Feature

The future of Brazilian science

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The election of Luiz Inácio Lula da Silva ('Lula') as president of Brazil on 30 October 2022 marked the end of the populist Bolsonaro era. In this Feature, five Brazilian scientists discuss their hopes and expectations for the new presidency and its scientific policies.

Mercedes Maria da Cunha Bustamante

Brazil emerges from the last presidential election as an even more complex country than it was before. The fractures that have deepened over the past four years are exposed in the population groups that ensured President Lula's victory: women, youth and those who are the poorest — most of them people of colour. The crucial support of these groups highlights the urgent demand for public policies that put Brazil back on the tracks of social justice and equity and that reconnect the country with the global sustainability agenda.

A resumption of support for science after years of denialism and discontinuity of investment will be necessary to propel Brazil towards a sustainable future. A strategic and long-term plan that enables science to respond to our main challenges in the coming decades is necessary. As custodians of a substantial share of global biodiversity and vast carbon stocks in our ecosystems, Brazilians have the opportunity to contribute innovative solutions to the social and environmental realities of the Global South. The challenges of reducing poverty, combating climate change and biodiversity decline are intrinsically connected. Climate instability and environmental degradation can hinder efforts to improve human wellbeing, and climate mitigation and adaptation strategies can be avenues for green jobs in the transition of the Brazilian economy to sustainability.

The Lula administration will also need to focus on improving education from the elementary level, which has been hit hard by the absence of coping strategies during the COVID-19 pandemic. Public universities have also been affected by unprecedented budget reductions under Bolsonaro[1]. Brazilian public universities account for most of the national scientific production and, thanks to affirmative policies that were consolidated a decade ago, have been major drivers of social inclusion, as shown by the marked increase of underrepresented groups in higher education[2]. However, the challenge to increase diversity in the subsequent stages of the academic career remains. Such diversity will be vital for addressing societal demands through the generation of new knowledge, in making Brazil attractive again for young scientists and in giving science a more prominent role in policy making.

Expectations around the new administration are very high, but the challenges are also substantial. If, on the one hand, there is great hope among the scientific community, on the other hand, it is necessary to maintain a critical and vigilant eye over the reality of the next few years. We must take advantage of this opportunity to pave the way for inclusive social and economic development that is well-supported by science, while protecting nature.

Juliana Hipólito

Brazilian science has systematically suffered budget cuts since 2014, but these skyrocketed during Bolsonaro's government[3]. Research funding and the budget of leading science and technology funding agencies was reduced by around 60% from 2014 to 2022. Such cuts mean that Brazil reduced its capacity for the innovation and economic diversification that are necessary for improving socioeconomic conditions. We also lost society's concern for the importance of science in our daily life, which may have been reflected in science denialism — leading to an increase in deforestation rates, denial of climate change, anti-vaccine movements and the use of ineffective drugs, especially during the COVID-19 pandemic[4].

There is no doubt that national leaders can play an essential part in either highlighting the importance of science or in undermining it[5]. The past government dismantled environmental policies and increased — among other impacts — deforestation and the release of pesticides[6]. Thus, the shift to a new government this year brings hope of change. President Lula's campaign emphasized respect for science as one of its goals. Priorities and demands, however, are urgent and challenging and may include multiple perspectives, from the need to increase scientific investments to bringing academia closer to society and public policies associated with this sector. We still find many legal decisions that need more scientific knowledge to support them[7]. We need a cross-cutting agenda that includes scientists in the formulation of public policy decisions.

Reversing budget cuts, correcting fellowship amounts according to inflation and ensuring the equitable allocation of research

funding is paramount to reigniting Brazilian science and advancing towards an inclusive and diverse academic environment, which can directly affect science and conservation. Resolving academic structural problems should also be a priority from the beginning of the new government[8]. Currently, Brazil is losing scientists who do not find jobs in their own country or feel discouraged. So, we need to increase job opportunities, improve conditions at all career stages and diminish gender imbalances[9]. There is much hope that the new government will improve science and education in Brazil; however, many challenges must be urgently considered.

Pedro Gabriel Godinho Delgado

According to the final report of the transition office of the Lula government[10], the nationwide system of science and technology was 'dismantled' in recent years under the Bolsonaro government. To heal this damage will require the reconstruction of Brazilian science agencies and the reversal of cuts in funding for science, technology and innovation. The Lula government has already committed itself to gradually recovering the sector's financing capacity and to the expansion of development actions. In the past two decades, Brazil had achieved much in terms of scientific production[11], and Brazilian biomedicine and public health research has achieved a substantial presence in relevant international journals. However, the registration of new patents has lagged behind; innovation should be one of the priorities of the new government.

In addition to financial and managerial recovery and the expansion of incentives for decentralization and geographical expansion of research centres, it is possible to foresee a new inflection in science and technology policy, in the sense of actions that stimulate knowledge transfer (which is a key issue in the area of public health) and that could expand access for new generations of researchers into the competitive world of research.

