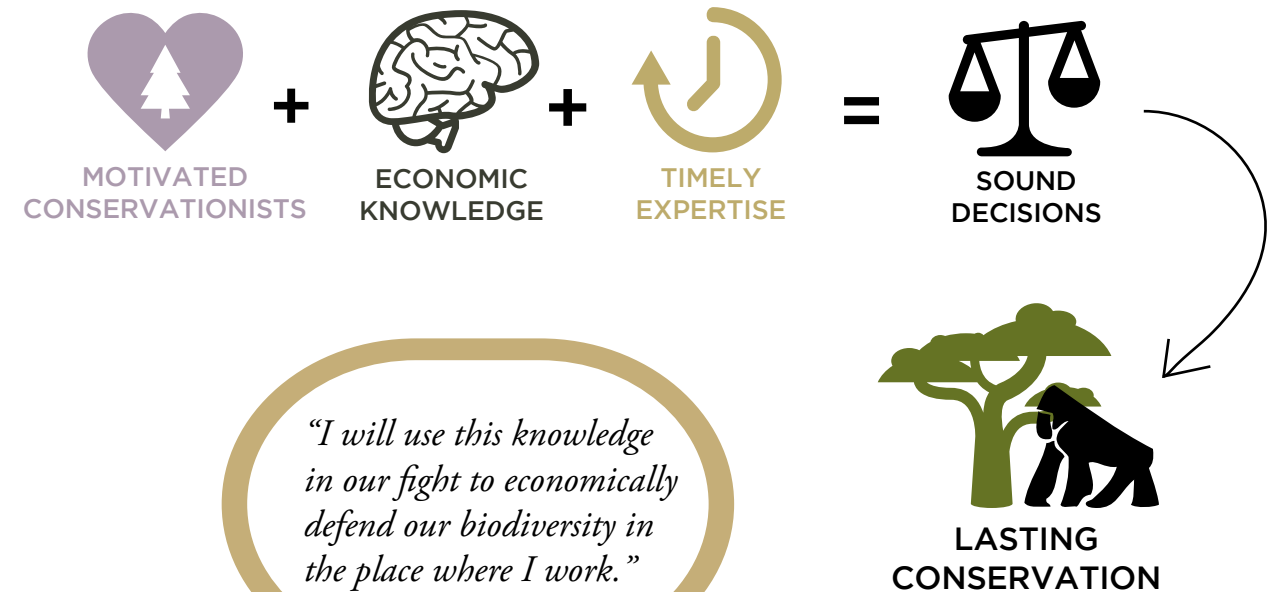




For over 15 years, CSF has been making a unique contribution to global conservation through intensive training in economics. By equipping people with a solid understanding of economic tools and an ability to identify opportunities to apply them, we have accomplished dramatic environmental victories and helped achieve widespread acceptance of economics' role in conservation.

During the BUILD program we offered three types of training: our core course in Economic Tools for Conservation with curriculum adapted to focus on infrastructure, short courses targeted at journalists, and tailored in-house training courses for governments and other institutions. We worked with local and regional partners to offer these courses to 217 people from 16 countries.

## CSF'S THEORY OF CHANGE



*"I will use this knowledge in our fight to economically defend our biodiversity in the place where I work."*

*"We all need to know and appreciate the essence of attaching economic value to the social benefits we enjoy."*

*"I gained a vital understanding of the necessity and importance of economic instruments and terminology for use in my field."*

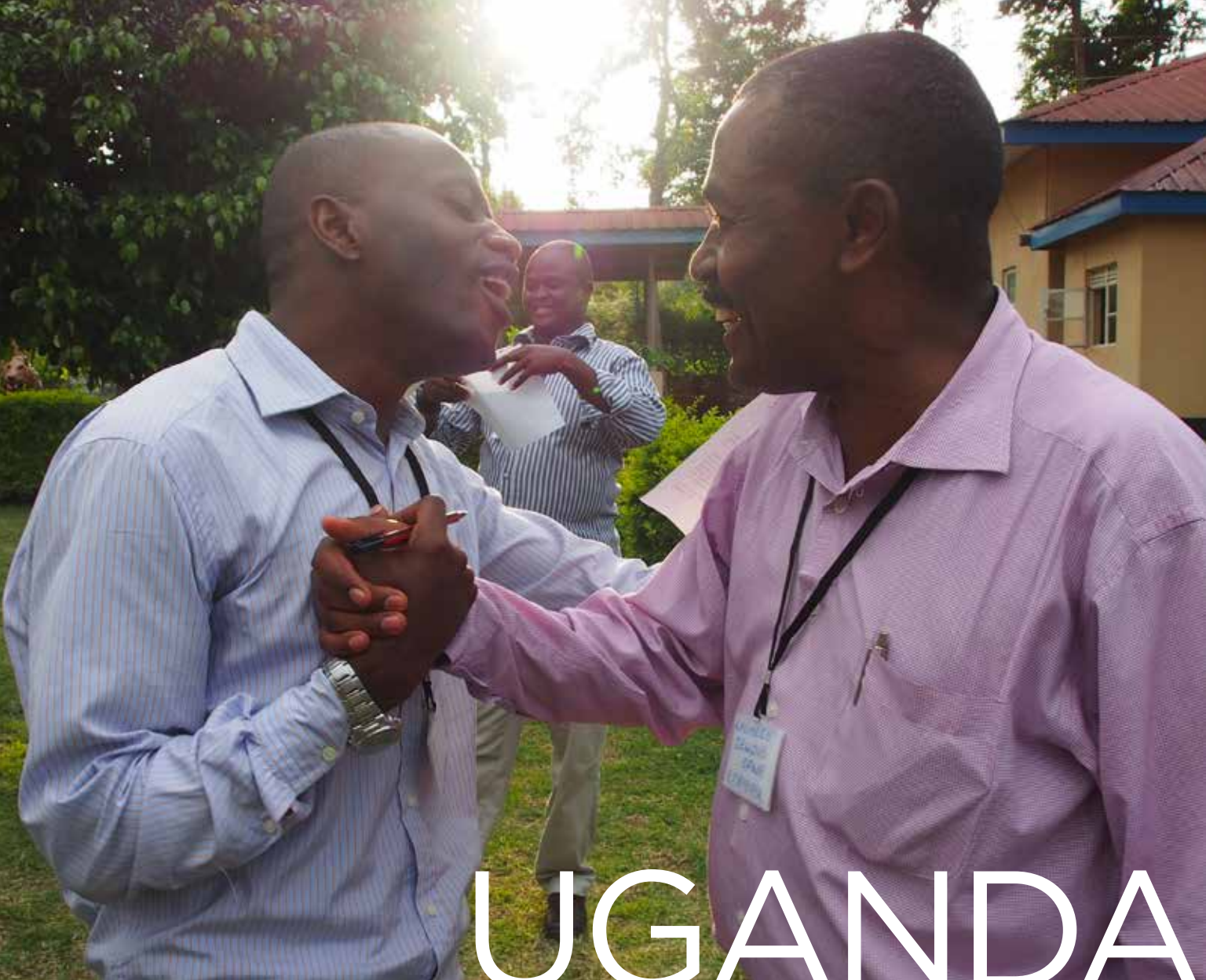
CSF trained **217 professionals** from **16 countries** in **9 courses** during the lifetime of BUILD



### COURSES

- Peru 2012 - Economic Tools
- Brazil 2012 - Economic Tools
- MINAM 2012-13 - In-house
- Peru 2012 - Media
- Brazil 2013 - Media
- Uganda 2012 - Economic Tools
- DRC 2013 - Economic Tools
- Bhutan 2014 - Economic Tools
- USAID 2015 - In-house





# UGANDA

The Albertine Rift is characterized by rich montane rainforests that are home to a vast number of species and endemic plants and animals. The critically endangered Mountain Gorilla lives only in these forests. This region is also one of the most densely populated in Africa, inhabited by rural farmers who harvest firewood and timber, and clear the forest to grow food. To complicate matters further, the five nations that comprise the region have been ravaged by ongoing civil wars for the past 25 years. Some of the world's lowest life expectancy and literacy rates can be found here, along with correspondingly high rates of poverty. The diverse ecosystems that support life in this region have been fragmented by conflict, with habitats held together by protected areas and national parks.

How can we reconcile the need to protect these forests for plants and animals with the need to improve livelihoods for their human residents? Are there ways to both conserve biodiversity and promote infrastructure development in the region? With these questions in mind, CSF began working with the Uganda National Environmental Management Authority (NEMA) and graduates from past CSF courses to offer an Economic Tools for Conservation and Infrastructure Planning course in Uganda in 2012.

The goal of the course was to bring together professionals from government agencies, non-profit organizations, and academic institutions across the region to investigate how economics can help explain the relationship between humans and their environment, and what strategies exist

to create smart infrastructure development in the Albertine Rift.

Participants spent two weeks together learning economic theory, practicing new concepts with interactive games and exercises, and exchanging ideas with other people working on similar issues. Two local field trips allowed them to apply the ideas presented in the course to real-life situations in Uganda.

In addition to CSF's core curriculum in conservation economics, special sessions on infrastructure best practices, protected areas, human rights, and biodiversity offsets were added to address the specific challenges faced by the countries in the Albertine Rift region. As the course progressed, participants built on this foundation and learned how and when to use tools like valuation and cost benefit analysis. In the culminating exercise of the course, groups analyzed a hydroelectric dam project and practiced presenting their results to a variety of stakeholders, gaining valuable experience tailoring their message to different audiences to make the most of their results.

After the course, CSF teamed up with course graduates to conduct three applied economic analyses in support of biodiversity conservation in the region. Over the ensuing three years, we partnered with NEMA, the Ugandan Wildlife Authority, Wildlife Conservation Society, and the International Gorilla Conservation Programme to investigate the impacts of new oil pipelines and roads in protected areas in Uganda, as well as develop national guidelines for environmental economic analysis.



