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Why environmental impact assessments often fail

William F. Laurance[1]*

[1] Centre for Tropical Environmental and Sustainability Science, College of Science and Engineering, James Cook University, Cairns, Queensland 4878, Australia. Email: bill.laurance@jcu.edu.au.
*Corresponding author

The environmental impact assessment (EIA) is a nearly universal instrument intended to limit or to offset the environmental tolls of development projects. Here, I describe some of the key shortcomings of EIAs in terms of their real-world application, especially in developing nations that harbor much of the world's imperiled biodiversity. A surprisingly large number of EIAs suffer from major inaccuracies and some are green-lighting projects that will have serious environmental and societal costs. I summarize by proposing eight strategies to help improve the conservation capacities of EIAs.

La evaluación de impacto ambiental (EIA) es un instrumento casi universal destinado a limitar o compensar los peajes ambientales de los proyectos de desarrollo. Aquí describo algunas de las deficiencias clave de las EIA en términos de su aplicación en el mundo real, especialmente en las naciones en desarrollo que albergan gran parte de la biodiversidad en peligro del mundo. Un número sorprendentemente elevado de EIA adolece de importantes imprecisiones y algunos son proyectos de luz verde que tendrán graves costes medioambientales y sociales. Resumo proponiendo ocho estrategias para ayudar a mejorar las capacidades de conservación de las EIA.

Keywords: Biodiversity protection; conservation; environmental threats; habitat loss; strategic environmental assessment; threatened species.

Introduction

Across much of the world, nature is declining apace. Many new protected areas have been established in the past half-century (Jones *et al.* 2018), but in most other ways nature is in broad retreat. For example, the total area of wilderness is declining rapidly worldwide (Watson *et al.* 2016), 70 % of the world's forests are now <1 km from a forest edge (Haddad *et al.* 2105), the rate of tropical forest fragmentation is accelerating sharply (Taubert *et al.* 2018), and half of the world's biodiversity hotspots retain <10 % of their original intact habitat (Sloan *et al.* 2014). As a consequence of such intense environmental disruption, nearly a hundred mammal species have become globally extinct and a quarter of all extant mammals are seriously threatened with extinction (Burgin *et al.* 2018; Richie and Roser 2021).

One of the biggest drivers of environmental change is the tsunami of development projects sweeping our planet (*e. g.*, Álvarez-Casteñeda and Lidicker 2015; Rodriquez *et al.* 2019). The wave of change is in the form of new roads, dams, mines, housing estates, and extractive-industry developments, among others (Finer and Jenkins 2012; Clements *et al.* 2014; Laurance *et al.* 2014). The governments and corporations enabling these projects urge us not to be concerned, as each project is subjected to a rigorous environmental impact assessment (EIA) to ensure there is no lasting harm to nature.

Yet the alarming fact is, many EIAs are of limited value and some are virtually useless (Wang *et al.* 2003; Alamgir *et al.* 2018; Laurance and Salt 2018). As a frontline of environmental protection in most countries, the EIA is usually a legal requirement placed on a developer to measure the impact on nature of their proposed development (Li 2008; Momtaz and Kabir 2018). If that impact includes anything that the government has pledged to protect, such as a threatened species or rare ecosystem, then the development is halted or redesigned to avoid the impact.

That is the idea, anyway. Unfortunately, many EIAs are failing to stop dangerous or otherwise ill-advised projects (*e. g.*, Fearnside and Graça 2006; Goosem 2008; Laurance *et al.* 2015; Alamgir *et al.* 2017). Globally, one sees a growing catalog of cases where EIAs are giving green lights to developments that should never proceed — projects that are destroying irreplaceable habitat or extirpating the last living representatives of critically endangered species (Alamgir *et al.* 2017, 2018; Jamal 2017; Laurance 2018; Arkert 2021).

In Panama, for instance, a remarkably superficial EIA gave a thumbs-up for a large housing project that would be carved out of tropical forest, because the study reported only 12 bird species in the area. Fortunately, a local bird expert repeated the bird survey and in just two hours of searching tallied 121 bird species, including several rare and threatened species, demonstrating just how grossly inadequate the EIA was (Laurance 2007). EIAs can be especially poor in sampling secretive, nocturnal species such as smaller mammals, bats, and amphibians, which require specialized methods (*e. g.*, camera-traps, bat detectors, mist nets) to reliably detect them (Knegtering *et al.* 2006). Surveys of mammals in particular can be labor intensive, requiring different skills and approaches for different taxa (*e. g.*, small mammals, bats, secretive species such as carnivores

and some large forest-dwelling herbivores like tapirs), and often requiring longer than the typical surveys for *e. g.*, birds.

