

Strengthening gender equality and  
inclusivity in the national system of  
Science, Technology and Innovation:



# ZAMBIA

## COUNTRY PROFILE



*Gender & Inclusivity*

A PROJECT OF THE SCIENCE GRANTING COUNCILS INITIATIVE



# Strengthening gender equality and inclusivity in the national system of Science, Technology and Innovation:

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## COUNTRY PROFILE

Strengthening Gender Equality and Inclusivity in Science, Technology and Innovation (STI) highlights the contextual factors driving gender and inclusivity disparities in STI in Zambia as well as options and strategies for addressing disparity gaps in some of UNESCO's STEM and Gender Advancement (SAGA) policy impact areas.

These impact areas are social norms and stereotypes, education (primary, secondary and tertiary), the career progression environment, research content and practice, policy and entrepreneurship and innovation.

This profile synthesizes important data for funding agencies, researchers, policymakers and other actors advancing gender equality and inclusivity in STI at country, regional and international levels.

# Acknowledgements

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This country profile forms part of a series covering 15 Science Granting Councils Initiative (SGCI) African countries. It was produced as part of the SGCI Gender and Inclusivity Project, led by the Human Sciences Research Council (HSRC) of South Africa in partnership with Gender at Work, Jive Media Africa and the Council for the Development of Social Science Research in Africa (CODESRIA). The SGCI is a multi-funder initiative geared towards supporting the development of research and evidence-based policies that contribute to socio-economic development, with participating Science Granting Councils (SGCs) in Botswana, Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Namibia, Rwanda, Senegal, Tanzania, Uganda, Zambia and Zimbabwe.

## Suggested citation

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# Country overview

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Zambia is in Southern Africa and borders Zimbabwe, Botswana, the Democratic Republic of the Congo, Tanzania, Malawi, Mozambique, Angola and Namibia.

Women and girls comprise 50,5% of the total population of 19,61 million (Zambia Statistics Agency, 2022).

Slightly less than half (43.5%) of the population live in urban areas (Zambia Statistics Agency, 2022).

Zambia gained independence in 1964 (Zambia Statistics Agency, 2022).

The country has stagnated in achieving many of its Sustainable Development Goals (SDGs) and regressed in some (Sachs et al., 2022; UN Women, 2020):

- Significant challenges remain in ending poverty (SDG 1).
- Ending hunger (SDG 2), access to good health and well-being (SDG 3), and gender equality (SDG 5) have stagnated.
- Access to clean water and sanitation has stagnated (SDG 6).
- Only 41,8% of indicators are available for monitoring Zambia's SDGs from a gender perspective, with critical data gaps in unpaid care work and information and communications technology skills. Closing these gender data gaps is essential for achieving the country's gender-related SDG commitments.

# Gender and inclusivity disparities negatively impact Zambia's human potential for socio-economic development

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- Gender inequality in Zambia is associated with deep-rooted inequitable laws, norms and practices, hampering women's and girls' access to opportunities, resources and power (Alpin-Lardiés et al., 2019).
- Structural drivers of gender inequality such as unequal gender roles and power relations between men and women persist across all social institutions, resulting in multiple forms of discrimination against girls and women. Some of these challenges are institutional, but the most critical ones are firmly rooted in social structures and beliefs (UNFPA & UNICEF, 2021).
- The country has made significant progress in reducing gender disparities and discriminatory practices in the critical social institutions of the family, civil liberties, reproductive autonomy and access to productive and financial resources between 2019 and 2023 (Table 1, SIG Index).
- There remains work to achieve full gender equality; disparities harm female livelihoods and the potential for poverty alleviation and growth on a national level (UNDP, 2021). Women and girls continue to face challenges accessing their human rights due to laws, policies, sociocultural practices and customs that discriminate against them in pursuing political leadership and economic achievements (World Data Atlas, 2022).
- Zambians have a higher tolerance for people of other religions (89%), ethnicities (93%) and immigrants and foreign workers (68%) and a much lower tolerance towards people of different sexual identities or orientations (4%) (Howard, 2020).
- Structural drivers of gender inequality result in Zambia reporting gender disparities on several socio-economic development indices (Table 1). These indicators do not include data on intersecting marginalised identities and experiences of women and girls, e.g., rurality or disability, which hampers a nuanced picture of gender and other inequalities in the country.

