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

MOZAMBIQUE
COUNTRY PROFILE

Gender & Inclusivity

A PROJECT OF THE SCIENCE GRANTING COUNCILS INITIATIVE


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Strengthening Gender Equality and Inclusivity in Science, Technology and Innovation (STI) highlights the contextual factors driving gender and inclusivity disparities in STI in Mozambique 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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Citation

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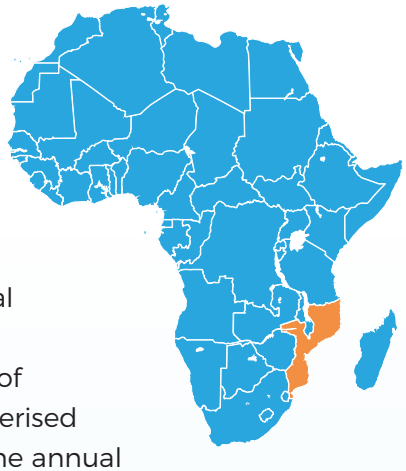
Country overview



Mozambique is located on the south-eastern coast of Africa and is bordered by Tanzania, Malawi, Zambia, Zimbabwe, the Kingdom of Eswatini and South Africa. Portuguese is the official language (Republic of Mozambique, 2020).

Women and girls constituted 50,9% of the total population of 32 077 072 people in 2021. With the population being characterised as "youthful", 44% of the population is under 14 years of age. The annual population growth of 2,8% in 2021 is slightly higher than the sub-Saharan population growth of 2,6% (Republic of Mozambique, 2020).

While the majority of the population lives in rural areas, the urbanisation rate has increased by 5,29%, from 32,4% in 2011 to 37,63% in 2021 (The World Bank, 2022).

The agriculture, forestry, fishing and mining sectors account for over three-quarters (76%) of the economically active population. The majority (86,7%) of all economically active women are involved in small-scale and subsistence farming, compared with 63,4% of men. Women account for 59% of unskilled agricultural workers, with men having a more substantial presence in the larger agricultural businesses (The World Bank, 2022).

Mozambique has stagnated in achieving many of its Sustainable Development Goals (SDGs) and regressed in some (Sachs et al., 2022; UN Women, 2021):

- Major challenges remain for ending poverty and hunger (SDGs 1 and 2).
- Progress in quality education (SDG 4).
- Access to clean water and sanitation (SDG 6) is moderately improving.
- Gender equality (SDG 5) shows progress, but critical gaps exist.
- Only 41,8% of indicators are available for monitoring Mozambique's SDGs from a gender perspective, with critical data gaps in unpaid care and domestic work, key labour market indicators 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 Mozambique's human potential for socio-economic development

- Gender inequalities are associated with laws, cultural norms and practices that hamper women's and girls' access to opportunities, resources and power. 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 (Alpin-Lardiés et al., 2019).
- Gender disparities in Mozambique are a persistent reality expressed in child marriage rates, teen pregnancy rates, low contraceptive use, and domestic violence and abuse rooted in patriarchal socio-cultural factors that exclude women and girls from social, political and economic life (Bicchieri & Ayala, 2017; UNDP, 2021).
- While many Mozambicans believe gender equality is improving, especially in relation to education, work and land ownership, the poor and marginalised and less educated are less likely to hold this perception of gender equality progress. Only 32% of people with "high lived" poverty see improvement in equal opportunities for men and women, compared with 44%-47% of those with no or "low lived" poverty. Still, most people (54%) prioritise men when it comes to employment, believing that families are better off if a woman takes care of the home and family (Bhoojedhur & Isbell, 2019).
- The country has made 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 (Table 1, SIG Index). However, social studies in Mozambique report a decreasing level of tolerance toward people of different religions (87%) ethnicities (81%), immigrants (76%), and different sexual orientations (54%) (Howard, 2020).
- 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).
- Structural drivers of gender inequality result in Mozambique 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 Mozambique

