

PERSPECTIVE PAPER

Special Issue: Women in Contemporary Science in Africa

Women networks leading change in science in Cameroon: perspectives on the HIGHER Women Consortium and CaPROWN

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ABSTRACT

This perspective paper explores the transformative role of women's networks in advancing scientific leadership and gender equality in Cameroon, focusing on two prominent organizations: the Higher Institute for Growth in Health Research for Women (HIGHER Women Consortium) and the Cameroon Professional Research-Oriented Women Network (CaPROWN). The HIGHER Women Consortium is dedicated to cultivating leadership among women scientists in health research, operating a structured Mentor–Protégé Program (MPP) and specialised workshops that enhance research skills, grant writing, and career advancement in medical and health sciences. In contrast, CaPROWN adopts an interdisciplinary approach, supporting women researchers across diverse scientific fields through capacity-building, advocacy, peer-networking, and cross-sector collaborations. Both networks confront persistent cultural and institutional barriers within Cameroon's male-dominated scientific landscape, serving as vital platforms for mentorship, professional development, and increased visibility for women scientists. This study employed a qualitative research approach, utilising participant observations, semi-structured interview with members, review of relevant literature and organizational documents that provided context and depth to the analysis. Thematic analysis identified common patterns and unique strategies that contribute to women's research productivity, collaboration, and policy influence. Quantifiable impact is illustrated through outcomes such as grant awards, publications, and leadership appointments within health and broader STEM domains. The paper further addressed enduring challenges—such as digital infrastructure gaps and societal gender norms—and recommends strategies for scaling network impact, including partnerships with technology firms and targeted advocacy for structural change. Ultimately, this work sheds light on grassroots women in science efforts that drive gender equity in STEM across sub-Saharan Africa, offering actionable insights for stakeholders and policymakers.

KEYWORDS:

Women's networks, Scientific leadership, Gender equality, Mentorship programs, Capacity building, Cameroon, Women in science

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INTRODUCTION

The leadership of women in science is increasingly recognised as a critical factor for driving innovation, diversity, and inclusive development worldwide. Globally, women remain significantly underrepresented in science, technology, engineering, and mathematics (STEM) fields, despite constituting nearly half of the world's population. This gender disparity is evident at all levels of scientific careers, from education through to leadership positions, limiting diversity and innovation in research¹. While these global trends are well-documented, Cameroon presents unique and pressing gaps that require localised attention. In Cameroon, systemic socio-cultural norms, limited infrastructure, and institutional barriers amplify challenges for women scientists, resulting in stark gender imbalances at every stage of the scientific pipeline^{2,3}. For example, only about 7% of full professors in Cameroon are women, and female graduates in STEM remain significantly fewer than their male counterparts⁴. Women in Cameroon face significant challenges such as gender bias, lack of mentorship, and balancing family responsibilities with professional demands, which hinder their career progression in scientific disciplines^{5,6}. These context-specific disparities underscore the urgent need for tailored interventions that leverage local strengths while addressing entrenched obstacles. Hence, the question: how do the HIGHER Women Consortium and Cameroon Professional Research-Oriented Women Network (CaPROWN) foster leadership development, address systemic barriers, and advance gender equity among women scientists in Cameroon?

This perspective paper adopted a reflective and analytical framework aimed at synthesising the roles and contributions of two key women's networks, the HIGHER Women Consortium and CaPROWN. The paper's focus on grassroots initiatives offers critical insights into how structured mentorship, capacity building, and advocacy contribute to fostering scientific leadership and gender equity in Cameroon. Unlike empirical research seeking to test hypotheses, this perspective paper aims to highlight emerging themes, celebrate successful strategies, and propose practical pathways for amplifying network impacts within comparable socio-cultural and institutional contexts.

Such networks provide safe spaces for knowledge exchange, professional development, and empowerment, helping to dismantle structural barriers and promote gender equity in science^{7,8}. The HIGHER Women Consortium focuses on enhancing women's participation in health research through structured mentorship programmes and training workshops, fostering both scientific excellence and leadership skills.⁹ Similarly, CaPROWN emphasises professional development and research collaboration among women scientists across disciplines, advocating for gender-sensitive policies within academic and research institutions.¹⁰ Together, these networks exemplify grassroots initiatives that leverage collective action to promote gender equity in science.

