



African Population and  
Health Research Center



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# UGANDA DATA VALIDATION WORKSHOP REPORT

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Examining Participation and Quality  
of Experiences of Women in  
Science, Technology, Engineering,  
and Mathematics (STEM)  
in Uganda.



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Protea Hotel By Marriot, Kampala Kololo.  
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# Acronyms

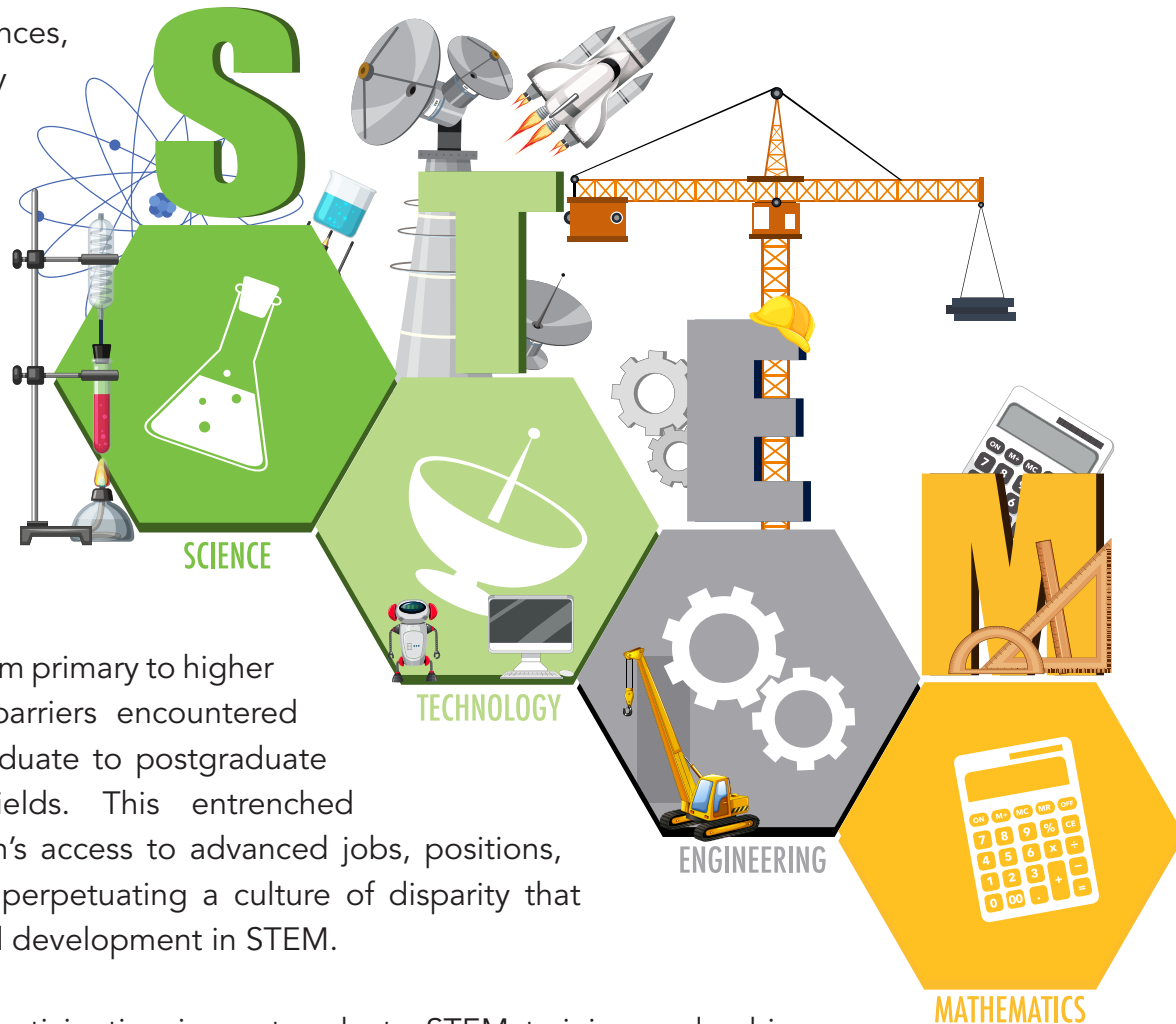
<b>APHRC</b>	African Population and Health Research Center
<b>IUCEA</b>	Inter-University Council for East Africa
<b>STEM</b>	Science, Technology, Engineering, and Mathematics
<b>NCHE</b>	National Council for Higher Education

# 1. Introduction

Africa remains the only region globally where women constitute a minority in postgraduate STEM training, despite worldwide commitments to gender justice. While women in Uganda have increasingly enrolled in higher education, the realities of gender equality have grown more complex and nuanced. Although women are well-represented in some fields like biological sciences, they remain significantly underrepresented in others, such as mathematics and engineering.

The persistence of gender inequality in Uganda's higher education system is exacerbated by the interplay of pre-entry barriers faced by women transitioning from primary to higher education and entry barriers encountered when moving from graduate to postgraduate studies in various fields. This entrenched inequality limits women's access to advanced jobs, positions, influence, and wealth, perpetuating a culture of disparity that affects their welfare and development in STEM.

To improve women's participation in postgraduate STEM training and achieve gender equality in these disciplines in Uganda, it is essential to raise awareness about the importance of STEM education and increase opportunities for women and girls in these fields. Reforming policies related to supervision and mentorship to address historical, cultural, and traditional barriers to college admission could be a critical step in addressing gender inequality in Uganda's higher education system.



## 2. Validation Workshop

The African Population and Health Research Center (APHRC), collaborated with the Inter-University Council for East Africa (IUCEA) to conduct a study to examine the gender disparities in STEM postgraduate supervision and mentorship in Ugandan universities affiliated with the IUCEA. This study was funded by the International Development Research Centre (IDRC), Canada. It utilized a mixed methods design and triangulated multiple sources of data on the experiences of women in STEM postgraduate studies and careers including primary data (online survey questionnaire, In-depth Interviews (IDIs) and Focus Group Discussions (FGDs)) and secondary data (policy documents, publications and, students and faculty data). These methods yielded both qualitative and quantitative data.

On April 20, 2023, APHRC and IUCEA in collaboration with the Uganda National Council for Higher Education hosted a data validation workshop at Protea Hotel by Marriott Kampala, Uganda. Prominent guests, including officials from the Ministry of Education, Representatives from the Ministry of Agriculture, and Innovation, a representative from IUCEA, researchers from various universities and university sectors in Uganda attended. The aim of the workshop was to review and validate the findings of the study.

### 2.1 Workshop Objectives



The objectives for the workshop were:

- 1.To present preliminary findings from the study on “Participation and Quality of Experiences of Women in STEM.”
- 2.To discuss the key study findings and formulate recommendations.
- 3.To gather feedback from the key stakeholders on how the data can be more representative of the research area.
- 4.To discuss, improve and adopt a framework for mentorship and supervision within the East African country.

## 2.2 Opening Remarks

During the session, speakers highlighted the significance of the data validation workshop in informing how to enhance women's participation and career advancement in STEM postgraduate programs in Uganda. The workshop was viewed as a crucial step towards improving and providing answers to some disparities in the data at hand as well as outcomes for women in STEM.

## 2.3 Professor Michael Mawa - Inter-University Council for East Africa



*Professor Michael Mawa*

On behalf of Professor Gaspard Banyankibona, Executive Secretary of the Inter-University Council for East Africa, who was unable to attend, Professor Mawa, the Chief Principal, Quality Assurance and Qualifications Framework at IUCEA warmly welcomed the partners from APHRC, representatives from the Ministry of Education (both the headquarters and the National Council for Higher Education), the Ministry of Agriculture, researchers, and all attendees. He expressed gratitude for the collaborative efforts with APHRC in this crucial study on the quality of work and experiences of women in STEM training and career development in East Africa, particularly Uganda.

The engagement aimed to validate the data collected over the past three years using various methods, including questionnaires, in-depth interviews, and focus group discussions. This validation workshop was vital for developing a framework that would enhance women's participation in STEM postgraduate training. He highlighted that the Inter-University Council of East Africa recognized the career advancement challenges faced by women and emphasized the need for support in East Africa and beyond.

He highlighted the importance of the Inter-University Council for East Africa in promoting and developing higher education in the region. Over the years, IUCEA has established mechanisms to improve education quality and harmonize educational standards, including initiatives to support women in STEM through scholarships. One such scholarship program, funded by the German Federal Economic Development Corporation, supported up to 45% women scholars, facilitating regional mobility and enhancement for women in East Africa.

