



Africa's Nuclear Future: Increasing the Participation of Women and Youth

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Executive summary

Nuclear science and technology are expected to play an increasingly important role in Africa in the near future. Nuclear power, nuclear medicine, nuclear applications in agriculture and nuclear research are all expected to enhance development. Against this background, it is vital to ensure that women and youth are included in this field, especially when considering the makeup of Africa's population and the commitment of the AU and its members to gender equality and the inclusion of youth in its development agenda. While participation by youth and women in nuclear science and technology has not yet reached an optimum level, they are already active in this field, which provides a foundation upon which to build. Challenges to improving their inclusion can be overcome by increasing education and training opportunities, expanding government commitment, and encouraging cooperation between African states, with the help of nuclear regulatory and oversight bodies such as the International Atomic Energy Agency and the African Commission on Nuclear Energy.

Introduction

African states have made significant developmental strides through their commitment to various development frameworks. These include the AU's Agenda 2063: The Africa we Want and the UN's Sustainable Development Goals (SDGs), preceded by the Millennium Development Goals. Across the continent, many people's quality of life has been enhanced as economies progress, access to education become easier and healthcare improves. Political stability and governance in many states have also improved, creating ideal environments for realising the development objectives of the continent.¹ Yet developmental progress is not evenly spread across Africa, with some states performing better than others.² Progress notwithstanding, the continent needs to overcome several challenges. According to the UN Economic Commission for Africa, some of the biggest issues Africa faces are food and energy crises, health security, climate change and water scarcity.³

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1 Landry Signé and Ameenah Gurb-Fakim, "Africa Is an Opportunity for the World: Overlooked Progress in Governance and Human Development", Brookings Institute, January 25, 2019.

2 African Development Bank, *Tracking Africa's Progress in Figures*, Report (Tunis: African Development Bank Group, Tunisia, 2014).

3 Economic Commission for Africa, *New and Emerging Challenges in Africa*, Summary Report (Addis Ababa: UNECA, 2011).

For many years, African leaders have emphasised the importance of finding uniquely African solutions to the continent's many development challenges. Nuclear science and technology is being promoted as one such solution. When used in a peaceful manner – such as research, civil electricity production or health and agriculture applications – nuclear science and technology can contribute to Africa's development in meaningful ways.⁴ However, for it to fulfil this role, it needs to complement the entire spectrum of sustainable development. This includes contributing to the achievement of the AU's aspirations to enhance gender equality and the participation of women and Africa's youth, in line with the goals of Agenda 2063 and the SDGs. Much attention has been paid to how nuclear science and technology can help the continent to overcome the challenges posed by climate change, food security and electricity shortages, and to contribute to human and animal health. Yet it is also important to focus on the way in which this industry reflects the AU's goal of enhancing gender equality and youth inclusion.

This policy insights considers the AU's commitment to gender equality and the increased participation of women and youth in key sectors. In doing so, it looks at a series of important frameworks, including the [Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa](#) (Maputo Protocol); the [AU Gender Policy](#) and its [Plan of Action](#); the aspirations and goals of Agenda 2063; the [Youth Decade Plan of Action](#); and the [African Youth Charter](#). It aims to illustrate the ways in which the AU's guiding frameworks provide for the inclusion of women and youth in its development agenda – not as passive recipients but as active role players. It then considers the extent to which women and youth are currently included in the peaceful use of nuclear science and technology. Finally, it turns to the future and what is required to enhance their participation in the nuclear sector, as well as the role of relevant continental and international bodies in this process.

AU guiding frameworks: The foundation for including women and youth

In Africa, women represent only 30% of experts,⁵ trainees and fellows in nuclear science and technology. To improve gender equality in society at large, and to enhance the gender balance in the nuclear field, national, regional and international decision makers will have to involve the capacities and potentialities of women and youth. The AU has made various official commitments to gender equality and increased youth participation on the continent, summarised in Table 1.

4 Isabel Bosman and Noel Stott, "Nuclear Science and Technology: Driving Africa's Development" (Policy Insight 109, South African Institute of International Affairs, Johannesburg, 2021).

5 These figures have been observed consistently by African Regional Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) management committees and the International Atomic Energy Agency (IAEA) Technical Cooperation (TC): Africa Division for several years, without improvement. See Estelle Marais, "Encouraging Women in Africa to the Forefront of Nuclear Science", IAEA, September 20, 2018.

