

## RESEARCH CAPACITY

## World Bank invests in Africa

Grassroots science initiative receives US\$280 million.

BY LINDA NORDLING

A World Bank scheme aimed at building research capacity in Africa has announced a third, and probably final, investment worth at least US\$280 million. The initiative loans money to African governments, and has set up 46 education and research centres in 17 African countries — but some worry what will happen once the bank's money runs out.

“I see a big challenge when the funding ends,” says Patrick Ogwang, who leads a traditional-medicine research centre funded by the initiative, at Mbarara University in Uganda. He is eyeing industry partnerships as a source of future cash, but says that competition is fierce.

The World Bank launched the African Centres of Excellence (ACE) initiative in 2014 with \$165 million in loans; it created 22 centres in West and central African nations. Two years later, the bank approved \$148 million to create 24 hubs in eastern and southern African countries. The third round, announced on 31 August, pushes the bank's total investment past \$500 million. It again targets West and central Africa, and French development agency the AFD may add another \$50 million.

The centres focus on local research challenges such as plant breeding and infectious diseases, and have created jobs for hundreds of scientists and trained thousands of graduate students. Centres are eventually expected to sustain themselves with funding from governments, charities and industry. It's important that the centres move towards this, says World Bank economist Andreas Blom, who leads the programme, but the third round of loans will offer “weaning off” funding for existing centres in West and central Africa, and pay for new ones.

Critics of the scheme say that it has allowed governments to delay making substantive national investments in research. Governments have 40 years to repay the money at low or zero interest. “Many African governments, with short political life spans, are not really concerned about who will pay and how,” says John Mugabe, an expert on science policy in Africa at the University of Pretoria in South Africa.

Representatives from the Ghanaian and Nigerian governments told *Nature* that the ACE loans complement their plans for national funding. In Ghana, higher-quality research proposals will reach the country's national research fund thanks to the scheme, says Mohammed Salifu, executive secretary of Ghana's National Council for Tertiary Education. ■



Firefighters battle a blaze near Redding, California, in July.

## ECOLOGY

# Huge wildfires defy explanation

Researchers scramble to improve wildfire models as blazes become larger and less predictable.

BY JEFF TOLLEFSON

In California, where the state's largest wildfire on record continues to burn, fires are getting bigger and less predictable — so much so that scientists are struggling to model them. Now, two research projects under way in the state are aiming to revamp the models that scientists, first responders and policymakers use to understand these dangerous and costly disasters.

One, slated to wrap up in the next few months, looks at how specific environmental factors such as extreme winds affect fires. The other, officially launched on 30 August, focuses on how wildfires will change in the coming decades as the climate warms.

“Something is definitely different, and it raises questions about how much we really know,” says Max Moritz, a fire scientist at the University of California, Santa Barbara.

The efforts come against a backdrop of

abnormal fire seasons around the world. The giant California fire has torched about 166,000 hectares since late July, and continues to burn in the northern part of the state. British Columbia in Canada is now experiencing its worst fire season on record (see ‘Scorched earth’). And in late July, after

**“We need to refocus some of our research efforts on characterizing the kinds of fire behaviour that cause us the most grief.”**

weeks of intense heat and some of the lowest rainfall totals since the late nineteenth century, officials in Sweden were battling roughly 50 wildfires across the country. Researchers have been at a loss to explain a flurry of unusual fire behaviour in California in recent years: wildfires that burn hot throughout the night instead of settling down, as many used to; blazes that race down hillsides faster than before; and fires that torch suburban neighbourhoods that were once considered safe from such

MARK RALSTON/AFP/GETTY

events. And, in July, a tornado with unprecedented wind speeds of 230 kilometres per hour span up inside a fire near Redding, California.

The problem, Moritz says, is that most of the fire models in use today are based on data from the past two or three decades. But it seems that fire behaviour might be shifting in response to climate faster than anybody expected, and that makes it increasingly problematic to extrapolate from past trends, he adds.