Additionally, the African Higher Education Centre for Excellence operated in several East African countries, including Uganda, which had four centers of excellence: two at Makerere University, one at Uganda Martyrs University, and one at Mbarara University of Science and Technology. Other countries like Kenya, Tanzania, Burundi and Rwanda also hosted these centers, supporting women's education.

Professor Mawa announced that applications for a 100% scholarship program, supported by the Centre's of Excellence in collaboration with the East African Community, were open. Applicants were advised to check online or visit the website for more details. He assured that the link would be widely shared to ensure everyone had access

to this opportunity. He encouraged women to apply and seize these opportunities to enhance their postgraduate training within the East African region, with the added benefit of mobility across different centers of excellence for broader exposure.

## 2.4 Dr. Anne Khisa - African Population and Health Research Center



*Dr. Anne Khisa*

Dr. Anne Khisa acknowledged the presence of several distinguished individuals, including Ms. Nellie Akullo, Honorable Assistant Commissioner of Education, Ministry of Education, Uganda, Prof. Gaspard Banyankimba, Honorable Executive Secretary of the Inter-University Council for East Africa (in absentia), Professor Mawa, Chief Principal of Quality Assurance & Qualifications Framework at IUCEA, Mr. Cosmas Muhumuza, Senior Higher Education Officer for Data Management at the National Council for Higher Education, as well as Vice Chancellors, deans, provosts, and other distinguished guests.

On behalf of APHRC, Dr. Anne expressed heartfelt gratitude to the Ugandan government and IUCEA for hosting the data validation meeting.

She highlighted APHRC's dedication to public and population health research, underscoring its 20-year commitment to research and capacity-building. She noted that although Africa contributes only about 1% of global research output, much of global health research focuses on the continent. The low representation of African research in peer-reviewed journals, along with the need for more African researchers and the inclusion of women—who currently make up less than 30% of this field—were pressing concerns.

Dr. Anne pointed out that various institutional and systemic factors, compounded by gender issues, contribute to the unequal representation and participation of women in STEM. Given the rapid advancements in science, technology, and innovation, she emphasized the need for support from both men and women to ensure adequate women participation in these fields.

She also noted that the underrepresentation of women in STEM is not just a problem in Uganda but a global issue. Dr. Anne advocated for homegrown solutions and collaboration within the East African region, such as developing a common framework for quality training—like the proposed supervision and mentorship framework—as a possible outcome of this consultative process.

Dr. Anne called for systemic change and more effective policies, programs, and initiatives to support and encourage women's participation in STEM. Dr. Anne stressed that men also play a crucial role in this effort, and a collaborative approach between men and women is essential for achieving gender equality in STEM. She emphasized that the future of STEM in East Africa hinges on the equal participation of both genders and urged immediate action to make this a reality.

She concluded with hopes that the collaborative efforts between IUCEA universities, Ministries of Education, APHRC, and all stakeholders would result in impactful, gender-transformative outcomes.

## 2.5 Mr. Cosmos Muhumuza-National Council for Higher Education



Mr. Cosmos Muhumuza

Mr. Cosmos Muhumuza who works in the Department of Research and Innovation under the Directorate of ICT gave his opening remarks on behalf of the Executive Director, National Council for Higher Education Prof. Bernard Okwakor in his absence.

He provided a brief overview, explaining that the National Council for Higher Education is a regulatory body established by a parliamentary act to oversee higher education institutions, ensure quality education, enhance qualifications, and advise the government on higher education matters. This includes overseeing tertiary institutions and universities,

which must be accredited by the Council to proceed with higher education.

Mr. Muhumuza expressed gratitude to the Inter-University Council for East Africa for their effective collaboration with other regional agencies, funders, and stakeholders to better understand women’s participation in STEM fields. Mr. Cosmos urged institutions to address challenges in STEM and education broadly to ensure quality education. He highlighted issues such as inadequate infrastructure, poorly equipped laboratories, and the lack of electronic labs in East African institutions as barriers to STEM advancement.

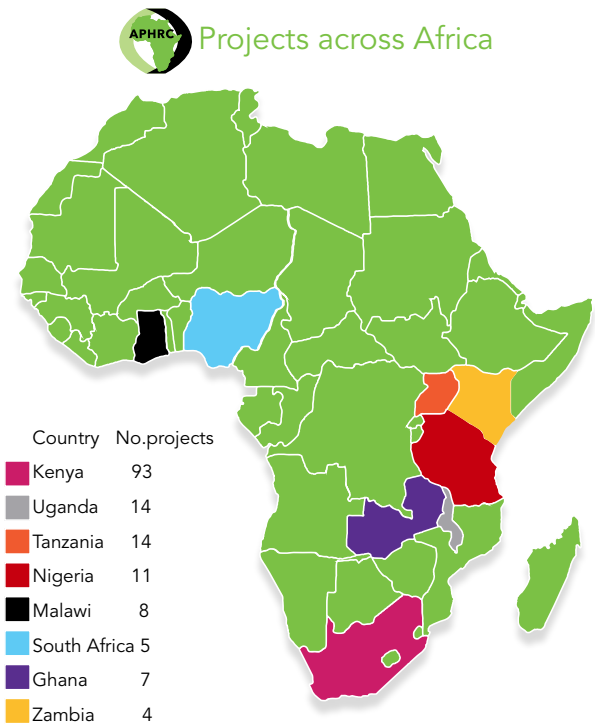
He also noted the problem of STEM researchers struggling to publish their work due to insufficient support, which impacts research quality. He concluded by inviting all stakeholders to contribute to the discussion, with the aim of increasing women’s participation in STEM and improving postgraduate training across Uganda and East Africa.

### 3. Presentations of the Study Results



Leah Mwangi

(5), Ghana (7), and Zambia (4). She emphasized that APHRC's multidisciplinary team includes experts from various fields, such as health, human development, population dynamics, urbanization, Water, Sanitation and Hygiene (WASH), data science among others.



#### 3.1 General Overview of the Study

Leah Mwangi, the project manager, presented the study findings, highlighting a consistent under-representation of women in STEM fields both in Africa and globally. She provided an overview of APHRC, a Pan-African policy-oriented think tank dedicated to generating research evidence, strengthening research capacity, and engaging with policy to improve population health and wellbeing. The study falls under APHRC's research and capacity strengthening theme, with the institution's core priorities being research, policy engagement, and communication.

Ms. Mwangi outlined APHRC's extensive projects across Africa, including Kenya (93), Uganda (14), Tanzania (14), Nigeria (11), Malawi (8), South Africa

The study focused on examining the participation and quality of experiences of women in STEM postgraduate training in Uganda. It aimed to generate evidence on women's participation in STEM training and careers across East Africa. Despite the overall low numbers of women in STEM, those who do graduate face significant challenges in securing and advancing in STEM careers due to social, institutional, environmental, and intrinsic factors.

The research addressed key questions related to gender distribution among STEM postgraduate students, differences in the gender distribution

of graduates and faculty, and factors influencing gender equality in STEM training and careers.

It also explored career pathways, success, and resilience of women in their respective fields. The findings revealed that the percentage of women in STEM disciplines in Uganda remains low, exacerbated by a lack of mentorship and networking opportunities, and a significant drop in women participation from undergraduate to postgraduate levels.

### 3.2 Study Objectives

1. To determine levels of gender equality in STEM-related post-graduate training and careers in Uganda.
2. To explore factors that contribute to participation of women in STEM related postgraduate training and careers in Uganda.
3. To develop a comprehensive framework for optimal engagement of women in STEM related post-graduate training and careers in Uganda.

### 3.3 Research Questions

To achieve our objectives, we will address the following research questions:



#### Objective 1

- i) Are there differences in gender distribution of students enrolled in and graduating from STEM-related postgraduate courses at Masters and PhD levels?

- ii) Are there differences in gender distribution of faculty in the various STEM-related post-graduate disciplines at various academic levels over the last 10 years?

- iii) Which practices promote or hinder gender equality in STEM related postgraduate training and careers in Uganda?

#### Objective 2



- i) What challenges and barriers to leadership do women face in STEM postgraduate training and careers?

- ii) What policies and guidelines influence women's participation in STEM post-graduate training in Uganda?

- iii) Which existing supervision and mentorship systems and structures promote quality postgraduate training and career paths among women in STEM related areas in Uganda?

- iv) Are there enough potential Women supervisors and mentors who can act as role models?

