

EDITORIAL

Special Issue: Women in Contemporary Science in Africa

Women in science in contemporary Africa from historical and cultural perspectives

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INTRODUCTION

The general marginalisation and disregard for women in the sciences (STEM) in Africa is one paragraph in an essay of the general trivialisation and suppression of women and girls in all aspects of life, the world over¹. Gender and cultural stereotypes, unconscious biases, and limited access to resources and mentorship are commonplace. In every epoch of African history, women have interrogated nature, stewarded environments, and healed communities. Yet their scientific labour, in time and space, whether inscribed in hieroglyphs, taught in courtyards, or practiced in rural clinics, have too often been relegated, footnoted or even completely erased mainly by Western social scientists². This constitutes a violation of human rights, disrespect for human dignity and constitutes gender-based violence. It is a disservice to both individuals and the society at large because recognising women and their achievements in the sciences benefits not only individual women and girls, but also men and boys, societies, businesses and economies². It will also accelerate progress towards other development objectives such as the environment and its sustainability, food security, and sustainable development.

Across Africa, women are blazing the trail and telling inspiring stories which spell hope for contemporary African “women in science”. Unfortunately, often-cited examples of trail blazers are the few who have shattered the glass ceiling, so to speak. Their achievements are largely heard and told because they became so conspicuous that the blind could see and so deafening that the deaf could hear. In fact, the world could no longer undermine them. The question is, what is wrong with women in science in Africa? This editorial draws from three contributions^{2,3,4}, to ASFI RJ special issue on women in science in contemporary Africa, to offer a succinct, and interwoven historical, cultural, and contemporary perspective on

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how African women have shaped science, suffered indifference, built resilience and how the continent can amplify their agency in contemporary African society. The editorial contends that the problem with women in science in Africa is not the absence of women's science but more of the absence of its recognition in dominant historiographies which often devalue "women's work" while elevating abstract, "masculine" high art and the sciences. Restoring historical memories and reading culture not as a constraint but as a reservoir of knowledge and identity will guarantee the appropriate recognition of women's contemporary contribution to science in Africa.

Deep roots: Re-membling a long scientific lineage

The story of women in science does not start with modern laboratories. African women's scientific roles stretch back millennia, embedded in sophisticated and complex indigenous knowledge systems, be it in agriculture, pharmacology, astronomy or metallurgy where women frequently served as custodians, experimenters, and teachers. Was Peseshet⁵ in ancient Egypt not the earliest known female physician (c. 2700 BCE)? Does anyone need further evidence that formal, recorded medical practice was not exclusively male in African antiquity? What about education? Fatima al-Fihri⁶ founded the University of Al-Qarawiyyin in Fez, Morocco, in 859 AD, arguably the world's first degree-granting university. Egyptian Sameera Moussa had her doctorate degree in atomic radiation and ardently advocated for peaceful application of nuclear use and its affordability to all. South Africa's Professor Tebello Nyokong, 2009 UNESCO L'Oréal- Award for Women in Science pioneered research work on photodynamic therapy which harnessed light for cancer therapy and environmental clean-up. This is only the tip of the iceberg from history.

One therefore does not need to be told that across the continent, women's science took multiple forms. From seed selection and soil management in Southern Africa⁷, midwifery and herbal pharmacology in West Africa to artisanal mathematics encoded in aesthetic traditions. Of course, these were not "folk" sidelines. As a matter of fact, they were empirically tested intergenerational systems of knowledge that sustained health and food security. Yet one must dig deep in the literature to know about these feats.

Colonialism has not made the situation better. Its most durable ramifications of the African continent and the global south in general, has intensified and exaggerated the erasure of women's achievements. In this disappointment Razel et al², in a contribution to an ASFIRJ special issue on this subject, bemoan colonial projects in Africa which slowly eroded the culture of its people. Imported educational models and patriarchal legal regimes devalued indigenous epistemologies and narrowed women's access to advanced instruction. The legacy was a "double marginalisation" as clearly described by Oladejo et al⁴ (p³) in another of such contributions. African knowledge was cast as inferior to Western science³, and women were barred from the institutions that conferred scientific authority. Those structural disruptions and ruptures explain much of the gender gaps and hiatuses that post-independence reforms have had to confront.

