Publication status: Not informed by the submitting author

On the value of publicly funded Science in Argentina

Humberto Debat

https://doi.org/10.1590/SciELOPreprints.7368

Submitted on: 2023-11-14
Posted on: 2023-11-16 (version 1)
(YYYY-MM-DD)

On the value of publicly funded Science in Argentina

Humberto Debat[1]

1. Instituto de Patología Vegetal, Centro de Investigaciones Agropecuarias, Instituto Nacional de Tecnología Agropecuaria (IPAVE-CIAP-INTA), Unidad de Fitopatología y Modelización Agrícola CONICET-INTA, Córdoba, Argentina. https://orcid.org/0000-0003-3056-3739, debat.humberto@inta.gob.ar

Abstract

Economic crises have triggered a surge in liberal discourses in the region, with a notable emergence of an anachronistic far-right movement espousing anti-rights, denialist, and neoliberal ideologies. Notably, Brazil's experience stands out, where Bolsonarism made significant inroads against the country's scientific sector through budget cuts, hostility towards researchers, and anti-science rhetoric, resulting in a dramatic impact on the nation's scientific and technological landscape. Under the leadership of Jair Bolsonaro, this agenda of rejecting scientific knowledge had a grim impact during the pandemic. Currently, Javier Milei, a presidential candidate on the upcoming Argentinian ballotage, regards Bolsonaro as a reference, sharing the ideological baggage of the Brazilian denialist. This trend is not immune to the global rise of disinformation campaigns aimed at discrediting scientific consensus and evidence-based policies. In line with scenarios in other parts of the world, Argentina has witnessed significant growth in anti-science movements in recent years, driven by a strong reliance on social media. These movements deny and discredit scientific consensus, clinical trials, and academic articles. We have observed direct attacks on prestigious institutions within our science and technology system, such as the National Scientific and Technical Research Council (CONICET), based on the distortion of research findings, particularly in the social sciences, or through the dissemination of fake news on social media. In some cases, these attacks occurred within the context of budget cuts to the R&D system. Here I address a threat to the future of Argentinian science in the context of the forthcoming presidential elections, highlighting the importance of publicly funded science.

Keywords: Science, Argentina, Public Funding, Government, R&D, Investment.

Opinion

An urgent call for action

Economic crises have triggered a surge in liberal discourses in the region, with a notable emergence of an anachronistic far-right movement espousing anti-rights, denialist, and neoliberal ideologies [**1**]. Notably, Brazil's experience stands out [**2**], where Bolsonarism made significant inroads against the country's scientific sector through budget cuts, hostility towards researchers, and anti-science rhetoric, resulting in a dramatic impact on the nation's scientific and technological landscape [**3**]. Under the leadership of Jair Bolsonaro, this agenda of rejecting scientific knowledge had a grim impact during the pandemic. At that time, I mentioned from Argentina that it was a reflection we did not wish to emulate [**4**]. Currently, Javier Milei, a presidential candidate on the upcoming Argentinian ballotage, regards Bolsonaro as a reference, sharing the ideological baggage of the Brazilian denialist [**5**]. This trend is not immune to the global rise of disinformation campaigns aimed at discrediting scientific consensus and evidence-based policies [**6**, **7**].

In line with scenarios in other parts of the world, Argentina has witnessed significant growth in anti-science movements in recent years, driven by a strong reliance on social media. These movements deny and discredit scientific consensus, clinical trials, and academic articles [**8**]. We have observed direct attacks on prestigious institutions within our science and technology system, such as the National Scientific and Technical Research Council (CONICET), based on the distortion of research findings, particularly in the social sciences, or through the dissemination of fake news on social media [**9**]. In some cases, these attacks occurred within the context of budget cuts to the R&D system [**10**, **11**]. Here I address a threat to the future of Argentinian science in the context of the forthcoming presidential elections.

The role of scientists in society

In my view, when faced with a situation that threatens research and science, our role as scientists is to get involved. Science is inherently political [**12**], and our place is to provide a systematic and analytical perspective that promotes evidence-based decision-making. When governments disregard scientists, the consequences can be devastating [**13**]. We have seen this during the pandemic and continue to witness it daily with climate change. Our responsibility is to safeguard the integrity of research and the scientific method, advocate for objectivity and transparency, communicate our findings and their implications for the public good, counteract misinformation, and provide accurate information to society. We should collaborate with governments and lawmakers, exerting pressure to ensure that policies are based on the best available scientific evidence. This should be done while maintaining independence, integrity, objectivity, and impartiality, avoiding distortions driven by partisan or economic interests. We must contribute to enhancing scientific literacy by educating our leaders on the importance of science and research. Our commitment should be focused on seeking solutions to the problems in our societies, environments, and territories.