METHODS

Study Design

This study adopted a qualitative research approach to explore the roles and impacts of women's scientific networks in Cameroon, focusing on the HIGHER Women Consortium and CaPROWN. Given the exploratory and contextual nature of the research questions, the qualitative methods offer important depth and nuance for understanding complex social phenomena such as gender disparities and empowerment strategies within these localised scholarly communities.

Data Sources and Selection Criteria

Data were drawn primarily from organisational documents (including strategic plans, annual reports, and programme evaluations) and relevant literature on women's participation in science within Cameroon and comparable settings. To ensure transparency and rigor, the following inclusion criteria guided document selection: Publications and documents published within the last 10 years were prioritised to reflect recent developments and contemporary challenges. Sources focused on gender equity, mentorship, capacity building, and advocacy in science, with an emphasis on Cameroon or comparable sub-Saharan African contexts, were included. Both peer-reviewed journal articles and grey literature (such as annual reports, strategic plans, program evaluations from the two networks) were considered. The exclusion criteria encompassed non-empirical opinion pieces,

duplicated sources, and documents not specifically related to gender or women's networks in science.

Enhancing Empirical Robustness: Participant Testimonials

Recognising the limitation of relying solely on organisational documents, the study incorporated direct testimonials from selected network members through semi-structured interviews and participant observations. These testimonials provided firsthand insights into the lived experiences, challenges, and successes of women scientists engaged in these networks. Inclusion of primary qualitative data enhanced the study's validity by triangulating documental analysis with authentic voices, supporting a richer and more credible interpretative account.

Thematic Analysis

The collected literature and documents were analysed using Braun and Clarke's¹¹ six-phase thematic analysis framework to identify patterns and themes relevant to the study objectives: The research team engaged in repeated, in-depth reading of all selected texts and documents to immerse themselves in the material, familiarise themselves and note preliminary observations. Using an open coding process, significant segments of text were identified and manually coded to ensure consistency. Codes captured concepts related to mentorship, capacity building, institutional barriers, professional development, and network impact. Codes were then searched and grouped into tentative themes that represented shared ideas or concepts emerging from the data, such as "mentorship effectiveness" or "cultural barriers." Candidate themes were iteratively reviewed and refined to verify internal coherence and distinctiveness among themes. The research team conducted peer debriefings to mitigate individual bias in theme development. Each theme was clearly defined and labelled to accurately encapsulate its central concept and relevance to the research questions. The finalised themes were integrated into a coherent narrative, supported by illustrative excerpts from the data, to generate analytical insights aligned with the study's aims.

Ethical Statement

This study was conducted in accordance with the fundamental ethical principles of research involving human participants. As the research was of minimal risk and did not require formal ethical approval according to applicable guidelines, informed consent was obtained from all participants prior to data collection. Participants' confidentiality and anonymity have been preserved throughout the study. All procedures adhered to ethical standards to protect participant welfare and data integrity.

FINDINGS AND DISCUSSION

Background and Context: Status of Women in Science in Cameroon

Women in Cameroon remain significantly underrepresented in STEM fields. Globally, women constitute less than 30% of researchers, and in Cameroon, the situation reflects similar disparities, with women making up a small fraction of STEM graduates and professionals¹². Despite representing nearly half of the population, approximately 14.2 million females as of 2023¹³, women face systemic challenges that limit their participation in scientific research and leadership¹². Studies show that only one in fourteen women graduate in STEM fields compared to one in nine men, highlighting persistent gender gaps in education and professional advancement¹².

Recent efforts to promote gender equity in STEM emphasize the importance of engaging girls and women early, redesigning curricula to be more inclusive, and creating supportive environments to foster their participation¹². Notably, some Cameroonian women scientists have gained international recognition, such as recipients of the L'Oréal-UNESCO Young Talent Award for Women in Science, who have made significant contributions in neuroscience and cellular physiology, underscoring the untapped potential of women researchers in the country¹⁴.

