

Africa's roads to ruin?

Africa's natural environments and spectacular wildlife are about to face their biggest challenge ever. In a recent paper, my colleagues and I assessed an infrastructure-expansion scheme for Africa so sweeping in scope, it is dwarfing anything the Earth's biggest continent has ever seen.

People, food and mining

Africa's population is expected to quadruple this century. With that, comes an escalating need to improve food production and food security.



An industrial logging operation in the Congo Basin (photo by William Laurance).

In addition, Africa today is experiencing a frenzy of mining activity, with most of the investment coming from overseas. China, for instance, is investing over US\$100 billion annually, with India, Brazil, Canada and Australia also being big spenders.

To feed its growing population and move its minerals to shipping ports for export, Africa needs better roads and railroads.

When located in the right places, improved transportation can do a lot of good. It makes it easier for farmers to acquire fertilizer and new farming technologies, and cheaper to get their crops to urban markets, with less spoilage.

And that's important because Africa's agriculture is badly under-performing. With better farming, Africa's farm yields could be doubled or even tripled without clearing one more hectare of land.

Pandora's box

However, there is a dark side to transportation projects, especially for the environment. When located in areas with high environmental values, new roads or railroads can open a Pandora's box of problems.

Roads cutting into remote areas can lead to range of legal and illegal human land uses. In the Amazon, 95% of all deforestation occurs within five kilometres of a road. In the Congo Basin, forest elephants decline sharply, and signs of hunters and poachers increase, up to 50 kilometres away from roads.

In the wrong places, roads can promote invasions of natural areas by illegal miners, colonists, and loggers. The explosive expansion of roads today is probably the greatest single peril to the world's natural environments.

Africa's 'development corridors'

We have identified 33 massive "development corridors" that are being proposed or are underway in Africa. At the heart of each corridor is a road or railroad, sometimes accompanied by a pipeline or power line.



An assessment of Africa's proposed and ongoing 'development corridors'.

If completed in their entirety, the corridors will total over 53,000 kilometres in length, crisscrossing the African continent.

Will these corridors generate large social and economic benefits, or will they cause great environmental harm? To address this question, we looked at three factors, focusing on a 25-kilometre-wide strip around each corridor.

First, we assessed the “natural values” of each corridor, by combining data on its biodiversity, critical habitats for wildlife, and the carbon storage and climate-regulating benefits of its native vegetation.

Second, we mapped human populations near each corridor, using satellite data to detect nightlights from human settlements. We then combined the natural-value and population data to generate a conservation-value score for each corridor, reasoning that sparsely populated areas with high natural values have the greatest overall conservation value.

Finally, we estimated the potential for new roads or railroads to increase food production. Areas that scored highly had soils and climates suitable for farming but large yield gaps, with better roads would be within a few hours’ drive of a city or port.

Costs versus benefits

When we compared the conservation value of each corridor with its potential agricultural benefits, we found them hugely variable.

A half dozen of the corridors look like a good idea, with large benefits and limited environmental costs. However, another half dozen seem really bad, in that they’d damage critical environments, such as rainforests of the Congo Basin and West Africa and the wildlife-rich equatorial savannas.

In the middle there are 20 or so “marginal” corridors. These tend to have high environmental values and high potential agricultural benefits, or vice versa.

We argue that these marginal projects should be evaluated on a case-by-case basis. If they do proceed, it should only happen under the most stringent conditions, with careful environmental assessment and land-use planning, and with specific measures in place (such as new protected areas) to limit their impacts.

Dangers for Africa

For Africa, the dangers of the development corridors are profound. Even if well executed, we estimate that the corridors would slice through over 400 protected areas and could easily degrade another 2,000 or so. This bodes poorly for Africa’s wildlife and biodiversity generally.

Beyond this, the corridors will encourage human migration into many sparsely populated areas with high environmental values. The wild card in all this is the hundreds of billions of dollars of foreign investments pouring into Africa each year for mining.

Even if a corridor is likely to yield only modest benefits for food production, it may be very difficult for governments and decision makers to say no to big mining money.

The bottom line: it could be a fraught battle to stop even ill-advised development corridors, though perhaps not impossible. If we shine a bright light on the corridors and argue strongly that those with limited benefits and large costs are a bad idea, we may succeed in stopping or at least delaying some of them.

This is unquestionably a vital endeavour. Africa is changing faster than any continent has ever changed in human history, and is facing unprecedented social and environmental challenges.

The next few decades will be crucial. We could see relatively sustainable development — or end up with a continent whose iconic natural values and wildlife have been irretrievably lost.

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Publication

[Estimating the Environmental Costs of Africa's Massive "Development Corridors".](#)

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Curr Biol. 2015 Dec 21