

It'll take more than research: improving environmental decisions and ecological sciences in Indonesia

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In the 1990s, President Suharto of Indonesia led a project to convert over a million hectares of Central Kalimantan's peat forests to rice fields. Critics (including some in Government) warned that the project was unrealistic and dangerous. Kalimantan's peat soils are unsuitable for sustained rice production. The required drainage jeopardizes local hydrology and dries out the peat itself, leaving it prone to fire. No prior environmental impact assessment was sought, and ecological concerns were simply brushed aside. To Suharto this was a very public battle against poverty and hunger. In private a wealthy elite grew wealthier on the work contracts and the timber. The forest was cleared and over 4,600 kilometers of drainage channels were cut.



A logging road

This vast area, once a rich productive forest with a diverse fauna and flora (including an estimated 5,000 orangutans, *Pongo pygmaeus*) became a blackened wasteland. The network of drainage canals opened neighbouring forest areas for further destruction. Not one sack of rice was produced.

Local villagers suffered. Indigenous people lost access to the numerous items they traditionally took from the forest – they now bought fish where previously they had sold them. As the drying peat subsided, canals intended to irrigate dry local fields reversed their flow leaving the fields even drier in the dry season and flooded in the wet. Water in many channels became too acidic to use.

The dried peat often burned, creating a dense haze and releasing vast amounts of carbon dioxide. In 1998 Indonesia's peat fires contributed around one billion tonnes of CO₂ – more than the European Union's entire fossil fuel contribution in a year (for more on this scheme see Rieley 2001; Hooijer et al. 2006).

Such hard lessons should be a thing of the past in Indonesia. Scientists and researchers have continued to build up a solid body of knowledge of soils, ecology and environmental impacts that can help policy makers avoid repeating past mistakes and to help address rather than exacerbate environmental problems. But this knowledge is seldom used. Those with power and influence often find it advantageous to ignore well-founded environmental concerns. Think of George Bush's past stance on global warming. Sometimes the politicians are not wholly to blame.

In Indonesia, few people are able and qualified to improve the uptake of scientific information by decision makers. Environmental sciences – here including ecology – are especially ill-favoured. Talented students are likely to look for careers with better rewards than those earned by environmental scientists. Or, almost as troubling for Indonesia's future development, pursue a career overseas. Those that persevere in national systems must confront a hierarchy and a culture where debate, let alone dissent, is not encouraged. Indonesia possesses few internationally recognized academics in ecology or other environmental sciences.

This is not to say real efforts are not being made. They are. We are often impressed by the hard work and commitment of our local colleagues in teaching, researching and publicizing the need for conservation, environmental awareness and applied sciences. But their task is much harder than for western scientists like us.



Wildlife training for logging concession staff

It doesn't help that the most visible environmental science, as wielded by international NGOs, seems more concerned with animals than people. Many of Indonesia's decision makers view scientific research with scepticism, and concern for the environment as a dispensable luxury. With little experience to draw upon why would they think otherwise? How can they locate and find the information that might help them? We can't expect public decision-makers – however sympathetic – to locate and read two-hundred scientific reports every time they make a decision. In wealthy countries, governments employ experts and advisors to read and apply this knowledge. But in Indonesia such well informed advisors are scarce.

An up-to-date environmental expert must keep abreast of the latest studies, concepts and debates. This requires well-funded libraries, top-class internet services and a strong culture of critical reading and evaluating evidence. Too many of Indonesia's scientists are on the wrong side of the digital divide when it comes to modern libraries stacked with expensive up-to-date journals and high tech information services. Many publications, journals and books are prohibitively expensive, and libraries often lack the resources to keep their collections accessible, safe, and up-to-date. Increased interest in open access publishing by BES and others can help but it is far from sufficient to bridge the information gap.

Expertise in Indonesia is still strongly grounded in age and experience – the immediacy of the dynamic publishing, learning, sharing and debating culture found in westernized countries remains largely non-existent. English, the common language of modern science, is often a hurdle too high for many Indonesian researchers and decision makers.

The future of Indonesia's natural environment is too important to allow this situation to continue. Environmental scientists and scientific advisors – from students to senior researchers – must be given the skills, access, tools and opportunities to better draw on current knowledge and build a strong Indonesian research community. This is where international agencies can make a real difference beyond simple overseas scholarship programs. They can improve access to knowledge by providing translations, subsidizing electronic media, and publishing cheap attractive non-specialist books such as the *Ecology of Indonesia* series (most recent: Marshall and Beehler 2007), which summarizes and provides context for a vast amount of past research on the Indonesian environment.

An example of how donors can assist occurred with our own recently published books in Indonesian and English on reconciling forest management with wildlife conservation in Borneo. With support from the World Bank, UNESCO and others, we were able to ensure the books better addressed the needs of local scientists, policy makers and forestry professionals. We summarized a large number of practical recommendations, outlined the research behind them, and offered guidance and solutions to decision-makers (Meijaard *et al.* 2005, 2007). Most importantly, donor support allowed us not only to make the books available in English and Indonesian, but also – and this is significant for developing country scientists – donor support allowed us to give them away free via our website, hosted by the donor funded Center for International Forestry Research (www.cifor.cgiar.org). Extensive feedback from Indonesian researchers suggests this approach is valued and that the books are an important contribution to forestry and conservation practices in the region.

Support from within Indonesia is also crucial. We hope the Indonesian government realizes the importance of a strong national community of scholars. The educational system in the country is improving, but environmental sciences are lagging behind—there is a need to update the syllabus and improve the incentives to encourage more young people to study ecology and the environment.

Researchers (local and foreign) can do more to ensure their research is useful and that its implications reach decision-makers. Local universities should encourage more publishing among staff and students, by recognizing and rewarding writers accordingly. Such writings are valuable whether they are aimed at popular local media or at peer-reviewed international journals. In a society where critical debate is slow to develop, the most important point is that ecological

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researcher can voice their scientific opinions and engage in public discussion.

Indonesian scientists need to engage with international research and with local debates. This requires training, outreach and perhaps a change in the way we work. Indonesia needs dynamic scientific communities that can help develop technical debates over the pros and cons of policies and the means to address environmental concerns.

One good example is development seen in the donor-supported Asia Forest Partnership (AFP), a forum for national and international policymakers and researchers to share concerns and solutions to pressing forestry challenges in the region. Similar fora for developing ecology and conservation science could play a valuable role in the future, especially if younger people can be involved. Perhaps, if suitable seed projects can be found, BES could broaden the scope of their Building Capacity in Ecology fund to support such networks in South East Asia.

Individual ecologists too can make a difference: by developing partnerships with local institutions and researchers, by supporting student exchanges, and encouraging initiatives that can bolster the visibility of environmental and ecological sciences in the region.



Oil palm plantations are a tempting prospect

Are mistakes like the million hectare rice scheme still possible? Perhaps they are. Recent years have seen several proposals to plant oil palm along Kalimantan's mountainous interior border region, despite the fact oil palm plantations cannot grow economically in most of this area. The government is hesitating. Proponents remain active and the outcome remains uncertain.

It is true decisive action to address environmental problems requires political will. But too often, as in Indonesia, decision makers and the voting public lack the information needed to act wisely. Ecological understanding is essential to cleaning-up and maintaining Indonesia's air, rivers and seas and ensuring sustainably productive forests and fisheries, but research alone is not enough.

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