#### Objective 3



- i) What strategies and approaches provide for optimal engagement of women in STEM related post-graduate training and careers in Uganda?

- ii) What key performance indicators can be tracked to ensure women's success in STEM related careers?



### 3.4 Ethical Approval

The Ugandan research protocol was reviewed by Prof. Mawa, the local research collaborator, and subsequently approved by Makerere University. Prof. Mawa facilitated the acquisition of the research permit through the National Council for Higher Education. Data collection began in 2022, incorporating secondary data from enrollment records, graduation statistics, and university faculties.

Qualitative data was collected via IDIs and FGDs. In 2023, the data was cleaned and analyzed, and the findings were validated by stakeholders from Ugandan institutions which culminated to the development of a draft framework for supervision and mentorship for postgraduate training and careers in STEM.

### 3.5 Data Collection Challenges

Access to institutions in rural areas of Uganda posed significant challenges, impeding data collection efforts. Key personnel involved in data gathering were often unavailable, resulting in gaps in the institutional data sets. These logistical difficulties increased costs due to the need for multiple trips.

### 3.6 Scoping Review

The scoping review conducted by APHRC researchers examined various journal articles and policy documents related to STEM within Sub-Saharan Africa. The team accessed relevant online journal articles and policy documents from Uganda obtaining peer-reviewed publications and policy documents from various electronic databases.

The study findings from the reviewed articles highlighted several key challenges faced by women in STEM, including societal expectations and family responsibilities. The findings underscored the critical role of scholarships, leadership opportunities, and gender-inclusive hiring policies in enhancing women's representation in STEM fields.

Mentorship and supervision emerged as crucial factors in supporting women's persistence in STEM programs and combating negative stereotypes. Creating leadership opportunities, offering scholarships, fostering mentorship, and addressing stereotypes were found to be essential strategies for increasing women's representation in STEM.

Moreover, fostering a supportive environment and promoting gender equality were vital for attracting and retaining more women in STEM careers. This can be achieved through the implementation of gender-sensitive policies and programs. Ongoing monitoring and evaluation of gender equality in STEM programs are necessary to address challenges and improve the effectiveness of these initiatives. This includes systematic data collection and analysis on women's representation, experiences, and the barriers they encounter.

In conclusion, the findings emphasized the importance of overcoming obstacles faced by women in STEM and the role of universities, government agencies, and other stakeholders in promoting women's participation and success in STEM careers through targeted policies and supportive programs.

### 3.7 Quantitative Data

Secondary data from Uganda, spanning from 2011 to 2020, were collected from 13 universities: Makerere University, Kabale University, Kyambogo University, Mbarara University, Busitema University, Gulu University, Islamic University in Uganda, Bishop Stuart University, Uganda Martyrs University, Ndejje University, Kampala University, Kampala International University, and Nkumba University. This data included enrollment, graduation, and faculty staff information. The analysis aimed to address whether there were differences in gender distribution among students enrolled in and graduating from STEM-related postgraduate programs at the master's and PhD levels.

Enrollment data for PhD students from 2011 to 2020 revealed that 214 women were enrolled in STEM PhD programs compared to 549 men. Notably, there was a marked increase in enrollments starting in 2016. Gender-specific trends indicated a gradual rise in women PhD enrollment from 2013, with the highest peak in 2018, particularly in Agriculture PhD programs. Since 2011 there has been an upward trend in masters graduation in STEM postgraduate programs on STEM with a couple of fluctuations with a rapid decline in 2020 during COVID-19. Similarly, there were declines in 2012 and 2016 which were subsequently followed by a sharp increase. The highest peak was observed in 2019 indicating that there was a bigger group that completed their program between 2018 and 2019 for both men and women. Notably, there were more men than women who graduated between 2011 and 2020 signifying the gender disparity in postgraduate programs in Uganda.

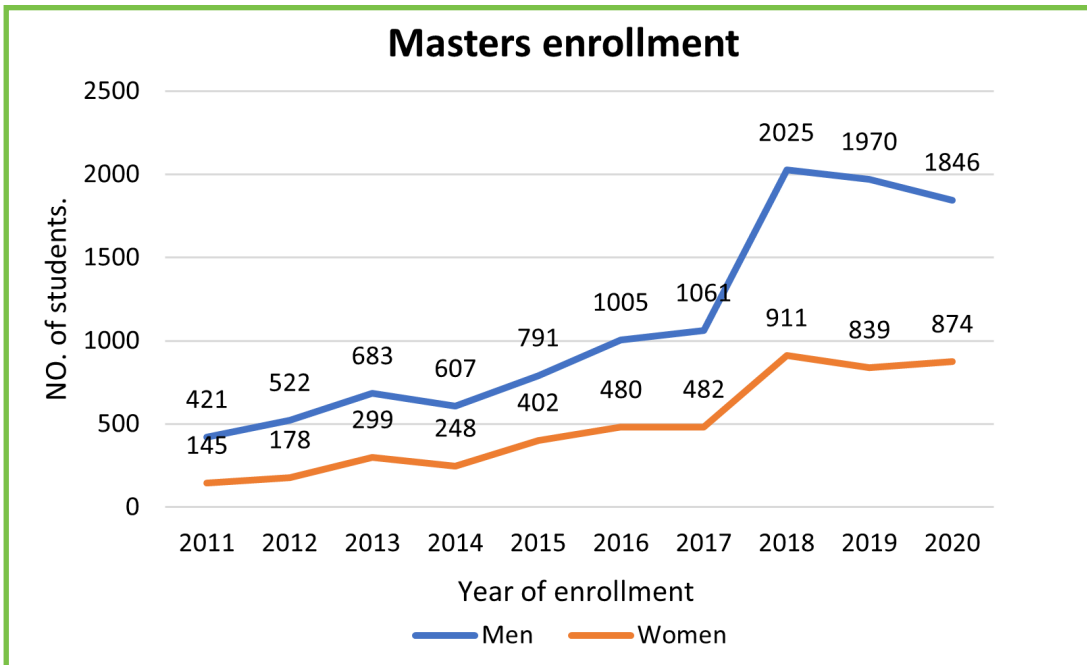


Figure 1: Masters Enrollment in Ugandan Institutions.

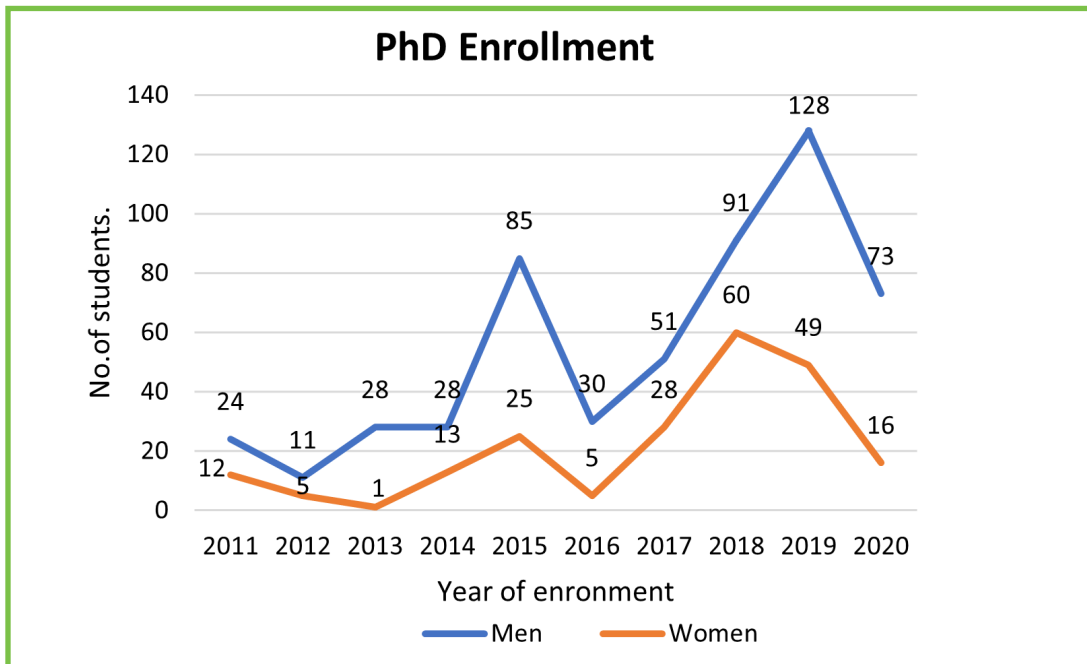


Figure 2: PhD Enrollment in Ugandan Institutions.

