

Enforcement more effective than financial incentives in reducing harmful peat fires?

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A builder by trade turns his hand to fishing and casts his net as firms close in Riau Province, Sumatra, due to the toxic haze from burning peatlands. Credit: Bjorn Vaughn

A new study looking at incentives to reduce globally harmful peatland fires suggests that fear of enforcement and public health concerns

influence behaviour more than the promise of financial rewards.

The findings come as wildfires devastate the US West Coast and Russian Arctic, and fire season begins in Australia, Indonesia and Brazil.

Led by the University of East Anglia (UEA), the research examined the intervention mix within a leading peat fire prevention programme in Indonesia and found that the incentives had little impact. Instead, communities responded more strongly to the deterrents of sanctions, such as fines, and to raised awareness about the negative health impacts of toxic smoke, or 'haze'. Indeed, fear of sanctions most consistently related to fire-free outcomes.

Indonesian peatlands are globally important for the carbon they store and help protect Southeast Asian biodiversity. However, they are undergoing rapid land-use change. They have been drained and frequently cleared using fire, often to enable the expansion of oil palm and acacia plantations.

Increasing fires are a leading environmental challenge, with impacts ranging from local infringements on public health, livelihoods and daily freedoms through the release of toxic haze, to regional economic losses and global burdens associated with climate change through carbon emissions.

With the fire season in Indonesia imminent, and a bad year in 2019, the authors say their findings have implications for future fire management interventions, including how to balance reward and sanction to ensure equitable and effective fire mitigation.

The study, published in the journal *Global Environmental Change*, involved researchers from UEA, Lancaster University and the University of Cambridge, together with scientists from the US, France and

Indonesia.

Lead author Dr. Rachel Carmenta, from the Tyndall Centre and School of International Development at UEA, said: "Uncontrolled fires are increasing globally and the trend is predicted to continue. Humid tropical forests that wouldn't normally burn are now sites of extensive mega-fires. These include the Brazilian Amazon, which last year hit record highs, this year the Brazilian wetland ecosystem the Pantanal, which is suffering extensively from uncontrolled fires, and Indonesia's peat swamp forests, where extensive fires are now annual events.

"Our results highlight that incentives were less important than deterrents in shaping environmental outcomes. However, there was also no single pathway to fire-free outcomes, and combinations of interventions were particularly important in high fire risk situations.

"Previous research shows supporting small-scale farmers is the least controversial fire mitigation policy in Indonesian peatlands. But as we find in this study, even a scheme considered to depend heavily on incentives, in practice hinges on deterrents. This raises important equity concerns. While sanctions are effective, they may cause more damage to those most vulnerable and with least alternatives to fire dependence."

Intentional fires to clear land can more easily escape on peatland and result in extensive uncontrolled peat fires. The resulting toxic smoke is responsible for outdoor air pollution, with atmospheric particulate matter concentrations exceeding those considered extremely hazardous to health, and is linked to hundreds of thousands of public health cases.

Many solutions have been proposed, such as forest protection measures, moratoriums on peat expansion, and agricultural support. However, numerous programmes have largely failed, and what policy interventions to combine and how to align these to local conditions remains unclear.

To help address this, the researchers compared 10 Indonesian villages that participated in the Fire Free Village programme in Riau Province, Sumatra. The scheme is operated by a pulp and paper company to incentivise small-scale farmers living in communities adjacent to their acacia tree concession areas to reduce fire, and therefore the prevalence of uncontrolled fires.

If villages prevent local fires, they are rewarded with US\$7,000 to support community projects. The programme includes interventions that focus on sanction and deterrent as part of the policy mix towards fire free outcomes.

The team found that effective combinations of interventions depend on the landscape context of the [village](#). In villages with lower fire risk, a single intervention was enough to reduce fire, for example the threat of enforcement for illegal burning. In these villages people had more diverse livelihood options, most land was already being farmed—reducing the need to use fire—and people farmed on mineral soils, which do not burn.

In villages with far higher risks of fire escape, fire was reduced only where at least two methods were combined: feared enforcement and concern about the impacts of fire haze on their health. Again, incentives did not matter.

People in higher [fire](#) risk villages were primarily reliant on oil palm for their livelihood. Village areas were on larger extents of highly flammable peatland and much of the land area was not planted, so people were still clearing for agriculture.

More information: 'Evaluating bundles of interventions to prevent peat-fires in Indonesia', Rachel Carmenta, Aiora Zabala, Bambang Trihadmojo, David Gaveau, Mohammad Agus Salim, Jacob Phelps, is

published in *Global Environmental Change* on October 1.

Provided by University of East Anglia

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