In the field of mental health, we expect to see the development of long-term projects that seek to better understand the interfaces between mental suffering (expressed through 'social suffering') and the profound social inequality and precariousness of life in Brazilian contexts, and to build more effective promotion and prevention interventions within the Unified Health System. It is expected that themes such as urban violence, racism, stigma, gender prejudice, loss of childhood and adolescence, and their relationship with social suffering[12] will no longer be marginal in the production of knowledge in mental health and will be included among the priorities of research. The long-term consequences of the COVID-19 pandemic on health and mental health will also deserve special attention from researchers.

Lucas Ferrante

The administration of President Bolsonaro (2019–2022) was notable for the prominent role of scientific denialism[13]. All ministers were chosen for ideology rather than technical ability[14], and scientific advice was simply ignored[13]. Listening to Brazilian science could have prevented catastrophes such as the second wave of COVID-19 in the Amazon[15], the emergence of the Gamma variant of SARS-CoV-2 (ref. [16]) and Brazil becoming one of the global epicentres of the COVID-19 pandemic[17]. The absence of a technically oriented government under Bolsonaro also increased deforestation in the Amazon to alarming levels, threatening the environment[18], traditional peoples[19] and global climate goals[20].

The October 2022 election of Lula brings hope for researchers, research institutes and universities, as well as public health and environmental agencies that long for technical and scientific management[14]. Despite the change, we need to remember that in President Lula's two previous terms as president (2003–2010), his administration also showed worrying denialist tendencies (such as ignoring technical reports and scientists). An example of this is the Belo Monte hydroelectric dam (recently defended by Lula), which affected traditional communities and caused an enormous environmental impact.

On 24 November 2022, I participated in a meeting with Lula and his transition team who were preparing for the new administration that was to begin on 1 January 2023. I warned of a new wave of COVID-19 that was taking shape in the world and its effects on Brazil, and pointed out that studies have found that vaccination of at least 90% of the entire population is necessary to eradicate severe forms of COVID-19 (ref. [16]), in addition to the need for a booster dose every four months[21]. Worryingly however, officials from the Ministry of Health are adopting the same vaccine strategy as is used for the common flu — an annual booster dose — and their plan would only immunize at-risk groups and health professionals. This is insufficient and would result in total immunization levels falling below those obtained in the Bolsonaro administration, owing to immunity loss[4]. The decline in immune response over time[16], together with the ability of Omicron subvariants to escape neutralization[22,23], means that a new catastrophe is being potentiated.

A science-based policy is needed that goes beyond restructuring research institutions and government agencies – although this is an important first step for Lula. Some actions for which there is a clear position of science need to be taken, such as a national vaccination plan that covers the entire population[16] and blocking major infrastructure projects in the Amazon (such as the BR-319 (Manaus–Porto Velho) highway)[18] as well as the production chains that could give rise to a new pandemic[24]. It is crucial that researchers continue to defend the science, and that the general population not be deceived into thinking that a change of presidential administration alone is sufficient to bring about the needed improvements in public health and the environment.

Mariana M. Vale

Imagine being a scientist in a country where the president links the COVID-19 vaccine to HIV. Brazilian scientists are exhausted. Exhausted from working with a meagre research budget, of being threatened and offended and, most of all, from reacting to the flow of harmful governmental actions[25,26]. After four years of Bolsonaro, what I expect from the new government is civility. Then, we need to address urgent matters.

First, we must regain control over the main source of science funds in the country (FNDCT; a governmental fund that was established in 1969 to support scientific research), which suffered a freeze under Bolsonaro. And second, to increase the stipend of graduate students, who produce most of the country's science but who have lost 70% of their purchasing power owing to a 10-year freeze and inflation.

On top of these urgent matters, the new government needs to address broader issues that have been left unaddressed while Brazilian science was operating in survival mode. These include creating funding mechanisms for open-access publishing[27], preferably through researchers' home institutions. Brazil has a rich biodiversity but lacks surveys of viruses circulating in its fauna; thus, a well-established surveillance programme is needed to reduce the risk of new pandemics emerging through viral spillover[28,29].

In terms of institutions, white male individuals still dominate Brazilian academia[30,31]. We must strengthen and improve existing policies on diversity, equity and inclusion in science, especially regarding Black and Indigenous

Feature

people. Finally, the government's vision for the future must be reflected in research funding. In the environmental area, for example, the new government is focused on Amazon deforestation and climate change[26]. This requires the strategic creation of funding lines that can produce the science that is needed to tackle these issues. The same must be done for other key areas, such as health, public safety and Indigenous rights.

There is much optimism among Brazilian scientists for the new administration, based on Lula's good record during his previous terms as president, his new ministries and the signing of several decrees at his first day in office[32]. Whether he will fulfil these expectations depends on his ability to handle Bolsonaro's legacy of a faulty economy and radical antiscientific supporters. The Brazilian scientific community is ready to help.

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