Javier Milei said [**14**] regarding R&D productivity that scientist's "by the sweat of their face they shall eat bread" revealing a profound level of ignorance. Quoting a phrase from the Genesis to discuss scientific efficiency and associating it with "people of integrity" is a medieval anachronism. Comments like that reflect a lack of understanding of what science is and how the evaluation and promotion system for researchers in our country works [**15**], which is characterized by qualitative and quantitative indicators of excellence [**16**], boasting a highly educated workforce and an efficient public R&D administration. No one expected more from an individual who denies climate change, believes in the sale of organs [**17**], thinks that companies can pollute rivers without consequences [**18**], and so on. Nevertheless, his attack left a strong impact, raising deep concern that this person could become the president of our country. His remarks go beyond far-right ideology and involve ethics and integrity: on one hand, he claims to charge between $10,000 and $25,000 for his speeches [**19**], and on the other, he reported in his obligatory asset declaration as a Legislator that his total wealth is $60,000 [**20**], which implies he is either a liar, a corrupt or both.

A recurring issue

This view of the Argentine scientific sector is neither original nor new but rather a feature of the neoliberal government of the 1990s, led by Economy Minister Domingo Cavallo. In fact, Cavallo

is considered by Milei as the best Economy Minister in Argentina's history [**21**], which gives us an insight into his view to the sector. The 1990s were a grim period for the scientific community as well. From the minister's dismissive remark telling scientists to "wash the dishes" to significant budget cuts [**22**] and the suspension of new entries into CONICET's research career. The political and economic deterioration that the country went through resulted in unpaid salaries, research grants held by banks, halted laboratory activities in Argentina [**23**], and the deterioration of resources, infrastructure, and scientific activity [**24**].

Reversing the damage from that era took years, with active policies aimed at recovering and prioritizing the R&D system, including the establishment of a Ministry of Science, programs to repatriate scientists, investment in infrastructure, and a revaluation of the science and technology sector [**25**, **26**]. The most significant lesson from those years was understanding how easy it is to destroy what took decades to build.

A robust R&D system aligned to societal needs

Public funding for science in Argentina is of vital importance for the country's scientific and technological development and the well-being of its society. It serves as a source of innovation and competitiveness, fostering the development of new technologies, enhancing the competitiveness of Argentine companies in the global market, and contributing to sustainable economic growth. State investment is crucial in setting the local and regional scientific agenda, focused on addressing fundamental societal issues such as food security, public health, natural resource management, sustainable energy, and the impact of climate change.

Our scientific sector has significantly contributed to improving the quality of life for Argentinians through advancements in healthcare, agriculture, education, and the development of crucial infrastructure. It synergistically integrates with the free public education provided by our universities, training highly skilled human resources that drive economic and social development by creating new industries and job opportunities. It also promotes a scientific culture and evidence-based decision-making as an integral part of our culture.

The 2030 Agenda

Public funding for science allows Argentina to narrow the technological gap, with strategic implications for sovereignty, import substitution, and the ability to address specific national issues. Argentina is a signatory to international agreements such as the 2030 Agenda, which promotes investment in science and technology as part of sustainable development. In a recent presidential debate, Javier Milei stated, "We will not adhere to the 2030 Agenda. We do not adhere to cultural Marxism"... "All these policies aim to raise funds to finance lazy socialists who write fourth-rate papers." [**27**]. The 2030 Agenda is a global action plan adopted by 193 member countries of the United Nations in September 2015. The primary objectives of the 2030 Agenda [**28**] include eradicating poverty, ensuring food security, guaranteeing health, promoting inclusive education, achieving gender equality, providing access to clean water and sanitation, fostering sustained, inclusive, and sustainable economic growth, promoting full and productive employment, reducing inequalities, caring for marine and terrestrial ecosystems, and taking urgent measures to combat

climate change and its effects. On the latter point, Javier Milei denies the anthropogenic effect on climate change: "All those policies that blame humans for climate change are false." [**29**].

This denial of basic and undisputed scientific consensus is perhaps one of the central risks posed by his leadership in a 21st-century nation. Milei advocates for the elimination of the public science sector, privatization of CONICET (the country's main science and technology organization) and leaving the science of our nation in the hands of private interests [**30**]. This manichean view is not shared by any developed country and ignores the positive correlation between public science funding and private investment in research and development [**31**].

