

10-2023

Perception of Nuclear Security as a Barrier to Female Representation in Africa

Primerose Ruhukwa
Radiation Protection Authority of Zimbabwe

Follow this and additional works at: <https://trace.tennessee.edu/ijns>

 Part of the [Nuclear Commons](#)

Recommended Citation

Ruhukwa, Primerose (2023) "Perception of Nuclear Security as a Barrier to Female Representation in Africa," *International Journal of Nuclear Security*. Vol. 8: No. 2, Article 15.

<https://doi.org/10.7290/ijns257949>

Available at: <https://trace.tennessee.edu/ijns/vol8/iss2/15>

This article is brought to you freely and openly by Volunteer, Open-access, Library-hosted Journals (VOL Journals), published in partnership with The University of Tennessee (UT) University Libraries. This article has been accepted for inclusion in International Journal of Nuclear Security by an authorized editor. For more information, please visit <https://trace.tennessee.edu/ijns>.

Perception of Nuclear Security as a Barrier to Female Representation in Africa

Primerose Ruhukwa

Radiation Protection Authority of Zimbabwe

Abstract

Women are strongly underrepresented in the nuclear energy sector, particularly in the field of Nuclear security. Regardless of several government efforts to increase the number of women in this field, which include gender balance policies, education, and awareness campaigns, the nuclear security industry remains a male-dominated field. The reason why nuclear security is shunned by most women in Africa is because of an incorrect perception of what nuclear security is. When a lay person hears the term *nuclear*, the first thing that comes to mind is nuclear weapons, and many are quick to judge, saying that Africa does not have any nuclear materials, not realizing that nuclear is more than just nuclear bombs. In Africa, the term *security* is associated mostly with men who safeguard sensitive buildings and public areas. People think of security in terms of men carrying guns. The security profession is usually undermined because of the lack of opportunities and privileges for people doing these jobs. Also, the fact that few women already work in the nuclear security industry, particularly in top positions, makes this field automatically perceived as a male job. Many wrong perceptions exist about what nuclear security is, and many young women simply do not know about the various career opportunities that nuclear security has. This paper seeks to clarify the wrong perceptions and myths about what nuclear security entails, highlight challenges that are hindering women from taking nuclear security as a profession, and suggest ways to increase female representation in the nuclear security industry.

Keywords: women, perception, underrepresentation, barrier, challenges, policies

1. Introduction

Despite various efforts by many governments in the past to increase the number of women in the nuclear sector, the number of women in this field, particularly in nuclear

security, remains significantly low. Studies have estimated that women comprise only 20% of the nuclear workforce, and this figure is even smaller within the nuclear security workforce and smaller still in specific areas such as cybersecurity [1]. Furthermore, women are significantly underrepresented in nuclear security areas associated with weapons programs when compared with the civil nuclear sector [2]. The underrepresentation of women in the nuclear security sector can be attributed to a number of factors, such as a lack of policies to address gender disparity, lack of awareness programs to increase the knowledge of women on the opportunities available in the nuclear field, and lack of institutions that offer nuclear security related training courses, especially in Africa. Additionally, another major problem has yet to be fully addressed that has also largely contributed to this imbalance is perception toward nuclear security: the perception of women themselves, the industry, and community as a whole. Many myths and misconceptions exist about nuclear security, and most societies seem to have shared beliefs and cultural stances that they believe to be true. It is generally believed that the nuclear security sector is for males, and considering that men dominate this field, this theory may appear to be true. The purpose of this paper is to highlight some of the perceptions that are acting as a barrier to women taking up nuclear security professions in Africa and to suggest ways to increase the number of females in this area.

2. Gender Disparity in Nuclear Security in Africa

Women only make up approximately 20%–25% of the nuclear workforce and are underrepresented in nuclear security and the nuclear field in general [3]. The underrepresentation of women in nuclear security can be attributed to the perception of women themselves, of the nuclear organizations that are supposed to be employing them, and of African society at large. *Perception* can be defined as “a thought, belief, or opinion, often held by many people and based on appearances” [4].