Challenges Faced by Women Researchers in Cameroon

Women scientists in Cameroon encounter a complex interplay of cultural, institutional, and social barriers. Cultural norms often reinforce gender stereotypes that discourage girls from pursuing STEM careers and limit

women's professional growth^{12,13}. Institutional challenges include limited access to research funding, inadequate infrastructure, and lack of gender-sensitive policies within academic and research institutions^{15,16}. Socially, women juggle professional responsibilities alongside familial and societal expectations, which can impede career progression^{13,17}.

Moreover, the politicization of research and insufficient national research policies hinder scientific development broadly, disproportionately affecting women who already face resource constraints¹⁵. Surveys of Cameroonian researchers reveal that women particularly highlight the need for targeted grants, capacity building, and societal recognition to advance their careers¹⁵. Despite these challenges, women researchers demonstrate resilience and commitment, often benefiting from mentorship, fellowships, and collaborative networks that support their development¹⁵.

Introduction to the HIGHER Women Consortium and CaPROWN

In response to these challenges, two key women's networks have emerged as vital actors in promoting women's leadership and participation in science in Cameroon:

The HIGHER Women Consortium: This organization aims to empower women researchers primarily in health sciences through mentorship programs, capacity-building workshops, and advocacy. Its mission focuses on increasing women's representation and leadership in health research, fostering scientific excellence, and addressing gender-specific barriers in research environments¹⁵.

CaPROWN: CaPROWN's vision is to create a collaborative platform for women scientists across disciplines to enhance professional development, promote research collaboration, and advocate for gender equity in scientific institutions. The network organizes training, networking events, and policy dialogues to support women's career advancement and visibility in the scientific community¹⁶.

Both networks play complementary roles in addressing the gender gap by providing mentorship, facilitating

access to resources, and advocating for institutional reforms that support women scientists. Their activities are crucial in fostering a more inclusive and equitable scientific ecosystem in Cameroon.

Role of Women's Networks in Scientific Leadership

The HIGHER Women Consortium and CaPROWN play pivotal roles in fostering leadership and empowerment among women scientists in Cameroon by addressing critical gaps in mentorship, skills development, and advocacy.

Fostering Leadership and Empowerment

The HIGHER Women Consortium, established in 2015, focuses on developing a pipeline of women leaders in health research through its Mentor-Protégé Program (MPP). This program pairs early-career women researchers (protégés) with experienced women mentors who provide professional guidance, career planning, and support to navigate the challenges of health research in Cameroon. The MPP aims to advance protégés' professional development, increase their ability to secure funding, and enhance their national and international visibility. Over the years, the consortium has brought together approximately 100 women, with about 80 protégés benefiting from mentorship and capacity-building workshops focused on skills such as proposal writing and research project development¹⁸. CaPROWN complements these efforts by creating a professional network that promotes collaboration among women researchers across disciplines. It organizes workshops, networking events, and advocacy campaigns to support women's career advancement and raise awareness about gender disparities in science. Both networks emphasize empowerment through knowledge sharing, skill enhancement, and creating enabling environments for women scientists to thrive.

Specific Initiatives

Mentorship Programs: The HIGHER Women Consortium's MPP is a flagship initiative that has successfully fostered leadership by enabling protégés to transition into mentors after five years, thus sustaining the leadership pipeline¹⁸.

Workshops: Both networks conduct workshops aimed at enhancing early-career women's skills in research

proposal writing and leadership goal setting, which have led to increased submissions of abstracts and successful grant applications¹⁸.

Advocacy Campaigns: Women in Global Health Cameroon, hosted by HIGHER Women, runs advocacy and awareness campaigns such as the COVID-19 Sheroes campaign and breast cancer awareness initiatives, promoting female leadership in health and public health emergencies^{18,19}.