Culture as knowledge: identity, practice, and scientific authority

A common and perennial error, a fallout of colonial legacy, often in policy discourse is to treat culture as a hurdle to be overcome rather than a foundation to be mobilised. No doubt that in the Kikuyu community the reverence for nature that was part of the Kikuyu's beliefs and traditions virtually died away right in front of Wangari Maathai because "European missionaries preached their religion and many local people started to accept it, and within the next two generations, they lost respect for their own beliefs and traditions"². This is injustice because, in many African societies, the everyday practices of women encode scientific method, be it observation, iteration or community validation. For example, biodiversity stewardship, women selecting seeds for climate resilience or managing soils for yield stability activities that reflect experimental design and ecological systems thinking.

This cultural grounding matters for contemporary science because it shapes identity in laboratories and field stations. When women enter Science, Technology, Engineering, and Mathematics (STEM) spaces, they do not arrive as blank slates or tabula rasa; they carry languages, symbols, and ethics that challenge the myth of value-neutral science. These are values which colonialism detached students from including their mother tongues and slowly eroded the people's

culture². The lives and work of figures such as Professor Wangari Maathai², whose Green Belt Movement fused environmental science, women's livelihoods, and civic activism, illustrate how scientific problem-solving in Africa often draws authority from cultural legitimacy and community accountability².

The frustrations from this vice have been expressed in various outlets, media and in works of arts. No doubt, Idowu E.S³ reclaims and asserts this nexus of science and culture. In *Binti*³, a Himba mathematician refuses to sever her cultural identity from her scientific pursuit, insisting that numbers “speak” in the language of her people. In *Wizard of the Crow*³, Nyawira embodies science as a community practice tethered to justice and healing. These narratives contest epistemic exclusion and model pluriversal science which is knowledge that is rigorous, situated, and socially responsive.

The social architecture of opportunity

Culture flows into social structure. Family expectations, community norms, and school ecosystems either catalyse or constrain women's scientific aspirations. Idohu E.S.³ reports that *Binti* defies community expectations of her staying back in Himba homeland for “making astrolabes and tending the family trade” and heeded “the call of the stars” to go to Oomza University^{3(p3)}. Where families actively sponsor girls' STEM, learning is seen through scholarships, mentoring, or exposure where women's participation rises and leadership pathways open. The career of Nigerian physicist, Professor Francisca Nneka Okeke⁴ shows how familial and spousal support can be decisive for research excellence and institutional change. Her advocacy subsequently widened departmental hiring to include more women, demonstrating the “role model multiplier” effect.

Mentorship remains a critical missing piece. Across many institutions, the scarcity of senior women scientists, limits peer networks and the tacit knowledge needed to navigate funding, publishing, and promotion. While male mentors can be invaluable, gender-sensitive mentoring better addresses implicit bias, work, family balance, and leadership barriers, concerns that research repeatedly documents as persistent across African STEM⁴.

Policy, power, and the possibility of structural change

Where states have recognised the multi-level nature of gender barriers, measurable progress has followed. Constitutional reforms (as is the case in Rwanda⁴) and sector strategies have elevated girls' participation in STEM and grown women's presence in higher education and technology programmes. South Africa's national initiatives on gender equity in STEM and Ghana's development of STEM-focused schools with gender-responsive curricula point to an actionable template which combines access (scholarships, infrastructure), retention (mentoring, flexible policies), and visibility (awards, leadership tracks)⁴.

Economic instruments matter as much as educational ones. Programmes like AWARD (African Women in Agricultural Research and Development)⁴ and digital-literacy initiatives demonstrate that targeted fellowships, research grants, and tech training can change trajectories, moving women from “promising student” to principal investigator, startup founder, or policy advisor. These interventions are most transformative when they build networks linking laboratories, farms, clinics, and communities and when they legitimise indigenous knowledge alongside lab-based science.

Contemporary realities: between gains and gaps

Despite progress, women remain underrepresented³ in many scientific domains, particularly engineering, physics, and information technology. Structural barriers, unequal funding, limited childcare, the burden of domestic labour, and subtle gatekeeping in hiring and promotion continue to depress participation and advancement. Cultural stereotypes⁴ remain markers of certain fields as “unfeminine,” discouraging girls early and channelling them away from mathematically intensive tracks.

Yet the resilience of African women scientists is remarkable. As Oladejo et al⁴ demonstrate, from environmental biochemistry to molecular plant pathology, women are leading research that blends frontier methodologies with context-specific problem-solving, pollution remediation that draws on ecological knowledge, climate adaptation rooted in local agronomy, and public-health strategies attuned to community behaviour. Literary analysis as illustrated in³

reminds us that representation itself is part of the infrastructure of inclusion, when girls see scientists who look like them and who honour their cultures, they are more likely to imagine science as “for us.”