In Africa, there is general lack of knowledge about what the term *nuclear* means. People usually associate the term *nuclear* with weapons, guns, and war. Culturally, going to war is typically a man’s job because men are considered to have the physical strength to do so and the mental capabilities to establish strategies for war. African societies are largely patriarchal, and this means any job which requires physical strength, critical thinking, or key decision-making is typically a man’s responsibility because men are seemingly better able to fill the *guns, guards, and gates* role of providing physical protection, guarding, and response [1]. The role of the woman is usually limited to the kitchen and raising children. Thus, the nuclear sector is regarded as an exclusively masculine territory because of the cultural belief that there are specific jobs for males and for females.

Furthermore, there is a general lack of understanding about what a nuclear security job involves. Many people perceive nuclear security as a sector that is limited to professionals drawn from the military, intelligence, state security apparatus, and law enforcement. Although some are of the view that nuclear security involves highly skilled technicians, others think that nuclear security is all about manning posts and that you do not need to be very educated to do such a job. In some cases, these misconceptions

act as a barrier that hinders women from taking careers in nuclear security simply because they do not know what nuclear security entails.

So many incorrect perceptions exist about what nuclear security is, and many young women simply do not know about the various career prospects that the nuclear industry presents. Most people view nuclear security as a field that requires only people with a strong scientific background, which is not entirely true. Many girls fear to take up science subjects because they think science is difficult. In reality, nuclear security is a very broad discipline that does not only need people with technical skills but also requires a much broader set of knowledge and skills. management, law, regulation, communications, and stakeholder engagement To perform their jobs competently, nuclear security professionals need expertise in human resource development, organizational psychology and culture, radiation protection, environmental [1]. Consequently, nuclear security experts, including those engaged in prevention, detection, and response, should come from diverse professions. Diversity should be in terms of academic qualifications, gender orientation, and skills.

Furthermore, the gender disparity in nuclear security can be attributed to the fact that the subject of security itself is perceived as a gendered issue. In other words, security has been viewed as a masculine matter and outside the realm of the involvement of women, and women have been generally excluded from decision-making processes on security matters [5]. The absence of women in these deliberations has been evident particularly at the nuclear disarmament discussions where women have been strongly underrepresented. The United Nations Institute for Disarmament Research (UNIDIR) and the International Law and Policy Institute (ILPI) observed that Africa historically has had the fewest women delegates at Treaty on the Non-Proliferation of Nuclear Weapons (NPT) review conferences from 1980 to 2015 [5]. At best, African delegations at NPT review conferences have been composed of 18% women, well below levels recorded for the Asia-Pacific region (21%), Western Europe and others (30%), Latin America and the Caribbean (37%), Eastern Europe (29%), and the global average of 27% [6].

3. Challenges Hindering Women

The International Atomic Energy Agency (IAEA) defines nuclear security as “the prevention of, detection of, and response to criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities, or associated activities” [7]. This definition lays out the three basic concepts of nuclear security: prevention, detection, and response. Coming up with innovations, technological breakthroughs, and advancements that will be used to develop infrastructure for protection from nuclear security events requires a sound scientific background. Science, technology, engineering and mathematics (STEM) fields form the basis of any technological innovation.

A study conducted by Marie Francoise Marie-Nelly, the World Bank Country Director for South Africa, Botswana, Namibia, Lesotho, and Eswatini, shows that the percentage of females graduating from tertiary institutions in the fields of STEM in Sub-Saharan Africa

(SSA) is below 30% (Figure 1) [8]. Excluding women from undertaking STEM subjects in tertiary education consequently means that scientific work and technological innovation in the nuclear security sector are missing women's invaluable perspectives and critical contributions.