Online engagement and professional development: CaPROWN conducts regular monthly online meetings within the Central and Western zones, providing a structured forum where members engage in diverse discussions on pre-selected topics. These sessions are strategically designed to address and propose solutions to pressing global issues and challenges related to gender inequality in science and society. Through this participatory model, members collaboratively share experiences and perspectives, fostering a culture of peer learning and collective problem-solving.

In addition to these monthly meetings, CaPROWN organizes monthly online symposia featuring distinguished professional speakers. These carefully selected experts deliver presentations and lead discussions on contemporary scientific and societal issues from a professional standpoint. The inclusion of external thought leaders not only enriches the discourse but also exposes members to a broad spectrum of strategies and best practices relevant to advancing gender equity and professional excellence in science. These initiatives collectively contribute to the professional growth of members and reinforce CaPROWN's mission to empower women scientists through continuous learning and networking opportunities.²⁰

Contribution to Capacity Building and Professional Development

These networks significantly contribute to capacity building by equipping women scientists with critical skills, mentorship, and opportunities for networking. The MPP's structured mentorship enables protégés to gain research competencies, leadership skills, and confidence to pursue competitive funding and present their work at international forums. This professional

development fosters a culture of sustained research productivity and leadership among women in Cameroon's scientific community^{18,19}.

Moreover, the networks create supportive peer networks and advocate for gender-sensitive policies in order to help mitigate institutional and cultural barriers, thereby enhancing women's retention and progression in science. Their efforts align with national gender policies aimed at improving women's participation and representation in STEM and leadership roles^{18,19}.

Impact on Scientific Progress and Advancing Scientific Innovation

The HIGHER Women Consortium and CaPROWN have made significant contributions to advancing scientific research and innovation in Cameroon by empowering women researchers and fostering a more inclusive scientific community. Through structured mentorship, skills development, and networking opportunities, these networks enhance research productivity and leadership among women scientists.

The HIGHER Women Consortium, through its Mentor-Protégé Programme (MPP), provides carefully matched mentor-protégé pairs with ongoing support and so has facilitated the professional growth of early-career women scientists by providing mentorship, skills development, and networking opportunities. This structured support has enabled protégés to increase their research productivity, including submitting more abstracts, securing grants, and presenting at national and international conferences. Surveys of program participants indicate a positive correlation between the duration of mentorship and the number of peer-reviewed publications, suggesting that sustained mentorship contributes to enhanced scientific output and innovation^{18,19,20}. Through its role of nurturing women's research careers, the consortium helps maximize creativity and gender expertise in health research, which is vital for addressing Cameroon's health challenges^{17,21}.

Similarly, CaPROWN empowers female researchers across disciplines by offering comprehensive training in research methodology, soft and hard skills development, grant writing, and public speaking. Their capacity-building initiatives equip women with

essential skills to conduct high-quality research and compete effectively for funding. Through career orientation and job placement assistance, CaPROWN supports women in navigating the research landscape and advancing to leadership roles, thereby strengthening Cameroon's scientific workforce²². Through the integration of these complementary approaches, these networks not only promote equity in STEM but also accelerate scientific progress needed to tackle national challenges.

Promoting Visibility and Recognition of Women Scientists

Both networks actively promote the visibility of women scientists by organizing workshops, conferences, and advocacy campaigns that highlight women's groundbreaking research and achievements. CaPROWN's events and campaigns raise awareness about the importance of women's participation in science and celebrate their accomplishments across Africa, helping to challenge gender stereotypes and inspire younger generations^{20,22}. The HIGHER Women Consortium similarly increases national and international visibility of its members through sustained research productivity and participation in global scientific forums^{19,21}.

Influencing Policy and Institutional Reforms

Beyond individual capacity building, these networks play a strategic role in advocating for gender-sensitive policies and institutional reforms. CaPROWN collaborates with policymakers, community organizations, and global partners to translate research findings into sustainable solutions that improve women's lives and promote equity in research environments¹⁹. The HIGHER Women Consortium's emphasis on quality research practices and leadership development contributes to shaping institutional cultures that support women scientists' career progression^{18,21}.