Human Development Index (HDI) (UNDP, 2021)	
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.	Mozambique had a low HDI of 0.456 in 2019 to 0.446 in 2021, well below the sub-Saharan Africa (SSA) average of 0,547.
Gender Inequality Index (GII) (UNDP, 2021)	
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.	Mozambique has a GII value of 0,537, ranking it 136 out of 191 countries in the 2021 index. When the sub-indices disaggregate this value, a more nuanced picture of imbalances emerges. ● Women hold 42,4% of parliamentary seats, much higher than the sub-Saharan African average of 25,7% and the world average of 42,5%. ● 10,8% of adult women have reached at least a secondary level of education, compared to 20,2% of their male counterparts; the figures are below the SSA averages of 31,1% for women. ● For every 100 000 live births, 289 women die from pregnancy-related causes, which is lower than the (SSA) average of 536. ● The adolescent birth rate is 165,8 births per 1 000 women of ages 15-19, higher than the SSA average of 101. ● Female participation in the labour market is 77,7%, compared with 78,9% for men. The figures are higher than the SSA of 62,1% for women and 72,3% for men.
Social Institutions & Gender Index (SIGI) (Organisation for Economic Co-operation and Development, 2023)	
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.	At 22,6% in 2023, Mozambique's social institutions showed a decrease in discrimination against women compared with 24,3% in 2019. Discrimination is highest in restricted access to productive resources and lowest in restricted physical integrity. ● Restricted access to productive and financial resources (44,7%) 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. ● Family discrimination (22,6%) 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). ● Restricted civil liberties (19,1%) capture social institutions that limit women's access to participation and voice in the public and social spheres. ● Restricted physical integrity (15%) 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).
The Global Gender Gap Index (GGGI) (World Economic Forum, 2022)	
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.	With a GGGI value in 2022 of 0,75, Mozambique has closed 75% of its gender gap, ranking 34 out of 146 countries. When the sub-indices disaggregate this value, a more nuanced picture of imbalances emerges, with greater parity on health and survival and stark inequalities in access to political empowerment. ● Health and survival (98%) evaluate parity in sex ratio at birth and years of health life expectancy. ● Educational attainment (82%) evaluates parity on literacy rate and percentage enrolments in primary, secondary, and tertiary education. ● Economic participation and opportunity (65%) 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. ● Political empowerment (49%) evaluates parity in the percentage of women in parliament, ministerial positions, and years with a female head of state.

STI and sustainable socio-economic development

- The country hosts a small science, technology and innovation (STI) system driven by government institutions through providing the policy framework that is informed and, to some extent, driven by the international development agencies (Kahn, 2021).
- Governance of STI has evolved under various entities from 2000, now under the authority of the **Ministry of Science, Technology, Higher and Technical Professional Education (MCTESTP)** (UNESCO, 2021a).
- Mozambique's STI landscape is rooted in various national policies, plans and strategies that have relevance today: **The Science and Technology Policy of 2003** and the **2006 National Strategy for Science and Technology and Innovation (2105-2019)**.
- These two instruments provide the framework for the development of the **National Innovation Fund (FNI)** and the Maluana Science and Technology Park (Kahn, 2021).
- Informed by Vision 2025 and the aforementioned policies, the **National Development Strategy (2015-2035)** emphasises inclusive growth and poverty reduction, gender equity, human resource development, employment creation and infrastructure development, with agriculture development fundamental to achieving these goals (UN Environment Programme, 2014).
- Strengthening the innovation system for knowledge creation across the different scientific fields and research institutions, updating the 2006 STI strategy and improving linkages between public and private universities, department-based institutes and bringing women to the center of STEM development is essential to operationalise Vision 2025 (Di Ciommo & Cumbi, 2021; Giva & Santos, 2020; Republic of Mozambique, 2006).
- Mozambique's scientific **peer-reviewed publications and patents**, used as a measure of research and development (R&D), indicate the following:
  - Mozambique researchers increased their publication outputs from 26 papers in 1996 to 770 in 2022 with a cumulative total of 6789, ranking 24th out of 59 African countries.
  - The country's percentage contribution to Africa's publications has grown from 0,19% in 1996 to 0,47% 2022 to 0,62% in 2022. Papers are largely related to Medicine, followed by Agriculture and Biological Sciences, then Environmental Sciences and Social Science. The proportion of papers written with international partners has increased from 85% in 1996 to 91% in 2022 (Scimago, 2023).