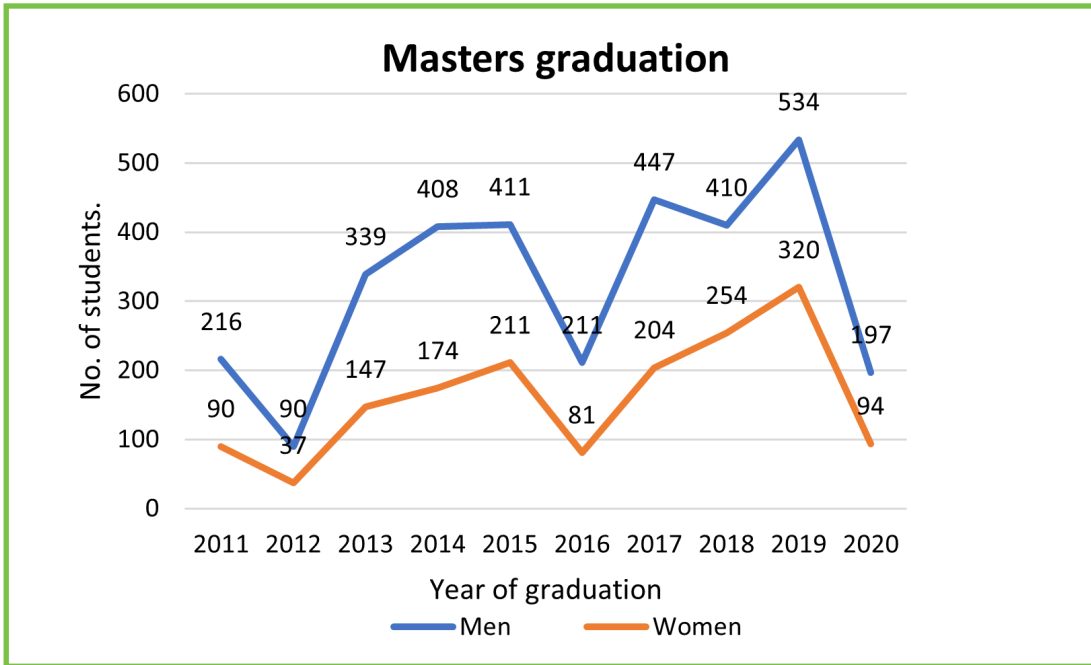


Figure 3: Masters Graduation in Ugandan Institutions.

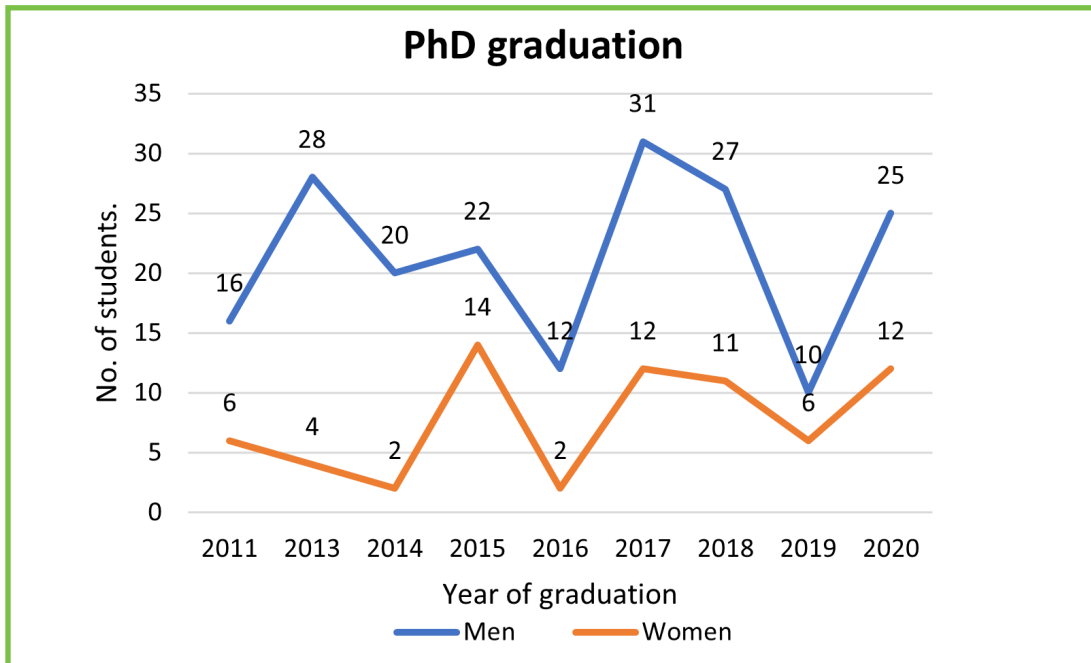


Figure 4: PhD Graduation in Ugandan Institutions.

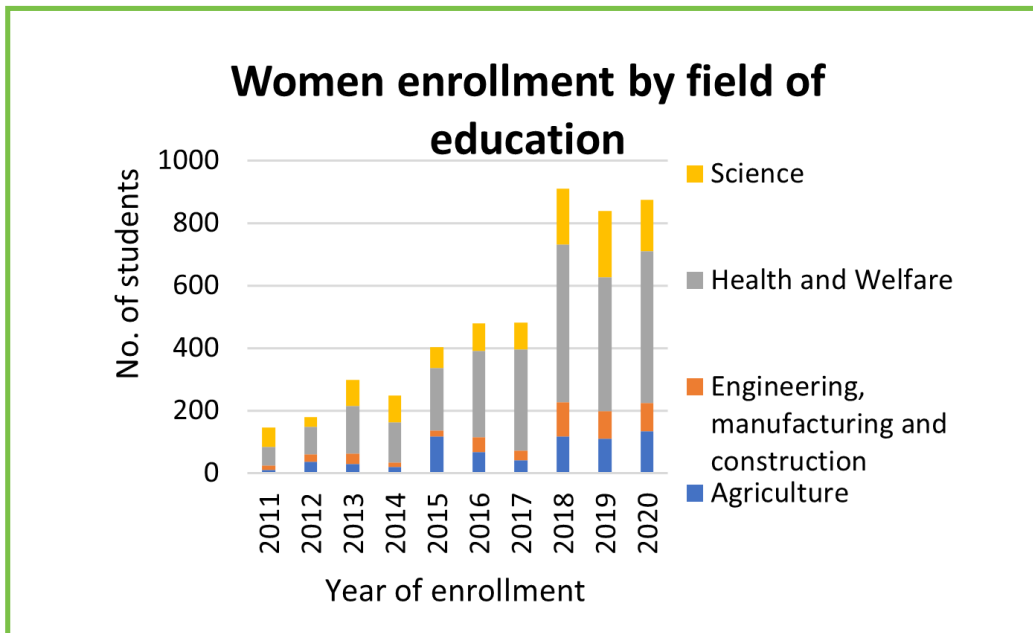


Figure 5: Women Enrollment by field of Education.

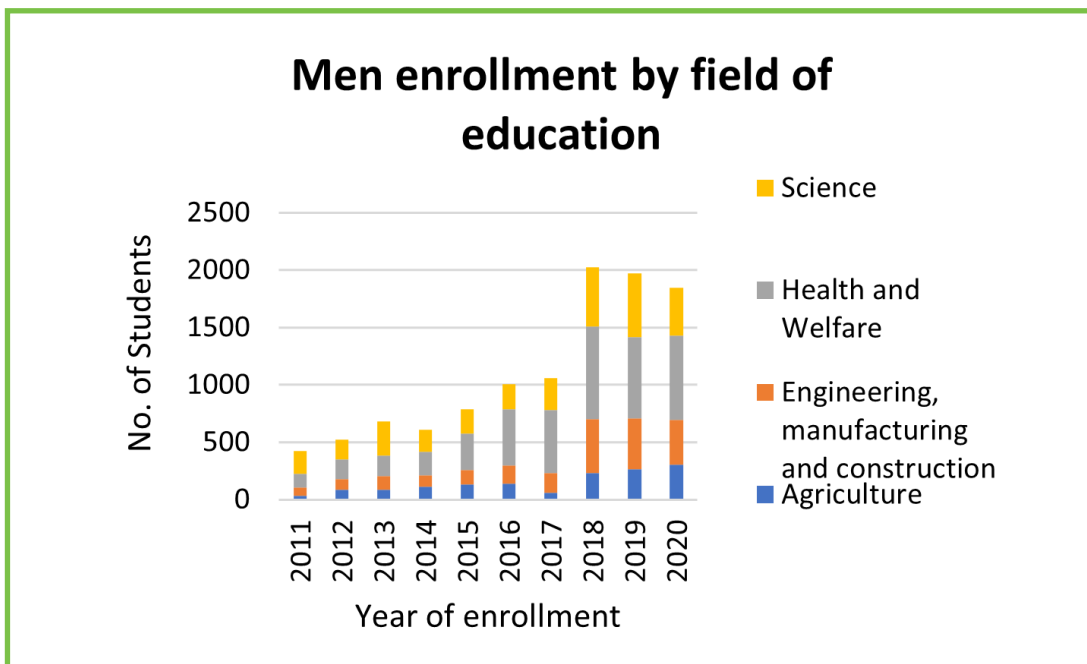


Figure 6: Men Enrollment by field of Education.