### BAD BEHAVIOUR

“More frequent, extreme fire behaviour is actually sort of expected, but just saying that it’s going to happen isn’t enough,” says Dave Sapsis, who specializes in fire modelling and behaviour at the California Department of Forestry and Fire Protection (CAL FIRE), based in Sacramento. “We need to refocus some of our research efforts on characterizing the kinds of fire behaviour that cause us the most grief.”

As part of one of the projects, Sapsis is updating the model that CAL FIRE uses to map fire hazards across the state. In use since 2007, the model incorporates information about environmental conditions such as topography, fire history and the type of burnable vegetation in an area. But it doesn’t capture how extreme winds can move through a local landscape. Those winds are the key to understanding urban conflagrations, Sapsis says.

Within the next few months, he hopes to complete work on a detailed record of wind speed and direction across the entire state over



the past 15 years. Those wind maps should help scientists to study recent fires and, ultimately, boost CAL FIRE’s ability to predict the risk of extreme fires in any given locality, Sapsis says.

Climate scientists expect those risks to

increase in the coming decades. California’s Fourth Climate Change Assessment, released on 27 August, projects that the area of land consumed by wildfires in the state each year could increase by 77% by 2100 if global greenhouse-gas emissions continue to rise. On average, more than 286,000 hectares have burnt each year over the past two decades.

### FUTURE ON FIRE

The second project, a US\$4-million study that includes Moritz and other scientists at multiple University of California campuses, will explore the future of fire, ecosystems and climate in California. Much of the existing research has focused on extrapolating from past trends. But this study is aiming to create a more realistic picture of how wildfires and ecosystems will evolve by integrating detailed models of fire behaviour, vegetation and climate across the entire state.

This should allow scientists to analyse how more-extreme and variable weather will affect wildfires and how ecosystems will respond to them, says Alex Hall, a climate scientist at the University of California, Los Angeles, and the project’s principle investigator.

A lot of work has focused on tracking average fire trends, Sapsis says. But scientists need to improve their understanding of the extreme blazes, as well as how fire patterns could shift in the future, he adds. This will help government agencies and communities make better choices when it comes to managing ecosystems and human developments in fire-prone areas. ■

SOURCE: WRI/USGS/BC WILDFIRE SERVICE

### PUBLISHING

# Radical plan to end paywalls

Top European research funders announce ‘Plan S’ to make all scientific works free to read.

BY HOLLY ELSE

Research funders from France, the United Kingdom, the Netherlands and eight other European nations have unveiled a radical open-access initiative that could change the face of science publishing in just two years — and which has instantly provoked protest from publishers.

The 11 agencies, which together spend €7.6 billion (US\$8.8 billion) in research grants annually, say they will mandate that, from 2020, the scientists they fund make resulting papers free to read immediately on publication. The papers would have a liberal publishing licence that would allow anyone else to download, translate or otherwise reuse the work. “No science should be locked behind

paywalls!” says a preamble document that accompanies the pledge, called Plan S, released on 4 September.

“It is a very powerful declaration. It will be contentious and stir up strong feelings,” says Stephen Curry, a structural biologist and open-access advocate at Imperial College London. The policy marks a “significant shift” in the open-access movement, which has seen slow progress in its bid to make scientific literature freely available online.

As written, Plan S would bar researchers from publishing in 85% of journals, including influential titles such as *Nature* and *Science*. According to a 2017 analysis, only around 15% of journals publish work immediately as open access (see ‘Publishing models’) — financed by charging per-article fees to authors or their

funders, by negotiating general open-publishing contracts with funders, or through other means.

More than one-third of journals still publish papers behind a paywall, and typically permit online release of free-to-read versions only after a delay of at least six months. And just less than half have adopted a ‘hybrid’ model of publishing, whereby they make papers immediately free to read for a fee if an author wishes, but keep most studies behind paywalls. Under Plan S, however, scientists wouldn’t be allowed to publish in these hybrid journals, except during a short transition period. The plan also states that funders will cap the amount they are willing to pay for open-access publishing fees, but doesn’t lay out what charge would be too much.

The initiative is spearheaded by Robert-Jan Smits, the European Commission’s special ▶