- Between 2008 and 2017, Mozambique increased the number of gender-related publications by 6% from 57 to 100 publications, with the average being at 6% for the 15 participating SGCIs (Figure 1) (Jackson et al., 2022; SGCI, n.d.).
- The country's number of patents filed by residents increased from 15 in 2016 to 30 in 2021, representing 5,8% of East Africa's filings for 2021 (The World Intellectual Property Organisation, 2021).

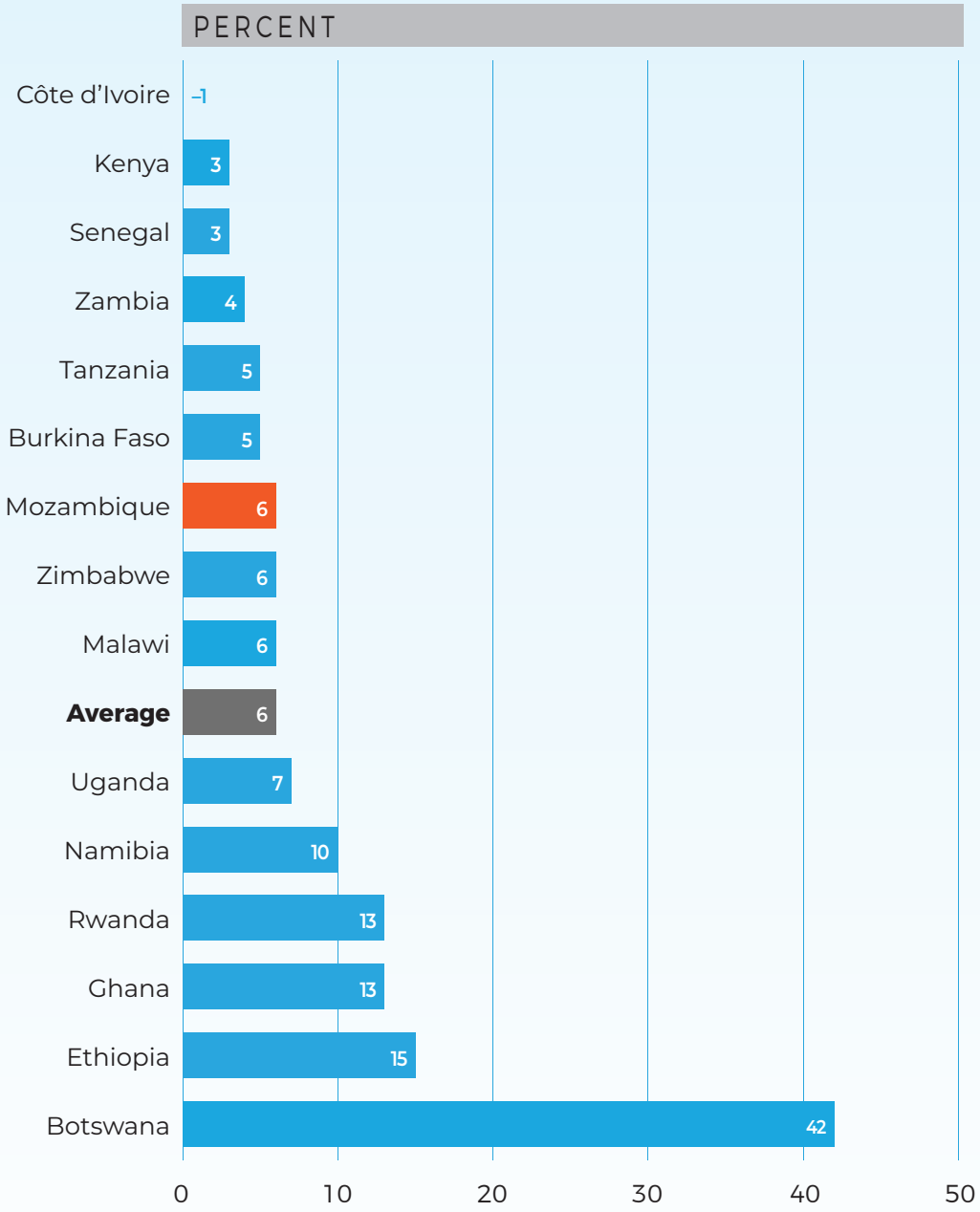


Figure 1: African SGCI participating countries: percentage (%) increase in publications with gender-related content between 2008 and 2017

Status of human capital for STI

- Gender disaggregated data gaps paint an incomplete picture of the status of human capital for STI in Mozambique. A lack of regular data reporting on the researcher pool 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 global data challenge in mind, in 2017, women researchers constituted 35% of the country's researchers (Giva & Santos, 2020; Kahn, 2021).