Indeed, these networks help create enabling environments that foster gender equality in science as they address systemic barriers such as gender bias, limited access to resources, and work-life balance challenges. Their advocacy efforts align with broader national and international commitments to gender equity in STEM, reinforcing the importance of women-

led initiatives in transforming scientific institutions in Cameroon and beyond^{19,20}.

Advancing Scientific Research and Innovation

The HIGHER Women Consortium and CaPROWN have significantly contributed to advancing scientific research and innovation in Cameroon by empowering women researchers and enhancing their capacity to produce high-quality research. The HIGHER Women Consortium's Mentor-Protégé Program (MPP) provides structured mentorship that supports early-career women scientists in developing research skills, securing funding, and increasing research productivity. Evaluations of the MPP show positive outcomes, including increased numbers of peer-reviewed publications and conference presentations among protégés, indicating enhanced scientific output and innovation^{19,20,21,22}. Their fort is seen in the manner they foster sustained research productivity and leadership, as they maximize creativity and gender expertise in health research, which is crucial for addressing Cameroon's health challenges.

Similarly, CaPROWN offers comprehensive capacity-building programs covering research methodology, data analysis, grant writing, and public speaking. These initiatives equip women scientists with essential tools to conduct rigorous research and compete effectively for resources, thereby strengthening Cameroon's overall research ecosystem²⁰. Through career orientation and job placement assistance, CaPROWN also supports women's advancement into leadership roles, contributing to a more diverse and innovative scientific workforce.

Their advocacy addresses systemic barriers such as gender bias, limited access to resources, and work-life balance challenges, helping to create enabling environments for women scientists. These efforts align with national and international commitments to gender equity in STEM fields, reinforcing the importance of women-led initiatives in transforming scientific institutions in Cameroon and beyond.

Quantifying the Impact of the HIGHER Women Consortium and CaPROWN

Testimonies from members of the HIGHER Women Consortium and CaPROWN underscore significant

measurable outcomes that demonstrate these networks' contributions to advancing women's scientific careers in Cameroon. A majority of surveyed members (over 80%) have participated in mentorship or capacity-building programs, gaining competencies critical for career progression. Importantly, research grant application success is notable: among respondents, approximately 55% have submitted research proposals or grant applications since joining, with several securing prestigious fellowships such as the WHO-AFRO Mwele Malecela Mentorship Program and the SmartScifrika fellowship.

Publication productivity has also markedly increased. Many of the networks' members report publishing several journal articles and book chapters, with about three members contributing over 14 journal articles, multiple book chapters, with edited and co-edited books since joining. Presentation at conferences is similarly active, with more than 70% of respondents presenting their research at least occasionally, facilitating knowledge dissemination and professional networking.

Leadership development within the networks is evident, with over 60% having assumed new leadership roles such as project coordinators, principal investigators, mentors, or network committee members. Collaboration is enhanced, with multiple joint research projects and institutional partnerships facilitated directly through the networks' connections. The HIGHER Women Consortium has established valuable scientific and project collaborations with multiple institutions to enhance the development of early-career women scientists in Cameroon. The consortium partners with a broad set of research institutions and universities across the country, involving 17 mentors from 18 different organisations who are matched with early-career protégés through the Mentor–Protégé Program (MPP). This collaborative structure as stated above provides tailored support in grant writing, research design, and career advancement.

Support and formal partnerships also extend to various Cameroonian ministries, including the Ministry of Higher Education, the Ministry of Scientific Research and Innovation, and the Ministry of Women's

Empowerment and the Family. These governmental collaborations foster a conducive environment for women scientists and contribute to policy advocacy efforts. Further, the consortium works alongside professional networks such as the Cameroon Women in Science and Technology (CWST) and Women Scientists of Cameroon (FESCICA), creating a united front to promote women's participation in STEM fields.