Beyond the false dichotomy he creates regarding public or private contributions to the sector, perhaps the fundamental issue is that Javier Milei sees science as an expenditure rather than an investment, disregarding basic evidence, even within his supposed area of economic expertise, regarding the returns on each dollar invested in research. Numerous studies provide evidence in this regard, such as one from Australia [**32**]indicating a return of $3.5 for every dollar invested or one from the USDA [**33**], which is relevant to our work at INTA, the National Agricultural Technology Institute, revealing a benefit of $20 for every dollar invested.

The majority of the scientific and technological sector's rejection of a Milei government does not imply a positive view of the current state of our country. We are in a crisis with possibly the lowest salaries in the region, significant limitations in research funding management [**34**], annual inflation exceeding 140%, and the context of extreme poverty affecting over 40% of our population. That being said, it is alarming to consider a leader who is a negationist, lacks a science policy/strategy plan, and displays overwhelming ignorance regarding technology and innovation.

The future of R&D in Argentina

The Argentine Chamber of Deputies has approved a law that establishes policies for scientific and technological development over the next decade, outlining 10 national challenges and R&D+I strategies to address them. The Science 2030 Plan [**35**] represents a step in the right direction, as science plays a pivotal role in Argentina's development, poverty reduction, and the achievement of sustainable economic growth. Investment in research, innovation, and technology is essential to achieve inclusive growth and overcome dependence on low-value-added exports, and this law is aligned with that objective.

Argentina requires a cultural shift that promotes increased investment in science and technology as drivers of development. Moreover, there are sectors with significant growth potential, such as renewable energy, digitization, healthcare, satellite industry, and others that this law emphasizes. To realize this vision, it is essential to have a smart government that invests efficiently, fosters partnerships with the private sector, and encourages international collaboration for the sake of development and inclusion. Milei and his legislators did not support this project and did not vote for it [**36**]. Their party's disinterest was so profound that it did not even warrant a minimal comment. In this context, not only does the potential implementation of this law under a Milei government appear at risk, but what is even worse is the jeopardy it poses to Law 27614 [**37**], which provides for a gradual and sustained increase in the national budget allocated to the science and

technology function. All of this is in the context of a potential government that may deem science unworthy of investment.

Scientific policy to spearhead sustainable development

An effective science policy for Argentina should be comprehensive, sustainable, and aimed at enhancing the quality of life for its citizens, while strengthening their global engagement. Long-term keys to success include stable and progressive funding. There must be a strong commitment to sustainably finance scientific research and innovation with adequate budgets that ensure the continuity of long-term projects and the attraction and retention of scientific talent. While Law 27614 [**37**] represents a significant step forward, offering predictability for the future, we cannot wait until 2032 to reach 1% of GDP, which is well below half the OECD countries' average [**38**].

Scientific policy should prioritize independence. The autonomy of INTA, CONICET and public universities in scientific and administrative decision-making should be respected, free from political interference. The various entities within the system should consolidate a balanced agenda, supporting both basic and applied research, recognizing that both are essential for advancing knowledge and developing solutions. Collaboration with institutions and scientists from other countries should be encouraged to facilitate the exchange of knowledge and participation in global research projects, while still addressing local socio-economic issues.

Continued support for the training of highly qualified human resources is essential. Our scientists and technicians are highly valued in the region, a result of an inclusive higher education system. Scholarship programs and researcher career entries should be expanded, along with incentives and ongoing training to promote scientific education, along with a corresponding salary structure.

Promoting the transfer of research results to industry and society through innovation, technology commercialization, and technology protection is vital. Creating and nurturing technology and innovation companies should be encouraged through financial support, infrastructure, and incubation and acceleration programs. Policies to ensure integrity and transparency in research and the use of public funds should be continued, along with a redesign of evaluation systems involving external peer review. Aligning scientific policy with the Sustainable Development Agenda 2030 and emerging challenges such as climate change and pandemic-risk infectious diseases is crucial.

Promoting scientific literacy in society is another critical aspect of a solid science policy. It should result from broad and constructive dialogue between the government, the scientific community, the business sector, and civil society. Additionally, it should be consistent with national priorities, investments in education, and the long-term vision for Argentina's development.

A pressing plea on science in Argentina

The value of publicly funded science in Argentina cannot be overstated [**39**]. It serves as a catalyst for progress, fostering innovation, improving the quality of life for citizens, and positioning the nation to meet the challenges of the 21st century. A robust commitment to sustained investment in research, scientific independence, and international collaboration is imperative. With the right

leadership, Argentina can foster its scientific community's talent to drive economic growth, address pressing regional issues, and play a significant role in the development of its society.