TABLE 1 AU COMMITMENTS TO ENHANCE GENDER EQUALITY AND YOUTH PARTICIPATION

Commitment	Year adopted	Purpose
Women, Gender and Youth Directorate established at the AU	2000	Oversees member states' compliance with the AU Solemn Declaration on Gender Equality in Africa
Maputo Protocol	2003	Promotes and protects the rights of girls and women in Africa
African Youth Charter	2006	Promotes youth participation, protection against discrimination, and their democratic freedoms
AU Gender Policy and Plan of Action	2009	Promotes the ideals of Article 4(L) of the AU Constitutive Act concerning gender equality
African Youth Decade 2009-2018 Plan of Action	2009	Connects relevant stakeholders to work for the achievement of the African Youth Charter
The Common African Position (CAP) on the Post-2015 Development Agenda	2014	In specific recognition of population growth patterns resulting in a large youth demographic, promotes development that is people-centred and identifies common challenges facing the continent and world
Agenda 2063: The Africa We Want	2015	Strives for people-driven development (Aspiration 6) and placing women and youth at the centre
Strategy for Gender Equality and Women's Empowerment	2019 (launch date)	Action plan for the achievement of Aspiration 6 of the AU Agenda 2063

Source: Compiled by author

AU Women, Gender and Youth Directorate

The AU Women, Gender and Youth Directorate, formerly the Women, Gender and Development Directorate, is tasked primarily with⁶

leading, guiding, defending and coordinating the AU's efforts on gender equality and development and promoting women's empowerment by ensuring that African countries comply with the AU Solemn Declaration on Gender Equality in Africa (SDGEA).

The directorate is also responsible for the design and implementation of 'programmes and projects based on the policies and frameworks adopted by AU Member States'. Its other responsibilities include the 'development and harmonisation of gender policies' and the definition of 'strategies for gender mainstreaming within the Commission, AU organs and Member States' while supporting capacity building through 'training on gender policies and instruments'.⁷

6 AU, "Women, Gender and Youth Directorate (WGYP)", <https://au.int/directorates/women-gender-and-development-wgdd>.

7 AU, "Women, Gender and Youth".

Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa

The AU adopted the Maputo Protocol in July 2003 in Maputo, Mozambique, and it entered into force in November 2005. Under the Maputo Protocol, African states commit to the protection and advancement of the rights of women and girls.

The Maputo Protocol recognises the right of women to 'a peaceful existence and the right to participate in the promotion and maintenance of peace' and the right to education and training. This gives states the responsibility to prevent discrimination against women that would see them excluded from education and training, and to 'promote education and training for women at all levels and in all disciplines, particularly in the fields of science and technology'.⁸ Furthermore, it makes provision for the protection of women in armed conflict, and for their health and reproductive rights.⁹ The protocol also recognises the right of women to food security, a healthy and sustainable environment, and sustainable development.¹⁰ Under the latter, states are required to 'introduce the gender perspective in the national development planning procedures', and include women 'at all levels in the conceptualisation, decision-making, implementation and evaluation of development policies and programmes'.¹¹

African Youth Charter

The AU's African Youth Charter, adopted in 2006 and entered into force in 2009, protects young people from discrimination and ensures freedom of movement, speech, association, religion, ownership of property and other human rights, while committing to promoting youth participation throughout society.¹² The Youth Charter is a 'political and legal document which serves as the strategic framework that gives direction for youth empowerment and development at continental, regional and national levels'.¹³

AU Gender Policy

In 2009, the AU developed its first Gender Policy and related Plan of Action. The AU Heads of State and Government have in recent years also adopted other imported decisions. These include Article 4 (L) of the Constitutive Act of the AU, which enshrines the gender equality principle, the Maputo Protocol and the Solemn Declaration on Gender Equality in Africa.

8 AU, "Protocol to the African Charter on Human and People's Rights on the Rights of Women in Africa", African Union, July 2003, 12-14.

9 AU, "Protocol on the Rights of Women", 12-15.

10 AU, "Protocol on the Rights of Women", 15-17.

11 AU, "Protocol on the Rights of Women", 17.

12 AU, "African Youth Charter", 20, https://au.int/sites/default/files/treaties/7789-treaty-0033_-_african_youth_charter_e.pdf.

13 AU, "African Youth Decade 2009-2018 Plan of Action: Accelerating Youth Empowerment for Sustainable Development" (AU, Addis Ababa, May 2011).

Article 4(L) of the AU's Constitutive Act specifically provides that it 'shall function in accordance with the promotion of gender equality'.¹⁴ The AU Heads of State and Government summits have continued to defend gender equality and empowerment through subsequent decisions aimed at accelerating the implementation of their own commitments, including those on gender equality and women's empowerment.¹⁵

African Youth Decade 2009–2018 Plan of Action

The African Youth Decade Plan of Action is 'a framework for multi-sectoral and multi-dimensional engagement of all stakeholders towards the achievement of the goals and objectives of the African Youth Charter'.¹⁶ The plan of action focuses on five key priority areas:¹⁷

- education and skills development;
- youth employment and entrepreneurship;
- governance, peace and security;
- youth health and sexual reproductive health rights; and
- agriculture, climate change and the environment.