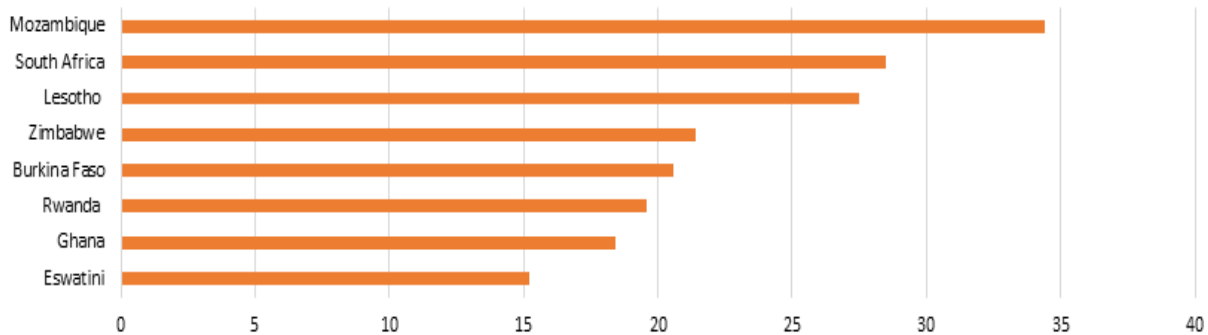


Figure 1. Share of female tertiary graduates in STEM in SSA [9].

Women often face barriers in entering and progressing in the fields of STEM, particularly when venturing into the nuclear sector. The nuclear workplace is a hostile industry where many women have experienced several challenges and barriers, including sexual harassment, gender stereotyping, microaggressions, unconscious bias, and/or male-dominated work cultures that negatively affect women's careers in the nuclear sector [10].

Challenges encountered by women in nuclear security sector are detailed in the following subsections.

a. Gender Inequality in Education

An initiative (2008) by the United Nations (UN) for STEM education is aiming at closing the gender gap in the science and technology workforce [11]. As such, there have been significant efforts have worked toward increasing female participation in STEM by most governments in developing countries, Africa included. Despite these tremendous efforts, there still exists a persistent, significant gap particularly in the nuclear sector, which is historically known to be a male-dominated industry. The gender disparity in education is a result of stereotyping during teaching, as STEM subjects are still being seen as being meant for boys. Gender inequality in education leads to gender inequality in occupation [12]. Failure to address inequality in STEM education prevents brilliant girls and women from pursuing careers in these fields and is a lost opportunity for society as a whole.

b. Gender Discrimination

Women's influence in security issues such as prevention and resolution of and conflicts, as well as post conflict peacebuilding or recovery efforts, is greatly undermined, hence contributing to the underrepresentation during negotiations. Although women and girls are the ones who are most adversely affected by armed conflict and humanitarian disasters, women are still left out when critical decisions are made. According to the

United Nations, between 1992 and 2011, women made up just 2% of mediators, 4% of witnesses and signatories, and 9% of negotiators in formal post conflict peace talks [13].

The problem of discrimination, however, is not unique to the nuclear security sector. A study conducted by UN Women in partnership with the Inter-Parliamentary Union found that where women have held executive government positions, they tended to be tasked with overseeing affairs traditionally associated with women [5, 14]. Out of 1,451 ministerial portfolios considered in 190 countries, the highest allocation of women ministers is in the *family/children/youth/elderly/disabled* and *social affairs* portfolio clusters. Other typical roles assigned to women in executive government positions are related to environmental/natural resources/energy, employment/labor/vocational training, and, of course, women affairs/gender equality [14]. None of the women holding executive government positions occupies the security docket [5]. Similarly, in the nuclear field, although few women are in management positions in the nuclear sector, many organizations in the nuclear security sector still view women as the weaker gender and mostly recruit them into traditionally female positions such as secretaries, personal assistants, and administrators. Women seldom make it to top management posts, especially in the technical, engineering, and security departments.

c. Toxic Work Environments

As the nuclear security field is regarded as a masculine field, women working in nuclear security often experience a toxic mix of implicit and explicit biases. Harassment and discrimination cases are common, and in most cases, no proper procedures exist for reporting and handling such cases. It can be difficult to excel when working in a toxic environment, especially in the challenging work of international security, particularly when the management and leaders take no actions to address such issues. The result is that people who are potential future leaders leave the nuclear security field early because they feel intimidated or because they see the lack of support when they are doing their duties.

d. Lack of Motivation

Additionally, a career in the nuclear security field is not very financially rewarding in Africa, and most governments and organizations have not come up with strategies to motivate the women to stay. As a result, many talented young women have left in search of greener pastures.