- Botswana
- Burundi
- Rwanda
- DRC
- Ethiopia
- Kenya
- Tanzania
- Uganda

50%  
NGO

50%  
GOV

## COURSE LOCATION:

*Queen Elizabeth National Park*

Uganda's most visited national park

28  
Participants





# MEDIA

In infrastructure development, all of the stakeholders need access to facts and information about tradeoffs in order to make informed decisions. But when people do not have the economic and ecological information they need to compare projects, common ground is hard to find, groups retreat to polarized positions and negotiations stall. The media is a key player in spreading this information to stakeholders, and improving the odds of reaching a compromise. Yet, most journalists have never received any formal training in the complex interrelationships between ecosystems, economics and policies that accompany infrastructure development, and are therefore ill equipped to communicate those issues clearly. In order to build capacity for radio, television, online and print journalists

in the Andean Amazon region, CSF partnered with local organizations to offer two targeted media trainings.

The first of these trainings was held in Peru in 2012 for journalists from Peru, Bolivia, Ecuador, Colombia, Brazil and Chile. During the three-day event, participating media representatives received training on methods for incorporating biodiversity and social concerns into infrastructure planning, economic incentives for conservation, and ecosystem management. Instructors highlighted the difference between comprehensive feasibility studies that include environmental issues such as flooding or deforestation, and those that don't. Special attention was given to how decision makers can

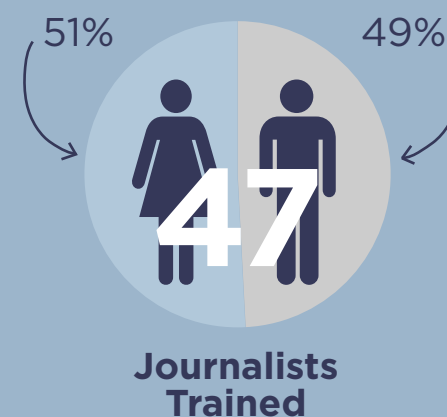
use environmental economic analysis to reduce the negative impacts of infrastructure projects. The training concluded with a field visit to help participants understand the real life implications of what they had learned.

The second media training was held in Brazil in 2013 for journalists from international, national, and Amazonian regional media. This one-day event focused on strategic media coverage of infrastructure projects in the Brazilian Amazon, and included discussion of the key issues that need to be incorporated into regional planning. Experts presented on a variety of pertinent topics including how to measure the economic viability of infrastructure projects, the need to incorporate conservation planning into decision-making, upcoming Brazilian infrastructure development plans, and challenges and opportunities for media coverage in the Amazon.

Both trainings contributed to more open discussions and a more realistic representation of the implications of infrastructure development for society and the environment in the Andes Amazon region.



*"The purpose of journalism is thus to provide citizens with the information they need to make the best possible decisions about their lives, their communities, their societies, and their governments." - American Press Institute*







Fourteen participants received graduation certificates for the full program, six of them with honors. Participants gave the training high marks for both quality and relevance, and as proof, MINAM officials went on to publish national guidelines for environmental valuation in January 2015.



*John Reid, CSF President, and Mariano Castro, Deputy Minister of Environmental Management, sign agreement that will promote environmental compensation in Amazonian ecosystems. Photo courtesy of MINAM.*



*“Excellent course, the level of professional satisfaction exceeded my expectations. Thanks, CSF!”*

In the early stages of CSF’s BUILD program, we began working with the Peruvian Ministry of the Environment (MINAM) on drafting guidelines for ecological compensation, which would later become law. In 2012, we agreed to develop our relationship further by designing a training program to build MINAM’s capacity in environmental valuation techniques. The goal of this in-house support was to give the government practical tools to integrate biodiversity into planning, approval and implementation of infrastructure projects.

After an extensive, collaborative design phase, we launched a nine-month training for economists, engineers, and technical advisors from the government and other institutions in Peru. Each module of the Economic

Valuation of Environmental Impacts course consisted of guided readings, a weekly discussion with the instructor, and a quiz. Three short in-person workshops were also held in Lima to give participants the opportunity to ask questions and work together on exercises.

The program began by building a foundation in microeconomics, and then dove deep into the rationale and application of five valuation methods. Participants improved their ability to understand and interpret valuation studies, identify appropriate methods to value environmental goods and services, contribute to the design of Environmental Impact Assessment terms of reference, and participate in the formulation and implementation of Peruvian law related to valuation.

**9**  
Month Program

- guided readings
- weekly virtual discussions
- 3 in-person workshops in Lima

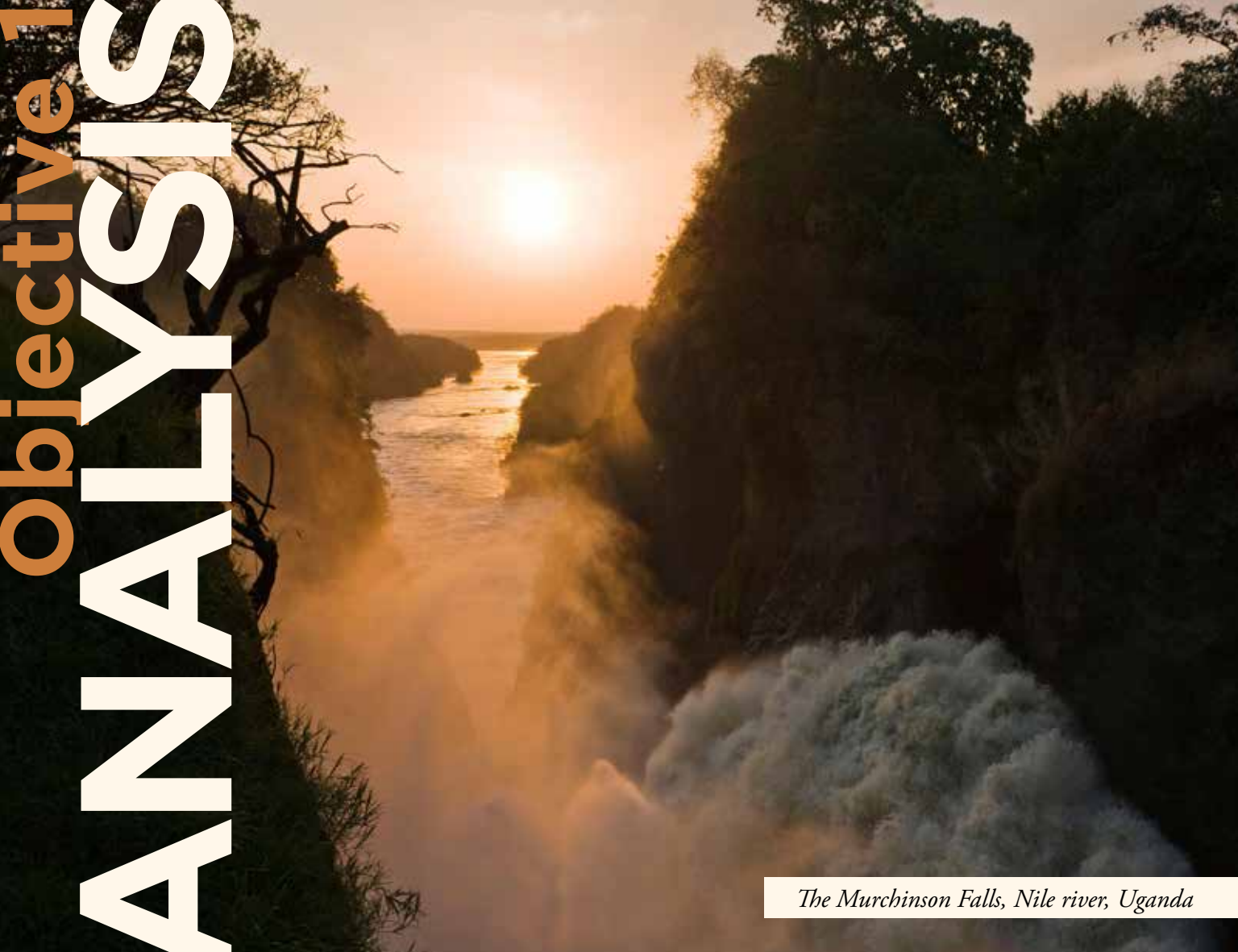
**22**  
Government Officials Participated