Another EIA, for the 870-km-long BR-319 highway slicing through the heart of Brazil's Amazonian rainforest, concluded that the project would cause *no net increase in deforestation*. Yet independent analyses suggest that by 2050 this project will provoke additional forest losses of up to 39 million hectares (Ritter *et al.* 2017), an area nearly the size of Switzerland.

As a final example, the approval of a $1.5-billion hydropower project in North Sumatra, Indonesia was based on an EIA that was so biased and rife with inaccuracies that I and 24 other international scientists wrote directly to Indonesian President Joko Widodo, decrying its serious distortions (Anon 2018; Laurance *et al.* 2020). Nonetheless, today this project is still advancing, cutting across the last remaining habitat of the critically endangered Tapanuli orangutan (*Pongo tapanuliensis*; Figure 1), the rarest great ape species in the world, and causing repeated construction-induced landslides that have so far claimed the lives of 10 local residents in the project area (Jong 2021; Karokaro 2021).

Designed for failure? Of course, not all EIAs are fundamentally flawed. In the most general terms, EIAs conducted in industrial nations tend to be more robust than those conducted in developing nations, which are often dogged by pervasive corruption and limited public engagement in the EIA process (Wood 2003; Fearnside and Graça 2006; Soares-Filho *et al.* 2015; Alamgir *et al.* 2017, 2018; McCullough 2017). EIAs commissioned by some major financial institutions, including multilateral lenders like the World Bank and Asian Development Bank, also tend to be relatively robust (Anon 2013). Rather than relying on an EIA, such lenders may require a broader evaluation known as a strategic environmental assessment (SEA) or strategic environmental and social assessment (SESA), which consider the cumulative effects of a project along with key economic and societal considerations (Lee and Walsh 1992).

Despite such positives, many EIAs are failing to do their job, for at least four reasons:

Inadequate investment. Rigorous environmental assessment takes time, effort, and resources. For example, detecting threatened species, one of the principal things EIAs are supposed to do, is technically challenging and expensive (Raiter *et al.* 2014; Middle and Middle 2010; Garrard *et al.* 2008, 2015; Wintle *et al.* 2012). Limiting EIAs to 'quick and dirty' appraisals, or simply avoiding an EIA altogether (Ward *et al.* 2019), saves money and time and also helps to avoid detecting rare species whose presence might block the development.