**TABLE 1:** Key gender indicators for Zambia

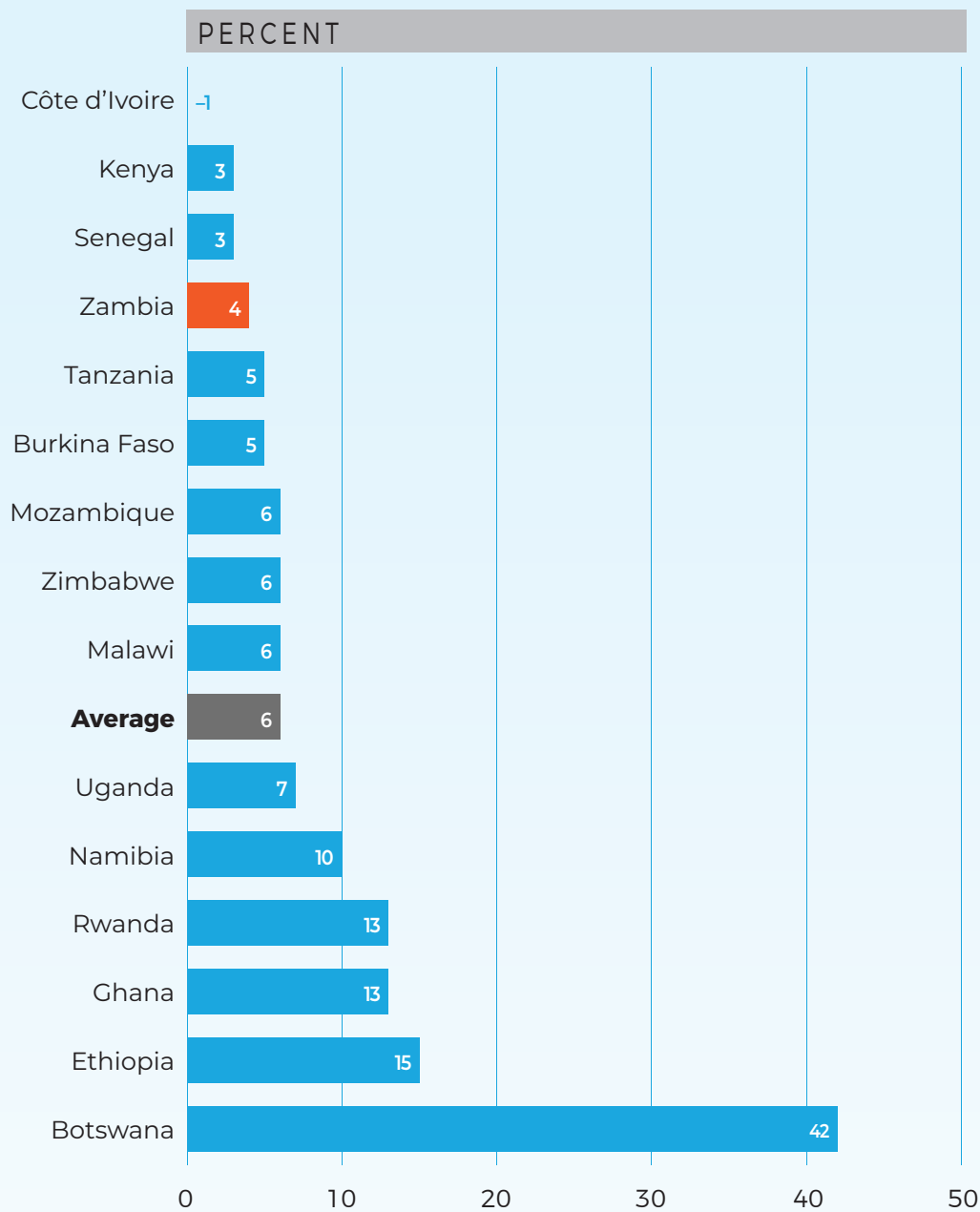
<b>Human Development Index (HDI)</b> (UNDP, 2021)	
<p>This index measures average achievement in human development in three dimensions: a long and healthy life (health), knowledge (education), and a decent standard of living (command over economic resources). The closer the value to 1, the higher the country's level of human development.</p>	<p>Zambia had an HDI value of 0,584 in 2019, reduced to 0.565 in 2021, standing at 154th out of 191 countries and territories.</p>
<b>Gender Inequality Index (GII)</b> (UNDP, 2021)	
<p>This index exposes the human development costs of gender disparities in three areas of human development: reproductive health (maternal mortality ratio and adolescent birth rate), empowerment (population with at least some secondary education; share of seats in parliament) and the labour market (labour force participation rate). The closer the score to 1, the more disparities between men and women and the greater the loss to human development.</p>	<p>Zambia has a GII value of 0,540, ranking it 138th out of 191 countries in the 2021 index. When the sub-indices disaggregate this value, a more nuanced picture of imbalances emerges.</p> <ul style="list-style-type: none"> <li>● Women hold only 15,1% of parliamentary seats, lower than the sub-Saharan Africa average of 25,7.</li> <li>● 47,1% of adult women have reached at least a secondary level of education, compared to 56,8% of their male counterparts; the figures are slightly higher than the SSA for both women and men.</li> <li>● For every 100 000 live births, 213 women die from pregnancy-related causes, which is relatively high but lower than the (SSA) average of 536.</li> <li>● The adolescent birth rate is 117 births per 1 000 women of ages 15-19, higher than the SSA average of 101.</li> <li>● Female participation in the labour market is 69,2%, compared with 77,8% for men but slightly higher than the SSA for both women and men.</li> </ul>
<b>Social Institutions &amp; Gender Index (SIGI)</b> (Organisation for Economic Co-operation and Development, 2023)	
<p>This index assesses the extent of discriminatory social institutions- the complex web of formal and informal laws, social norms, and practices that limit women and girls' access to their rights, justice, opportunities for empowerment, and resources and undermines their agency and authority. A SIGI value of 0% indicates no discrimination and 100% very high discrimination in social institutions.</p>	<p>At 31,3% in 2023, Zambia's social institutions showed a decrease in discrimination against women compared with 34,8% in 2019. Discrimination is highest in discrimination in the family and lowest in restricted civil liberties.