

## PUBLISHING

# Indonesian preprint server takes off

*Website's creators aim to open up the country's science to a wider audience.*

BY IVY SHIH

A preprint server that focuses exclusively on Indonesian research passed a milestone on 5 December when the number of papers posted on it reached 1,500. INA-Rxiv is one of the first preprint repositories to focus on the work of a single country.

"I didn't think it would be this huge in such a short period of time," says hydrogeologist Dasapta Irawan, who helped to create INA-Rxiv, which launched in August.

Most preprint servers specialize in particular academic disciplines — including the original arXiv, which covers physics and mathematics. The four researchers who developed INA-Rxiv built it to draw attention to Indonesian research, which they felt was going unnoticed by the international science community. "I want people to understand that in Indonesia, we can produce original research and papers," says Irawan, who is based at the

Bandung Institute of Technology in Indonesia.

The server hosts papers in multiple disciplines — most in the natural sciences, followed by engineering, the social and behavioural sciences and arts and humanities — and accepts material written in Bahasa Indonesian and English. It operates in partnership with the Open Science Framework, a service run by the Center for Open Science in Charlottesville, Virginia.

Computer scientist Robbi Rahim at Indonesia's Medan Institute of Technology has uploaded 26 papers. One of those articles, about multimedia learning in mathematics and written in Bahasa, has been downloaded some 330 times. Rahim says that the site helps him to reach a big audience, because he can upload articles in both languages.

Irawan says that some Indonesian scientists

seem to be using INA-Rxiv to boost the chance of having their papers included in the government's new research-evaluation system, called the Science and Technology Index (SINTA). Launched in January 2017, SINTA ranks researchers and institutions by various metrics, including the number of publications listed in major citation databases and Google Scholar.

But Irawan says that SINTA does not index many open-access Bahasa-language journals. Some researchers, he says, seem to use INA-Rxiv to get around SINTA's limitation. That's because articles on the preprint server are automatically indexed on Google Scholar.

Although Indonesian scientists have embraced INA-Rxiv, some question whether it will improve the country's research. Psychology researcher Dicky Pelupessy of the University of Indonesia in Depok says that research quality is one of the reasons Indonesian scientists struggle to get their research read and cited internationally. ■

**"In Indonesia, we can produce original research and papers."**

## CLIMATE SCIENCE

# 'Blue carbon' defies expectations

*Results of soil survey could bolster efforts to monitor and protect wetlands around the globe.*

BY JEFF TOLLEFSON

Tidal wetlands come in many forms, but they could be more alike below the surface than anyone realized. Whether it's a mangrove forest in Florida, a freshwater swamp in Virginia or a saltwater marsh in Oregon, the amount of carbon locked in a soil sample from each of these coastal ecosystems is roughly the same.

That's the surprising message from a new analysis of some 1,900 soil cores collected around the United States during the past few decades. "In terms of carbon stocks, all tidal wetlands are very, very similar," says Lisamarie Windham-Myers, an ecologist with the US Geological Survey (USGS) in Menlo Park, California, who is leading a 3-year, US\$1.5-million assessment of coastal

carbon funded by NASA. "The variability that everybody expected just doesn't exist."

Her team presented its findings last month in New Orleans, Louisiana, at a meeting of the American Geophysical Union; the researchers plan to publish data from 1,500 soil cores online as early as this month, and hope to release information on the remaining 400 later this year.

The discovery could bolster efforts to assess and protect the world's coastal wetlands. These ecosystems accumulate vast stocks of carbon that escape into the atmosphere when wetlands are destroyed. Development alters some 800,000 hectares of coastal wetlands around the world each year, sending roughly 500 million tonnes of carbon dioxide into the atmosphere — double the carbon emissions of Spain in 2016.

Over the past decade, scientists and policymakers have pushed to protect the carbon stored in coastal wetlands, known as blue carbon. The goal is to address climate change while protecting ecosystems that sustain fisheries, improve water quality and protect coastlines against storms. But raising money to support such efforts often requires determining precisely how much carbon these ecosystems hold, and how it accumulates over time.

Windham-Myers's team reanalysed raw data from some 1,500 sediment cores collected over the past several decades, and 400 newer samples. The data showed a clear relationship: the density of soils decreased as the fraction of carbon in those soils increased, and vice versa. As a result, the amount of carbon in any given cubic metre of soil remained roughly the same, regardless of differences in vegetation, climate, topography or water chemistry across blue-carbon ecosystems.

"It's almost like a universal constant," says Stephen Crooks, an independent geomorphologist in San Francisco, California, who analysed blue-carbon stocks in the latest US inventory of greenhouse-gas emissions and sinks. That report, which the US Environmental Protection Agency released in April last year, found that the United States' 3.8 million hectares of coastal wetlands soak up 8.1 million tonnes of CO<sub>2</sub> each year.

Estimates from a century's worth of soil surveys by the US Department of