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If you can't build well, then build nothing at all

Scientists must call out — not merely greenwash — infrastructure building that will ruin environments, lives and economies, urges William Laurance.

Esteemed Brazilian scientist Eneas Salati once said that the best thing that could be done for the Amazon was to blow up all the roads. By 2050, Earth could accumulate another 25 million kilometres of paved roads, according to the International Energy Agency — enough to encircle the planet more than 600 times. When a new road penetrates intact forest, it can facilitate illegal deforestation, poaching, fires and land investors bent on encouraging a building boom — factors that are rarely considered in cost–benefit analyses of planned infrastructure projects.

Around nine-tenths of new infrastructure is slated for developing nations, which contain nearly all of the world's tropical and subtropical forests — biologically, the richest real estate on the planet. Yet many 'greening' measures, such as adding rope-bridges or underpasses to help species cross roads, bring relatively trivial benefits, akin to treating cancer with a Band-Aid.

Developing nations unquestionably need better infrastructure, but the benefits of many building proposals are oversold. Even without considering environmental costs, many infrastructure projects risk causing damage to countries' finances, social cohesion and responsible governance. They would not survive a rational cost–benefit analysis that factored in liabilities such as long-term maintenance costs, debt burdens and social well-being.

Instead of rotely focusing on mitigating environmental damage, we need to develop global guidelines to assess whether an infrastructure project should even go forward. Establishing a half-dozen simple criteria could red-flag the highest-risk projects, which the global community could research in depth and potentially recommend for cancellation. This task should be adopted in Sharm El-Sheikh, Egypt, this month, when a United Nations meeting of the Convention on Biological Diversity (CBD) will discuss infrastructure and extractive industries, such as mining and petroleum, that spur road development.

If you think conventional environmental-impact assessments are sufficient for countries to make appropriate infrastructure decisions, you are misguided. These evaluations are systematically biased towards project approval, in part because project proponents pay for them or may exert undue influence on government decision-makers.

For example, the environmental-impact assessment for Brazil's 900-kilometre-long BR-319 highway, which is slicing into the heart of Amazonia, concluded that the project would cause no net increase in deforestation. Yet independent analyses suggest that it will provoke dramatic acceleration of forest loss — an extra 5 million to 39 million hectares by mid-century (C. D. Ritter *et al. Biol. Conserv.* **206**, 161–168; 2017). Similarly, the provincial government of North Sumatra, Indonesia, approved a hydropower project that would cut across the scarce habitat of the critically endangered Tapanuli orangutan (*Pongo tapanuliensis*), of which there are fewer than 800 individuals still alive.

My colleagues and I found the environmental-impact assessment to be rife with inaccuracies and misinformation, which we reported to Indonesian President Joko Widodo in July. A local non-governmental organization is now challenging the project in a lawsuit.

It is often hard for citizens to access unbiased information about infrastructure projects in their countries. China's Belt and Road Initiative is intended to span some 120 nations and involve at least 7,000 infrastructure and extractive-industry projects. But because the initiative is inscribed in the Communist Party's constitution, it is legally protected from public criticism within China. Bad news about the scheme is blocked by government censors, or simply not translated into Mandarin.

People without these constraints must speak up. Too many scientists are ceding responsibility to overstretched decision-makers and public-interest groups.

Some put too much trust in existing regulations and safeguards. Others think that all development is good, or that it's inappropriate to advise a country if you're a foreigner. Some think it's just hopeless. And many simply don't have the stomach for real-world conservation: it's controversial, taxing and stressful. It can also be dangerous: my colleagues and I have faced death threats and lawsuits for speaking out against projects.

But we need to drive home messages that most current assessments won't or can't: that the price of building a road in a flood zone might not include installing proper drainage or rebuilding after inevitable washouts; or that, without an assured funding stream for maintenance, big investments for infrastructure, such as a major paved highway or

hydropower project, can easily be squandered, yet the damage and debt they create remains. Many nations, including Pakistan, Laos, Sri Lanka and some Pacific Island countries, are now veering towards insolvency.

If a project is in a remote area, wilderness or locale prone to flooding, that's a red flag. Another is the likelihood of highly inequitable economic benefits. Many developing nations, including Brazil, Papua New Guinea and Nigeria, have been plagued by such projects. Brazil, for instance, has lost billions of dollars in bad hydro-dam investments.

The CBD needs to set out simple guidelines and priorities to help nations produce smart, sustainable infrastructure. Experts should independently investigate projects pocked with red flags. Every nation has a sovereign right to determine its own development priorities. There is nothing even faintly undemocratic about giving citizens in each nation an opportunity to understand the real risks involved.

Many building projects should be screened out entirely — not just greened up. ■

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