</p> <ul style="list-style-type: none"> <li>● Family discrimination (34%) captures power distribution within households. It evaluates how much girls and women may be undervalued (e.g., child marriage rate, the gender gap in unpaid care and domestic work, and laws on divorce and inheritance).</li> <li>● Restricted access to productive and financial resources (32,3%) captures women's restricted access to and control over crucial economic assets and resources, e.g., land ownership, bank account ownership, and the gender gap in management positions.</li> <li>● Restricted physical integrity (31%) captures social institutions that make women and girls vulnerable in these areas and limit their control over their bodies and reproductive autonomy (e.g. laws on violence against women, female genital mutilation, and reproductive freedom, the prevalence of intimate partner violence and percentage unmet needs for family planning).</li> <li>● Restricted civil liberties (27,1%) capture social institutions that limit women's access to participation and voice in the public and social spheres.</li> </ul>
<b>The Global Gender Gap Index (GGGI)</b> (World Economic Forum, 2022)	
<p>This index measures gender-based gaps in access to resources and opportunities across four categories: economic participation and opportunity, educational attainment, health and survival, and political empowerment. The closer the score to 1, the higher the gender parity.</p>	<p>With a GGG value in 2022 of 0,72, Zambia has closed 72% of its gender gap, ranking 12th out of 36 sub-Saharan African countries and 62 out of 146 countries globally. Still, resources and opportunities need to be equal between men and women. When the sub-indices disaggregate this value, a more nuanced picture of imbalances emerges, with stark inequalities in access to political empowerment and almost full parity on health and survival.</p> <ul style="list-style-type: none"> <li>● Health and survival (98%) evaluate parity in sex ratio at birth and years of health life expectancy.</li> <li>● Educational attainment (94%) evaluates parity on literacy rate and percentage enrolments in primary, secondary and tertiary education.</li> <li>● Economic participation and opportunity (80%) evaluate parity on measures such as the labour force participation rate, wage equality for similar work, percentage of women legislators, senior/executive management, and professional and technical workers.</li> <li>● Political empowerment (17%) evaluates parity in the percentage of women in parliament, ministerial positions and years with a female head of state.</li> </ul>