Also important in this context is the Continental Strategy for Technical and Vocational Education and Training, which provides¹⁸

a comprehensive framework for the design and development of national policies and strategies to address the challenges of education and technical and vocational training to support economic development, creation of national wealth and contribute to poverty reduction through youth entrepreneurship, innovation and employment.

The Common African Position on the Post-2015 Development Agenda

The Common African Position (CAP) on the Post-2015 Development Agenda of 2014 clearly supports youth and women. Its second pillar, dedicated to science, technology and innovation (STI), is relevant to the developmental role of nuclear science and technology and the inclusion of women and youth in this sector.

14 AU, "Constitutive Act of the African Union", 2000, 7, https://au.int/sites/default/files/treaties/7758-treaty-0021_-_constitutive_act_of_the_african_union_e.pdf.

15 World Bank, "Millennium Development Goals", <https://www5.worldbank.org/mdgs/>.

16 Jean Ping, quoted in AU, "African Youth Decade 2009-2018", I.

17 AU, "African Youth Decade 2009-2018".

18 AU, "Continental Strategy for Technical and Vocational Education and Training (TVET)" (AU, Addis Ababa), 6.

Pillar two of the CAP envisions¹⁹

- enhancing technological capacities for Africa's transformative agenda;
- building an enabling environment for innovation;
- increasing support for research and development; and
- optimally using space and geospatial technologies.

Agenda 2063: The Africa We Want

The AU adopted Agenda 2063 in 2015 as the continent's 'blueprint' for transformation to develop into 'the global powerhouse of the future'.²⁰ Through Agenda 2063, the AU 'aims to deliver on its goal for inclusive and sustainable development and is a concrete manifestation of the pan-African drive for unity, self-determination, freedom, progress and collective prosperity'.²¹ It identifies seven aspirations and 20 goals which the AU hopes to achieve by 2063. These goals and aspirations are key sites of intervention and contribution for women and youth. Aspiration 6 of Agenda 2063, for example, envisions 'an Africa whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children'.²²

Agenda 2063 also aims to increase the involvement of women and youth in the continent's development by including them in the following:²³

- creating a skills revolution underpinned by STI;
- creating economies and communities that are environmentally sustainable and climate resilient;
- enhancing the peace, security and stability of the continent;
- fostering complete gender equality in all spheres of life; and
- creating an engaged and empowered youth.

Strategy for Gender Equality and Women's Empowerment 2018–2028

The Strategy for Gender Equality and Women's Empowerment 2018–2028 sets forth a plan to realise Aspiration 6 of Agenda 2063 and the principles enshrined in Article 4 (L) of the AU Constitutive Act. It is founded on six principles: women's economic empowerment and

19 AU, "Common African Position on the Post-2015 Development Agenda" (AU, Addis Ababa, March 2014).

20 AU, "Agenda 2063: The Africa We Want", <https://au.int/en/agenda2063/overview>.

21 AU, "Agenda 2063".

22 AU, "Goals & Priority Areas of Agenda 2063", <https://au.int/agenda2063/goals>.

23 AU, "Goals & Priority Areas".

sustainable development; social justice and the protection of the rights of women; equal participation of women in leadership and governance; gender management systems; women, peace and security; and the inclusion of women in media and information and communication technologies.²⁴

Women and youth in nuclear science and technology in Africa

As is clear from these AU frameworks, African states place a high value on improving education and training, especially in science and technology. Combined with the emphasis on gender equality and the inclusion of youth in development, this means that all education, training, science and technology programmes on the continent will have to include more women and youth. Africa's population numbered 1.4 billion in March 2022, representing 17% of the world's population, with 19.7 years as the median age.²⁵ Women currently make up some 50% of the population of sub-Saharan Africa.²⁶ The population of Africa is forecast to double from 2017 to 2050, reaching a total of 2.5 billion people.²⁷ In short, the future of humanity will be increasingly African and female.