Women consistently showed a huge preference for Health and Welfare programs over the years and hence more enrollment compared to other STEM related masters programs. This trend was slightly different in that higher enrollment in Health and Welfare programs began in 2015.

Overall, there was a major fluctuation in PhD graduation trends in Uganda between 2011 and 2020 which might be attributed to a number of reasons including data gaps indicated by missing data in 2012. The PhD graduation had a similar pattern for both men and women however there was a wide gap in 2013. Above all, it was clear that there was a gender disparity over ten years in Uganda in terms of PhD graduation in STEM.

Faculty data indicates a gender disparity in STEM fields, with 650 men staff members compared to 204 women staff members. This highlights a significant imbalance in gender representation and a lack of women role models in STEM faculty positions.

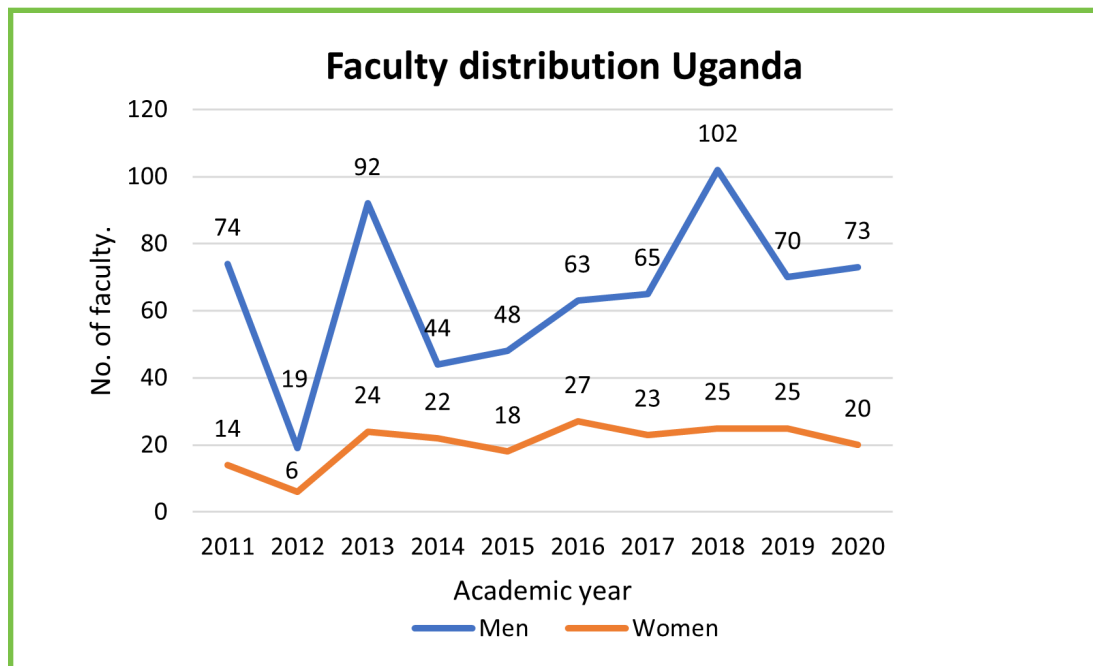


Figure 7: Faculty Data in Ugandan Institutions.

## Key Insights



## 3.8 Qualitative Data

The research employed a mixed methods approach utilizing a partially mixed concurrent equal status design. It incorporated both qualitative and quantitative data collection methods to provide a comprehensive analysis. Initially, exploratory qualitative interviews were conducted with students and faculty to refine the research questions, supplemented by a review of policies related to the training, recruitment, promotion, and retention of women in STEM. This was followed by a quantitative survey responded to by the same participants.

Focus group discussions (FGDs) and in-depth interviews were purposefully conducted with women faculty members teaching STEM postgraduate students, as well as researchers and practitioners in academia within this field. This phase included 14 in-depth interviews and one FGD with 14 participants, totaling 28 individuals.

In contrast, the online survey targeted a broader audience, including both men and women postgraduate students enrolled in STEM master's, PhD, and postdoctoral programs. Additionally, career faculty and researchers working in STEM departments at universities and research institutions were invited to participate.

Data sources included primary data (questionnaires, in-depth interviews, and focus group discussions) and secondary data (policy documents and existing datasets) to explore the experiences of women in STEM postgraduate studies and careers. The research also aimed to identify desirable characteristics of supervision and mentorship models.

### 3.9 Data Analysis

Individual and group interviews were recorded and transcribed verbatim. Transcripts were cleaned and subsequently transferred to QSR NVivo 12 software for analysis. The analysis adopted both deductive and inductive thematic analysis to examine how various factors influence women’s participation in STEM training at the postgraduate level.

Both qualitative and quantitative data were collected and synthesized to generate integrated findings on strategies to enhance women’s participation in STEM postgraduate programs in Africa. These findings informed the development of a framework aimed at improving the participation and experiences of women in STEM-related postgraduate training and career advancement.

### 3.10 Findings/Themes

The results of the study revealed notable gender disparities in the STEM field in Uganda. The online survey data indicated that only 39% of respondents were women, while 61% were men. This disparity may be attributed to the demanding schedules of women in master’s and PhD programs, who often manage family responsibilities, or the relatively small number of women in STEM fields. Additionally, the study found that over 70% of scientists in Uganda are in urban areas, underscoring the need for STEM programs in rural regions and increased mentorship and role models in these areas.

#### Online Survey Data Results.



#### WOMEN

The online survey data indicated that only 39% of respondents were women

**39%**



#### MEN

The online survey data indicated that 61% of respondents were men

**61%**

Online survey data was also analyzed based on 110 responses from both men and women in STEM. Most of the responses came from men and women in sciences STEM postgraduate programs compared to technology, engineering, and mathematics.

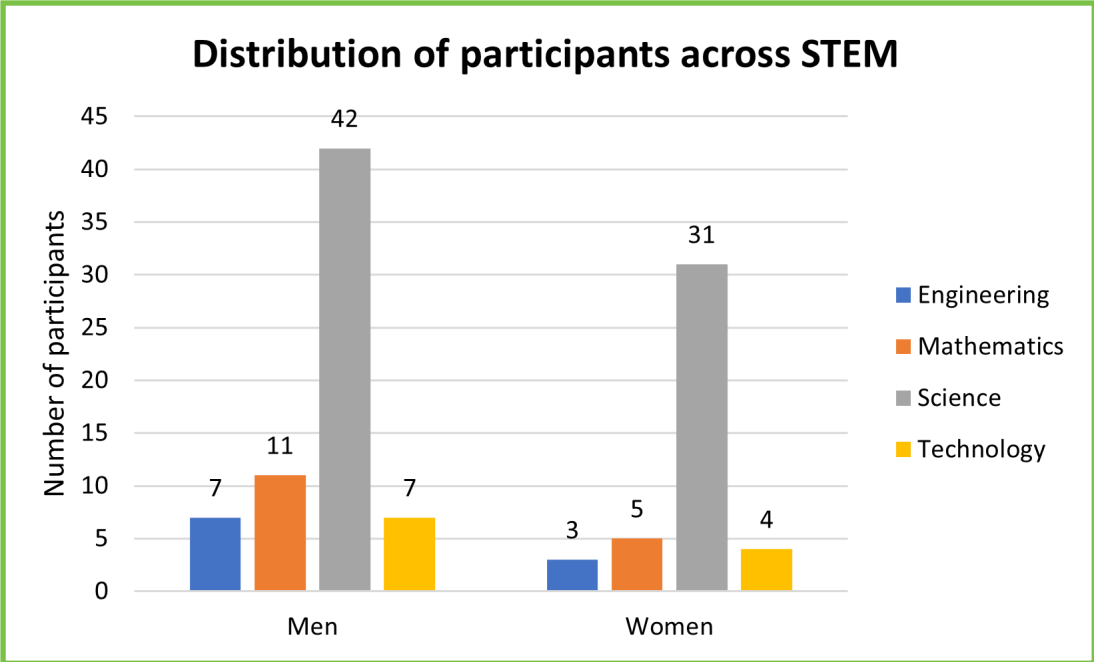


Figure 8: Distribution of participants across STEM.