In addition, the HIGHER Women Consortium has also secured substantial funding from prominent international and national agencies, underpinning its expansive capacity-building activities. Major grants include support from WHO/TDR in 2014, Canada's International Development Research Centre (IDRC) in 2015, and the L'Oréal/UNESCO For Women in Science programme in 2018. Further funding from the Consortium for Mothers, Children, Adolescents, and Health Policy and Systems Strengthening (COMCAHPSS) in 2018, the Dangote Foundation in 2019, and UN Women in 2022 has enabled the Consortium to sustain its mentoring, training, and advocacy initiatives. These financial endorsements underscore the global recognition and credibility of the Consortium's work in empowering women scientists and transforming Africa's research landscape. CaPROWN also actively engages in scientific and project collaborations with several prominent institutions to support and empower female researchers. CaPROWN has strategic partnerships with the University of Buea, Universität Hamburg (Germany), and the Alexander von Humboldt Foundation, among others. These partnerships facilitate capacity building, research mentorship, joint projects, and exchange opportunities across disciplines. CaPROWN also maintains close ties with national research bodies and ministries, contributing to Cameroon's research ecosystem through collaborations that promote women's participation in science. The network regularly organises workshops, campaigns, and training sessions, leveraging these institutional relationships to raise awareness about gender equity and foster interdisciplinary and transdisciplinary research collaboration at both national and international levels. Recently Caprown had the 2025 CaPROWN-PROFAESTEM (Promoting Female Academic Excellence) Women in STEMS book project and the 2025 CaPROWN-PROFAESTEM jointly organised

conference on “Emerging Trends in Science, Technology, Engineering, Mathematics, and Transdisciplinarity for Global Transformation”. These collaborations strengthen CaPROWN’s role as a dynamic network dedicated to improving research outputs, skills development, and policy advocacy for women scientists in Cameroon and across the African continent.

The HIGHER Women Consortium has registered significant, quantifiable successes since its founding in 2015. Over a decade, it has trained and empowered more than 200 young women researchers through workshops, mentorship, and capacity-building programs, providing critical skills in research design, grant writing, leadership, and advocacy. The Consortium nurtures a network of over 30 mentors in Cameroon and the diaspora, fostering a supportive and resilient community of women scientists. Notably, it has produced more than 10 scientific publications and guides on mentorship in health, and hosted about ten workshops promoting STEM education and gender equity. Members have actively participated in public events and scientific outreach efforts in schools, contributing to a broader societal awareness and engagement in science. The HIGHER Women Consortium has organised a series of impactful workshops and events designed to advance the careers of early-career women researchers in Cameroon. These initiatives include the inaugural 2015 workshop “Advancing the Career of Emerging Women in Higher Education & Research for Health,” followed by skills-building events such as the 2016 “Proposal Writing Workshop” and the 2017 “Strengthening Skills to Propel Women’s Career.” Subsequent gatherings have addressed topical issues, including sharing research advances, balancing career and family responsibilities, post-COVID-19 recovery strategies, and breaking barriers in health research. These regular assemblies have fostered a dynamic space for mentorship, collaboration, and professional development tailored to women scientists’ unique challenges.

CaPROWN’s recognition on the global stage is exemplified by its 2020 Humboldt Alumni Prize for Innovative Network Initiative, awarded for innovating a sustainable platform that empowers junior female scientists with training in competitive proposal

development, digital research tools, and project management excellence. In addition, the network fosters visibility and knowledge sharing through a biennial publication series highlighting Cameroonian women scientists’ research achievements.

Among the two consortiums’ success stories is a distinguished member who has secured multiple prestigious fellowships, including the Fulbright Scholar Award, Alexander von Humboldt Experienced Research Fellowship, and a postdoctoral fellowship through a major industry foundation. This individual’s trajectory, from mentee to recognised leader, and similar stories across the networks underscore the vital role the HIGHER Women Consortium and CaPROWN play in cultivating scientific leadership, collaborative research, and a vibrant community of women researchers who are making significant contributions to Cameroon’s and Africa’s scientific progress.

The Consortium’s core Mentor–Protégé Program (MPP) has been instrumental in advancing early-career women’s scientific outputs. Evaluations show protégés increasingly submit abstracts, participate in national and international conferences, and secure grants, a testament to the Consortium’s role in enhancing research visibility and capacity. Testimonials highlight career-transforming opportunities, such as international fellowships and academic promotions, enabled by the program. Through this platform, women scientists gain visibility and agency, becoming ambassadors for scientific and social development in Cameroon and beyond.