Editorial Position: Toward a Pluriversity of Science and Conviviality

If the goal is a more just and innovative scientific ecosystem, Africa must reject two false choices: between “traditional” and “modern” science⁴, and between individual merit and structural change. We need both the archive and the algorithm, the herbal pharmacopeia and the spectrometer, thus a call for conviviality. And we need to celebrate, (as clearly argued by Idowu E. S.³) individual excellence while redesigning systems, funding, curricula, tenure, and intellectual property to recognise diverse epistemologies and life courses. This is the position upheld by the three papers^{2,3,4} in this collection of the special ASFIRJ issue.

These three perspective-based studies collectively examine the intersections of culture, gender, and science in African contexts, highlighting the critical yet underrecognized contributions of African women to scientific knowledge and societal transformation. Drawing on Wangari Maathai’s Green Belt Movement, the first article explored how indigenous knowledge, environmental stewardship, and cultural identity shaped grassroots responses to ecological degradation and poverty. It further situated these insights within a comparative African–Asian context, emphasizing shared environmental challenges and opportunities for cross-continental collaboration.² The second article adopted a literary lens, analysing representations of African women in science through works by Nnedi Okorafor and Ngũgĩ wa Thiong’o. It illustrates how fictional portrayals of women scientists challenge dominant stereotypes, reclaim indigenous knowledge systems, and foreground resistance, agency, and cultural identity within scientific discourse.³ The third article broadened this perspective through an integrative review of African women’s contributions across medicine, environmental science, and technology. It highlighted persistent structural and cultural barriers, while emphasizing women’s resilience and innovation in addressing global challenges such as

climate change and public health.⁴ Together, these studies underscore the importance of centring African women’s voices in science, advancing gender equity, and fostering inclusive, culturally grounded approaches to scientific development and policy.

Three commitments should guide the next decade in scholarship: First, there is a need to historicise and institutionalise indigenous knowledge². Universities and research councils should catalogue, evaluate, and co-produce with communities, embedding ethnobotany, soil science, and community health practices into curricula and research agendas. Credit should be given where knowledge originated; benefit-sharing frameworks should be designed; indigenous expertise should be treated as data, method, and theory. Second, we must build gender-responsive ecosystems, not programmes. We must move beyond one-off scholarships to comprehensive pipelines: STEM-rich primary schooling; gender-aware pedagogy in secondary; funded undergraduate research; doctoral cohorts with embedded mentorship; postdoc-to-PI bridges; leadership residencies; and re-entry grants for scientists returning from caregiving. Policy should align ministries of education, science, health, agriculture, and finance around shared indicators. Third, cultural identity must be elevated as scientific asset². Representation in textbooks, media, and literary works is not cosmetic as has been argued by Idowu E. S.³; it shapes aspirations and peer norms. Artists and authors who portray African women scientists should be supported; sponsor science-and-culture festivals; language, art, and ethics should be integrated into STEM curricula so that students can encounter science as part of lived African worlds.

A note on narratives: Why stories matter

Data persuades policymakers, but stories persuade publics. Idowu E. S.³ demonstrates that *Binti* and *Wizard of the Crow* reclaim African women’s voices as scientists, modelling what it means to do science without abandoning culture or community. They are counter-narratives to the notion that excellence requires assimilation, and they invite girls to imagine careers where identity is a source of insight rather than a liability, as it was Professor Wangari Maathai’s experience as Rizal et al.² observe. For editors, educators, and funders, the lesson is clear, amplify

narratives that connect science to justice, ecology, and cultural dignity.

CONCLUSION: PLANTING FOR THE LONG TERM

African women have always done science, sometimes in the academy, often outside it. The task before us is not to “introduce” women to science, but to recognise, resource, and refine the ways they already practice it, while widening pathways into frontier research⁴. When the continent invests in a pluriverse scientific commons, where indigenous methods stand alongside genomics and AI, and where women’s life-courses are accommodated rather than penalized, Africa does more than fix a fairness problem; it unlocks new logics of discovery. Wangari Maathai² taught the world that planting trees was both ecological repair and political courage. In the same spirit, planting women firmly in the centre of African science, which is rooted in culture, branching into innovation, will shelter future generations and remap the canopy of global knowledge.

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CONFLICT OF INTEREST

None declared

AUTHORS’ CONTRIBUTIONS

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