The survey also highlighted that men were more likely to be enrolled in postgraduate programs, with male students and lecturers comprising 60.7% of the respondents. Additionally, the underrepresentation of women faculty in STEM disciplines was identified as a significant issue affecting mentorship and role model programs for women in STEM individuals. The survey highlighted the representation of women in supervision in postgraduate STEM training and majority of the women indicated that they were in a formal academic supervision relationship. On the other hand, there was little difference between women in formal mentorship relationships and those who were not.

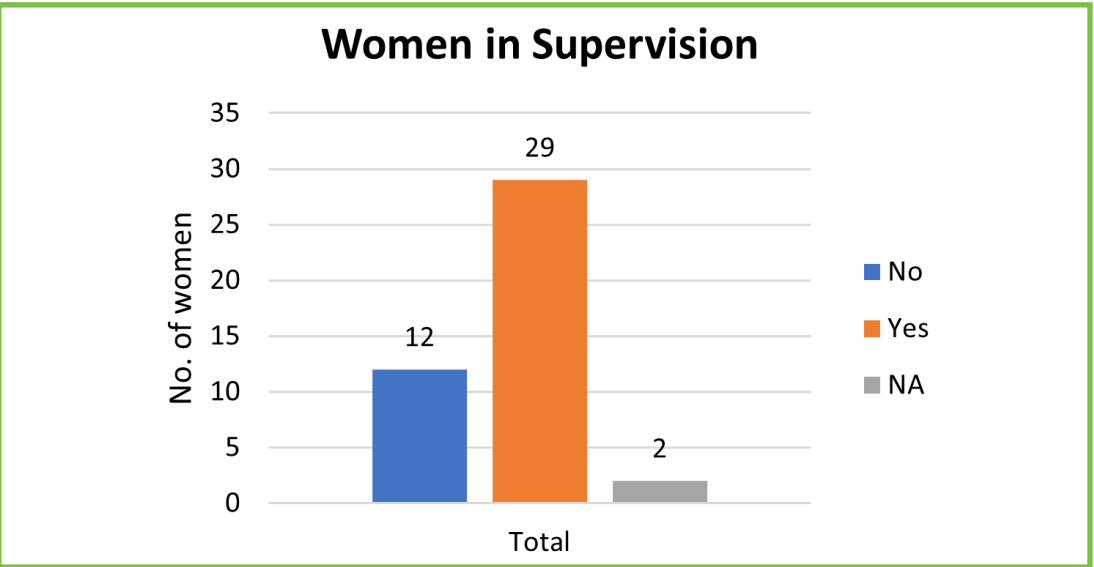


Figure 9: Women in supervision.

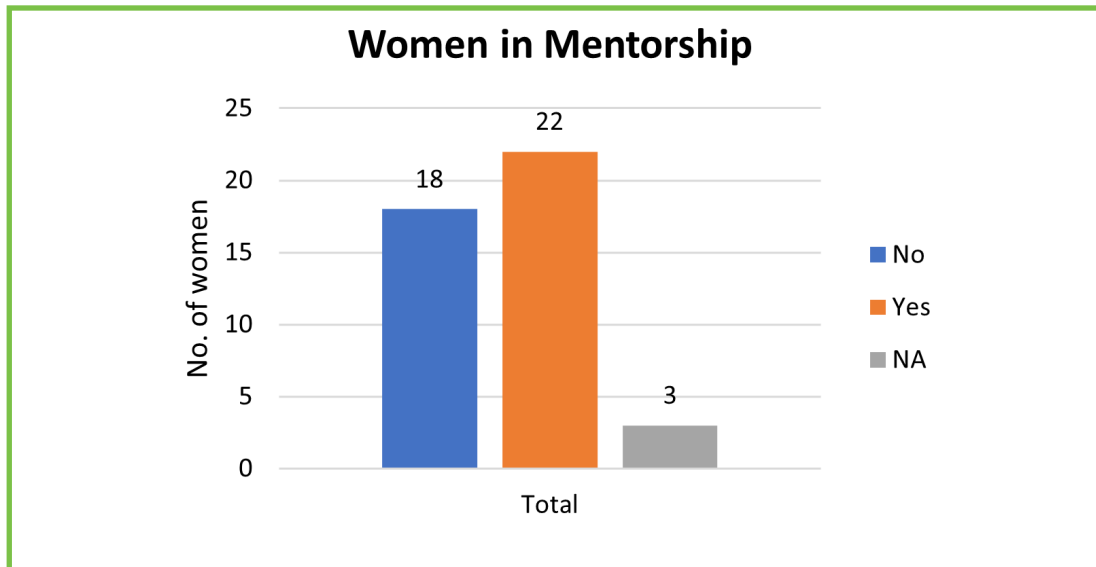


Figure 10: women in mentorship.

## Gender Equality

The study identified persistent gender disparities in terms of numbers, progression, and career opportunities within STEM fields.

It was noted that women have unique participation patterns in STEM, which are less progressive compared to men. Disparities were evident in all STEM programs, where fewer women engaged compared to men.

## Factors Affecting Gender Equality

The study identified several factors that promote gender equality, including:

- Motivational support from institutions.
- Flexible working schedule.
- Availability of gender equality units within institutions.
- Family support during early career stages.
- Presence of mentors and effective leadership.
- Opportunities to challenge gender stereotypes.

Conversely, the study also highlighted numerous hindering factors such as:

- Socially constructed gender stereotypes.
- Lack of women mentors and role models.
- Limited pool of women mentors and supervisors.
- Workplace discrimination affecting opportunities and promotions.
- Inequitable scholarship opportunities that do not accommodate women's family responsibilities, hindering career progression and gender equality.

## Career Pathways

The study examined women's career progression after graduation, investigating whether they remain in academia, join industry, or pursue other career paths. It assessed the challenges they face and the availability of opportunities for career advancement.

Dr. Anne highlighted the key challenges encountered by women in STEM in Uganda which include the existence of discriminatory policies, gender roles and family responsibilities, lack of mechanisms to support women's career breaks occasioned by family responsibilities, limited employment opportunities for women in STEM, and research funding opportunities skewed toward experienced researchers who are usually men. This was demonstrated by a quote from one of the in-depth interviews which indicated that:

*"Once you complete your bachelor's degree, there's often a high level of expectation from family. They may expect that, after graduation, you will get married, have children, stay at home, and focus on raising a family. I have found that these expectations can hinder many women from pursuing further studies, as balancing education with family responsibilities can be extremely challenging" (IDI).*

She also highlighted some of the key enablers of equality in career progression. Such enablers include women's contribution to departmental decision-making processes, target opportunities and support and value and recognition emphasis of women's contributions in their field of specialization. This was demonstrated from the quotes below which indicated that:

*"The composition of the Deans, who are members of the Senate, is significant because the Senate provides the academic direction for the university and makes key decisions affecting academics. Given the representation of women compared to men, it may appear that women have less influence. However, I believe that when women are at decision-making table and share their perspectives, their opinions are valued and considered" (IDI).*

*"My personal experience, which I greatly appreciate, was not representative of many of my colleagues. I was fortunate to have equal access to educational resources and career opportunities throughout my path in STEM. However, remuneration has been a different story. When it comes to the foundation that led me to choose a STEM field, I personally did not experience inequality" (FGD).*

## Success of Women

Dr. Anne also mentioned some of the success stories of women leaders in STEM, focusing on their resilience, the challenges they faced, and how they achieved their current status. As demonstrated by the quote below:

*“By demonstrating resilience and confidence, I’ve built a reputation that encourages others to approach me and recognize my work. Being visible in our small society has helped me make connections and led to opportunities, like joining an educational body. Putting oneself out there is essential—staying in a small circle limits recognition. This proactive approach might yield different results for men, but resilience remains key for anyone” (IDI).*

## Conclusion

There is a clear need for more women mentors in the East African region and a concerted effort to address gender disparities in STEM-related postgraduate training and careers. Enhancing access to education and resources for women, encouraging girls to pursue STEM careers, and creating a more inclusive work environment in STEM fields are crucial steps. By implementing these measures, African countries can harness the potential of all members of society and foster growth and development in the STEM sector.