Participants gave the program

★★★★★  
or a rating of **95%**



# ANALYSIS OBJECTIVES

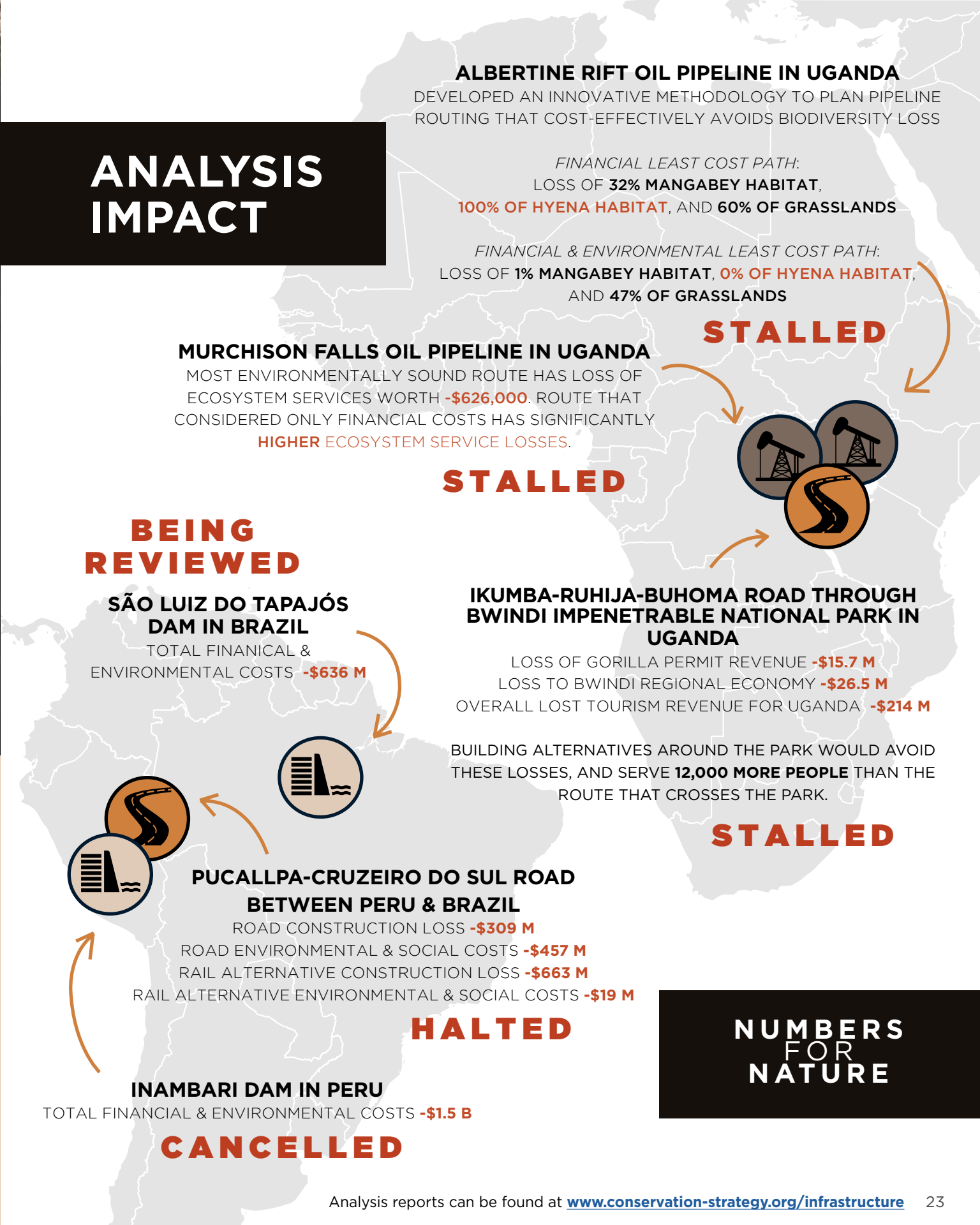


*The Murchinson Falls, Nile river, Uganda*

Since its creation in 1998, CSF has conducted dozens of analysis projects in forests, rivers and coastal environments. Most of our work has focused in the tropics, where extraordinarily high levels of biological diversity are found. These analyses draw from the fields of environmental, natural resource, agricultural, transportation, behavioral, and development economics. The unifying thread is our goal to promote conservation of nature and inform development decisions with a clear understanding of the tradeoffs involved. Our analysis work has influenced over \$20 billion in development investments, resulting in improved conservation of over 20 million acres around the world.

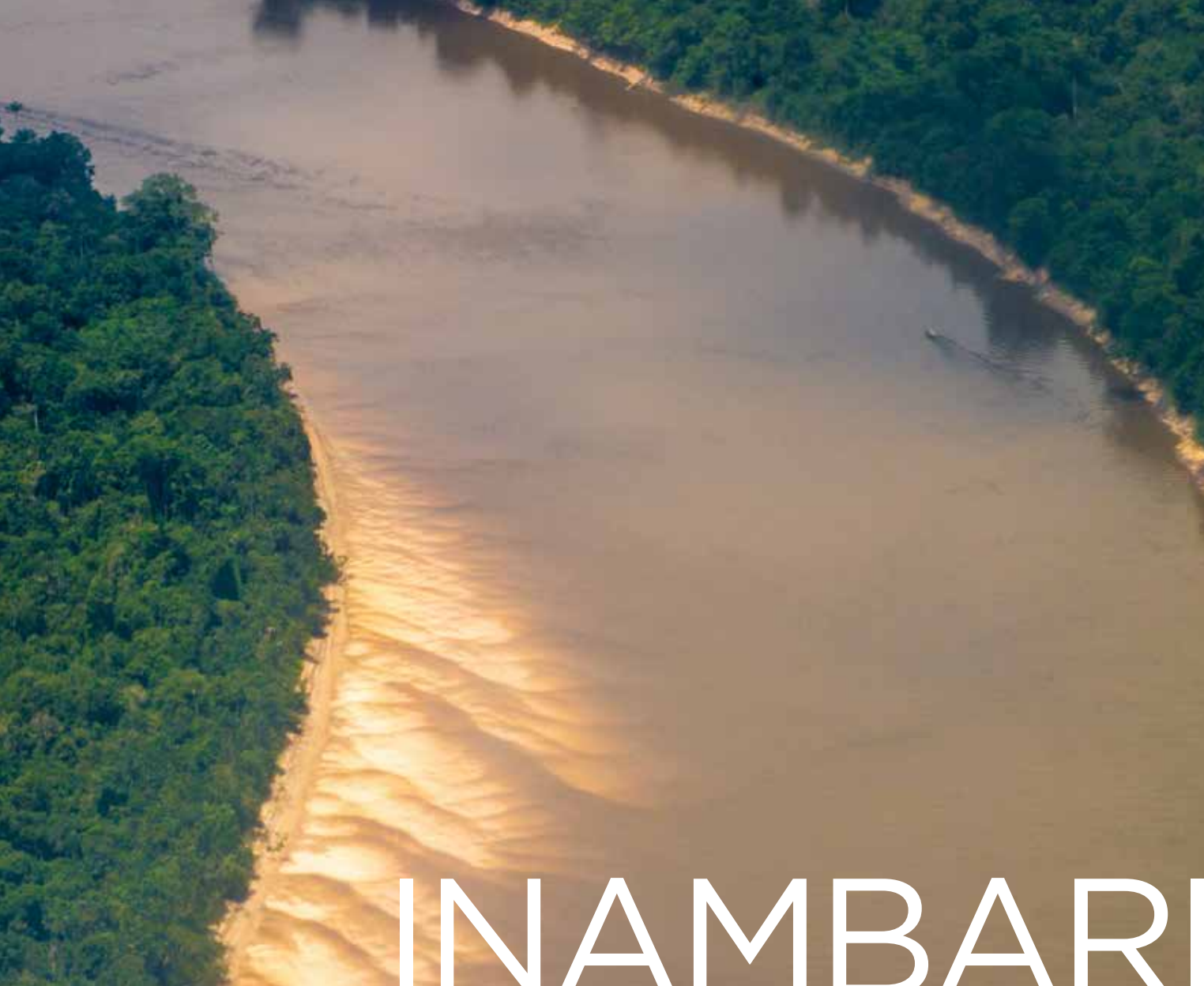
For the BUILD program we worked with local partners to conduct six analysis studies of road, dam, and oil pipeline projects in the Andes Amazon and Albertine Rift regions, with the goal of changing outcomes in favor of improved biodiversity conservation. Each of these involved many months, and sometimes years, of work: meeting with partners to design the project, consulting with affected stakeholders, collecting and analyzing the data, and writing reports and policy briefs. Each study was then followed by a series of meetings, conferences, forums, and workshops to present and discuss results. All of the projects gave stakeholders and decision-makers important information about costs, benefits, tradeoffs and alternatives. In some cases, the results of our analyses changed minds and impacted policy decisions, allowing for protection of biodiversity and other precious natural resources.

## ANALYSIS IMPACT



**NUMBERS FOR NATURE**





# INAMBARARI

In 2010, the governments of Peru and Brazil signed an energy agreement that included plans for hydroelectric plants in the Peruvian Amazon. The Inambari dam was the first of several to be built under the agreement, with a goal of sending 80% of the generated electricity to Brazil via a newly constructed transmission line. The dam would have created a 410 square kilometer reservoir, forming the second largest lake in Peru, flooding many small towns along the river and displacing their inhabitants. The dam would also have generated 2,200 megawatts of power to support the growing economies of both countries, and would have safeguarded water supplies for use in drought years.

The project had strong voices on both sides. The local people, fearing the loss of their livelihoods and destruction of the rich

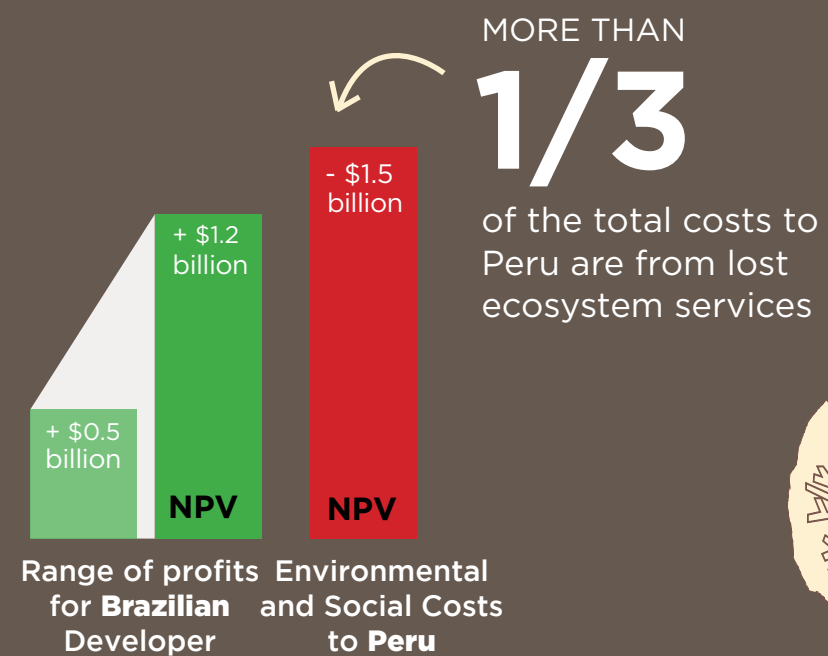
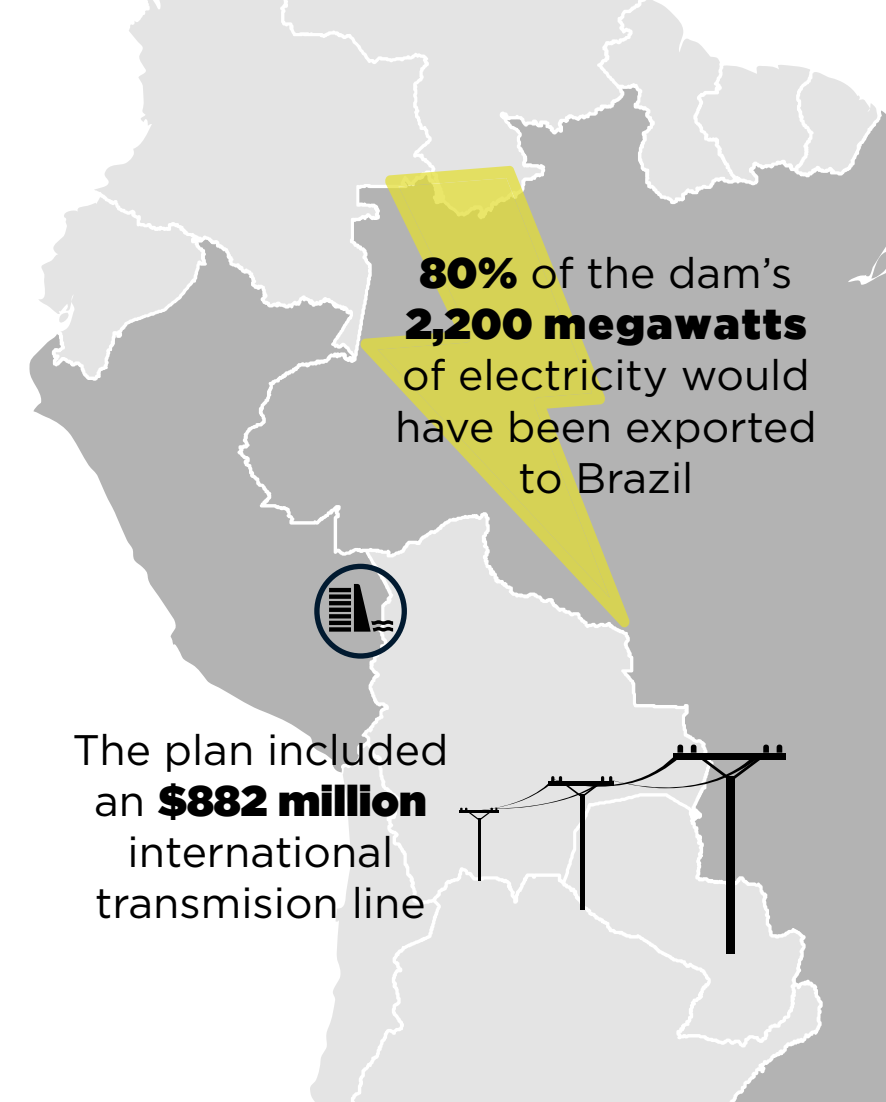
ecosystems in the valley, staged protests and strikes, often closing the river road to all traffic. The construction companies and governments of both countries stressed the importance of energy security, and cited the jobs that would be created by building and operating the dam.