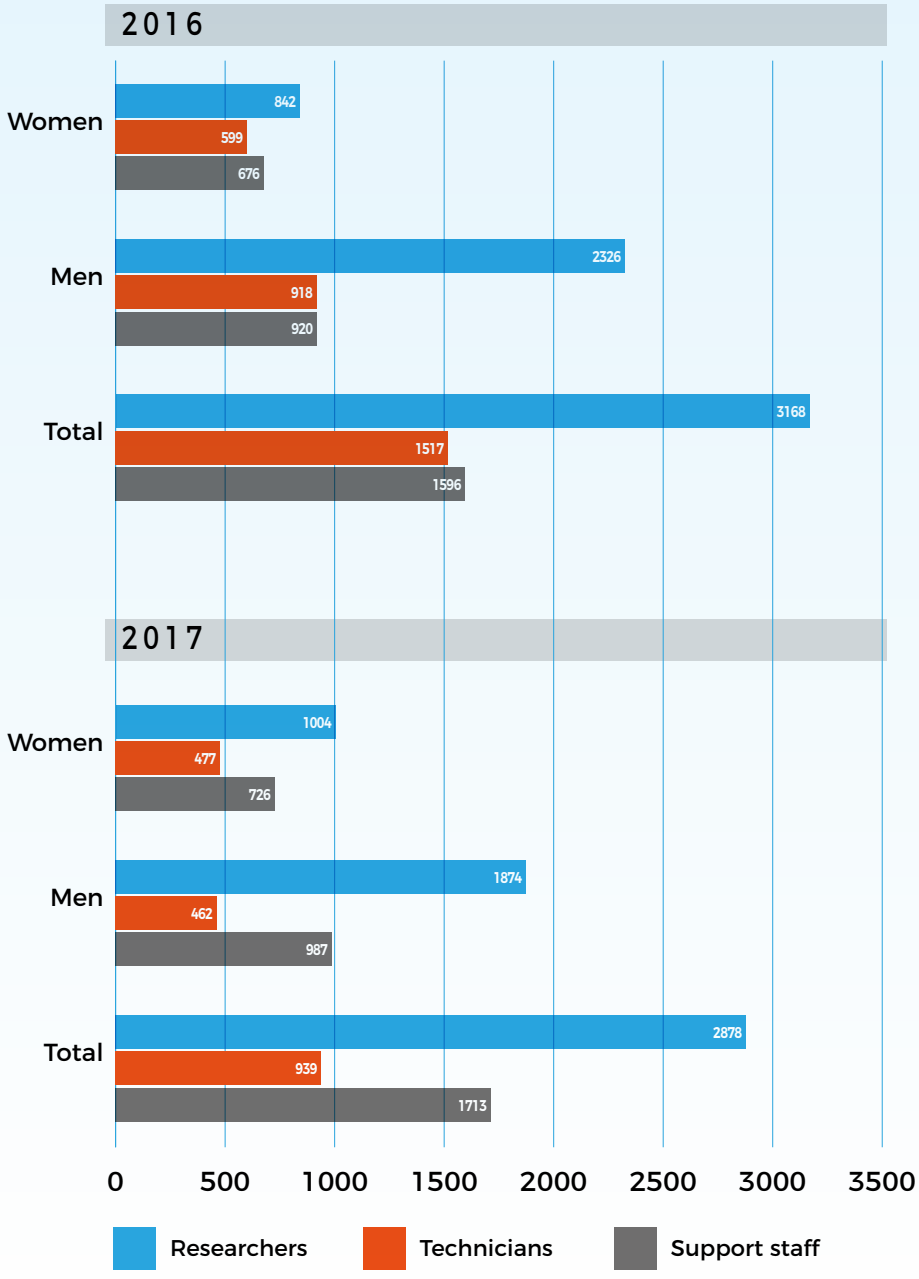


Figure 2: Distribution of R&D personnel (headcount) by category and gender for 2016 and 2017