## 4. Supervision and Mentorship Framework

The Supervision and Mentorship Framework was introduced as a tool to address gender disparity in STEM fields. The session facilitator asked participants ten guiding questions to validate the mentorship framework and understand the Uganda situation in STEM programs and to find ways to improve it, that is;

- a) Was the quantitative data a true representation?
- b) Could the situation be improved to have an equal number of men and women in STEM programs?
- c) What strategies could be put in place to bring the desired change?
- d) What aspects of supervision are most important in Uganda?
- e) What aspects of mentorship are most important in Uganda?
- f) During training of postgraduate students, should mentorship be separated from supervision?  
How can we restructure supervision and mentorship?
- g) What should be the gender of the mentee and mentor?
- h) Should mentorship be formal?
- i) What are the indicators of a successful mentorship?
- j) Should mentorship be compensated?

Dr. Uwizeye Dieudonne defined the concept of mentorship and emphasized the importance of having a good supervisor. He described a good supervisor as one who is available for consultation, gives encouraging advice, puts in place tracking mechanisms, introduces the supervisee to other students, engages with the supervisee's existing issues, has a well-equipped laboratory, is well-informed and is sensitive to gender issues.

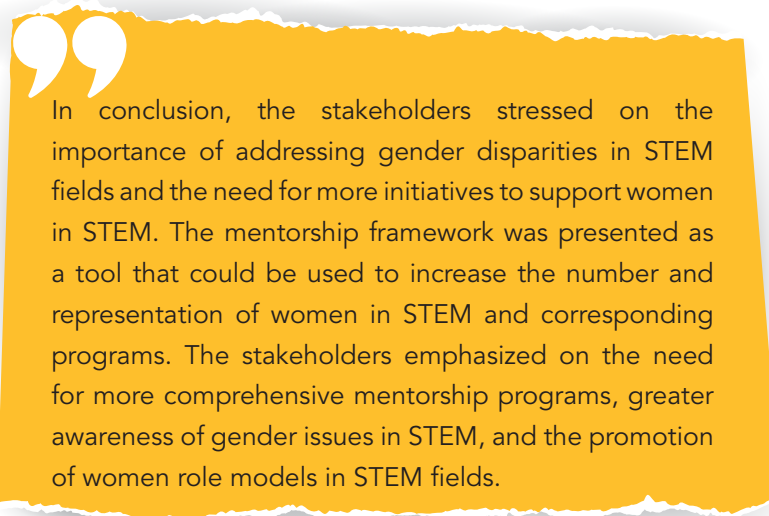
This session aimed at providing a comprehensive understanding of mentorship and its role in resolving gender disparities in STEM programs. The stakeholders highlighted the need for more women mentors in STEM fields and the impact that mentorship can have in improving the representation of women in STEM programs.

Some stakeholders proved that despite the general view that women are few in the postgraduate positions, for the case of Kyambogo university, very many women were applying for PhDs because of the funding thus gender equality is promoted to some extent. Discussion arose on the small pool from which to recruit women at postgraduate level in STEM which originates from lower levels of secondary education where fewer women take up sciences.

The Higher Education Student Financing Board with a mandate to provide loans and scholarships to Ugandan students pursuing approved STEM programs emerged as the reason for the sharp rise in the many postgraduate enrollment which happened in the year 2017-2018 since it was the time when the system became active.

Most scholarships give girls opportunities to join university on lower cut off points though this is still inaccessible to many women. We still have a gap from the small pool of girls who succeed to reach this level to benefit from such programs. They further added that scholarships of from the Inter-University Council for East Africa which allow for mobility to other centers of excellence don't consider women's responsibilities for family back home thus they remain inaccessible.

The lack of women role models in STEM fields was identified as a challenge. Mentorship was presented as a solution to help address this issue. Stakeholders noted that while gender distribution was a problem in STEM faculties, the impact of gender on supervision had a neutral or positive effect. However, there were a few cases where male respondents reported negative effects in a supervision relationship of both men-women or opposite gender.



In conclusion, the stakeholders stressed on the importance of addressing gender disparities in STEM fields and the need for more initiatives to support women in STEM. The mentorship framework was presented as a tool that could be used to increase the number and representation of women in STEM and corresponding programs. The stakeholders emphasized on the need for more comprehensive mentorship programs, greater awareness of gender issues in STEM, and the promotion of women role models in STEM fields.

## 4.1 Group discussions

Dr Uwizeye later divided participants into 4 groups each with representation from academia, university administrators, researchers and students, each group received a printed sheet of some of the desirable characteristics of supervision and mentorship derived from the study.

The participants were encouraged to point out some missed out key characteristics that they thought were relevant and then rank them in their perceived importance. He gave the participants 25 minutes to discuss among themselves and agree for Uganda which strategy could be used to achieve the set goal, improve the framework, be able to audit supervision and mentorship among other aspects as stakeholders.

All key points were noted on flip charts provided. A public vote was taken on the key desirable characteristics for both mentorship and supervision using sticker notes numbered one and two against the point they thought was a priority for Uganda's case. Later all votes were recorded, counted tallied and results were used in the development process of the framework.

### What aspects of supervision are most important in Uganda?

Actors	Responsibilities	Activities	Indicators of success
Supervisor	Trainings	<ul style="list-style-type: none"> <li>✓ To teach.</li> <li>✓ To guide.</li> </ul>	<ul style="list-style-type: none"> <li>• Success of the supervisee.</li> <li>• Research publications of the supervisor.</li> </ul>
	Accompaniment	<ul style="list-style-type: none"> <li>✓ To orient.</li> <li>✓ To correct.</li> <li>✓ To encourage.</li> <li>✓ To track progress.</li> <li>✓ To care and lead.</li> </ul>	<ul style="list-style-type: none"> <li>• Respect of the deadline.</li> <li>• Success of both the supervisee and the supervisor.</li> <li>• Independent researcher.</li> <li>• Good leadership skills.</li> </ul>
Supervisee	Study and complete assignments in time	<ul style="list-style-type: none"> <li>✓ To be diligent.</li> <li>✓ consider suggestions and recommendations made by the supervisor.</li> <li>✓ To present his/her report to the supervisor regularly.</li> <li>✓ To work in teams with other students.</li> <li>✓ Innovate.</li> </ul>	<ul style="list-style-type: none"> <li>• Critical thinker.</li> <li>• Independent researcher.</li> <li>• Ability to write grants.</li> <li>• Good leadership skills</li> <li>• Success of the supervisee.</li> <li>• Publications from the supervisee.</li> <li>• Good decision makers.</li> </ul>

## What aspects of mentorship are most important in Uganda? And among the actors of supervision who should do what?

Actors	Responsibilities	Activities (Group members have considered activities as fields or domains)	Indicators of success
<b>Mentor: professors, supervisor, professionals</b>	<ul style="list-style-type: none"> <li>To guide</li> <li>To orient</li> <li>To correct</li> <li>To advice</li> <li>To support</li> </ul>	<ul style="list-style-type: none"> <li>Academic field</li> <li>Industrial field</li> <li>Social field</li> <li>Economic domain</li> <li>Political field</li> <li>Religious field</li> </ul>	<ul style="list-style-type: none"> <li>Number of mentees to increase</li> <li>Increase of the life standards</li> <li>Increase of the academic level</li> <li>Increase her/his networking</li> </ul>
<b>Mentee: students</b>	<ul style="list-style-type: none"> <li>To accept to learn</li> <li>To apply what they have learned</li> <li>To submit thier report to the mentor</li> <li>To have humility towards mentors</li> </ul>		<ul style="list-style-type: none"> <li>Mentee receives certificate at the end of her/his program</li> <li>Her/his academic level will increase</li> <li>Her/his life standards will increase</li> </ul>

## During training of postgraduate students in STEM, should mentorship be separated from supervision? If yes, why and how should we separate them? If no, why, and how then should we introduce mentorship? (Think of the case of Uganda)

Mentorship should be separated from supervision because most supervisors in universities are overwhelmed with very many students especially in private universities who have a small pool of supervisors for students to choose from. Even for cases of government universities, they do not follow the rule of supervision, having 3 master students and 2 PhD students due to the limited resources hence one supervisor is overloaded with 15 students, this leaves no space for supervisors to also do the mentorship role. Thus, the two aspects should be separated.