Overall, the HIGHER Women Consortium and CaPROWN networks function as dynamic incubators for female scientific leadership, combining technical skill development with personal empowerment in an integrated model. Their impact, evidenced by the growth in trained researchers, publications, leadership roles, and outreach initiatives, sets a foundation for sustained transformation toward gender equity in Cameroon’s research landscape. The Consortiums’ continued ambition to expand mentorship networks and professional development programmes promises to deepen their influence on Africa’s scientific future.

These quantifiable outcomes reflect the crucial role of the HIGHER Women Consortium and CaPROWN in nurturing the next generation of women scientists in Cameroon, fostering scientific productivity, leadership, and collaborative networks necessary to address both national and international research priorities. Despite these successes, members continue to face significant challenges including limited research funding (81.8%), balancing professional and domestic responsibilities (81.8%), and pervasive gender stereotypes (81.8%). Inadequate digital infrastructure and socio-political instability further hinder participation and visibility.

Challenges and Barriers

Challenges Faced by the Networks

While the HIGHER Women Consortium and CaPROWN have made commendable progress in empowering women scientists in Cameroon, they themselves face significant limitations that constrain their effectiveness. A primary challenge is securing sustainable funding to support ongoing programs and to expand their outreach. Limited financial resources restrict their ability to offer comprehensive training, mentorship, and networking opportunities to members. Additionally, coordinating activities across a wide geographical area and across diverse scientific disciplines remains complex and resource-intensive. Effective communication, collaboration, and knowledge sharing require continuous effort and investment. Furthermore, despite their advocacy efforts, these networks' capacity to influence policy and institutional reforms is often hindered by the broader political and socio-economic environment.

Persistent Cultural and Institutional Barriers

Beyond network-specific challenges, women scientists in Cameroon face pervasive cultural and institutional barriers that substantially impact their careers. Long-standing cultural norms reinforce gender stereotypes that discourage girls and young women from pursuing STEM education and limit women's professional progression. Patriarchal traditions and entrenched gender roles continue to restrict opportunities, particularly in conflict-affected regions where social upheaval exacerbates vulnerabilities. Additionally, there is a scarcity of available mentorship and female role models, which hinders early-career women's navigation of the research ecosystem. Institutional

barriers further compound these challenges; women often have limited access to research funding, face inadequate infrastructure, and operate within institutions lacking gender-sensitive policies and supportive environments. The politicisation of research and inconsistent national research policies further stifle scientific advancement for women.

Socio-Economic and Structural Factors

Socio-economic and structural factors significantly affect women's participation in science in Cameroon. Poverty, lack of access to education, and limited economic opportunities disproportionately impact women, hindering their ability to pursue STEM careers. Like any other women in science, HIGHER and CaPROWNIANs often juggle professional responsibilities alongside familial and societal expectations, which impede their career progression. The ongoing conflict in some regions of Cameroon has intensified these challenges, exposing women and girls to new forms of gendered violence and displacement, further limiting their opportunities.

Additionally, access to reliable network connectivity and constant electricity remains a persistent challenge for many women in these networks, especially those in rural or conflict-affected areas. Inadequate digital infrastructure hampers participation in online training, mentorship, and collaborative research activities, core components of both the HIGHER Women Consortium and CaPROWN. Frequent power outages and unstable internet connections disrupt communication, limit access to resources, and can isolate women from valuable professional development opportunities.

Addressing these socio-economic and structural factors requires integrated approaches that promote education, economic empowerment, and gender equality. Implementing policies that support women's access to resources, childcare, flexible work arrangements, as well as investments in digital infrastructure and reliable electricity, can help create a more equitable environment for women in science.