In 2012, CSF and the Wildlife Conservation Society undertook an analysis to clarify the merits of the Inambari project. The study analyzed the financial and economic feasibility of the dam from the distinct viewpoints of the developer, the Peruvian government, other key groups in Peru, and society in general in the two countries. The analysis found that the project would be very profitable for the developer, but would have significant environmental and social costs. It would displace around 4,000 people, cause the deforestation of 96,000 hectares of

bio-diverse ecosystems, lead to lost agricultural and mining income, and contribute to global warming via the emission of greenhouse gases.

Additionally, the developer proposed selling the power at rates 30% higher than prices prevailing in Peru at the time. These higher electricity prices would result in a loss to Peruvian consumers of \$200 million. The Brazilian firm was the clear winner in this scenario, taking 70% of the profits, and absorbing very few of the environmental or social costs. The Peruvian people would be on the losing side, having to pay all the social and environmental costs, as well as higher prices for any electricity sold in Peru. Based on these findings, CSF recommended a thorough review of the Inambari project and the addition of full environmental mitigation and ecological compensation plans. CSF staff and partners presented the results to stakeholder monitoring groups and government officials in Peru and Brazil. These meetings enabled us to communicate our results to those with the power to decide the fate of the Inambari river valley.

In 2014, the Peruvian government officially cancelled the Inambari hydroelectric project.



NPV = Net Present Value

The dam would have displaced

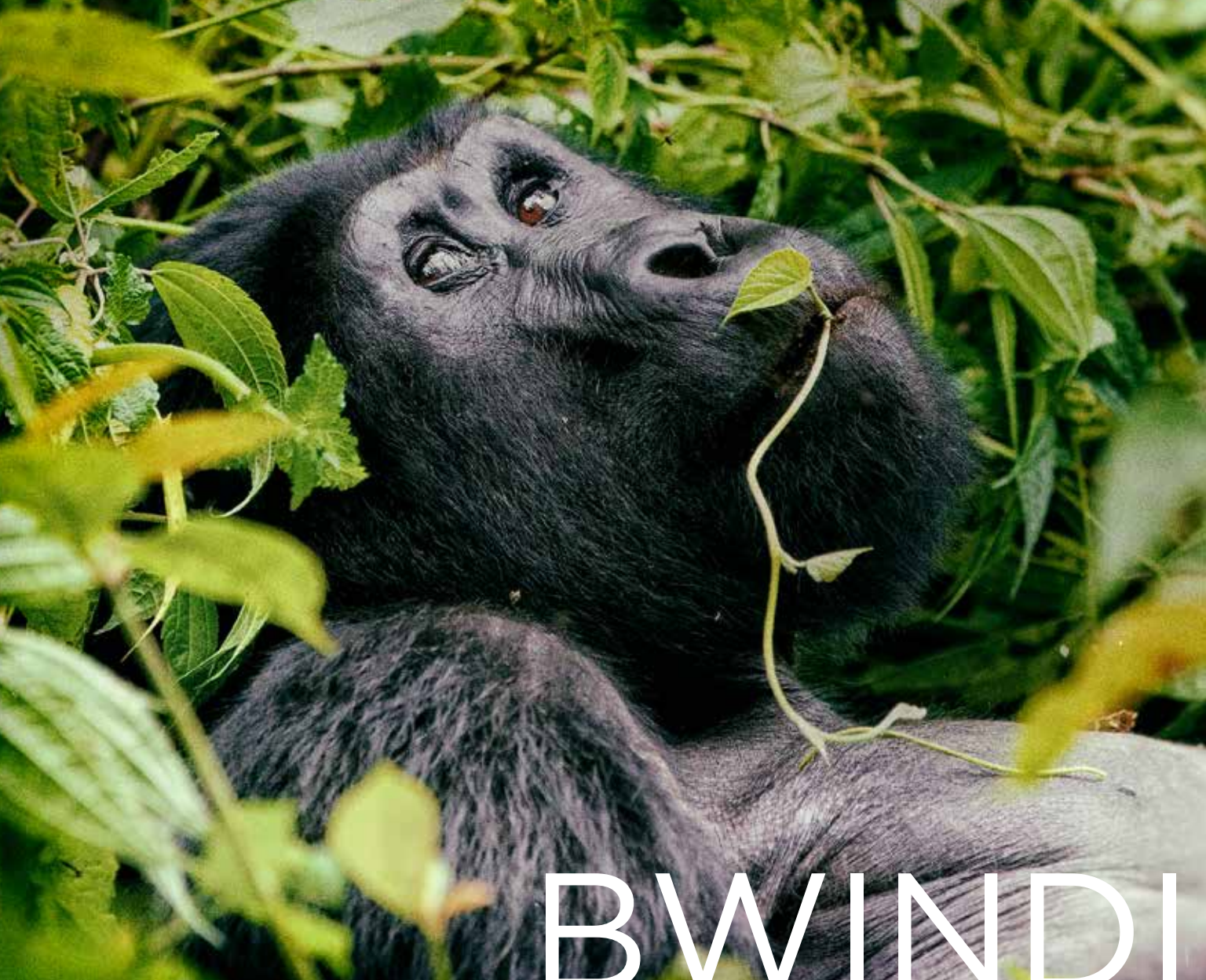
**4000** people

and deforested

**96000** hectares







# BWINDI

In July 2012, the Uganda National Road Authority announced plans for the design and construction of 1,900 km of roads in the country. One of the proposed projects included upgrading a road that passes through Bwindi Impenetrable National Park, a globally recognized UNESCO World Heritage Site that is refuge for almost half the world's population of critically endangered mountain gorillas, and one of Uganda's main tourist attractions. Evidence suggests that if the road were upgraded, the gorillas would actively avoid the area near the road, and gorilla mortality from disease, poaching, and vehicle collisions would increase.

A month prior to this announcement, Stephen Asuma, a program officer from the International Gorilla Conservation Programme (IGCP), attended CSF's BUILD Economic

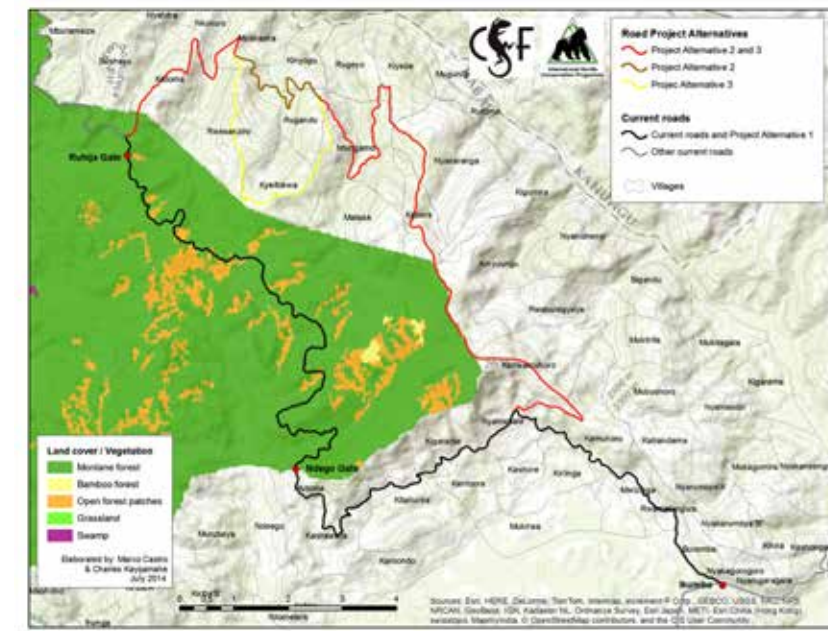
Tools for Conservation and Infrastructure Planning course in Uganda. Following the course, CSF invited proposals from course graduates for follow-up analysis of priority biodiversity and infrastructure issues in the region. Stephen submitted a proposal to evaluate the economic and environmental impacts of the proposed road upgrade through Bwindi Impenetrable National Park compared with two alternative routes that would not cross the park, and was selected to collaborate with CSF.