# STI and sustainable socio-economic development

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- Zambia's science, technology and innovation systems for human development are part of the long-term national development plans and strategies, legal frameworks and policy instruments stemming from the country's first long-term development plans after independence (Republic of Zambia, 2020).
- The **National Science, Technology, and Innovation Policy of 2020** guides the organisation of the STI landscape in Zambia. The government and the Ministry of Technology and Science recognised the importance of having a clear science and technology policy to provide guidelines for the effective development and application of science and technology and to map its role in national development (Republic of Zambia, 2020).
- The **National Institute for Scientific and Industrial Research (NISIR)** is Zambia's government-funded statutory research organisation. The NISIR plays a significant role in fostering STI activities. The objective of the NISIR, among others, is to perform and build capacities in research and development (R&D), food technology, the textile industry, building and industrial minerals, agriculture and natural resources. However, poor government allocation of funds directed at research activities has led to a crippling of operational capabilities (Republic of Zambia, 2020).
- Zambia's scientific **peer-reviewed publications and patents** used as a measure of research and development (R&D), indicate the following (Scimago, 2023):
  - Scientific knowledge production has grown since 1996.
  - Researchers have increased their publication outputs from 90 publications in 1996 to 1110 documents in 2022, with a total of 9997, ranking 19th out of 59 African countries.
  - The country's percentage contribution to Africa's publications has grown from 0,65% in 1996 to 0,68% in 2022 with a peak of 0,84% in 1997.
  - The proportion of papers written with international partners has increased from 64% in 1996 to 82% in 2022.
  - Publications in Medicine dominate, followed by the Agricultural and Biological Sciences, Social Sciences, Environmental Sciences and Immunology and Microbiology.
  - Between 2008 and 2017, Zambia increased the number of gender-related publications by 4% (Figure 1), generating the fourth-lowest growth rate among the 15 participating SGCI's (Jackson et al., 2022).
  - The country ranks 35th out of 37 African rankings in 2021, filing 2 patents from applicants abroad which represents 0,0% of Africa's share of patents (The World Intellectual Property Organisation 2021).



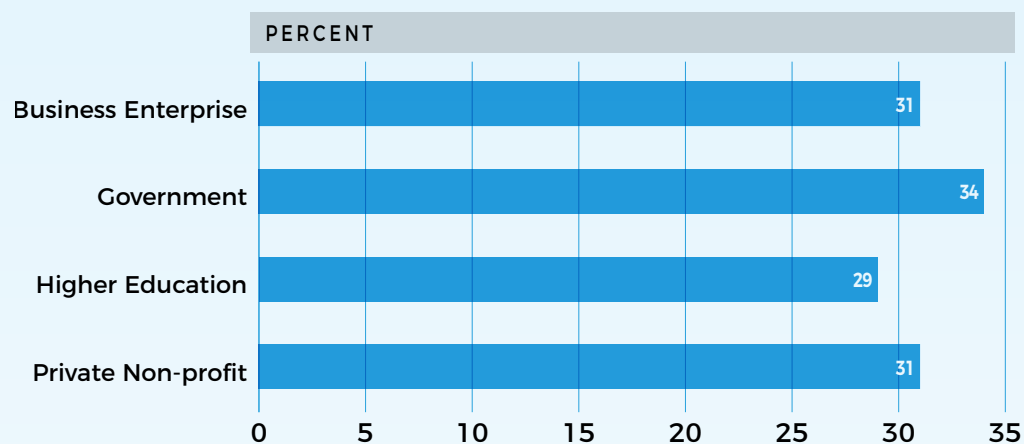


**FIGURE 1:** African SGCI participating countries: percentage (%) increase in publications with gender-related content between 2008 and 2017

