

Mathematical Sciences in Angola: An Urgent Scientific Concern

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Dear Editor,

This letter addresses a critical issue concerning the development of mathematical sciences in Sub-Saharan Africa, with a particular focus on Angola. As Angola celebrates fifty years of national independence in 2025, it becomes imperative to assess the progress and challenges in the landscape of mathematics research and education in the country, since mathematical sciences are essential for the development of nations, promoting logical reasoning, technological innovation and efficient decision-making, supporting advances in engineering, economics, data science and health, strengthening infrastructure, competitiveness and quality of life, thus becoming fundamental to the sustainable and strategic progress of the country.

Despite the remarkable expansion of higher education and the creation of scientific institutions, the number of mathematicians with doctorates remains alarmingly low. To the best of our knowledge, Angola has only one woman with a doctorate in Mathematics, which reflects the persistent structural barriers that limit both access and advancement in the field [1]. It is worth noting that the academic trajectory of many Angolan researchers was interrupted by the civil war that plagued Angola for decades and affected the educational infrastructure of the country [2]. Now, in the post-Civil War period and with fifty years of national independence, it is necessary to redirect priorities and increase the number of young people interested in the field of mathematical sciences [3].

Although mathematical sciences have flourished globally, particularly in areas such as mathematical modelling, computational methods, data science, and applied mathematics, there is still a notable lack of research that applies these frameworks to the socioeconomic and environmental challenges of Angola [4–9]. Areas such as epidemiological modelling, natural resource management, environmental analysis, financial systems, and technological optimisation remain underexplored in national academic production, becoming topics of scientific research for future generations of mathematics scientists in Angola. The lack of research in these areas highlights, on the one hand, the scarcity of qualified specialists and, on the other hand, the lack of long-term institutional strategies to integrate mathematics into the broader agenda of scientific and technological development in Angola.

To address these structural challenges, coordinated efforts are needed between Angolan universities, governmental entities, and international partners. Strategic investments should prioritize (i) expansion and internationalization of postgraduate programs in mathematics; (ii) establishment of national funding mechanisms dedicated to mathematical research; (iii) promotion of academic mobility and partnerships with global research institutions; and (iv) creation of inclusive programs to attract and support underrepresented groups in the Science, Technology, Engineering, and Mathematics (STEM) fields.

Indeed, enrolment in mathematics courses in Angola's higher education system remains persistently low, a structural trend in both public and private institutions. Recent statistical reports from national education authorities consistently show that mathematics is among the least chosen courses in university admissions processes, with significantly fewer applicants than in fields such as economics, law, health sciences, and engineering [10]. This low demand reflects not only students' perception of mathematics as an academically demanding discipline, but also broader educational and socioeconomic factors that shape career expectations and decision-making. Many high school graduates demonstrate little confidence in their mathematical training, often perceiving the discipline as a barrier rather than a viable academic path. Furthermore, a lack of widespread awareness of career opportunities for mathematics graduates contributes to the field's lower attractiveness compared to courses associated with clearer or more immediate employment prospects. As a result, universities struggle to fill available places, leading to chronically under-enrolled classes and raising concerns about Angola's long-term capacity to train specialists in areas fundamentally dependent on quantitative and analytical skills. This persistently low enrolment underscores the need for targeted interventions to promote interest, strengthen pre-university mathematical preparation, and increase the visibility of mathematics as a strategic area within national development priorities.

In summary, the training of a critical mass of mathematicians is essential to consolidate a sustainable research ecosystem and position Angola to benefit from the ongoing global transformation driven by mathematical and computational sciences. This training would allow Angolan researchers to position themselves competitively in the global production of knowledge in mathematical sciences, strengthening the role of Angola in international scientific advancement.

References

1. Ana Mendes and Paulo Saraiva. Maria de Natividade: o que eu andei para aqui chegar. 2023 Jan [cited 2025 Dec 7].
2. Alyssa Knapp. Angolan Civil War (1975-2002). American Archive of Public Broadcasting [Internet]. 2021 [cited 2025 Dec 7].
3. Governo de Angola. 50 anos de Independência Nacional de Angola 1975-2025. Governo de Angola [Internet]. 2025 [cited 2025 Dec 7].
4. Nicola Graves-Gregory. Historical Changes in the Concepts of Number, Mathematics and Number Theory. ArXiv [Internet]. 2017 [cited 2025 Dec 7].
5. Hernández E, Martell JM, de Natividade M. Quantifying Democracy of Wavelet Bases in Lorentz Spaces. *Constr Approx* [Internet]. 2011 Feb 9 [cited 2025 Dec 7];33(1):1–14.
6. De Natividade M. Best approximation with wavelets in weighted Orlicz spaces. *Mon Hefte Math* [Internet]. 2011 Sep 28 [cited 2025 Dec 7];164(1):87–114.
7. Garrigós, G., Hernández, E., & de Natividade, M. (2011). Democracy functions of wavelet bases in general Lorentz spaces. *Journal of Approximation Theory*, 163(10), 1509-1521.
8. Garrigós, G., Hernández, E., & de Natividade, M. (2012). Democracy functions and optimal embeddings for approximation spaces. *Advances in Computational Mathematics*, 37(2), 255-283.
9. Hernández, E., & de Natividade, M. (2016). Results on Non-linear Approximation for Wavelet Bases in Weighted Function Spaces. In *New Trends in Applied Harmonic Analysis: Sparse Representations, Compressed Sensing, and Multifractal Analysis* (pp. 145-189). Cham: Springer International Publishing.
10. Ricardo, A., & Cruz, J. (2025). META-ANALYSIS OF PREFERENCES IN THE EXTERNAL ASSESSMENT AND ACCREDITATION MODEL FOR HIGHER EDUCATION COURSES IN ANGOLA. In *ICERI2025 Proceedings* (pp. 5615-5623).

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