The results of the CSF-IGCP analysis show that both road alternatives would have better overall economic performance than upgrading the route through the park, despite having higher up-front costs. These alternative routes present lower overall risks to the gorilla population, and provide thousands

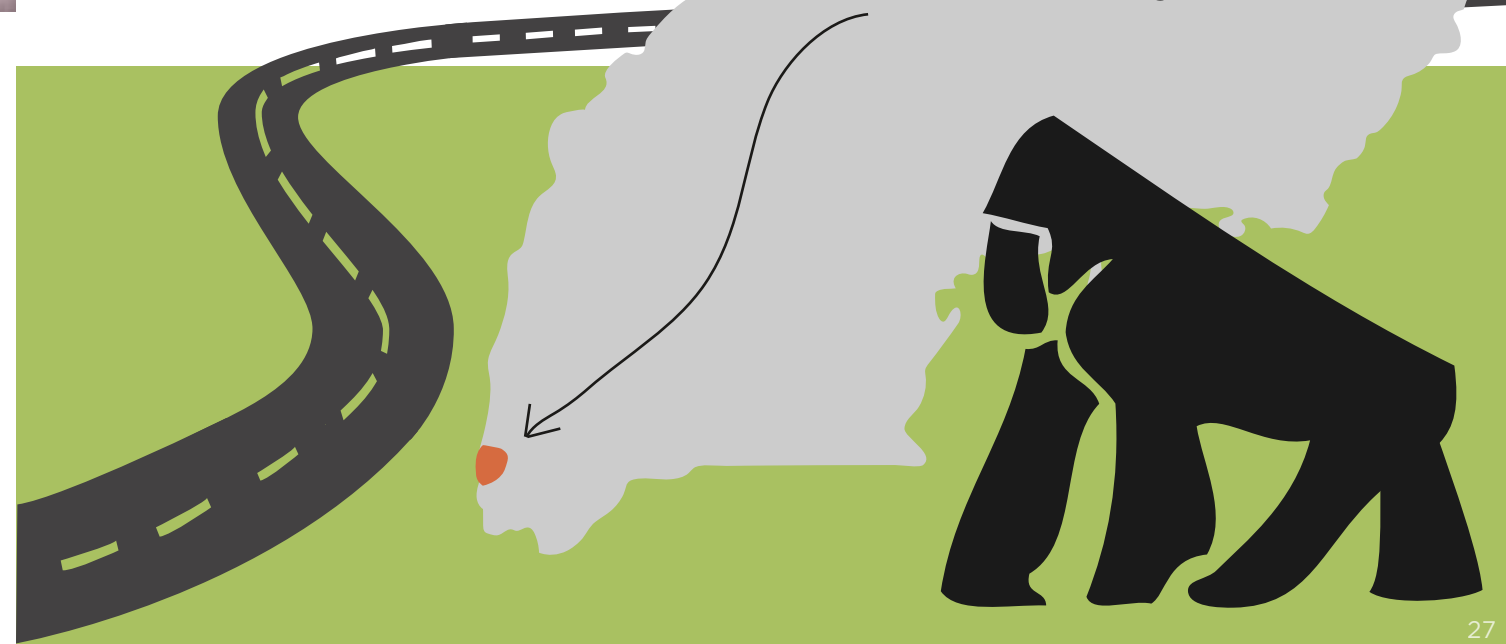
more people with access to important services like healthcare and education. When the potential loss of tourism revenue due to reduced gorilla populations is included, upgrading the road through the park actually costs twice as much as the alternatives. Considering impacts on tourism more broadly, this translates to a possible loss for Uganda of US \$214 million over the next 20 years.

The fate of this road has not yet been decided. CSF, IGCP, and the Uganda Chapter of the Poverty and Conservation Learning Group have widely disseminated the results via meetings with local communities and politicians, as well as an international impact assessment conference in Italy. We remain hopeful that the stark economic realities revealed by our study will sway decision makers in the direction of the alternative routes, thereby protecting some of the world's last remaining gorilla habitat.

The Bwindi road study is a prime example of CSF's strategy: build the capacity of local professionals in economics and help them apply this knowledge to critical conservation challenges in their countries. Case studies carried out with course graduates like Stephen foster an iterative process of outreach and dissemination to a wide range of stakeholders on the ground. As a result, specific projects change in the short-term, but perhaps even more importantly, over the long-term people gain awareness, knowledge and tools to improve infrastructure planning and development for decades to come.



Bwindi Impenetrable National Park contains one of the last remaining habitats for almost **1/2 the world's population** of critically endangered mountain gorillas







# ONLINE TOOLS

CSF has developed several online tools to analyze the effects of infrastructure development and provide a platform for information dissemination about the costs and benefits of large-scale infrastructure projects. These tools allow users to explore different development options and calculate various factors to help determine which projects make the most economic and environmental sense, providing immediate results that could aid the future of fragile ecosystems world-wide.

## HydroCalculator

Dams are sources of electricity and irrigation, both vital for improving the lives of millions of people worldwide. From environmental, economic and social perspectives, however, dams are by no means created equal. Some can be relatively benign while others have extensive negative impacts. Perhaps the single most important way to minimize impacts is to choose “good” dam sites. Doing so early on requires simple tools that generate comparable results across proposed locations. CSF’s HydroCalculator Tool (HCT) allows users to analyze and compare projects in an interactive, user-friendly online platform. Our goal is for the tool to stimulate debate, transparency and ultimately good decisions about hydro development.

The HCT considers environmental, social and economic variables in its calculations, with an extensive amount of data built into the back end of the tool. Users can compute the economic feasibility of a dam investment based on its costs and benefits over a 50-year period. Outputs also include the type and area of habitat impacted per megawatt (MW) of installed generating capacity, number of people displaced per MW, and amount of CO2 emissions. In addition, HCT users can perform extensive sensitivity analyses, as well as comment on analyses done by others. These features are important because the dam projects are long-term investments with uncertain future costs and benefits.

During the BUILD program, CSF made significant upgrades to the HCT, including a more detailed vegetation type selector, a more accurate map location picker, and geo data by satellite imagery to help the user determine vegetation types. We also made strides in collecting and disseminating information generated by the HCT. In 2012, we gathered field data and used the HCT to analyze all major dams over 100MW in the Andean Amazon, making the results public via the tool on CSF’s website. In 2015, International Rivers, in consultation with CSF, used the HCT to evaluate proposed dams throughout Africa and published their results in a high-profile campaign.

## Roads Filter

When do the benefits of roads outweigh their costs? Economic feasibility studies can provide the answer, but time and financial limitations mean that many of these studies fail to accurately represent accurately the full costs, and many roads are never analyzed at all. Further, studies are seldom done comparatively, so governments lack the information they need to effectively prioritize road development. In order to determine which projects warrant closer examination, CSF developed the online Roads Filter Tool. Rather than examining roads one at a time, the Roads Filter allows the user to compare an array of potential road investments based on financial, environmental and social criteria, identifying the projects that merit closer scrutiny due to their associated risks.

In 2011, we applied the Roads Filter to 36 proposed

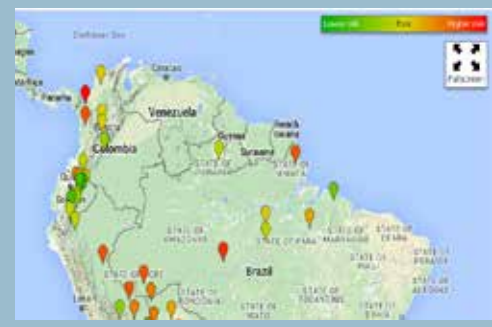
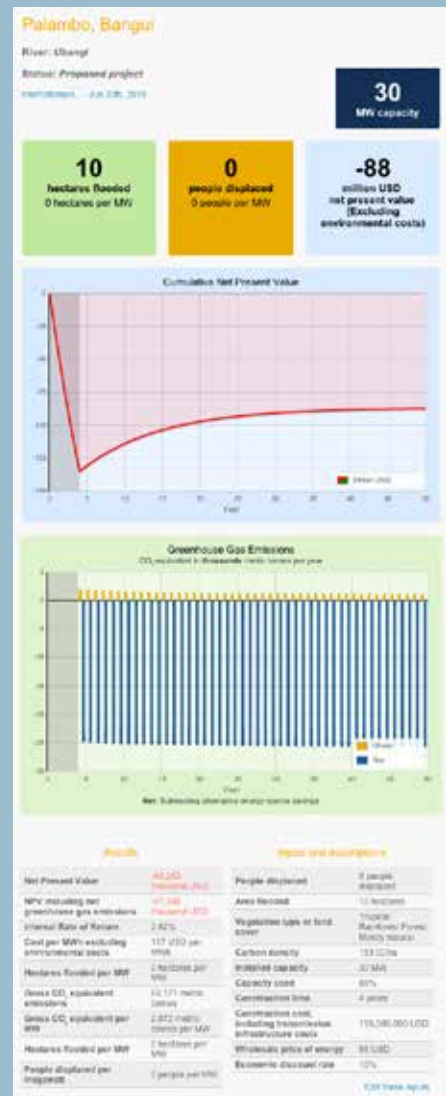
road construction and improvement projects across five countries in the Amazon region. The list of roads was compiled through interviews with conservation experts in each country, and includes projects perceived as posing some degree of threat to natural ecosystems. The Roads Filter ranks selected projects depending on their level of economic, environmental, socio-political, and cultural risk (or inversely, the potential for conservation by avoiding construction). The overall risk of each project is assessed through an index of variables grouped into four categories and weighted according to their relative importance.

Output from the Roads Filter makes it possible to share information about the tradeoffs of different road options and to direct conservation attention to those projects that present the highest risk levels. Application of the tool and follow-up assessments can improve decision-making to aid both conservation and the development of cost-effective transportation infrastructure.