## Status of human capital for STI

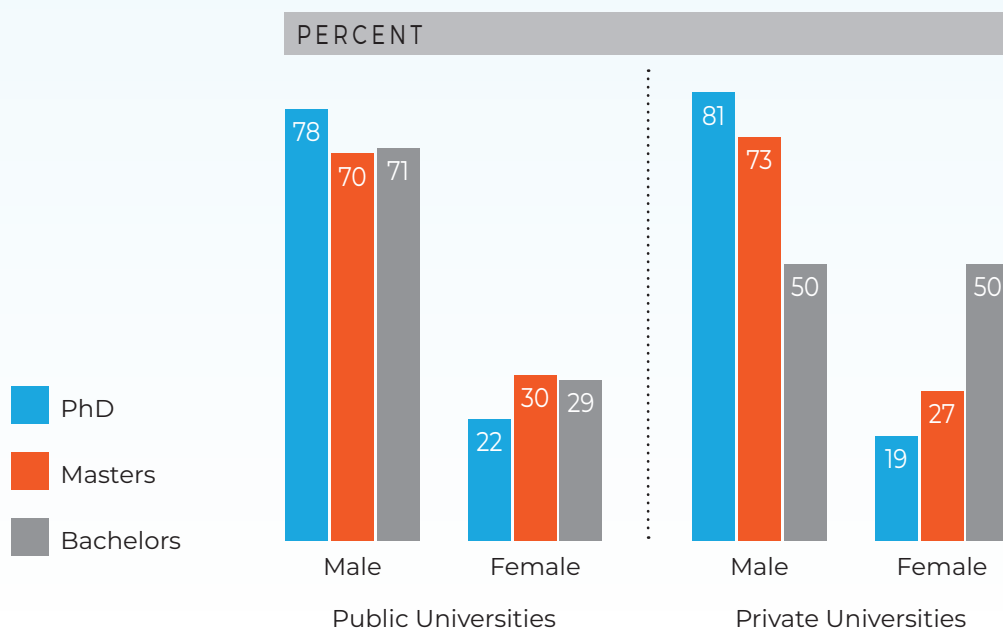
- Gender disaggregated data gaps paint an incomplete picture of the status of human capital for STI in Zambia. A lack of regular data reporting on R&D personnel is a global challenge: “In 2018, 50 countries recorded the number of researchers (in head counts), down from 97 countries in 2015” (UNESCO, 2021, p. 47).
- Bearing this data challenge in mind, in 2008 women researchers constituted 31% of the country’s researchers.

- The latest UNESCO Institute for Statistics (UIS) data (2008) show that Zambia had 41,71683 researchers per million inhabitants, well below the sub-Saharan African average of 73,63548 for the same year (UIS, 2021).
- In 2008, women researchers constituted only 30,7% of the total number of researchers, which is 1% less than the 2020 sub-Saharan Africa average of 31,3% women researchers (UIS, 2021).
- Distribution by field of employment (Figure 2) shows that in 2008 women were more concentrated in government (33,8%) and Business Enterprise Private Non-Profit Institutions (31,4%), followed by Higher Education (29%) (UIS, 2021).