Stakeholders also stressed that specialization is one form of perfection and effectiveness of work, thus they believed that the actors would do a great job if they were specific to what they do and thus would enhance training of women and male gender at postgraduate level in STEM.

Stakeholders in the group further discussed that separating mentorship and supervision in their academic programs is important at the master's level, students often require a mentor to help them identify their strengths and develop the competencies necessary for success in their future careers based on their life experiences. Even at PhD level where the world thinks students have a great deal of understanding of their research interests, these students need guidance and counselling due to the exaggerated stress because of one student doing a PhD in the whole department.

To ensure effective separation of mentorship and supervision, universities can establish contracts or committees to carefully select mentors with the necessary skills and experience in STEM to collaborate effectively with students. These committees should also have measures in place to monitor the quality and of mentorship, organize seminars for trainings to build mentors capacity and ensure that students are adequately supported, and indicators of success should be drafted.

In addition, stakeholders agreed that universities should incorporate mentorship into their programs and include all staff members, including non-research personnel like psychologists, social scientist and library staff into the mentorship program. It was concluded that anyone can be a mentor, if they have a good understanding of handling students, have experience and ability to guide and inspire students.

Stakeholders noted the difficulties faced by women in STEM fields which go beyond financial issues such as the orientation system in educational institutions, the high cost of offering STEM courses with well-equipped labs and additional challenges like family duties, economic devastation after COVID-19, burden of household activities and gender stereotypes.

Lastly, it was pointed out that the absence of mentorship in Africa could lead to difficulties in professional success. Mentors must possess such qualities as being knowledgeable, experienced, and inspirational in their respective fields such as academia, business, politics or religion.

## 4.2 Recommendations

During the discussion, participants made several recommendations to improve the representation of women in postgraduate programs in STEM, in Uganda.

A) The Ministry of Education should add more resources such as loans and scholarships allowing women students to apply for postgraduate courses in STEM.

B) The Inter-University Council for East Africa (IUCEA) together with the African Population and Health Research Center (APHRC) and other partners should encourage universities to offer both PhD and master's level courses in STEM fields.

C) Participants further suggested that the Ministry of Education should offer more resources and support to students who choose STEM courses. They also emphasized the importance of encouraging women to pursue careers in STEM and addressing the obstacles they face, including family duties, the COVID-19 pandemic, household responsibilities and gender stereotypes.

D) The participants also stressed the importance of ensuring that STEM courses are accessible to everyone, regardless of financial status. Universities should provide adequate funding for well-equipped labs. To enhance the quality of education in STEM fields, participants recommended ongoing professional development for mentors and teachers in these fields.

E) Participants also argued ministry of education to support science uptake by girls and women at lower levels of secondary to provide a wide pool of women for recruitment in the STEM courses at graduate and later postgraduate levels.

### 4.3 Steps Forward

Dr Anne revealed that there were a few details that needed to circle back for enrollment for some universities in 2017 and 2018 and ensure that all information from all universities was captured. She talked about a list of universities which had-not provided the study with faculty data because the study was done in the middle of the COVID-19 pandemic thus these universities were to be visited to pick such data.

Dr Anne also added that 110 participated in the online survey in Uganda which is not sufficient thus a plan would be drafted to go back to faculties of technology, mathematics, and engineering to capture the full data to get a full picture for Ugandan statistics on STEM at postgraduate level. She concluded that in two months, APHRC team would be able to share the joint framework that would be agreed, later they hoped to organize a stakeholder meeting to discuss on the issues further.

Namakula Patra who was a research assistant during the data collection process in Uganda read out a list of universities that would be visited to cover up the gaps for type of data required.

Institution	Data gaps
Makerere University	Responses in for technology, mathematics, and engineering.
Kabale University	Faculty data
Mbarara University	Faculty data
Kyambogo University	Gaps in specific years of enrollment
Kampala University	Faculty members
Kampala International University	Departmental data

## 5. Closing Remarks

### 5.1 Dr. Salome Guchu – Inter University Council for East Africa



*Dr. Salome Guchu*

Dr. Salome Guchu acknowledged the important role of IUCEA in promoting and supporting higher education and research in East Africa. She noted that IUCEA is dedicated to enhancing staff mobility, providing scholarship opportunities, and promoting research programs and projects to support the development of higher education in the region. She said it is important to understand the current situation and role of IUCEA, so that they can make informed decisions on how to improve their operations and better serve the region. She concluded by thanking all participants who spared time to attend the meeting for a better women participation in STEM.

### 5.2 Dr. Marta Vicente-Crespo - Study Co-investigator (APHRC)



*Dr. Marta Vicente-Crespo*

It had been a while since she visited Uganda and with gratitude, she thanked all stakeholders in Uganda and the entire team of APHRC for conducting valuable research on the participation and quality of experiences of women in STEM in Uganda.

She was grateful for the energy and power invested in this engagement to increase numbers of women in STEM. She posed some questions to the audience to reflect on;

- Are women and men different?
- Is it because of the choices they make in life that makes them differ in their STEM participation?
- Are we missing something as to the reason why more women and men are represented in some fields of study than the others?

Finally, Dr. Marta urged all stakeholders not to think that gender inequality is no longer an issue and as well not assume that all talents are evenly distributed to all genders in Uganda. Therefore, there

was need to provide skills and open up opportunities to women in STEM to enable them to have a choice to choose from all fields of study and outcomes can be used as measure for progress.

# Annex 1: List of Participants

## Data Validation Workshop

Examining Participation and Quality of Experiences of Women in Science Technology Engineering and Mathematics (STEM) in UGANDA

Date: 20th April 2023

Venue: Protea Hotel by Marriot Kampala

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# Annex 2: Program Agenda

## Data Validation Workshop

Examining Participation and Quality of Experiences of Women in Science Technology Engineering and Mathematics (STEM) in Uganda

Date : 20th April 2023

Venue : Protea Hotel by Marriott Kampala  
Kampala

Agenda

Time	Activity	Description
<b>Opening Session</b>		
8 :00-9 :00 a.m.	Registration and Morning tea	<p><b>Participants registration and zoom log in for APHRC staff from Nairobi (IDRC Breaking barriers team - APHRC)</b></p> <p>Facilitator : Lisa Omondi (APHRC)</p> <p>Program facilitator: Leah Mwangi (APHRC)</p> <p>Rapporteur – Flavia Makerere University</p> <p>Note taker – University of Rwanda</p>
9 :00-9 :05 a.m.	Welcome	<p><b>Welcome Remarks</b></p> <p>Prof. Michael Mawa - Inter-University Council for East Africa</p>
9 :05-9:40 a.m.	Official Opening	<p><b>Opening Remarks</b> (10min per speaker)</p> <ol style="list-style-type: none"> <li>1. Dr. Marta Vicente-Crespo – Study Investigator (APHRC)</li> <li>2. Prof. Gaspard Banyankimbona - Executive Secretary Inter-University Council for East Africa (IUCEA)</li> <li>3. Ministry of Education official – Uganda</li> </ol>
9 :40-10 :00 a.m.	Introduction, Methods and Data Analysis	<p><b>Presentations</b></p> <ol style="list-style-type: none"> <li>1. General Overview of the study &amp; scoping review – Leah Mwangi (20 min)</li> </ol>
10 :00-10:15 a.m.	Health Break	<b>All participants to take a group photo</b>

<b>10 :15-10 :45 a.m.</b>	Presentation of preliminary findings	2. Quantitative data (secondary and online Survey) (30 min) - Leah Mwangi / Dr. Anne Khisa
<b>10 :45-11 :15 a.m.</b>	Introduction, Methods and Data Analysis	3. Qualitative data and draft supervision and mentorship Framework (30 min) - Dr. Anne Khisa
<b>11 :15-12 :00</b>	Group discussion and Plenary	<b>Plenary</b> 1. Validation of supervision and mentorship framework (45mins) Dr. Dieudonne Uwizeye
<b>12 :00-1:00 p.m.</b>	Plenary discussion	2. Questions, answers and reflection – Validation of supervision and mentorship framework (60 mins)Dr. Dieudonne Uwizeye & Dr. Anne Khisa
<b>1:00-2:00 p.m.</b>	Lunch	
<b>2:30 – 3:00 pm</b>	Closing Remarks	<b>Closing Remarks</b> Prof. Idris Rai – Deputy Executive Secretary, Inter University Council of East Africa
<b>3:00 p.m.</b>	<b>Refreshment and departure</b>	