A study conducted by the Organization for Economic Co-Operation and Development (OECD) Nuclear Energy Agency (NEA) shows that women in the nuclear sector tend to be paid less than men [10]. The same study shows that women are 28.8% of new hires in the nuclear sector, but they are better represented in non-STEM hires (40.7% female) than in STEM hires (24.6% female). Because STEM roles in the nuclear sector are those that most typically lead to senior management, the low percentage of STEM hires does not point to substantial future changes. This lack of representation demotivates women to take up careers in nuclear security because it is difficult for women to find jobs in this field and prospects for advancements and promotions are limited for women. Generally, female promotion rates for non-STEM roles significantly exceed those for

STEM roles (including in the nuclear security field), exacerbating trends that concentrate women in non-STEM areas [10].

e. Lack of Awareness

Most people in Africa seem to associate the term *nuclear* with nuclear power plants and nuclear weapons and generally believe that there is nothing nuclear in Africa. This idea automatically makes young girls shun any subjects relating to nuclear industry, thinking it will be difficult to find employment after completing their studies. Organizations that are involved in the nuclear industry in general are not very proactive when it comes to career guidance. Very few girls are knowledgeable about the prospects of nuclear industry as a career path. Strategies are needed to instill interest in nuclear security starting from a very young age. In most cases, the awareness programs are offered to females already in tertiary education, by which time they have already chosen a different career path or are not represented at all. On the other hand, boys are encouraged at an early age to pursue careers in STEM, which could eventually lead them to the nuclear field.

f. Lack of Role Models

The other obstacle for women entering the nuclear security profession is a lack of role models. Very few women have made it to the top, and as such young women do not have role models to emulate. Very few national security professionals can mentor the next generation of women and who can work to increase the representation of women who are seeking careers in these fields.

Girls between the ages of 8 and 16 learn better in a collaborative and noncompetitive way [15]. They can be inspired by connecting with female role models in careers that they emulate, who can serve as mentors and examples of success. Research shows that a role model approach can encourage and help young girls and women to excel in their studies and choose the right career [5, 8].

g. Lack of National and Organizational Policies on Gender Parity

Many organizations do not have policies or programs in place that address gender parity and inclusion issues. Although some women occupy high-level positions and actively participate in key decision-making areas, the reality is, “for women as a whole, the playing field needs to be level, opening opportunities for all” [14]. Very few countries in Africa and organizations have policies on gender equality, and for those who do, the policies are not being implemented [5].

h. Lack of Training Institutions

Very few organizations offer programs in nuclear-related education, let alone nuclear security. Interested parties often have to travel abroad to get a certification in nuclear security, and in most cases, funding is a challenge.

i. Lack of Organizations Supporting Females to Venture into Nuclear Industry

Although many organizations support young girls and women in STEM, very few organizations encourage women to participate in the nuclear industry. One of the few organizations that is encouraging young girls and females to take up career paths in the field of nuclear science and technology is Women in Nuclear (WiN) Africa, which was formed in 2019 [16]. WiN Africa is a nongovernmental organization affiliated with WiN Global, which works to represent women in all nuclear-related forums within Africa internationally and provide mentoring solutions for problems hindering the progress of women in the nuclear field.

4. Benefits of Female Inclusion

The role of women in nuclear security, and nuclear technologies in general, should never be underestimated. One of the highly celebrated scientists who made groundbreaking work on radioactivity in the late 1800s and enabled us to harness the power of the atom and develop countless applications in medicine, engineering, and science was a woman: Marie Skłodowska-Curie. As the US Secretary of State Anthony John Blinken has often noted, diversity and inclusion make us stronger, smarter, more creative, and more innovative, and that diversity gives us a significant competitive advantage on the world stage [13].

As the world faces pressures from a changing climate, growing populations, food insecurity, and increased energy demand, maintaining a qualified workforce to drive innovation and productivity is crucial. Nuclear-related research can help countries tackle several of these challenges, and the high demand for qualified professionals in nuclear-related fields will continue to grow. This workforce does and must include women. “Equipping women with scientific education and work experience will promote equal representation in the application of nuclear technologies to meet our shared global challenges such as climate change, growing populations, and food insecurity,” said International Atomic Energy Agency (IAEA) Director General Rafael Mariano Grossi during the initiation program of the Marie Skłodowska-Curie Fellowship Programme (MSCFP), which is one of IAEA’s initiatives for empowering women [17].