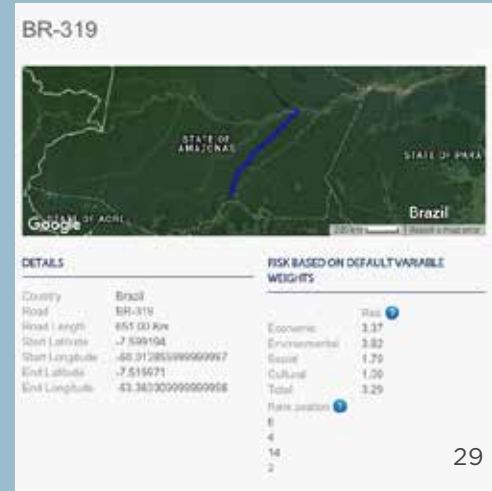
Screenshots of the HCT (below and middle) show map and table views of the tool, as well project details. Screenshots of the Roads Filter (far right) show map and table views of the tool, as well as road details.



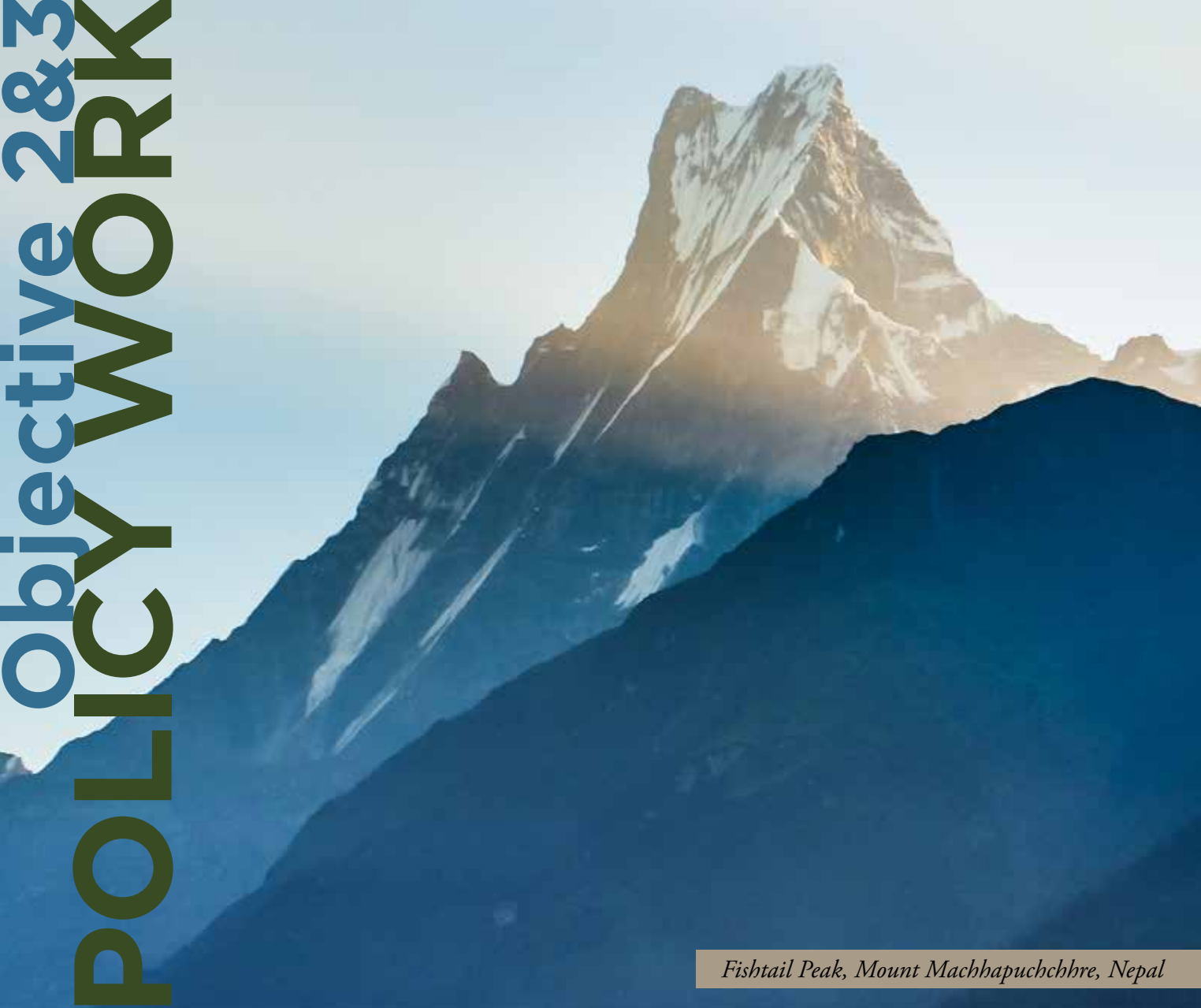
Project Name	Size	Country	Internal Rate of Return	Net Present Value	CO2 emissions (g/MWh)	Standardized load (g/MWh)	Displaced people / MW
Su Don, Laos	View Data	Laos	18.5%	700,204 thousand USD	30,000	110	1
Palambo, Bangui	View Data	Central African Republic	2.82%	-86,243 thousand USD	2,100	0.33	
Ndidi 3, Nigeria	View Data	Nigeria	0.183%	-409,299 thousand USD	87	0.18	0.4
1. Luchua, Amazonas	View Data	Brazil	16.3%	8,201 thousand USD	130	4.2	10



Country	Project Name	Capacity (MW)	Net Present Value (USD)	CO2 emissions (g/MWh)	Standardized load (g/MWh)	Displaced people / MW
Colombia	Palambo	30	-88,243,000	2,100	110	1
Brazil	1. Luchua	10	8,201,000	130	4.2	10







*Fishtail Peak, Mount Machhapuchchhre, Nepal*

Throughout the BUILD program, we engaged with governments in each of the three focus regions with the following goals: create awareness of infrastructure and biodiversity issues, build knowledge of economic analysis tools, promote sharing of information on infrastructure projects and best practices, and provide technical support to change outcomes and improve policies.

### Peru Compensation & Mitigation Policy

In 2014, Peru’s Ministry of the Environment (MINAM) made a major policy announcement introducing a landmark ministerial resolution on compensation and mitigation that establishes guidelines for developers to offset the impacts

of their projects. Supporting the ministry in developing these innovative guidelines was a major focus of our policy work during the first three years of BUILD. Our policy recommendations emphasized the importance of long-term compensation commitments, financial guarantees, coverage of indirect impacts, and a practical approach to economic valuation.

CSF and our partners are now collaborating with MINAM in the implementation of case studies to test the guidelines. Four infrastructure projects have been selected for the cases, including waterway and hydroelectric projects in Loreto, and a road and oil concession in Madre de Dios. The goal of this project is to address the opportunities and challenges of using public protected areas as the places where compensatory

actions, such as habitat protection and restoration, are done. The cases will provide guidance on methods of identifying equivalent areas for environmental compensation, recommendations for integrating biodiversity information into Economic Impact Assessments and environmental compensation plans, tools to estimate the management costs of compensation plans, and recommendations for financial mechanisms that ensure resource availability over a project’s life.

With this input, MINAM will be able to design detailed and practical compensation standards for infrastructure projects in a way that maximizes conservation and cost-effectiveness.

### Nepal Policy Forum

In 2014, CSF collaborated with WWF Nepal, the Asian Development Bank, World Bank, and several of Nepal’s government ministries to hold a one-day policy forum in Kathmandu on biodiversity conservation and infrastructure development. The forum covered environmental economic

analysis and policy tools used to integrate conservation and infrastructure development, with a focus on how infrastructure planning and decision-making could be improved across the Himalayan Region.

In sessions moderated by Nepal’s Secretary of the Ministry of Forest and Soil Conservation, Secretary of the Ministry of Science, Technology and Environment, and the Deputy Director General of the Department of Roads, participants learned about global best practices and innovations in infrastructure policies, as well as plans for future development in the region. Economic analysis case studies of roads and dams from Panama, Mexico, Brazil, and Nepal were also presented to highlight methods for incorporating environmental and social concerns into feasibility studies.

Overall, the forum gave investors, development planners, journalists, representatives from environmental NGOs, and government agencies a rare opportunity to come together and discuss policy tools that can be used to optimize the economic, environmental and social performance of

### POLICY WORK:

- Peru 2011-15 - MINAM compensation policy*
- Peru 2015 - MINAM valuation guidelines*
- Uganda 2014 - NEMA economic analysis guidelines*
- Uganda 2014 - Policy Forum*
- Nepal 2014 - Policy Forum*

### EVENTS:

- Australia 2013 - James Cook University Symposium “Impacts of Roads on Ecosystems and Livelihoods”*
- USA 2014 - Yale International Society of Tropical Foresters Conference “Forests as Capital: Financial Mechanisms for Tropical Forest Conservation”*
- Peru 2014 - UNFCCC COP20*
- USA 2015 - University of Florida Conference “Envisioning a Sustainable Tropics”*
- Italy 2015 - International Association for Impact Analysis Conference*
- South Africa 2015 - Ecosystem Services World Conference*

### GLOBAL PARTNERSHIP:

- Environmental Law Alliance Worldwide Partnership 2012-15 - Infrastructure best practices worldwide*



*Peru Compensation & Mitigation Policy Forum, 2014*



*Nepal Policy Forum, 2014*



**CSF's long-term vision is to make biodiversity conservation and management a central component of large-scale development design and implementation.**

**Therefore, our long-term commitments are to:**

- *Effectively communicate that the development of smart infrastructure is only possible if decision-making includes a rigorous economic analysis of impacts and alternatives.*
- *Build capacity within civil society and governments to understand and conduct comprehensive economic analyses of infrastructure projects.*
- *Provide support to governments and civil society to design and apply policy that ensures environmentally, socially, and economically sound selection and implementation of large-scale infrastructure projects.*

**SUSTAINABILITY**  
*of BUILD efforts*

**E**nergy and transportation infrastructure development is one of CSF's four priority areas in our 2015-2020 strategic plan. We believe that an economics-based approach can have significant positive impacts on biodiversity by improving environmentally destructive and economically inefficient policies and projects. CSF will therefore continue to focus on improving access to information about large-scale infrastructure development in our engagement with governments, in our communications, publications and online tools, and in our efforts to participate in key national and international meetings and events. We will continue improving our online HydroCalculator and Roads Filter analysis tools and the infrastructure portion of our website, and we plan to expand our infrastructure project inventory. We also plan to create additional online materials and training targeted at non-technical audiences to help them understand the economic and environmental impacts of infrastructure development as well as international standards, safeguards and best practices. We will also continue to disseminate our work on financial incentive mechanisms for greener infrastructure.

