



The journal *Cardiovascular and Metabolic Science* and the material contained therein are under the Creative Commons Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND) license.



Is a meager budget for science and research compatible with a country's progress?

¿Es compatible un presupuesto insuficiente para la ciencia y la investigación con el progreso de un país?

Eduardo Meaney-Mendiolea*

A nation is a mixture of many elements: a defined territory; sometimes, a single ethnic group or, conversely, an amalgam of different ethnicities and languages; a common historical past; and a combination of cultures and civilizational values. As classically defined, culture is the set of collective systems of values, tenets, customs, and social behavior shared by a human community.¹ The amalgamation of musical, literary, philosophical, pictorial, sculptural, architectural, cinematographic, photographic, handicraft, sports, and culinary traditions on the one hand, and the technical-scientific legacy on the other, forms the core of what could be called «the national soul». To be recognized as a true nation, a society must possess territory, a socio-economic organization, a political system, and a form of government. Equally important, however, is a legacy of cultural, artistic, philosophical, and scientific achievements. Without this heritage, the nation becomes a soulless community of individuals who –as the great Cuban poet Nicolás Guillén put it– are «people already of animal projects» (literal translation for the Spanish line: *gentes ya de proyectos animales*). Furthermore, given the rapid advancement of science and technology—an avalanche that is reshaping contemporary civilization—a country lacking its own scientific capabilities is condemned to remain forever a colony, a protectorate, or the backyard of hegemonic powers. In other words, relegated to being a «banana republic»- a derogatory term used by

hegemonic centers to describe underdeveloped nations that export cheap natural products and import expensive goods resulting from scientific and technical advancement, while also being plagued by political turmoil, weak institutions, widespread corruption, and foreign intrusions.

In a little more than a century, from the years following the end of the armed phase of our 1910 social revolution, between advances and reversals, Mexico transformed from an underdeveloped, semi-feudal society into a capitalist nation with moderate industrialization growth and a flawed liberal democracy. An accelerated urbanization and industrialization shifted populations from rural areas to cities, reducing agricultural production. Meanwhile, manufacturing currently accounts for 20% of the national GDP (Gross Domestic Product) currently,² surpassing the combined revenues of oil, tourism, and migrant remittances. Based on these data, we are far from being a banana republic from an economic standpoint. Instead, amid today's turbulence and international threats, we are building a stable, upper-middle-income economy without the economic crises and currency devaluations of the recent past. Mexico's economy is now the 13th largest in the world –on the same level as Australia, above Spain and South Korea, close to Canada's and Russia's, and ahead of all the Latin American economies except Brazil's. We are no longer a «poor» country, as our nominal GDP is about \$2.12 trillion USD.³ However, 2025 data

* Editor-in-Chief.
Instituto Politécnico
Nacional. Mexico
City, Mexico. ORCID:
0000-0003-0377-4645

How to cite: Meaney-Mendiolea E. Is a meager budget for science and research compatible with a country's progress? *Cardiovasc Metab Sci.* 2026; 37 (3): 113-115. <https://dx.doi.org/10.35366/124265>



indicate that GDP per capita –national wealth divided by the number of inhabitants– is deplorably low: barely US\$13,889 per person per year, placing it below Uruguay and Chile but above Brazil and Colombia.⁴ This means that, although Mexico is a moderately wealthy country, income inequality across various segments of society condemns vast sectors of our population to relative or absolute poverty. It is estimated that the top 10% of society receive nearly 30% of total income. In contrast, the bottom 10% receive less than 2% of income.⁵ Furthermore, since the economy is not growing beyond 1.3% annually, and tax evasion and corruption, though reduced, continue to weigh on public finances, government revenue is insufficient to meet all the needs of a society that aspires to join the select group of developed nations.

As physicians and scientists, we are directly concerned by this situation, setting aside all political or ideological considerations. For example, contrary to recommendations from the World Health Organization and the Pan American Health Organization (PAHO) for developing nations to invest at least 6% of their GDP in public health, Mexico allocated only about 3.22% through federal public spending.⁶ This falls drastically short of what an overburdened health system requires. This budgetary shortfall in public health funding is not new, as it has persisted for decades. Therefore, a health system constrained by a lack of resources could not fulfill its basic function of providing modern medical care for the population.

On the other hand, the United Nations Educational, Scientific and Cultural Organization (UNESCO), among other bodies, has suggested that nations allocate 1% of their GDP to research and development (R&D) expenditure.⁷ On September 1, 2004, following intense pressure from various political parties and the national scientific community, Article 9 bis of the Law on Science and Technology was amended, establishing an obligation for the State to allocate at least 1 percent of the country's GDP to scientific research.⁸ This constitutional obligation has never been fulfilled. During the previous six-year terms, the proportion of GDP allocated

to research fluctuated around 0.4%, falling far short of the target set by our Constitution. Although conflicting and sometimes malicious figures regarding research spending have circulated over the last two years –during which a renowned researcher has served as the country's highest-ranking executive– the most reliable sources⁹ report a value between 0.25 and 0.5%. Wealthier countries spend the most on research. The United States, Canada, and Europe allocate nearly 2.5% of their GDP to this purpose, while spending in East and Southeast Asia ranges from 2 to 4%. North Africa and the Near East spend about 1%, Latin America and the Caribbean average 0.57%, and sub-Saharan Africa spends 0.38%. It is disappointing that, relative to our economy's size, R&D spending is no higher than –or is even equivalent to– that of some of the world's poorest countries, and lower than the regional average, despite our status as the second-largest economy in Latin America.⁹⁻¹¹