Additionally, international research into gender equality and the participation of women in the workforce has consistently shown that a diverse and inclusive workforce is better for everyone: shareholders, stakeholders, and society in general [1]. In its report in *Women, Business, and Law 2019*, the World Bank writes that equality of opportunity allows women to make choices that are best for them, their families, and their communities. The report also notes that gender equality is a critical component of economic growth, and that the world is better off when it draws on the talents of all its people [18]. It has been proven that including women in governance processes alongside their male counterparts “broadens the perspective, increases creativity and innovation, diversifies the pool of talents and competences, reduces conflicts, and improves the process of decision-making” [19].

Also, as history and scientific evidence attest, women are often the worst affected by conflict and security issues, making their inclusion even more pertinent. Moreover, women also have a better track record than men when it comes to conflict resolution and the establishment of peace. Research shows that peace negotiations are more likely to succeed and result in lasting stability when women participate. Whether they join the conversation before, during, or after a conflict has arisen, their active participation at all levels makes a stable and lasting peace easier to achieve [13].

In Africa, a famous proverb says, “If you educate a man, you educate an individual, but if you educate a woman, you educate a nation.” Although this maxim speaks volumes about the value that women add to society, underrepresentation and disenfranchisement remain obstacles faced by women in their everyday lives [5].

5. Ways to Address Gender Parity

There are several ways in which governments, organizations, and institutions can improve gender imbalance. These include fostering organizational cultures that promote gender equality, the development of national policies to address gender parity, and the introduction of initiatives to promote women to take up STEM subjects.

a. Fostering Organizational Cultures that Promote Gender Equality

The concept of culture as a barrier can be described in terms of the model for organizational culture prescribed by Edgar Henry Schein, a former professor at the Massachusetts Institute of Technology Sloan School of Management. Edgar Schein defines organizational culture as “the basic tacit assumptions about how the world is and ought to be that a group of people share and that determines their perceptions, thoughts, feelings and their overt behavior” [20]. According to his model, three distinct levels exist in an organizational culture:

- Artifacts and behaviors—culture predominantly manifests itself through behavior defined by Schein as *artifacts*. Artifacts include any tangible, evident, or verbally identifiable elements in an organization.
- Espoused values—these are principles by which leadership claims to believe in and wants the organization to display in their actions. Espoused values are expressed in the mission, vision, philosophies, strategies, and values of the organization.
- Basic assumptions and values—the core or essence of culture is represented by basic underlying assumptions and values, which may be difficult to discern because they exist at a largely unconscious level, yet they provide an understanding of why events happen the way they do [21]. In practical terms, this means that an organization will display observable artifacts and behavior that relates to what it assumes about a variety of phenomena [22].