- Women in Mozambique are underrepresented in the academic staff of higher education institutions. In 2017, 26% of the academic staff in tertiary education were women (Giva & Santos, 2020; Kahn, 2021).
- Disaggregating Research and Development (R&D) personnel by gender and function shows gender disparities, with women increasingly and negatively affected across the three functional positions (Figure 2). The total number of women in R&D is significantly lower than men for each category of R&D function. Overall, women constitute 38% of the R&D workforce, with a concentration among support staff (42%) (UIS, 2021).
- Mozambique's distribution of researchers by field of research in 2015 (Figure 3) illustrates gender disparities in the field of scientific research, with men prominent across the "hard sciences" of Natural Sciences, Engineering and Technology, Agricultural Sciences and Natural Sciences (UIS, 2021).

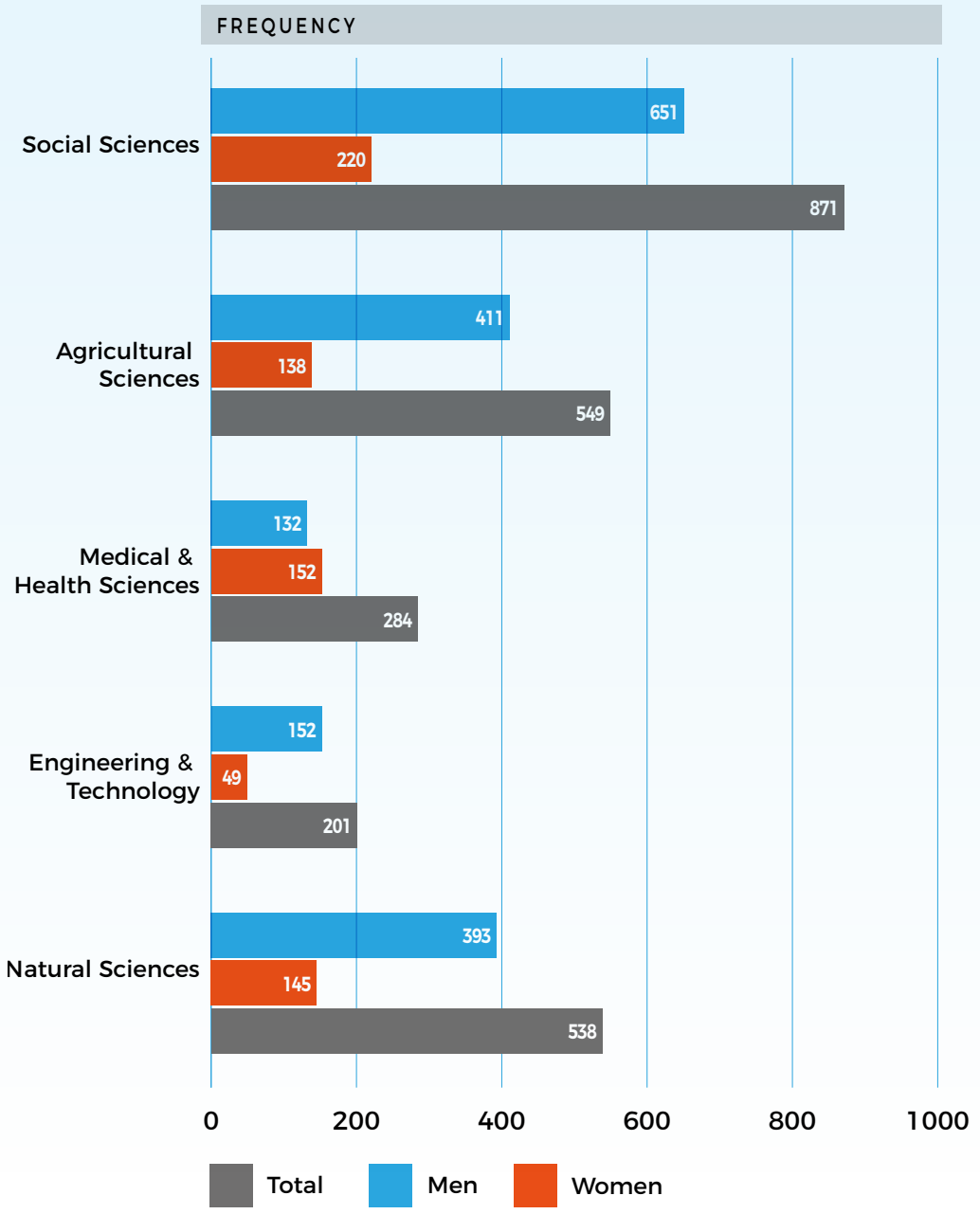


Figure 3: Distribution of researchers (headcount) by scientific field and gender, 2015

- Overall, a decisive move away from the stereotypic notion and practice of the hard sciences as mainly a male domain is not yet apparent.
- MCTESTP data indicated that by 2016, out of the 7 030 researchers in the country, only 28,9% were female.
- Researchers with PhDs accounted for 14,8%, out of which 11,3% were male and 3,5% women.
- The number of men researchers at all levels of research is more than two times greater than that of their female counterparts.
- The percentage of women PhD researchers is lower than those with an MSc or BSc, suggesting that men are more able to advance their academic qualifications than women (Giva & Santos, 2020; Kahn, 2021).
- Distribution by field of employment (Figure 4) shows that researchers are concentrated in government and in higher education.

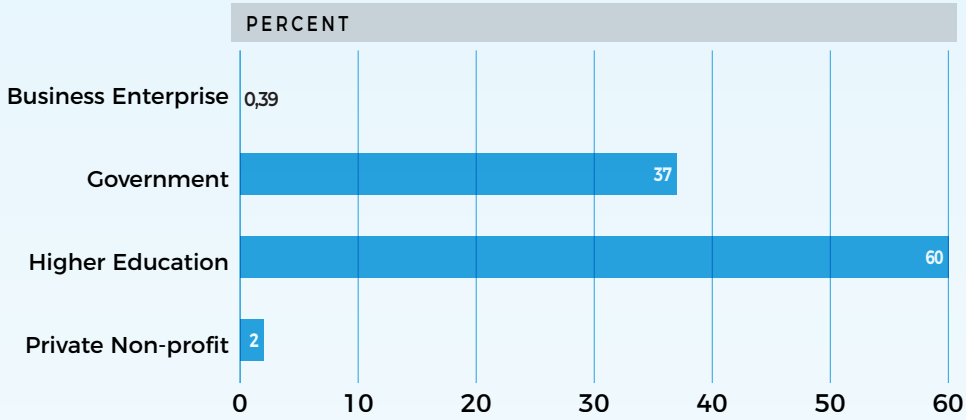


Figure 4: Proportion % of women and men in R&D by employment sector for 2015

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

Policy and frameworks