The contribution of the Mexican scientific establishment to global science is very small, as only 0.5 to 1.3% of articles in journals listed in Scopus and Web of Science (WoS) originate from Mexico.^{12,13} Although a combination of circumstances explains the country's poor scientific output, one factor –in our view, the most significant– is the meager funding the Mexican State provides for the development of science. One could politely point out to those responsible for national finances and promoting scientific research that science, as well as the arts and education, hinges on adequate funding. Scientists, artists, and educators need enough funding not only to live with dignity but also to access the necessary facilities, equipment, and supplies. Of course, this is not true for every art form. Writing a sonnet, for instance, requires only a poet's talent, a pencil, and paper. However, other creative works demand heavy funding. Creating a large mural requires a wall, surface preparation, liters of paint, scaffolding, and a team of assistants. The same applies to science. A researcher's talent and training are not enough; access to laboratories, instruments, various sophisticated devices, materials, and reagents is also required. The principle that there is no science without funding applies to both basic and applied science.

At the same time, we are aware of the immense and varied needs of our society. Nothing is more important than the well-being of the most vulnerable segments of the population. The point is not to suggest withdrawing support for the elderly, the disabled, and students, or halting the major infrastructure projects currently underway or planned for the immediate future, to redirect those funds to national science. Nevertheless, the Mexican State must find a way to finance national science, a task in which the private sector should also contribute to this effort. At stake are not only Mexico's sovereignty and techno-scientific independence, but also the further development of vital areas –such as industry, environmental protection, agriculture, energy, and natural resources– that depend directly or indirectly on science and technology.

The bulk of the country's scientific research is conducted at public universities (and a few private ones). Although there is no precise data on the matter, hospital systems under the Mexican Social Security Institute (IMSS) and those belonging to the Health Institutes and High-Specialty Hospitals under the Ministry of Health are the largest contributors –after public universities– to biomedical scientific output, with the Institute for Social Security and Services for State Workers (ISSSTE) trailing in a distant third place. However, only a small proportion of the clinical research studies from these institutions are published in Q1-ranked journals.

In conclusion, scientific research broadly, and biomedicine specifically, have failed to keep pace with national economic development. Historically and today, scientific advancement has not been a primary strategic priority for the Mexican State. We, the members of the medical and scientific community, have failed to demand that successive governments fully comply with our constitutional mandate: investing at least 1% of GDP in science and technology, and, in addition, increasing enrollment in graduate programs and creating jobs for young researchers to prevent «brain

drain» of talent moving abroad. We must explain to our government officials and legislators the truth contained in this quote by Louis Pasteur: «Science is the soul of national prosperity and the lifeblood of all progress».

REFERENCES

1. UNESCO. What is culture. Available in: <https://www.unesco.org/en/query-list/c/culture>
2. INEGI. Manufacturas aportaron 21.5% y comercio 20% del PIB en 2024. Available in: <https://www.debate.com.mx/economia/INEGI-Manufacturas-aporaron-21.5-y-comercio-20-del-PIB-en-2024-20251002-0249.htm>
3. GDP by Country (2026) – IMF. Available in: <https://www.worldometers.info/gdp/gdp-by-country/>
4. Grupo Banco Mundial. GDP per capita (current US\$) – México. Available in: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MX>
5. Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2024. Available in: <https://mexicocomovamos.mx/enigh-reimaginemos-el-panorama/>
6. Mexico – Government Health expenditure. Available in: <https://countryeconomy.com/government/expenditure/health/mexico>
7. UNESCO. Aumenta la inversión en investigación y desarrollo en el mundo, pero continúa muy concentrada. Disponible en: <https://www.unesco.org/es/articulos/aumenta-la-inversion-en-investigacion-y-desarrollo-en-el-mundo-pero-continua-muy-concentrada>
8. Ley de ciencia y tecnología. Disponible en: https://sep.gob.mx/work/models/sep1/Resource/15131/2/images/ley_ciencia_tecnologia_01_2020.pdf
9. The Global Economy.com. Research and development expenditure - Country rankings. Available in: https://www.theglobaleconomy.com/rankings/research_and_development/
10. The Global Economy. Mexico: research and development expenditure. Available in: <https://www.theglobaleconomy.com/>
11. UNESCO. 2026 R&D Data Release. Available in: <https://www.uis.unesco.org/en/2026-rd-data-release>
12. López-Leyva S. Mexican researchers' contributions to the world scientific publications. *Management Dynamics in the Knowledge Economy*. 2021; 9: 50-64. doi: 10.2478/mdke-2021-0004
13. Furlan-Magaril M, Valdés VJ. Science in Mexico: a rising force amid adversity. *Trends Cell Biol*. 2025; 35 (9): 720-722. Available in: <https://doi.org/10.1016/j.tcb.2025.07.001>

Correspondence:

Eduardo Meaney, MD, PhD

E-mail: lalitimini1@gmail.com