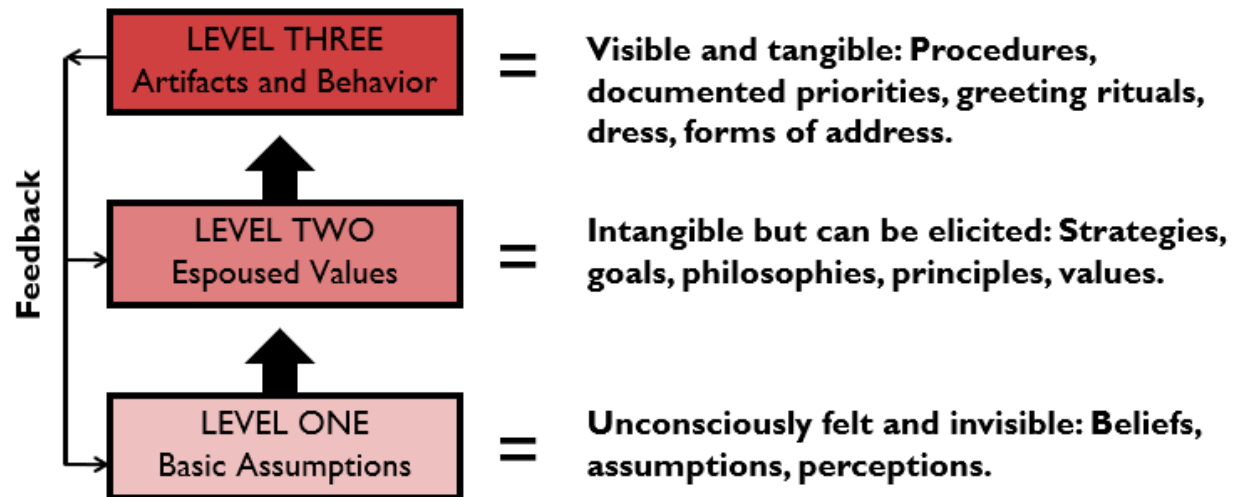


Figure 2. Edgar Schein's model for organizational culture [21].

This model illustrates that nuclear security organizations can inherently have cultures that are biased against gender parity without even realizing it. For instance, in most nuclear security organizations, the number of females is less than the number of males, and the numbers are even lower for positions that require technical skills or physical strength. Most women working in such organizations in Africa are employed as secretaries, personal assistants, and record clerks. Although this so-called *policy* for segregating duties may not be officially written anywhere, this unconscious bias is evident.

The best way to increase gender parity in nuclear security organizations is by improving organizational cultures, which heavily relies on senior management commitment. Culture is not something that can easily be changed, and it takes leaders with a strong will to introduce policies and strategies that promote gender parity. The management of nuclear security organizations should develop a culture that is conscious of gender parity and must encourage female participation at all levels; management must also believe that, given an opportunity, women can deliver as much as men can.

b. National Policies on Gender Equality

To assist nuclear security organizations in realizing the goal of gender equality, governments should establish national policies on gender equality such that organizations can derive their own organizational policies from the government directive. Initiatives are needed that support public policies that address gender inequality and promote the participation of women. Most governments in the African Union are also member states of the United Nations and have all adopted the *Agenda 2030 for Sustainable Development* (also known as the Sustainable Development Goals [SDGs]), thereby reaffirming the developmental importance of gender equality and the empowerment of women. Additionally, with the adoption of key agreements promoting gender equality and greater participation of women in decision-making processes, many states also set targets, commonly 50%, for the proportion of women represented in leadership positions [5]. Although this commitment is in place at the political level, in

practice, implementation is often lagging. Thus, much work remains to be done globally to achieve the equal participation of women in decision-making, especially in forums relating to peace and security, where participation and the overall discourse remain dominated by men [6]. African governments should also require the nuclear sector to set such 50% targets for promoting gender equality and monitor the implementation thereof.

The Forum of Nuclear Regulatory Bodies in Africa (FNRBA) was created with the purpose of strengthening the regulatory oversight of the nuclear and radiation safety and security of nuclear resources on the African continent through increased cooperation among regulatory bodies. The FNRBA could also make initiatives to encourage its members to promote gender balance and require regulated facilities to establish policies that promote gender equality in the nuclear sector.

Established policies lay the fundamental basis for inclusion of women in politics and international security. Gender equality and the empowerment of women and girls should be made a key component of foreign policy. This policy does not only reflect values of a particular state, but it also contributes to advancing democracy and human rights, economic development, and international peace and security [13].

c. Workplace Reforms

According to the Edgar Schein model, culture is something that cannot be changed easily. It takes time to cultivate a new culture and to see change and results. To increase female representation in the nuclear sector, the change must come with senior management as the drivers of organizational vision who are responsible for developing institutional strategies. Senior management must be deliberate in their approach—that is, they must be willing to promote gender equality, actively recruit women, and allow them a chance to hold positions in influential posts where they can make a difference. As such, organizations should come up with policies that promote balance when recruiting staff for nuclear security positions. The policies should clearly state the ratio of females to males that the organizations endeavor to employ.

The management of nuclear security organizations must develop policies that discourage gender stereotyping and discrimination and also have friendly reporting structures where women can report cases of harassment and sexual abuse at the workplace. The work environment must also allow women to advance their education and careers while maintaining a healthy work–life balance.

d. Initiatives to Cultivate Interest

Many young women and girls end up not choosing nuclear security careers and other careers related to nuclear technology because of their lack of knowledge of career options available in such fields. Awareness programs starting from grassroot levels are needed. Young girls in elementary and high schools should be made aware of the various careers available should they choose to take up STEM subjects. This awareness can be achieved by organizing career seminars in schools or introducing competitions where young girls participate in projects related to nuclear technologies.