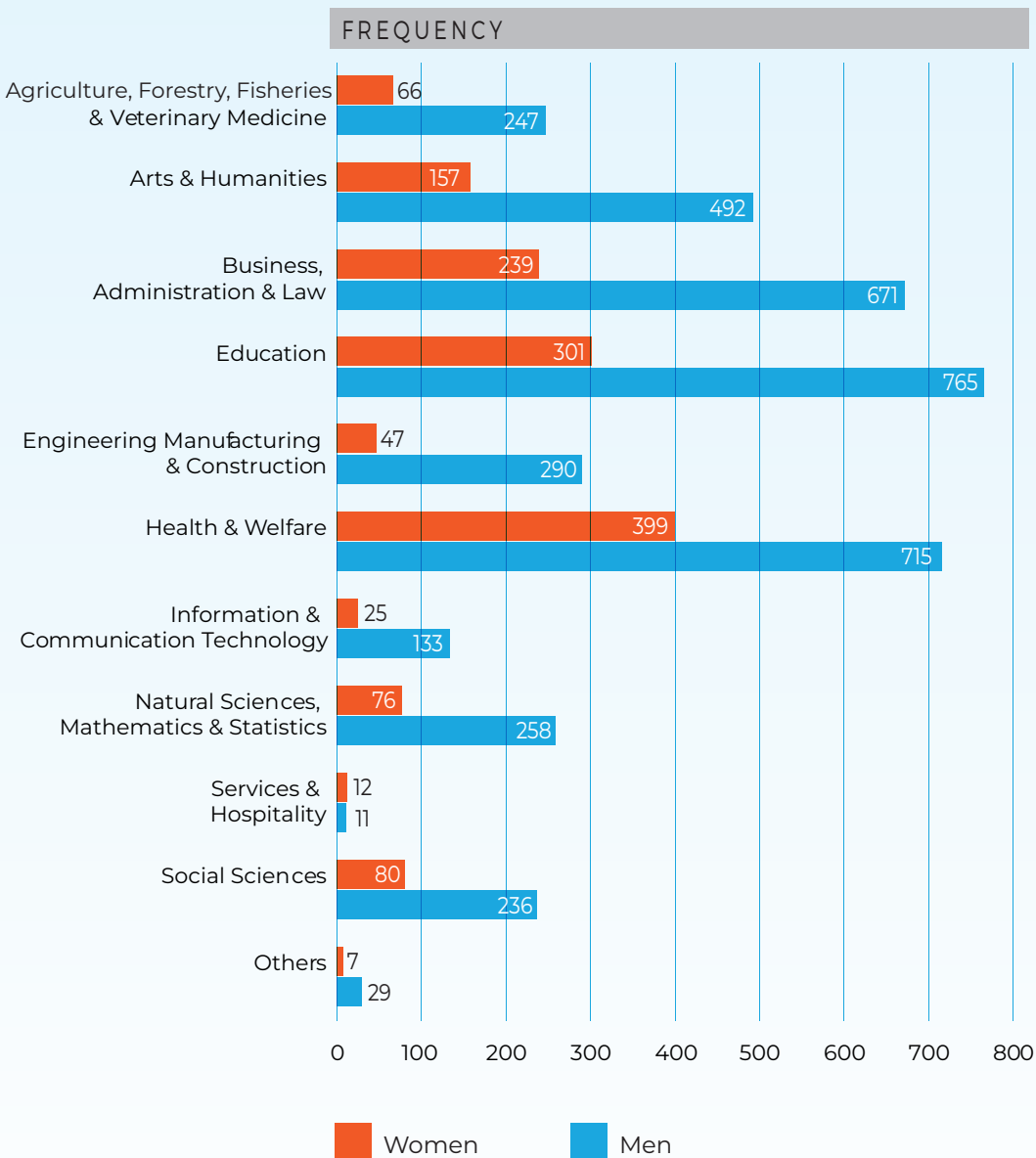
**FIGURE 2:** Proportion (%) of women in R&D by employment sector for 2008

- It is evident that men in academic positions outnumbered women in all levels of qualifications (Figure 3).



**FIGURE 3:** Percentage (%) academic staff by qualification and gender in Zambian Universities in 2020

- The gender gap was particularly significant at the Doctoral level, where women PhD holders accounted for only 19% in private and 22% in public universities. In contrast, men comprised 81% and 78% of the Doctoral population in private and public universities, respectively (Higher Education Authority, 2020).
- Finally, the distribution of academic staff by field research in public and private universities illustrates stark gender disparities across all research fields (Figure 4). Overall, a decisive move away from the stereotypic notion and practice of academia as mainly a male domain has yet to be apparent.



**FIGURE 4:** Number of academic staff by academic field and gender in public and private universities in Zambia, 2020

# What factors encourage (discourage) women's participation in the national system of science, technology and innovation?

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## Policy and frameworks

- The government of Zambia has recognised the importance of gender in promoting science. Policies such as the Gender Policy, Higher Education Act, National Policy on Science and Technology, and Education Policy aim at ensuring gender-based STI participation. The government has also acknowledged that science and technology, guided by national policies in education and other development-related sectors, can lead to economic development.
- The **2014 National Gender Policy** attempts to address gender imbalances and ensure gender equality in the development process by redressing the existing gender imbalances, including those in education and socioeconomic opportunities. It also provides equal opportunities for women and men to participate actively and equitably and contribute to the best of their ability, to benefit from national development (Ministry of Gender and Child Development, 2014).
- The **2020 National Policy on Science and Technology** revises the 1996 policy forging stronger links between research programmes, the development community and priority sectors of the economy. Significantly, the policy promotes equality and non-discrimination and considers different intersecting identities (Republic of Zambia, 2020).
- The country's **1997 School Re-entry Policy** guarantees girls the right to remain in school as long as they choose. The policy does recommend girls take maternity leave in the seventh month of pregnancy and return up to one year after birth. However the policy is unevenly implemented, influenced by the prevailing social norms about teenage pregnancy as undermining the social fabric of society (Zuilkowski et al., 2019).

