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PICTURE ALLIANCE/AVALON/RED



People march in protest against Jair Bolsonaro, one of Brazil's presidential candidates, in the southern city of Curitiba.

POLITICS

Brazil's presidential election could savage its science

One leading candidate has proposed pulling the country out of the Paris climate agreement.

BY JEFF TOLLEFSON

A populist surge from a right-wing presidential candidate in Brazil that is threatening to upend the country's politics could have huge impacts on research budgets and environmental policies.

Jair Bolsonaro, a controversial politician often dubbed the 'Tropical Trump', has outlined plans that would weaken environmental protections and reorganize federal science programmes. He won the first round of voting on 7 October with 46% of the votes — just shy of the 50% he needed to avoid a run-off election.

Bolsonaro will face Fernando Haddad, a former São Paulo mayor who won 29% of the vote, in a run-off on 28 October. Haddad is the

replacement candidate for former Brazilian president Luiz Inácio 'Lula' da Silva, a popular leader of the leftist Workers' Party who was barred from running in this election because he is in prison on corruption charges.

Years of economic woes and corruption scandals serve as a backdrop to the election. Brazil's federal science budget has declined sharply over nearly a decade, and pro-industry politicians are slowly chipping away at the country's environmental regulations. But the two leading presidential candidates have offered very different visions for addressing these issues, leaving scientists on edge.

Bolsonaro, a lawmaker from Rio de Janeiro in Brazil's lower house of Congress, often votes with the conservative rural caucus, which is

actively seeking to weaken environmental regulations. He has proposed decentralizing federal science programmes — although it's unclear how he would do so — and merging environment ministry with the agriculture, livestock and supply ministry. Bolsonaro has also suggested pulling Brazil out of the 2015 Paris climate accord.

In the Amazon region, scientists say, Bolsonaro is seeking to promote agricultural and industrial expansion at the expense of environmental protections and the rights of Indigenous communities.

The message to industry and agriculture seems to be that a Bolsonaro administration would let them do whatever they want in the Amazon, says Carlos Rittl, executive ▶

▶ secretary of the Climate Observatory in São Paulo, a network of 37 groups focused on climate policy. If Bolsonaro won, it “would be a nightmare”.

Bolsonaro — whose vice-presidential running mate has raised the spectre of military intervention to address political dysfunction — was once considered a long-shot candidate. The latest poll analysing run-off scenarios, however, shows Bolsonaro with a slight lead over Haddad.

“People say Bolsonaro stands no chance, but who knows,” says Carlos Nobre, a climate scientist and former secretary for research and development policy at Brazil’s Ministry of Science, Technology and Innovation.

BOOSTING SCIENCE

Haddad, by contrast, has a more mainstream vision for Brazil that emphasizes science, innovation and action on climate and environmental policies. He has promised to promote renewable energies, such as wind and solar, while fighting deforestation and maintaining protections for Indigenous territories in the Amazon.

And unlike Bolsonaro, who has called for more private-sector research and development, Haddad has committed to boosting federal spending on science. He has proposed raising the national investment in research and development to 2% of Brazil’s gross domestic product, using government and private funding. That would bring the country’s science spending in line with many industrialized nations.

It’s unclear how feasible those spending goals are. One wrinkle is that in late 2016, Brazil adopted a constitutional amendment that caps government investments for 20 years, aside from adjustments for inflation.

Any policies that recognize and invest in science and technology are welcome, says theoretical physicist Luiz Davidovich, president of the Brazilian Academy of Sciences. He notes that, after adjusting for inflation, the science ministry’s budget has decreased by roughly two-thirds since 2010, to around 3.4 billion reais (US\$860 million).

Budget shortfalls have meant less money for equipment, federal grants, travel and postdoctoral fellowships for public-university researchers in Brazil. Despite this, Davidovich says, scientists are pressing on wherever possible.

Although science and technology factor in the campaigns of Bolsonaro and Haddad, it’s too soon to tell what might happen after the election.

“The fact that they have science and technology in their programme does not mean it’s going to be important when they become president,” Davidovich says. “There is a big difference between what is written, and what is practised.” ■



Glaciers and sea ice won't be safe in a world that warms to 2 °C above pre-industrial levels.

GLOBAL WARMING

Clock ticking on climate action

IPCC sees small window to avoid worst effects of warming.

BY JEFF TOLLEFSON

Limiting global warming to 1.5 °C above pre-industrial levels would be a Herculean task, involving rapid, dramatic changes in how governments, industries and societies function, says the Intergovernmental Panel on Climate Change (IPCC). But even though the world has already warmed by 1 °C, humanity has 10–30 more years than scientists previously thought in which to kick its carbon habit.

To meet this target, the world would have to curb its carbon emissions by at least 49% of 2017 levels by 2030 and then achieve carbon neutrality by 2050, according to a summary of the latest IPCC report, released on 8 October. The report draws on research conducted since nations unveiled the 2015 Paris climate agreement, which seeks to curb greenhouse-gas emissions and limit global temperature increase to between 1.5 and 2 °C.

The world is on track for around 3 degrees of warming by the end of the century if it doesn't

significantly reduce greenhouse-gas emissions. It could breach 1.5 °C between 2030 and 2052 if global warming continues at its current rate.

Scientists have “high confidence” that 1.5 °C of warming would result in a greater number of severe heat waves on land, especially in the tropics, the report says. They have “medium confidence” that there will be more extreme storms in areas such as high-elevation regions, eastern Asia and eastern North America. The risk of such severe weather would be even greater in a 2 °C world. Temperatures on extreme hot days in mid-latitudes could increase by 3 °C with 1.5 °C of global warming, or by 4 °C in a 2 °C world.

Two degrees of warming could destroy ecosystems on around 13% of the world’s land area, increasing the risk of extinction for many insects, plants and animals. Holding warming to 1.5 °C would reduce that risk by half.

The Arctic could experience ice-free summers once every decade or two in a 2 °C world, versus once in a century at 1.5 °C. Coral reefs would almost entirely disappear with

NASA/EVINE

CORRECTION

The News story 'Brazil's presidential election could savage its science' (*Nature* **562**, 171–172; 2018) incorrectly stated that Bolsonaro had proposed eliminating the science ministry and reorganizing it under the agriculture ministry. The candidate has discussed efforts to decentralize federal science programmes in Brazil, but it's unclear how he would do so.