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In striving to achieve the goals of these development agendas, African leaders are increasingly looking to those fields that not only enhance the economic development of their states but also improve human capital. Nuclear science and technology is thus of special interest. African states are implementing, with the support of the International Atomic Energy Agency (IAEA), relevant national and regional programmes. The African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology, for example, supports endeavours related to peaceful nuclear applications in the spheres of human health, agriculture and animal health, water resources, industry, environment, energy planning and nuclear power. The involvement of

24 AU, "Gender Equality & Development", <https://au.int/en/gender-equality-development>.

25 Worldometer, "Africa Population", March 30, 2022.

26 World Bank, "Population, Female (% of Total Population) - Sub-Saharan Africa", 2019.

27 ONE, "The African Century", June 7, 2017.

women and youth in these programmes is of particular importance, especially considering the gender equality commitments made by the AU.

Although women at present make up only a small percentage of the continent's nuclear science and technology experts, they are key actors in the field and have achieved important milestones, including the establishment of the Women in Nuclear (WiN) national and African networks. WiN is a global organisation with different regional chapters. WiN Africa is one such regional chapter and has about 350 participants from 37 African countries. By connecting women in different nuclear fora across the continent, WiN Africa serves as a vehicle for their international representation and promotes their inclusion and progress in the nuclear field.²⁸

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In terms of youth participation, Africa's youth is particularly engaged in promoting the peaceful use of nuclear energy. A continental non-profit organisation, African Young Generation in Nuclear (AYGN), was established to connect national networks of young nuclear professionals. The primary objective of the AYGN is to²⁹

address the socio-economic issues of the continent through promoting peaceful uses of nuclear science and technology by educating the general public and facilitating knowledge transfer from the current generation of leading nuclear industry experts to the young generations.

Africa's youth is particularly engaged in promoting the peaceful use of nuclear energy

The AYGN has established a platform to enable professionals to 'share, exchange ideas and network on issues related to nuclear science and technology in Africa and globally'.³⁰

28 Soheir Saad Korraa, "WiN Africa: One Voice for Education, Equality, Peace and Progress" (Presentation, African Commission on Nuclear Energy, "Women's Contributions to Building Strong State Systems of Accounting for and Control of Nuclear Material in Africa", March 8, 2021).

29 African Young Generation in Nuclear, "About AYGN", <https://africanygn.org/about.html>.

30 AYGN, "About AYGN".

National AYGN networks are currently found in Egypt, Ghana, Kenya, Lesotho, Malawi, Nigeria, Rwanda, South Africa, Uganda and Zambia.

Figure 1 National AYGN networks in Africa



Source: Map constructed by author

African Commission on Nuclear Energy (AFCONE)

AFCONE, despite limited resources, has demonstrated its commitment to support youth and women in nuclear. It has done so by holding close consultations with the two regional organisations and contributing to events organised. It also invites the AYGN and WiN Africa to all AFCONE activities and events, organises regional events promoting their actions, and supports their participation in education and training programmes offered by AFCONE partners, including nuclear safeguards and science, technology, engineering, and mathematics (STEM).

In 2020 and 2021, the AFCONE Secretariat recruited about 40% women (targeting 50%) as its expert consultants in nuclear disarmament and non-proliferation, nuclear safety and security, food security, cancer treatment, uranium mining and strategic planning. One challenge is the availability of an updated database, provided by states parties and the regional organisations, that integrates the profiles of African experts in each sector of the nuclear field. Strong recommendations on this vital matter were made at the WiN Africa launch meeting in September 2020. The visibility of women's leadership in nuclear matters is critical for the successful implementation of the AU's vision and the regional organisations' programmes.³¹

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AFCONE has also proposed an internship policy for 2020–2023 to give young postgraduate candidates in natural sciences, engineering and the humanities the opportunity to get acquainted with the work of the commission and regional coordination processes more broadly. It was submitted to the states parties of the Pelindaba Treaty³² for approval in April 2022.

Prospects and challenges

With the anticipated role of nuclear science and technology in Africa's future development, African states have taken key steps to include women and youth in the sector. Notable efforts include the integration of nuclear power in the energy mix of many states.³³ This paves the way for the creation of national nuclear engineering institutes and nuclear sciences and technology and, in turn, greater inclusion of women and youth.³⁴ However, much remains to be done, as current levels of participation and inclusion are not optimal.

The main challenges the continent faces have been identified. At the national level, the appropriate infrastructure needs to be developed and efficient peaceful uses of nuclear

31 Messaoud Baaliouamer, "Women in Nuclear Africa – WiN Africa Regional Chapter Launch Event Virtual Meeting" (Opening Remarks, WiN Africa Regional Chapter Launch, September 16, 2020).

32 The African Nuclear-Weapons-Free Zone Treaty, or [Treaty of Pelindaba](#), was adopted in 1996 and entered into force in 2009. It designates Africa as a nuclear-weapons-free zone, while promoting the peaceful uses of nuclear energy and cooperation between states to achieve this.