One organization that has been proactive in trying to increase female representation in the nuclear field is the IAEA. The IAEA came up with a number of initiatives, including the IAEA Marie Skłodowska-Curie Fellowship Programme (MSCFP), named after pioneering physicist and double Nobel Prize laureate Marie Skłodowska-Curie, which was launched in March 2020. The MSCFP seeks to enable and encourage highly motivated female students to pursue careers in nuclear technology, research, safety, security, and other related fields [23]. The other program that the IAEA has introduced is the Women in Nuclear Security Initiative (WINSI), which was formed in March 2021 with the mission to support the achievement of gender equality in nuclear security within the IAEA's Division of Nuclear Security and the global community of practice [24]. Member states of the IAEA should let their female citizens know of such global opportunities, and they should encourage them to apply and take part.

e. Policies that Support STEM

States should establish policies that support women and girls' full participation in STEM fields. STEM subjects collectively form the foundations of arms control and nonproliferation [13]. Policies should advocate for women and girls to have equal opportunities to pursue an education and vocation in STEM.

f. Establishment of Institutions that Offer Nuclear Security Programs

Governments should not only form policies that support STEM, but they should also establish institutions and education centers that offer these subjects locally because the cost of education abroad is too high for many.

6. Conclusion

Despite these tremendous efforts by institutes, governments, and international organizations, a persistent, significant gap still exists in the nuclear sector, particularly in the nuclear security, which is historically known to be a male-dominated industry. A lot of misconceptions and various challenges are encountered by women that act as a barrier and hinder them from taking professions in nuclear security. However, the significant role that women play in nuclear security cannot be underestimated, and the need to include women in this field cannot be overemphasized. Women are essential to the strong development of the global nuclear sector. Organizations should prioritize understanding and tackling the barriers that prevent women from joining and thriving in the field and should come up with initiatives to attract and lure women to the nuclear security field, thus improving diversity. When the workforce better reflects the diversity of society, including the representation of women, it also helps to build society's trust in nuclear technologies. It is everyone's responsibility to cultivate a diverse, inclusive, and accessible workplace culture where women can thrive.

7. References

1. World Institute for Nuclear Security. *Gender and Nuclear Security: Challenges and Opportunities*; World Institute for Nuclear Security: Vienna, 2019.

- https://www.wins.org/wp-content/uploads/2020/12/Gender-and-Nuclear-Security_Pg33.pdf.
2. Nuclear Skills Strategy Group. *Nuclear Workforce Assessment 2017*; Cogent Skills for Science Industries: 2017.
<https://www.nssguk.com/media/1316/publication-nuclear-workforce-2017-exe-summary.pdf>.
3. Gergiieva, V.; du Crest, A.; Kalinina-Pohl, M. *Black Sea Women in Nuclear Network Celebrated Women's History Month with a Panel on Women's Leadership*, 2023. Middlebury Institute of International Studies at Monterey, James Martin Center for Nonproliferation Studies.
<https://nonproliferation.org/black-sea-women-in-nuclear-network-celebrated-womens-history-month/#:~:text=Women%20only%20make%20up%20about,and%20thriving%20in%20the%20field>.
4. Cambridge Dictionary. *Perception*.
<https://dictionary.cambridge.org/us/dictionary/english/perception>.
5. Bosman, I.; Van Wyk, J.-A. *Africa's Women and the Promotion of Peaceful Uses of Nuclear Science and Technology*; Policy Insights 140; South African Institute of International Affairs: Johannesburg, South Africa, 2022. https://saiia.org.za/wp-content/uploads/2022/12/SAIIA_PI_140_AfricasWomenPromotion.pdf.
6. Borrie, J.; Dimmen, A. G.; Hugo, T. G.; Waszink, C.; Egeland, K. *Gender, Development and Nuclear Weapons: Shared Goals, Shared Concerns*; International Law and Policy Institute and United Nations Institute for Disarmament Research: 2016.
<https://undir.org/sites/default/files/publication/pdfs/gender-development-and-nuclear-weapons-en-659.pdf>.
7. International Atomic Energy Agency. *Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control*; IAEA Nuclear Security Series No. 15; Vienna, 2011.
8. Marie-Nelly, M. F. *Why we need more girls in Africa in STEM—and how to get them there*, 2021. World Economic Forum.
<https://www.weforum.org/agenda/2021/04/women-stem-africa-science-gender-education-tech>.
9. United Nations Educational, Scientific and Cultural Organization. *UNESCO Science Report: Towards 2030*; UNESCO Publishing: Paris, France, 2015.
<https://uis.unesco.org/sites/default/files/documents/unesco-science-report-towards-2030-part1.pdf>.
10. Organisation For Economic Co-Operation And Development Nuclear Energy Agency. *Gender Balance in the Nuclear Sector: Human Aspects of Nuclear Safety*; OECD Publishing: Paris, France, 2023. https://www.oecd-neo.org/jcms/pl_78831/gender-balance-in-the-nuclear-sector.
11. Gudyanga, A.; Gudyanga, E. Selection of Science Subjects at Advanced Level by Females: Aetiology and Challenges. *The Dyke Journal* **2012**.
<https://cris.library.msu.ac.zw/handle/11408/809>.
12. Jones, M.; Wheatley, J. (1988). Factors Influencing the Entry of Women in Science and Related Field. *Journal of Science Education* **1988** 72 (2).