## Gender social norms and the education pipeline

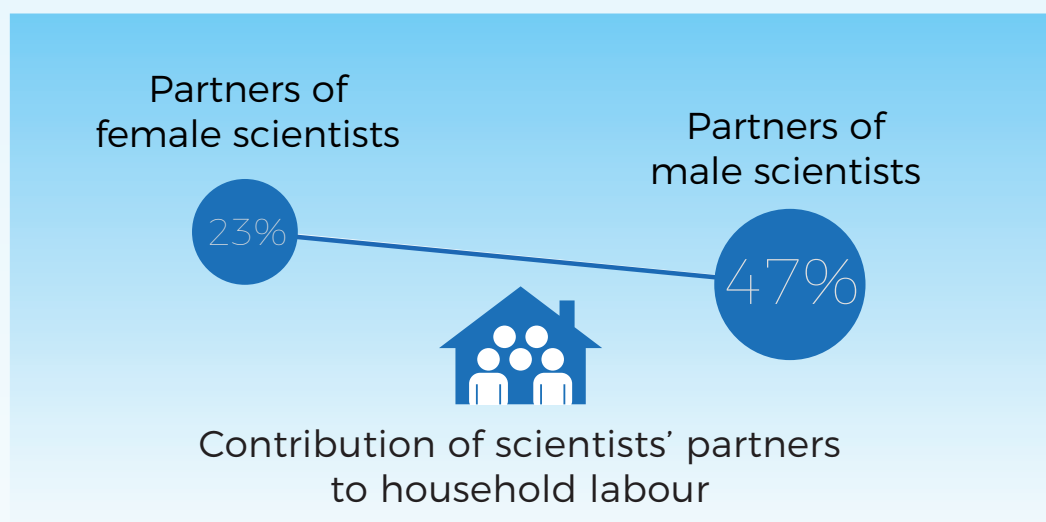
- Gender stereotypes impact the progression of girls from one level to another in STEM subjects as they advance in their education. Female students have household chores that limit study time and hinder their chances of enrolment in tertiary education. Other barriers to tertiary education faced by female students include a lack of financial support, especially in sociocultural settings that prioritise male children's tertiary education. Early marriage contributes to female students' attrition from the education pipeline since, once married, women must turn their focus to the household (Phiri & Mwaanga, 2020).

- The Ministry of Finance 2019 Annual Economic Report indicated that the total student population in both public and private universities had increased by 5% to 99 222, from 94 250 in 2018. Of the entire student population, 39 689 were female (Phiri & Mwaanga, 2020).
- According to the graduation data for academic fields of study in 2020 in private and public universities slightly more men than women graduated in Agriculture and Fisheries, Business Administration and Law, Engineering, Natural Sciences while slightly more women graduated in the fields of Education, Arts and Humanities, and Health and Welfare.
- Interestingly, the overall number of male and female graduates is almost equal, with 13,962 men and 13,922 women graduating. However, to understand gender attrition throughout the entire educational pipeline, a cohort analysis is needed (Higher Education Authority, 2020; Phiri & Mwaanga, 2020).
- Training in STI is offered mainly in government-owned learning institutions due to the lack of capacity of other institutions to buy the required equipment for STEM training (Phiri & Mwaanga, 2020). The government has increased the number of technical schools for girls to bridge the gap in terms of accessing science and technical subjects (Mataka & Sikapizye, 2020).
- Indicators tracking gender equality in human development (Table 1), though, do reveal contributing factors for gender gaps and disparities linked to Zambia's loss of human development potential across the life course, including those related to STI.

## **Gender science norms and the STI career progression environment**

- In 2008 women researchers constituted 31% of the country's researchers.
- Under-representation of women in STI in SSA is better explained by discriminatory practices that prevent women's participation in science than by supposed preferences for or aptitude in STI. Gender-science leaks emerge in women's tertiary education participation, affect completion rates and continue as leaks or blockages in their research career trajectory. Gender-science stereotypes are perceptions that connect scientific achievements with men more than with women. The STI landscape is rife with gender-science stereotypes (Elu & Price, 2017; Huyer, 2019).
- Gender bias during grant review processes impacts women's success in securing research funding (Sato et al., 2021). A continent-wide study found that men received more funding than women in engineering and applied sciences (Fisher et al., 2020).