33 AFCONE, [AFCONE AUC IAEA Webinar on Safe and Secure Development of Nuclear Power Programs in Africa: Development of Clean Energy, Mitigation of Climate Change Impact and Set Up of Appropriate Regulatory Framework](#), December 10, 2020.

34 AFCONE, [AFCONE Webinar on Capacity Building for Safe and Secure Development in Africa of Peaceful Uses of Nuclear Energy Including Nuclear Power](#), March 31, 2021.

energy programmes implemented as part of national socio-economic programmes. There is also a lack of sustainable human resources development programmes, as well as education and training programmes dedicated to nuclear science and technology. At the regional level, it is crucial to inform and sensitise decision makers and diplomats on the role Africa could play at the global and regional level in terms of the AU's vision and agenda, and the Pelindaba Treaty provisions. It is also important to encourage ownership of the regional networks created to address, in particular, the weaknesses observed in higher education and training programmes in nuclear science and technology.

To overcome these challenges and improve the inclusion of women and youth in the nuclear sector, education, training and research must improve

To overcome these challenges and improve the inclusion of women and youth in the nuclear sector, education, training and research must improve. The peaceful application of nuclear science and technology is a field rich with potential for the contributions of African women and youth. However, thousands of professionals are needed and have to be trained and educated to implement programmes in nuclear power and its peaceful uses, such as fighting cancer, developing food and agriculture, fostering industrial applications and expanding the use of isotope hydrology.³⁵ The required expertise in nuclear safety and security must also be reached.

Furthermore, greater governmental commitment to the peaceful use of nuclear science and technology is crucial. This will require governments to enhance their political, financial and institutional commitments to the sector, and to the peaceful uses of nuclear science and technology as a tool for development.³⁶

At the same time, African nuclear regulatory and oversight bodies have a major role to play. AFCONE is of particular importance, as it can contribute to improved education and training. Through its international partnerships, especially its cooperation with the IAEA, it can also provide critical insights in establishing nuclear power programmes, furthering nuclear medicine and managing radioactive waste. Nuclear safety and security are high on the agendas of both AFCONE and the IAEA. AFCONE has also prioritised the implementation and operationalisation of national State Systems of Accounting for and Control of Nuclear Material. At the same time, the leadership of African countries in sharing nuclear expertise is also important. South Africa is uniquely positioned to share its

35 Isotope hydrology is a technique whereby stable and unstable (radioactive) isotopes are used to "trace the movements of water in the hydrological cycle". Through isotope hydrology, scientists are able to determine whether a water source is suitable for use.

36 Messaoud Baaliouamer, "In Support of Africa's Agenda 2063: Pathways Forward for Expanding Peaceful Uses of Nuclear Energy and Nuclear Technology in Africa" (Opening Address, Wilton Park Conference, February 25, 2020).

knowledge of nuclear energy and nuclear medicine with other African countries and can play a leading role in shaping the continent's nuclear future.

Conclusion

Africa's women and youth, which make up a substantial part of the continent's population, should be increasingly prioritised in its development agenda. With the role of nuclear science and technology in enhancing development on the continent expected to increase, it is important that this becomes a sector in which women and youth can participate directly, in addition to their deriving benefits from it. In other words, the many health, agricultural, environmental and economic benefits that nuclear science and technology can facilitate should not only be achieved for women and youth but also by them. This can be done by increasing the training, education and employment opportunities in nuclear science and technology, and by including their voices as diplomats and advocates for the peaceful use of nuclear energy.

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It is therefore crucial that governments invest in the education of women and youth in nuclear and related sciences (ie, STEM). States can be helped by nuclear regulatory and oversight bodies to establish AYG and WY chapters. This involves sharing best practices, organisational procedures and regulatory documents.

Regionally, women and youth platforms such as the WY and the AYG should be included in the activities of continental nuclear oversight and AU Treaty bodies such as AFCON. Women and youth leaders in nuclear science and technology can be identified and invited to join WY and the AYG, and to collaborate on its outreach and sensitisation campaigns.

At the international level, existing continental cooperation with the IAEA should be enhanced to encourage participation by women and youth in nuclear science and technology.

Author

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Cover image

A lab technician handles samples in the P3, the Pasteur Institute's laboratory dedicated to the Ebola virus, in Bangui on May 31, 2018. Having affected the Democratic Republic of Congo, the Ebola virus threatened to spread to the Central African Republic where the Ministry of Health, supported by the WHO, has put in place risk prevention measures (Florent Vergnes/AFP via Getty Images)

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