13. Jenkins, B. D. Women and Diversity in Arms Control and International Security. Presented at Geneva Centre for Security Policy, Geneva, Switzerland, September 29, 2021, for the US Department of State.
<https://www.state.gov/women-and-diversity-in-arms-control-and-international-security/>.
14. Inter-Parliamentary Union; UN Women. *Women in Politics: 2020*.
<https://www.unwomen.org/en/digital-library/publications/2020/03/women-in-politics-map-2020>.
15. Aremu, A.; Ekine, A.; Ordu, A. U. *Making the future of African STEM female*, 2022. Brookings. <https://www.brookings.edu/articles/making-the-future-of-african-stem-female/#:~:text=In%20sub%2DSaharan%20Africa%2C%20between,percent%20in%20the%20Arab%20States>.
16. Korraa, S. S. WiN Africa: One Voice for Education, Equality, Peace and Progress. Presented at Women's Contributions to Building Strong State Systems of Accounting for and Control of Nuclear Material in Africa, March 8, 2021.
17. International Atomic Energy Agency. *Marie Skłodowska-Curie Fellowship Programme Launches*, 2020.
<https://www.iaea.org/newscenter/multimedia/videos/marie-sklodowska-curie-fellowship-programme-launches>.
18. World Bank Group. *Women, Business and the Law 2019: A Decade of Reform*; World Bank: Washington, DC, 2019.
<https://openknowledge.worldbank.org/handle/10986/31327>.
19. Schein, E. *The Corporate Culture: Survival Guide*; Jossey-Bass: San Francisco, 1999.
20. Asuako, J. *Women's Participation in Decision Making: Why It Matters*, 2020. UN Development Programme Ghana. <https://www.undp.org/ghana/news/women's-participation-decision-making-why-it-matters>.
21. Value Based Management.net. *Analyzing Organizational Culture: Summary of the 3 Levels by Schein*.
https://www.valuebasedmanagement.net/methods_schein_three_levels_culture.html.
22. Hattangadi, V. *A Practical Guide to Edgar Schein's three levels of organizational culture*, 2022. <https://drvidyahattangadi.com/edgar-scheins-three-levels-organizational-culture/>.
23. International Atomic Energy Agency. *IAEA Marie Skłodowska-Curie Fellowship Programme*. <https://www.iaea.org/services/key-programmes/iaea-marie-sklodowska-curie-fellowship-programme>.
24. International Atomic Energy Agency. *Women in Nuclear Security Initiative (WINSI)*. <https://www.iaea.org/about/overview/gender-at-the-iaea/women-in-nuclear-security-initiative-winsi>.