- Gender equality is enshrined in the **country's Constitution** and Mozambique has ratified several international conventions related to human rights and gender equality: the Convention on the **Elimination of Discrimination Against Women** (CEDAW), the Beijing Declaration and Platform of Action (PDPFA), and the SADC Protocol on Gender and Development (Di Ciommo & Cumbi, 2021; Kahn, 2021).
- Despite having a **Gender Equality Policy and Implementation Strategy** from 2012-2016, the country faces challenges in executing the policy due to insufficient technical and financial support and inadequate monitoring and evaluation mechanisms (Bhoojedhur & Isbell, 2019; Di Ciommo & Cumbi, 2021).
- One of the key objectives of the gender policy is to encourage women's participation in STI-related fields and support their retention. However, the higher education sector lacks policy tools to promote and track female involvement in STI, resulting in women's underrepresentation. A **Gender Equity Strategy for Higher Education 2018-2023** has been drafted to address this issue and is awaiting approval (Giva & Santos, 2020; Kahn, 2021; Nakiyawa et al., 2020).
- **The National Research Fund (FNI)** is crucial to the STI funding landscape. Information about a gender dimension in the criteria for selecting fundable projects varies. In 2022, an evaluation found that despite having a national gender strategy, FNI has not provided specific calls for female researchers or a gender dimension in research or applied gender-related criteria in assessing research proposals or formats for reporting. However, a 2020 report mentions that FNI includes a gender dimension in the requirements for fundable projects but focuses on gender equality in the research team, the project beneficiaries and the project outcomes but does not prioritize women for funding (Giva & Santos, 2020; van Gerwen et al., 2022).
- The country does not currently have a **School Continuation or Re-Entry Policy** that outlines girls' right to stay in school during and after their pregnancy. The country does have a ministerial decree (2018) that revoked the prohibition on pregnant students attending school during the day time. This policy gap contributes to gender-related barriers to girls' educational retention and attainment (Human Rights Watch, 2022).