References

[**1**] https://elpais.com/internacional/2023-05-14/auge-de-la-extrema-derecha-y-declive-de-la-derecha-tradicional-chile-y-el-efecto-contagio-en-latinoamerica.html retrieved November 7, 2023.

[**2**] Escobar, H. (2018). We are headed for a very dark period Brazil's researchers fear election of far-right presidential candidate. Science. https://www.science.org/content/article/we-are-headed-very-dark-period-brazil-s-researchers-fear-election-far-right

[**3**] Escobar, H. (2021). A hostile environment. Brazilian scientists face rising attacks from Bolsonaro's regime. Science. https://www.science.org/content/article/hostile-environment-brazilian-scientists-face-rising-attacks-bolsonaro-s-regime

[**4**] https://www.theguardian.com/global-development/2021/mar/30/neighbors-shun-brazil-covid-response-bolsonaro retrieved November 7, 2023.

[**5**] https://www.lanacion.com.ar/politica/javier-milei-tuvo-una-videollamada-con-jair-bolsonaro-y-coincidieron-en-unir-fuerzas-para-luchar-nid15022023/ retrieved November 7, 2023.

[**6**] https://www.nytimes.com/2022/05/25/magazine/anti-vaccine-movement.html retrieved November 7, 2023.

[**7**] McIntyre, L. (2021). Talking to science deniers and sceptics is not hopeless. Nature, 596(7871), 165-165. https://www.nature.com/articles/d41586-021-02152-y

[**8**] https://www.revistaanfibia.com/no-somos-un-pais-antivacunas-pero/ retrieved November 7, 2023.

[**9**] Ferreyra, A. C., & Céspedes, L. (2021). " Fake news", abordaje mediático y desinformación en torno a CONICET durante el conflicto de diciembre 2016. Revista Iberoamericana de Ciencia, Tecnología y Sociedad-CTS, 16(46), 117-135. https://www.redalyc.org/journal/924/92467621011/

[**10**] Rodríguez Mega, E. (2016). Argentina's scientists engulfed in budget crisis. Science. http://www.sciencemag.org/news/2016/11/argentina-s-scientists-engulfed-budget-crisis

[**11**] Kornblihtt, A. (2017). Where science and nonsense collide. Nature, 541(7636), 135-135. https://www.nature.com/articles/541135a

[**12**] https://www.scientificamerican.com/article/yes-science-is-political/ retrieved November 7, 2023.

[**13**] Modi, N. (2020). Why nature needs to cover politics now more than ever. Nature, 586(7828), 169-170. https://www.nature.com/articles/d41586-020-02797-1

[**14**] https://www.pagina12.com.ar/579269-la-motosierra-de-javier-milei-tambien-llegaria-a-la-ciencia- retrieved November 7, 2023.

[**15**] https://evaluacion.conicet.gov.ar/ retrieved November 7, 2023.

[**16**] https://www.conicet.gov.ar/el-conicet-vuelve-a-ser-la-mejor-institucion-gubernamental-de-ciencia-de-latinoamerica-2/ retrieved November 7, 2023.

[**17**] https://www.infobae.com/politica/2023/05/03/javier-milei-volvio-a-hablar-de-la-venta-de-organos-busquemos-mecanismos-de-mercado/ retrieved November 7, 2023.

[**18**] https://www.lanacion.com.ar/politica/elecciones-2023-javier-milei-dijo-que-una-empresa-puede-contaminar-un-rio-todo-lo-que-quiera-y-nid02092023/ retrieved November 7, 2023.

[**19**] https://www.clarin.com/politica/javier-milei-explico-vive-cobro-10-mil-25-mil-dolares-conferencia-_0_BcjY7Sl5rD.html retrieved November 7, 2023.

[**20**] https://chequeado.com/el-explicador/elecciones-2023-que-patrimonio-declararon-milei-bullrich-massa-schiaretti-y-bregman/ retrieved November 7, 2023.

[**21**] https://www.ambito.com/politica/javier-milei-le-dijo-mirtha-legrand-que-no-le-interesa-el-matrimonio-se-mete-el-estado-n5840556 retrieved November 7, 2023.