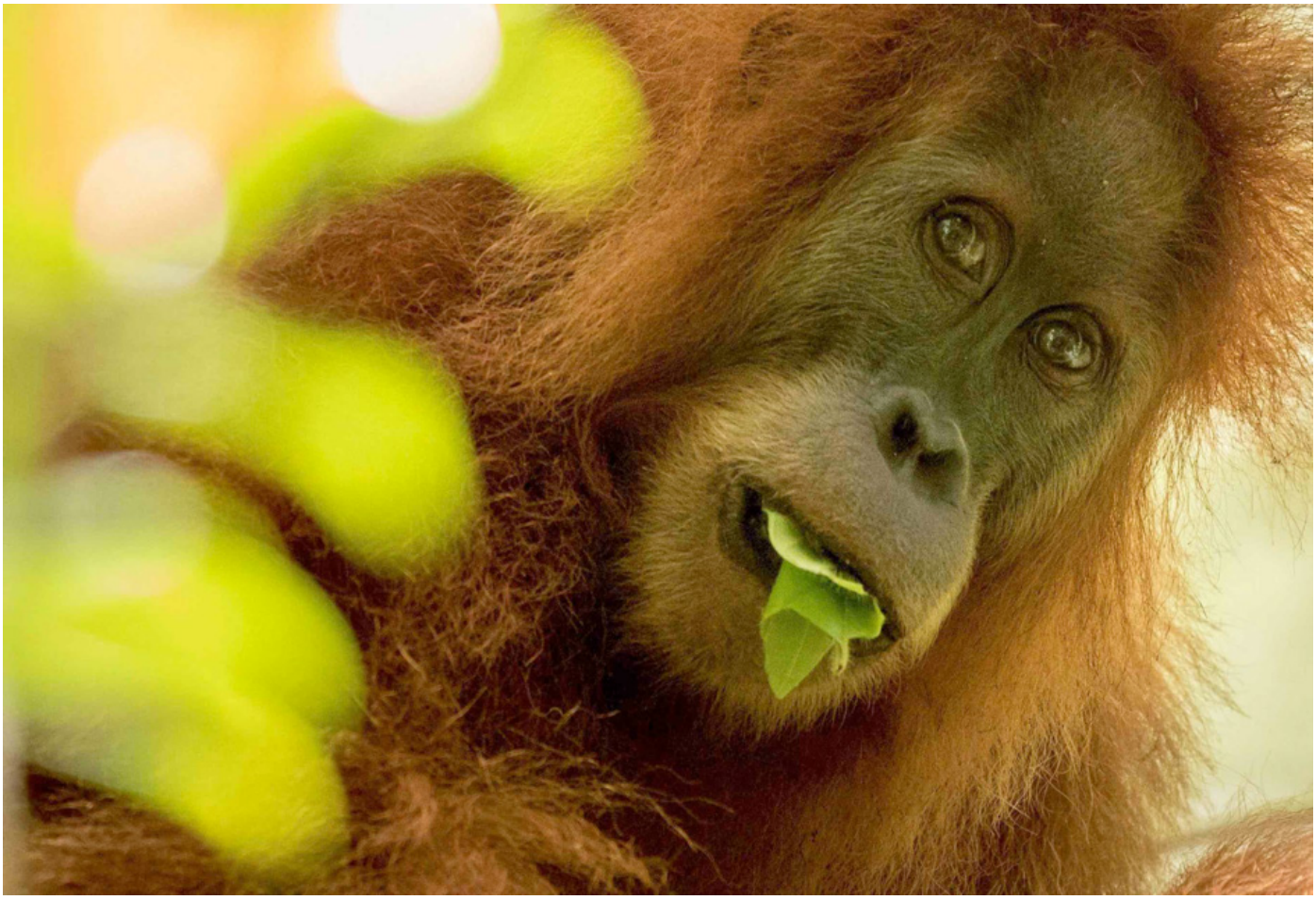

Figure 1. In Sumatra, Indonesia, a seriously biased EIA is allowing a major hydroelectric project to slice through critical habitat for the Tapanuli orangutan (*Pongo tapanuliensis*), the rarest great ape species in the world (photo © Maxime Aliaga).

Insufficient scope. The impacts of any development are rarely confined to its planned spatial footprint. Industrial mining projects in the Amazon, for example, have caused sharply elevated deforestation up to 70 km outside of the mine sites (Sonter *et al.* 2017). This is because the mines require new forest roads and those, in turn, promote illegal land encroachment and forest loss.

Similarly, in Malaysia, as elsewhere, few EIAs have considered the chronic increases in poaching (especially on mammals sold in the illegal wildlife trade or used as food, *e. g.*, Figure 2), habitat fragmentation, and other human pressures that occur when a new project slices into a native forest (Gray *et al.* 2016; Alamgir *et al.* 2017, 2018). The situation is comparable in Amazonia, where roads lead to broad 'deforestation halos', with 95 % of all deforestation occurring within 5.5 km of a legal or illegal road (Barber *et al.* 2014). In yet another example, EIAs for large dams in Brazilian Amazonia have markedly underestimated the size of the area that will be flooded by dam reservoirs, by 65 % on average (Cochrane *et al.* 2017).

Vested interests. Why do EIA assessors not simply try harder, do the job properly, and extend their assessment to incorporate all impacts related to the development? In short, vested interests and conflicts of interest (Arkert 2021). Most governments require the developer to pay for the EIA, which is typically undertaken by private consultants. Obviously, the last thing the developer wants is an EIA that stops its project dead in its tracks. If that happens, the EIA assessors involved might be blacklisted by other project developers in the future (Alamgir *et al.* 2018), creating a strong disincentive for the assessors not to favor a particular project.

On occasion, one even sees EIA consultants defending and promoting the project in public. In northern Queensland, Australia, for example, environmental experts were stunned in 2018 to see an EIA consultant publicly defending a major resort development, known as KUR-World (FOE 2019), that he was hired to evaluate objectively.

Figure 2. A poacher selling dead moustached monkeys (*Ceropithecus cephus*) for bushmeat along a Chinese-funded road cutting through a national park in the Republic of Congo. Many large development projects trigger uncontrolled secondary effects, such as wildlife poaching and illegal gold mining, that are not effectively countered by the EIA process (photo by William Laurance).