- Other factors constraining women’s participation in STI include workplace sexual harassment, gender pay gaps, low job security for young women scientists who often hold contract positions, and a lack of mentors and role models (Mukhawana et al., 2020; Prieto-Rodriguez et al., 2022; Prozesky & Mouton, 2019). In academic institutions, women scientists generally have higher teaching, supervisory and administrative loads, leaving less time for publishing and fundraising. Interestingly, when controlling for this additional workload, women researchers in Africa publish more than their male peers (Beaudry et al., 2023).
- Overwhelmingly, the most widely cited structural barrier to women’s full participation in STI is unequal gendered beliefs and expectations about their role as caregivers (Beaudry et al., 2023; Fisher et al., 2020; National Academies of Sciences, Engineering, and Medicine, 2020). A study about African scientists’ career experiences notes that balancing work and family life was reported as the most significant career challenge for 80% of women researchers. Overall, male scientists’ partners contributed a much higher percentage (47%) than women scientists’ partners (23%) to alleviating the household labour burden (Prozesky & Mouton, 2019).



- A study conducted in 17 African countries, including Zambia, compares the performance of men and women in STEM PhD programs (Fisher et al., 2020):
  - Men and women had similar completion rates, but women took longer to earn their PhD. This was attributed to women being more likely than men to take a break due to family reasons such as having children (11% of women compared to 2% of men). This delay in completion time for women is known as the ‘motherhood penalty’.
  - Women with a female supervisor, who attended an institution with gender policies in place, and pursued their PhD in a department where sexual harassment by faculty was perceived as uncommon were more likely to complete their program on time.

- Marriage during PhD studies had different impacts on men and women. Women’s publication productivity decreased, while men’s increased, likely due to changes in domestic responsibilities associated with marriage. Research consistently shows that marriage benefits men while disadvantaging women regarding the division of household labour.
- Gendered relationship norms are also relevant. The study notes that 33% of married women felt compelled to downplay their successes and career prospects to avoid conflicts with their spouses.
- Interventions to address gender-related barriers in STI environments include implementing family-friendly policies and facilities that support women’s roles as mothers, incentivising men’s involvement in childcare, addressing workplace sexual harassment, and creating broader networks and linkages for women in STEM fields including mentoring and supervisory support (Fisher et al., 2020; Prieto-Rodriguez et al., 2022).
- Networks of stakeholders with interest and influence in advancing gender and inclusivity in STI in Zambia aim to create an enabling and empowering environment for women in science. Examples of such stakeholders include: The Women in Technology Network which aims to narrow the gender gap in technology; the Eastern Africa Network for Women in Basic Sciences that promotes a gender balance in the basic sciences from primary to tertiary levels. These institutions and networks address inequality among boys and girls and men and women and motivate girls and women to take on science-based education and careers.

# Conclusion

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Harnessing 100% of the country's human development for accelerated socio-economic development is entrenched in policy instruments across the STI pipeline. The Zambian Government has taken comprehensive policy measures to promote gender equality. While the country has made remarkable progress over the past decades to improve the rights protections of women, the impact of national gender policy is tempered by uneven implementation and structural barriers to equality, and the fallout is evident in persisting discrimination against girls and women across critical development domains.

In Zambia's policy context, gender equality and inclusivity considerations are conceptualised mainly in terms of male/female disparities. Social exclusion and disadvantage based on social factors beyond gender – such as disability, ethnicity, gender diversity, rural/urban location, and socio-economic status – are generally not meaningfully engaged in policy. Applying an intersectional lens to gender-related policy concerns will provide a more nuanced understanding of the interlocking systems of inequality that place women and other marginalised groups at a disadvantage in STI.

The absence of up-to-date education and R&D data disaggregated by sex, gender, and other diversity stratifiers hampers the ability of Government and other STI stakeholders to monitor policy implementation and impact. Moreover, very few science granting councils in Africa collect and make available gender and diversity-related data in their research and grants management processes (Global Research Council, 2021).

Publication trends show that Zambia is making strides in growing knowledge production on gender-related topics. Further investing in research to define and drive intersectional gender equality in STI is vital. Insights gleaned from such research will deepen understanding of the lived experience of girls and women in their diversity. Research to better understand gender and STI policy implementation gaps is also critical. These efforts will help the country attain equitable social, political and economic development outcomes for its entire population.



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# Notes

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