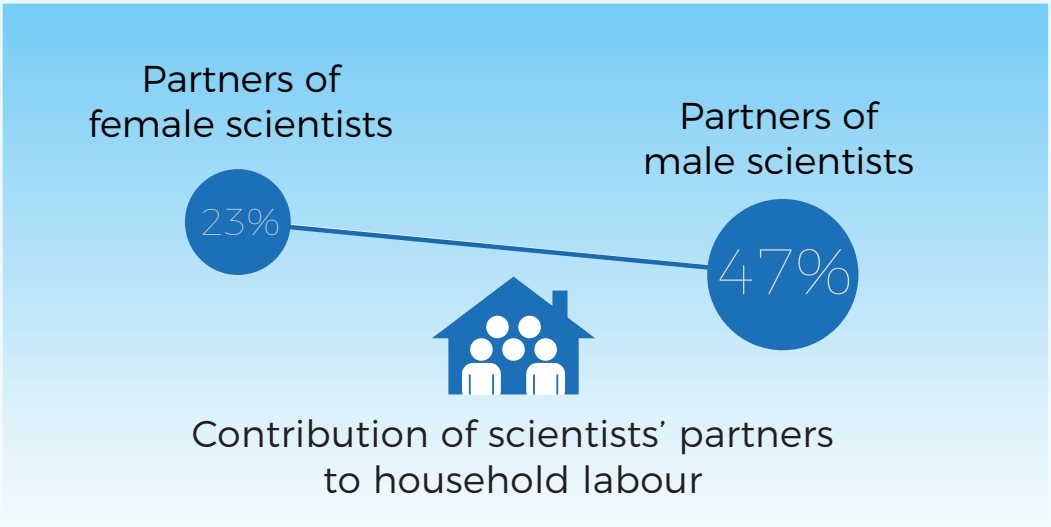
Gender social norms and the education pipeline

- The 2018-2023 higher education strategy recognises the need for greater interface between the Ministry of Education and MCTESTP, noting that the challenge of gender equity and women's participation in STEM starts during primary and secondary education (Giva & Santos, 2020; Nakiyawa et al., 2020).
- Gender parity is reflected in primary school enrolment, with 94% of girls participating in primary school. However, more than half of girls across the nation drop out by the fifth grade, only 11% of girls continue to secondary school and 1% go to college.
- School dropout rates are influenced by wealth and location. Quality of education is also a challenge with nearly two thirds of children who finish primary school leaving the system without basic reading, writing and maths skills (Kahn, 2021; Republic of Mozambique, 2020; The World Bank, 2022).
- Although women have a major role in agriculture, female students make up only 23% of the student population in Mozambique's agricultural schools (Kahn, 2021).
- Indicators tracking gender equality in human development (Table 1) expose contributing factors for these disparities and reflect the resulting unfortunate loss of the country's human development potential across the life course, including STI.
- Indicators tracking gender equality in human development (Table 1) reveal contributing factors for gender gaps and disparities linked to Mozambique'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 2021women researchers constituted 35% 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 Mozambique, 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 Mozambique aim to create an enabling and empowering environment for women in science. Examples of such stakeholders include OWSD (Organisation for Women in Science in the Developing World) which addresses inequality among boys and girls and men and women and motivate girls and women to take on science-based education and careers.

Conclusion

Harnessing 100% of the country's human development for accelerated socio-economic development is entrenched in policy instruments across the STI pipeline. The Mozambique 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 Mozambique'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 Mozambique 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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