In Peru, we will continue working with the government on infrastructure policy reform and compensation policy test cases through the end of 2016. In Brazil, we will carry on our work in the Tapajós basin valuing impacts of dam development on various ecosystem services, focusing on a strong outreach strategy. In Uganda, we will continue collaborating with our partners to disseminate the results and communications products developed by the research teams. In the coming years, we will seek additional opportunities to engage with governments and organizations in all three focus regions to guide and improve infrastructure policies in favor of biodiversity protection.

After the conclusion of the BUILD Program, we will continue to develop and improve our infrastructure curriculum for integrated environmental-economic analysis. This curriculum will be incorporated into

CSF courses, both in-person and online, and shared through our network of Training Partners. Over the four years of our BUILD program, we have observed CSF's theory of change in action around the world. We have seen that giving people the opportunity to understand, conduct, and share analysis methods that assess economic and environmental trade-offs of infrastructure projects is an effective and essential strategy towards promoting green infrastructure, protecting biodiversity and achieving sustainable development. By making information about trade-offs and consequences available to people, the doors to public scrutiny are opened, allowing for rigorous debate and the opportunity to use an inclusive technical approach to explore alternatives. Through the process of learning, applying, and sharing tools and information with others, people gain the power to influence decision-making and affect real change. These successes are made possible through countless connections, partnerships, collaborations, and alliances with groups large and small in all the places where we have had the privilege to work. We look forward to the many relationships, projects, courses, and events in the years to come as we continue this important work on behalf of the world's life-sustaining ecosystems.

**Through the process of learning, applying, and sharing tools and information with others, people gain power to influence decision-making and affect**

**REAL CHANGE.**





# APPENDIX

## BUILD Activities by Region

BUILD reports, policy briefs, case studies, instructional videos and links can be found on [www.conservation-strategy.org/infrastructure](http://www.conservation-strategy.org/infrastructure). The electronic version of this report can also be obtained at [DEC](#) and the [FAB gateway](#).

### Global

**Gathered information** on infrastructure information bottlenecks, infrastructure policy and innovations around the world in partnership with the Environmental Law Alliance Worldwide (ELAW).

- 2012 - Began collecting information in Brazil, Bolivia, Peru, Ecuador, Colombia, Uganda, Democratic Republic of Congo, Nepal and the Philippines.
- 2013 - Final report completed by ELAW reviewing best practices and innovations in infrastructure policy in the Andes-Amazon, Albertine Rift, and Himalayas.
- April 2014 - Publication of ELAW-CSF review on best practices and innovations in infrastructure policy *Moving towards greener infrastructure: Innovative legal solutions to common challenges* via a [Policy Brief](#) and [Discussion Paper](#).
- 2014-2015 - Shared our lessons learned about infrastructure policy best practices and models during international infrastructure and biodiversity related events:
  - December 2014 [UNFCCC COP20](#) side event in Lima
  - March 2015 [University of Florida Conference](#)
  - April 2015 [International Association for Impact Analysis 15 Conference](#) in Italy

**HydroCalculator upgrades** to improve ease of use and accuracy.

- 2012-2013 - [HydroCalculator](#) upgrades launched including dynamic map, improved satellite imagery and more detailed vegetation types.
- 2012 - Information gathered and entered into HCT on dams greater than 100 MW in Brazil, Bolivia, Peru, Ecuador and Colombia.
- May 2013 - [Policy brief](#) about the HydroCalculator.
- 2015 - Assisted International Rivers in using the [HydroCalculator Tool](#) to evaluate dams throughout Africa. The result of this effort is the October 2015 [publication](#) *Right Priorities for Africa's Power Sector: An Evaluation of Dams Under the Programme of Infrastructure Development for Africa*.

**Develop financial incentive mechanisms** for greener infrastructure.

- June 2013 - *Financial Mechanism for Environmental Compliance of Infrastructure Projects* discussion paper written and disseminated

- January 2014 - publication and dissemination of the *Financial Incentives for Green Infrastructure* [policy brief](#).
- 2013-2015 - Further dissemination via network, courses, forums, meetings and international events. Locally we shared information on compensation and financial mechanisms with the Pucallpa and Inambari monitoring groups, and with the partners for the Uganda analysis projects (NEMA, UWA, WCS, and IGCP).

**Develop web resources** to promote access to infrastructure & biodiversity information.

- 2011-2013 - Infrastructure web resource area designed
- February 2014 - Public launch of CSF's [Infrastructure & Biodiversity](#) section of our website, which includes an introductory video explaining how visitors can use the resources included, links to global inventories of infrastructure development, infrastructure publications, infrastructure news, and additional infrastructure resources.

**Trained key BUILD staff** members in communication and public presentation skills to more effectively participate in local, national and international events to promote environmental-economic analysis of infrastructure development to improve biodiversity outcomes.

- December 2014 - Training in Costa Rica for staff from Costa Rica, Peru and Brazil
- April 2015 - Training in California for U.S. based staff

**Created overarching BUILD communication products** about the important connection between infrastructure, economic analysis and biodiversity.

- April 2015 - Created overview PowerPoint presentations on roads, dams and biodiversity for international meetings and events.
- August 2015 – Finalized an internal one-page document, produced in English, Spanish and Portuguese.
- September 2015 – Published a Smart Infrastructure [infographic](#) in English, Spanish and Portuguese.
- November 2015 - Produced a Smart Energy and Transportation Infrastructure animated video in English.

**Animated video lessons** have over 80,000 views to date.

- May 2014 - Launched CBA [animated video lessons](#) with over 20,000 views
- June 2015 - Launched CSF's Valuation video series

**Delivered in-house training for USAID** staff: *Economic Tools for Integrating Biodiversity and Ecosystem Services into Development Investments*.

- Curriculum included economic fundamentals, how to value and incorporate environmental impacts, integrated environmental-economic cost-benefit analysis of energy and transportation, CSF's online HydroCalculator and Roads Filter, and strategies for effective communication of results.
- Participants in the training ranked the overall value of the course as 4.5 out of 5, and 100% said they would recommend the training to others.

**Presented at international events** and conferences to disseminate findings from our analysis projects.

- December 2014 - CSF collaborated with TNC to convene a [side event](#) at the UNFCCC COP20 in Lima. We presented results of the Pucallpa-Cruzeiro do Sul road and railway analysis, and shared recommendations from our reviews of infrastructure policy best practices and financial mechanisms for mitigation and compensation.
- March 2015 - CSF participated in the University of Florida's [Envisioning a Sustainable Tropics](#) Conference. Presented on "Making the Economic Case for Avoidance of Biodiversity Loss" that showcased road and dam infrastructure examples, including BUILD analyses.
- April 2015 – Participated in the 2015 [International Association for Impact Analysis Conference](#) in



Florence, Italy. CSF and WCS-Uganda staff presented results of the WCS oil pipeline analysis, Bwindi road analysis, and Pucallpa-Cruzeiro do Sul projects, as well as our recommendations for financial mechanisms for mitigation and compensation. Conference papers: [Financial Mechanisms for the Mitigation Hierarchy & EIA Compliance](#) and [Making the Economic Case: Avoidance of Biodiversity Loss in Infrastructure Development](#).

**Consolidated our experiences and curriculum** for teaching integrated environmental-economic analysis as developed and tested during the BUILD courses in Peru, Brazil, Uganda, DRC and Bhutan.



## Andes-Amazon

**Policy events and forums** focused on infrastructure & biodiversity:

- In the Andes, we participated in infrastructure and biodiversity policy events hosted by the Initiative for Conservation of the Andes Amazon Phase II (ICAA II). Likewise, we worked with TNC, WCS and SPDA in Peru and participated in compensation stakeholder meetings and forums.
- In Brazil, we participated in the Amazon Infrastructure Working Group (CSF, Imazon, Instituto Centro de Vida, Idesam, WWF, Instituto Socioambiental, AVINA Foundation, TNC, Associação O Eco and others).

**Sortable [Roads Filter](#)** list developed and launched, including 36 Amazon region roads of concern.

- November 2011 - [Report](#) published
- January 2013 - [Policy brief](#) published

**Information gathered and entered into [HydroCalculator](#)** on dams greater than 100 MW in Brazil, Bolivia, Peru, Ecuador and Colombia (2012).

**Economic Tools for Conservation and Infrastructure Planning** training courses implemented.

- May-June 2012 - Economics Tools for Conservation and Infrastructure Planning course in [Peru](#) (ICAA II).
- August 2012 - Economics Tools for Conservation and Infrastructure Planning course in [Brazil](#).
- **Supported Peru's Ministry of Environment (MINAM)** in [drafting a directive on ecological compensation](#) for development projects.
- February 2013 - Draft Ministerial Resolution on environmental compensation circulated by MINAM for comments.
- 2014 - Continued support of the approval process of the Draft Ministerial Resolution on environmental compensation.
- September 2014 - [Signed an agreement with MINAM](#) to design and develop at least two [compensation case studies](#) in Amazonian ecosystems.
- December 2014 - MINAM made a major [policy announcement](#) passing Peruvian compensation policy, the

focus of our policy support during the first three years of BUILD. During the [COP20 event in Lima](#), MINAM officially launched the environmental compensation policy.

- 2015 - [Launched compensation policy test cases](#) in Peru on four specific infrastructure projects: the Hidrovía Amazonas and Mazán hydroelectric projects in Loreto, and the Interoceánica Sur road and Hunt oil concession in Madre de Dios.
- May 2015 - Publication of [peer-reviewed paper](#) about the Peruvian compensation policy in the Journal of Sustainable Forestry: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies*

**Analysis of Inambari dam** in Peru, showing higher costs than benefits to Peruvian society.

- May 2012 - [Policy brief](#) published.
- December 2012 - [Final report](#) published.
- 2013 - Results of the analysis presented to Inambari stakeholder monitoring groups and government officials in Peru and Brazil.
- May 2014 - the Peruvian government [officially cancelled](#) the Inambari hydroelectric dam project.