Poor governance. How do developers get away with such poor outcomes? A large part of the answer is weak or inadequate governance. Governments responsible for ensuring the integrity of the EIA process are failing to ensure it actually happens at the level required (Alamgir *et al.* 2017). Governments have vested interests, too. Development is usually equated with economic growth and jobs, and politicians can turn these benefits into votes. Add to that bribery and corruption, which are rife in many developing countries (Li 2008; Mukul *et al.* 2012; Alamgir *et al.* 2017; Momtaz and Kabir 2018) and common even in some wealthier nations, and it is easy to see how developers can gain an unhealthy hold over political and governance processes (Dupuy and Williams 2016; Laurance and Arrea 2017; Arkert 2021), including EIAs.

Eight ways to improve EIAs. Our planet is experiencing intense development pressures (Figure 3), including the planned construction of around 25 million km of new paved roads (Dulac 2013) and over 3,700 major hydropower projects (Zarfl *et al.* 2015), among others. Assessing such development trends in a way that prevents or greatly limits their environmental impacts is technically doable, as the relevant science is available. A greater challenge, however, is demanding appropriate transparency, accountability, and compliance around assessment efforts (Ward *et al.* 2019). Without those ingredients, we are poorly prepared for the ongoing wave of development.

Here are eight things we can do to help improve EIAs:

1. Insist to government authorities that EIAs be made freely available online, and that anyone be allowed to comment on them. Governments often allow only local residents to comment on EIAs, but many projects have regional or global effects. Limiting comments also excludes top international experts, such as hydro-dam or mining specialists, from providing critical advice.

2. Expect bribery to plague most projects (Laurance 2004; Alamgir *et al.* 2017, 2018), and tailor your strategies accordingly. Many projects that should never be approved move ahead because key decision-makers have been secretly paid off by the project proponent or land developers. These realities need to be communicated to stakeholders, journalists, and the general public, who may not be aware of the potentially serious impacts of corruption in development projects.

3. Insist that the public be allowed to comment on projects *early* in the approvals process, before a project gains momentum. Many developers try to ram projects rapidly through the approvals process (Laurance 2018). Hence, by the time the public is allowed to raise concerns, the project is virtually a *fait accompli* (Jamal 2017).

4. Where financial resources are available, urge that EIAs include funding for a) detailed pre-project surveys of envi-

Figure 3. The Padma Bridge, a US$6.2 billion project, is heavily impacting the world's largest mangrove forest in Bangladesh (photo © Azim Khan Roonie).

ronmental values and biodiversity, b) long-term monitoring and habitat rehabilitation after the project is completed, and c) insurance coverage for unexpected project disasters.

5. Be aware that too many EIAs recommend approving projects with only minor 'tweaks'. Such mitigation or offset measures can make the project seem palatable but are often minimally effective (Alamgir *et al.* 2018; Arkert 2021). Fish ladders around big dams and wildlife underpasses beneath highways are examples of expensive measures that may have only modest benefits for disturbance-sensitive species (van der Ree *et al.* 2007; Brown *et al.* 2012). Highway underpasses in Peninsular Malaysia, for instance, are largely avoided by the most vulnerable mammal species in the area, such as tigers, leopards, and elephants (Clements *et al.* 2014).

6. We need to say "no" to projects far more often (Fearnside and Graça 2006; Laurance 2018). Many proposed projects are simply a bad idea, with serious environmental, economic, social, and reputational risks that exceed their potential benefits. Such projects should be cancelled altogether rather than being allowed to proceed despite having serious flaws.

7. Watch your government closely. Just because a completed EIA recommends certain mitigation measures does not mean the developer will be compelled to do them (Arkert 2021). Government agencies that oversee development are typically overwhelmed and sometimes compromised by big money behind projects. Governments do better when they are closely monitored and scrutinized.

8. Use your expertise to help environmental and social groups opposing ill-advised projects. Most environmental and public-interest groups are stretched thin and in dire need of financial help and volunteers (Lawrence 2018).

The bottom line: Do not trust EIAs. Some are relatively strong and others are passable. But far too many are based on 'boilerplate' documents (standardized text that is re-used with only minor changes) or superficial reports that fall apart on close inspection. Expect many EIAs to be full of holes, and you will not be alarmed or disappointed.

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