[**22**] Cereijido, M. (1998). Science in the firing line in Argentina. Nature, 394(6691), 314-314. https://www.nature.com/articles/28483

[**23**] Marzuola, C. (2002). Argentina's crisis heralds time of torment for scientists. Nature, 415(6868), 104-104. https://www.nature.com/articles/415104a

[**24**] Dalton, R. (2008). Argentina: The come back. Nature 456, 441–442. https://www.nature.com/articles/456441a

[**25**] Belluscio, A. (2010). Argentina smooths the path for returnees. Nature, 466(7305), 519-519. https://www.nature.com/articles/nj7305-519a

[**26**] Barañao, L., Jacobs, H., & Breithaupt, H. (2014). More than beef and tango: An interview with Lino Barañao, the Minister of Science, Technology and Productive Innovation in Argentina. EMBO reports, 15(5), 477-480. https://www.embopress.org/doi/full/10.1002/embr.201438771

[**27**] https://www.telam.com.ar/notas/202310/642871-nicolini-milei-busca-destruir-la-agenda-2030.html retrieved November 7, 2023.

[**28**] https://chequeado.com/ultimas-noticias/javier-milei-en-el-segundo-debate-presidencial-2023-todas-esas-politicas-que-culpan-al-ser-humano-del-cambio-climatico-son-falsas/ retrieved November 7, 2023.

[**29**] https://www.un.org/sustainabledevelopment/es/objetivos-de-desarrollo-sostenible/ retrieved November 7, 2023.

[**30**] https://elpais.com/argentina/2023-08-18/el-ultra-javier-milei-abre-un-nuevo-frente-y-arremete-contra-la-ciencia-en-argentina.html retrieved November 7, 2023.

[**31**] "A $1.00 increase in public basic research stimulates an additional $8.38 of industry R&D investment after 8 years." https://www.nih.gov/sites/default/files/about-nih/impact/impact-our-nation.pdf retrieved November 7, 2023.

[**32**] "Every dollar invested in research and development creates $3.50 in benefits for Australia" https://www.csiro.au/en/news/all/articles/2021/november/value-innovation-investment retrieved November 7, 2023.

[**33**] "Research supported by the USDA, Economic Research Service (ERS) has found spending on public agricultural R&D from 1900 to 2011 generated, on average, $20 in benefits to the U.S. economy for every $1 of spending" https://www.ers.usda.gov/amber-waves/2022/june/investment-in-u-s-public-agricultural-research-and-development-has-fallen-by-a-third-over-past-two-decades-lags-major-trade-competitors/ retrieved November 7, 2023.

[**34**] Carignano, H. A., & Jaworski, J. P. (2019). Argentina's subpar investment in science. Science, 363(6428), 702-702. https://www.science.org/doi/full/10.1126/science.aaw3872

[**35**] https://www.argentina.gob.ar/sites/default/files/plan_nacional_de_cti_2030.pdf retrieved November 7, 2023.

[**36**] https://votaciones.hcdn.gob.ar/votacion/4870 retrieved November 7, 2023.

[**37**] https://www.argentina.gob.ar/normativa/nacional/ley-27614-347804 retrieved November 7, 2023.

[**38**] https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm retrieved November 7, 2023.

[**39**] Debat, H. (2023). Argentina: publicly funded science under threat. Nature, 621(7978), 258-258. https://www.nature.com/articles/d41586-023-02862-5

Conflicts of interest

The author is a researcher from INTA, a publicly funded federal agency from Argentina.

This preprint was submitted under the following conditions:

- The authors declare that they are aware that they are solely responsible for the content of the preprint and that the deposit in SciELO Preprints does not mean any commitment on the part of SciELO, except its preservation and dissemination.
- The authors declare that the necessary Terms of Free and Informed Consent of participants or patients in the research were obtained and are described in the manuscript, when applicable.
- The authors declare that the preparation of the manuscript followed the ethical norms of scientific communication.
- The authors declare that the data, applications, and other content underlying the manuscript are referenced.
- The deposited manuscript is in PDF format.
- The authors declare that the research that originated the manuscript followed good ethical practices and that the necessary approvals from research ethics committees, when applicable, are described in the manuscript.
- The authors declare that once a manuscript is posted on the SciELO Preprints server, it can only be taken down on request to the SciELO Preprints server Editorial Secretariat, who will post a retraction notice in its place.
- The authors agree that the approved manuscript will be made available under a Creative Commons CC-BY license.
- The submitting author declares that the contributions of all authors and conflict of interest statement are included explicitly and in specific sections of the manuscript.
- The authors declare that the manuscript was not deposited and/or previously made available on another preprint server or published by a journal.
- If the manuscript is being reviewed or being prepared for publishing but not yet published by a journal, the authors declare that they have received authorization from the journal to make this deposit.
- The submitting author declares that all authors of the manuscript agree with the submission to SciELO Preprints.