Future Directions and Recommendations

Strategies to Strengthen the Impact of Women's Networks

To enhance the influence of women's networks like the HIGHER Women Consortium and CaPROWN, it is essential to adopt a structured and sustainable approach to mentorship that builds on their existing successes. Evidence from the HIGHER Women MPP demonstrates that carefully matched mentor-protégé pairs, combined with ongoing support from the consortium, foster long-term engagement and measurable research productivity gains^{18,25}. Expanding these programs to include more participants and diverse scientific fields can broaden their impact. Networks should also integrate holistic support addressing psychosocial challenges unique to African women scientists, which has been shown to improve retention and success¹⁸.

Scaling Mentorship, Advocacy Efforts and Tech Partnerships

Scaling mentorship requires leveraging local and international partnerships to secure resources, expertise, and institutional backing. Collaborations with universities, government agencies, and global organizations can provide platforms for wider recruitment, training, and dissemination of best practices¹⁸. To overcome critical digital infrastructure barriers, including limited internet access, power outages, and technology gaps, it is imperative to create strategic partnerships with technology firms and telecommunications providers. Such collaborations can deliver stable internet connections, affordable devices, and digital literacy workshops across Cameroon, promoting inclusive access to virtual mentorship, online training, and collaborative research activities. Digital platforms can help overcome geographical and logistical challenges, enabling broader participation within Cameroon and across. Intensified advocacy efforts are needed to raise awareness about gender disparities in STEM and promote inclusive policies at institutional and national levels. Campaigns that highlight women scientists' achievements help inspire younger generations and can shift cultural perceptions.

Multi-Sectoral Partnerships for Sustainability

Strong partnerships are critical to creating an enabling ecosystem for women in science. Governments can enact and enforce gender-sensitive policies, allocate dedicated funding, and integrate gender equity goals

into national research agendas¹⁸. Academic institutions play a vital role by embedding mentorship programs within their structures, providing career development resources, and fostering inclusive environments. International stakeholders, including development agencies and research funders, can support capacity building, provide grants, and facilitate knowledge exchange. Such multi-sectoral collaboration ensures sustainability, scalability, and alignment with broader development goals^{24,25}.

Importance of Sustained Funding and Policy Support

Sustained funding is fundamental to the continuity and growth of women's networks. Many mentoring initiatives face challenges related to limited and short-term funding, which restrict their ability to expand and maintain quality programs^{18,26}. Long-term investment from national governments, international donors, and private sector partners is necessary to institutionalize mentorship and advocacy activities. Additionally, policy support that mandates gender equity in research institutions and funding bodies can institutionalize change, ensuring women's participation and leadership are prioritized^{18,27}. Embedding gender equity in national science policies and research frameworks will help address systemic barriers and promote a culture of inclusion.

CONCLUSION

Women's networks such as the HIGHER Women Consortium and CaPROWN have demonstrated a transformative role in advancing scientific leadership and gender equality in Cameroon. Through their strategic gender role that necessitates providing mentorship, capacity building, and advocacy, these networks empower women scientists to overcome cultural, institutional, and socio-economic barriers, thereby enhancing their professional development, research productivity, and visibility. Their efforts contribute not only to individual career advancement but also to the broader scientific progress and innovation essential for national development. Continued support for gender equality in science remains critical. Sustained funding, policy reforms, and institutional commitments are necessary to scale and sustain the impactful work of these networks. Recognizing and investing in women-led initiatives is

fundamental to creating an inclusive, diverse, and innovative scientific community that benefits all. We call on governments, academic institutions, funding agencies, and international partners to prioritize and invest in women's networks. By doing so, they will foster a more equitable research environment, unlock the full potential of women scientists, and accelerate scientific advancement in Cameroon and beyond.

ACKNOWLEDGMENTS

We acknowledge the Government of Cameroon for the sponsorship of this research through the last quarter of the 2024 research Modernization Allowance (RMA) in the Ministry of Higher education. *AI disclosure*: AI Pleplexity was used to enhance grammar. The outputs were reviewed, edited and verified by the authors who take full responsibility of the content.

CONFLICT OF INTEREST

None declared

AUTHORS' CONTRIBUTIONS

EFFF: Conceptualisation, design, data acquisition/analysis/interpretation, drafting, final revision and approval. MND: Supervision, data acquisition, critical revision, approval.

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