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.

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

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. ■

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_2 each year.

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

WESTWINDGRAPHICS/GETTY

Tidal wetlands such as this marsh in Oregon can store large amounts of carbon.

Agriculture (USDA) showed more variation, but those figures were based on data collected by people who were often thinking more about agriculture on land. In the Mississippi delta, for instance, many early measurements were limited to surface sediments that are rich in carbon, and estimates of the soil density below the surface may have been too high. As a result, Windham-Myers says, the USDA overestimated carbon stocks in the region.

Crooks says that if soil measurements from wetlands elsewhere agree with the US findings, global estimates of carbon stocks could improve. Windham-Myers and her colleagues recently examined data from coastal wetlands across Africa, and the results were consistent with the team's analysis of cores from US tidal wetlands.

But understanding how much carbon is in the ground is just a prelude to determining the rate at which wetlands sequester carbon. That figure depends in part on local topography and on the rate at which seas rise and create more space for carbon-rich sediments to accumulate. And methane emissions vary widely depending on whether water in a wetland is salty, fresh or brackish. Similarly, understanding how much carbon enters the atmosphere when a wetland is drained for agriculture or other purposes requires a more detailed understanding of the soil make-up. All of this information must be plugged into models to project how wetlands will evolve in the coming decades.

Crooks hopes that providing better data on the carbon stored by wetlands will encourage governments to halt the destruction of these ecosystems. "It's important that we find every mechanism that we can to offset our carbon emissions," Crooks says. "This is one piece of the puzzle." ■

CORRECTION

The image of the eclipse in 'Images of the year' (*Nature* **552,** 308–313; 2017) was an artistic representation that did not accurately depict the event. It has been replaced with a new image online.