**Analysis of the Pucallpa-Cruzeiro do Sul road** between Peru and Brazil.

- June 2012 - [Discussion paper](#) published.
- June 2012 - [Policy brief](#) published.
- 2013 - Completion of second phase of Pucallpa-Cruzeiro do Sul road and rail analysis in Peru, including analysis of rail alternative, inclusion of social and environmental externalities, analysis of land use change and deforestation, and analysis of opportunity costs. None of the transport alternatives is economically feasible, and the train project represents the least bad alternative, because it would have significantly lower environmental costs than the road.
- December 2013 and March 2014 - Workshops held in Lima to share the results from this follow-up research with CSF, TNC and Grupo de Análisis para el Desarrollo.
- May and August 2014 - Meetings in Pucallpa in with the infrastructure monitoring team (Grupo de Monitoreo) and Indigenous group representatives (Comunicadores Indígenas), as well as the Ucayali Regional Government.
- September 2014 - Participated in a two-day workshop in Rio Branco, in the state of Acre in Brazil to present the Pucallpa-Cruzeiro project and general CBA analysis concepts to government and civil society organizations.
- November 2014 - Publication of a shorter English discussion paper.
- December 2014 - CSF collaborated with TNC to convene a [side event](#) at the UNFCCC COP20 in Lima and presented results of the Pucallpa-Cruzeiro do Sul analysis
- March 2015 - Published [final report](#).
- March 2015 - CSF presented final results of the study to the Pucallpa monitoring group (Grupo de Monitoreo) and Indigenous group representatives (Comunicadores Indígenas), as well as to the Ucayali Regional Government.
- April 2015 – CSF participated in the 2015 [International Association for Impact Analysis Conference](#) in Florence, Italy. CSF staff presented results of the Pucallpa-Cruzeiro do Sul road and rail analysis.
- July 2015 - Documentary video about the project: [Infraestructura y Conservación: El Caso Pucallpa-Cruzeiro do Sul](#), which was shared during forum in Lima, through CSF's website, the CSF newsletter, and the ICAA bulletin.
- July 2015 - Convened a [high-profile](#) forum in Lima: *Challenges for sustainable interconnection in the Ucayali region*. Presented results of the Pucallpa-Cruzeiro do Sul road analysis to government and other stakeholders.



**In-house training** to build capacity of Peru's Ministry of Environment of Peru (MINAM).

- May 2012-April 2013 - Planning and design phase.
- April-December 2013 - Implementation of nine-month capacity building program in environmental valuation techniques. Program consisted of guided readings, weekly virtual discussions, and three in-person workshops in Lima.
- January 2015 - MINAM launched official [national guidelines for environmental valuation](#).

**Media trainings** for journalists and other media representatives:

- December 2012 – Infrastructure media training in [Puerto Maldonado, Peru](#): *Amazon Dialogue for Journalists*. Journalists from Peru, Ecuador, Colombia, Bolivia and Brazil attended.
- November 2013 - Infrastructure media training in [Brasília](#): *Obras de infraestrutura na Amazônia: desafios da cobertura midiática e ferramentas de apoio à análise e ao diálogo*.

**Analysis of the São Luiz do [Tapajós hydroelectric dam](#)** in the Tapajós Basin in Brazil.

- June 2015 – Participated in [Dams on the Tapajós River](#) workshop held at the Pontifícia Universidade Católica in Rio de Janeiro, Brazil in June 2015.
- September 2015 - Presented Tapajós study at workshop in Brasília: *Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment*
- November 2015 – Presented our Tapajós study at the [Ecosystem Services Partnership World Conference](#) in South Africa



## Albertine Rift

**Policy events and forums** focused on infrastructure & biodiversity:

- April 2014 – The National Environmental Management Authority of Uganda (NEMA) convened a meeting to discuss infrastructure policy best practices and innovations, and identify opportunities for policy reform: *Policy Meeting on Innovative Solutions for Biodiversity and Gender Integration in Infrastructure Developments and Guidelines for Economic Analysis of Environment Impacts*. Attended by representatives of key government ministries, departments and agencies, the private sector, and civil society organizations.

**Economic Tools for Conservation and Infrastructure Planning** training courses implemented.

- June 2012 - Economics Tools for Conservation and Infrastructure Planning course in [Uganda](#).
- June 2013 - Economics Tools for Conservation and Infrastructure Planning course in [Democratic Republic of Congo](#). Course [video](#).

**Analysis of the [Ikumba-Ruhija-Buhoma road](#)** through Bwindi Impenetrable National Park in Uganda with the International Gorilla Conservation Programme (IGCP).

- Fall 2012 - Project launched.
- 2012-2015 - Met with key stakeholders throughout the project, including Uganda National Road Authority, Uganda Wildlife Authority, and Uganda Chapter of Poverty and Conservation Learning Group.
- 2013 - Fieldwork and data gathering.
- 2014 - Analysis finalized showing the higher benefits and lower risks of road alternatives outside the park. CSF and IGCP had several informal meetings with Uganda National Road Authority to present results of the analysis.
- September 2014 - project methods, results and conclusions presented at [national policy forum](#) in Kampala.
- September 2014 - [Policy brief](#) of the project published and disseminated.
- March 2015 - Presented results of study to local communities and stakeholders during Ug-PCLG forum.
- April 2015 – CSF participated in the 2015 [International Association for Impact Analysis Conference](#) in Florence, Italy. CSF presented results of the Bwindi road analysis.
- May 2015 - Published the [full report](#): *Pave the Impenetrable? An economic analysis of potential Ikumba-Ruhija road alternatives in and around Uganda's Bwindi Impenetrable National Park*.
- September 2015 – [Full report](#) published in hard copy in Kampala for distribution by IGCP and NEMA.

**Analysis of oil pipeline construction in the Albertine Rift** region, with the Wildlife Conservation Society.

- Fall 2012 - Project launched.
- 2012-2015 - Met with key stakeholders throughout the project, including the Hoima, Bulisa, and Kasese district local governments.
- 2013 - Fieldwork, data gathering, and development of GIS methodology
- February 2013 - Infrastructure information sharing meeting in Uganda with key government ministries, departments and agencies, the private sector, and civil society organizations. During this meeting, NEMA/ UWA and WCS presented their analysis projects. Oil company representatives from Tullow and Total were also present.
- 2014 - Analysis finalized.
- July 2014 - WCS hosted the *Multi Stakeholder Marxan/Tradeoffs Workshop* to present goals, methods and preliminary results of the project.
- September 2014 - project methods, results and conclusions presented at [national policy forum](#) in Kampala.
- September 2014 - CSF, WCS, and Joseph Bull, a biodiversity offset expert from Imperial College in London, held a meeting with staff from the Ministry of Energy and Mines to discuss project results and potential opportunities for biodiversity offsets in Uganda.
- April 2015 - Published [final report](#): *A Cost Effectiveness Approach to Routing of Linear Infrastructure in Environmentally Sensitive Areas: A Case of a Crude Oil Pipeline In the Albertine Rift in Uganda*.
- April 2015 – CSF participated in the 2015 [International Association for Impact Analysis Conference](#) in Florence, Italy. CSF and WCS-Uganda staff presented results of the WCS oil pipeline analysis.

**Analysis of oil pipeline development in [Murchison Falls National Park](#)** with Uganda National Environmental Management Authority (NEMA) and Uganda Wildlife Authority.

- Fall 2012 - Project launched.
- 2012-2015 - Met with key stakeholders throughout the project, including NEMA, UWA, WCS, Ministry of Finance, Planning and Economic Development, and Tullow Oil
- 2013 - Project planning, design, and fieldwork.
- February 2013 - Infrastructure information sharing meeting in Uganda with key government ministries, departments and agencies, the private sector, and civil society organizations. During this meeting, NEMA/



UWA and WCS presented their analysis projects. Oil company representatives from Tullow and Total were also present.

- June 2013 - Technical meeting between CSF and the analysis team.
- 2014 - GIS methodology developed and data gathering.
- September 2014 - project and methodology presented at [national policy forum](#) in Kampala.
- April-November 2015 - Worked with NEMA and UWA to complete the study of oil pipeline development in Murchison Falls National Park. Coordinated technical support from WCS staff, a two-day analysis methods workshop at NEMA, final revisions, and plans for communication of results.
- December 2015 - [Discussion paper published](#): *Estimating the environmental and biodiversity costs accruing from planned oil pipeline development in the Albertine Rift, the Case of Murchison Falls National Park.*

**Developed guidelines with NEMA** for economic analysis of environmental impacts.

- August 2014 - publication of [Guidelines for Economic Analysis of Environmental impacts in Uganda](#).
- September 2014 - Guidelines launched during the [national policy forum](#) in Kampala.

**Coordinated a national policy forum** on environmental-economic analysis and infrastructure in Kampala, Uganda.

- September 2014 - Hosted a 2-day [policy forum](#): *Integrating ecosystem conservation and infrastructure development for social and environmental well-being in Uganda.*
- Infrastructure clinic on environmental-economic tools, CSF case studies around the world, presentations on the three Ugandan analysis projects, and a presentation on the potential of biodiversity offset mechanisms to compensate and mitigate environmental degradation.
- Policy sessions presented an overview of infrastructure development plans in Uganda, the results of CSF's global review of infrastructure policy best practices with ELAW, and potential policy innovations to integrate biodiversity conservation into infrastructure development in Uganda.
- Event concluded with the launch of the [NEMA valuation guidelines](#).

**Assisted International Rivers (IR)** in using the [HydroCalculator Tool](#) to evaluate dams throughout Africa, including 10 in the Albertine Rift region.

- 2015 - The result of this effort is the [publication](#): *Right Priorities for Africa's Power Sector: An Evaluation of Dams Under the Programme of Infrastructure Development for Africa.*



## Himalayas

**Organized a policy forum** in Kathmandu, Nepal

- May 2014 – hosted a Himalayan [policy forum](#) in collaborations with WWF Nepal: *Environmental-Economic Analysis and Infrastructure Policy Forum*. Event [photos](#).

**Economic Tools for Conservation and Infrastructure Planning** training course implemented.

- May 2014 - Himalayan regional [training course](#): Analysis of Infrastructure from a Conservation Economics Perspective with BUILD curriculum was implemented in [Bhutan](#). Participants came from Nepal, India and Bhutan. A [video](#) of impressions of the course from one of the participants.

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