

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



MALAWI

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 Malawi 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.

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Country overview



Malawi is in southern eastern Africa in the Great Rift Valley and borders Zambia to the west, Tanzania to the north and northeast and Mozambique to the east and southeast.

The country's total population of 19 129 952 is expected to double by 2038 (SADC, 2020). 51% of Malawi's population is below 18 years (SADC, 2020).

Women and girls constitute 50,68% of the total population. 70% of Malawians live in rural areas, with urbanisation rapidly increasing (SADC, 2020).

Malawi's largely agrarian economy employs 43% of all employed people in the agriculture sector.

Over half (59,2%) of employed people are in vulnerable employment, e.g., working in jobs as family members and own-account workers. Women experience higher unemployment and vulnerable employment than men (SADC, 2020).

Malawi 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), ensuring decent work and economic growth (SDG 8) (especially reducing unemployment and the gender unemployment gap), and reducing inequalities (SDG 10).
- Progress in quality education (SDG 4), especially in the 15-24 years age group, is currently not on track, with gender disparities for girls and young women.
- Access to clean water and sanitation has stagnated (SDG 6).
- Gender equality (SDG 5) shows progress but critical data gaps exist. Only 41,9 % of indicators are available for monitoring Malawi's SDGs from a gender perspective, with none for information and communication technology skills. Closing these gender data gaps is essential for achieving the country's gender-related SDG commitments.

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

- Gender inequality in Malawi is linked to inequitable laws and deep-rooted social 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; UNDP, 2021).
- Persons living with disabilities continue to experience stigma and discrimination, including socio-economic exclusion. Malawian girls and women living with disabilities experience a double burden of disability and gender-related inequalities (Remnant et al., 2022).
- Compared to other countries in the region, Malawi has greater tolerance of people of different religions (92%) and ethnicities (88%) as well as immigrants and migrant workers (72%) (Howard, 2020). Country survey data indicate persistent negative views, misconceptions and discrimination relating to sexual and gender minorities (The Other Foundation, 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, 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 Malawi 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 Malawi

Human Development Index (HDI) (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>Malawi's low HDI decreased from 0,51 in 2019 to 0,512 in 2021, well below the sub-Saharan Africa (SSA) average of 0,547. The country is ranked 169th out of 191 countries on the HDI.</p>
Gender Inequality Index (GII) (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>The country's GII value decreased from 0,565 in 2019 to 0,554 in 2021. Malawi ranks 142nd out of 191 countries and falls below the SSA average of 0,569.</p> <ul style="list-style-type: none"> ● The maternal mortality ratio was consistent at 349 maternal deaths per 100,00 live births for the years 2017-2021, well below the SSA average of 536. ● The adolescent birth rate reduced from 121,4 live births per 1,000 women aged 15-19 in 2019 to 117,9 in 2021, significantly higher than the SSA average of 100,9 in 2021. ● Women held only 22,9% parliamentary seats in 2019 and 2021, lower than the SSA average of 25,7% for women. ● The percentage of women aged 25 years and older with some form of secondary education grew by approximately 3% from 17,6% in 2015 to 21,3% in 2021, still well-below the SSA average of 31,1%. ● In 2021, the labour force participation rate for women aged 15 years and older was lower than for men at 71,6% and 80% respectively but higher than the SSA rate of 62,1% for women and 72,3% for men.
Social Institutions & Gender Index (SIGI) (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 31,5 %, Malawi's social institutions showed lower discrimination against women in 2023 than 41,4 % in 2019. Discrimination in Malawi is highest in restricted civil liberties and lowest in discrimination in the family.</p> <ul style="list-style-type: none"> ● Restricted civil liberties (50,4%) capture social institutions that limit women's access to participation and voice in the public and social spheres. ● Restricted physical integrity (34,1%) 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). ● Restricted access to productive and financial resources (24,9%) captures women's restricted access to and control over crucial economic assets and resources, e.g., land ownership, bank account ownership, the gender gap in management positions. ● Family discrimination (12,7%) 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).
The Global Gender Gap Index (GGGI) (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 GGGI value in 2022 of 0,63 (ranking 30th out of 36 Sub-Saharan African countries and 132nd out of 146 countries globally in 2022), Malawi has closed 63% of its gender gap. Still, resources and opportunities remain unequally divided between men and women.</p> <p>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"> ● Health and survival (98%) evaluate parity on measures of sex ratio at birth and years of health life expectancy. ● Educational attainment (76%) evaluates parity on literacy rate and percentage enrolments in primary, secondary, and tertiary education. ● Economic participation and opportunity (62%) 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 (16%) 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

- Malawi's STI systems for human development are rooted in long-term national development plans and strategies, legal frameworks and policy instruments emanating from the country's first long-term development plan launched in 1998, Vision 2020 (Malawi National Economic Council, 2000) and Vision 2063, launched in 2020 (Malawi National Planning Commission, 2020).
- **Vision 2020** identified science and technology-led development as one of nine goals for achieving the overarching sustainable development vision. Achievement gaps primarily related to pluralistic STI systems, resource allocation not based on the development goals and inadequate progress tracking in Vision 2020 led to **Vision 2063**. Vision 2020 and Vision 2063 both emphasise the importance of reducing gender inequalities and improving opportunities for people living with disabilities.
- Malawi's STI landscape is principally guided by the 1991 and revised 2002 **National Science & Technology Policy of Malawi** (Republic of Malawi, 2002). The 2002 revised policy specifically integrates STI activities into development planning.
- This 2002 National Science and Technology Policy is supported by the **Science and Technology Act of 2003** (Republic of Malawi, 2003). It sets out the principles, policy objectives and cross-cutting strategies for an integrated and nationally coordinated science, technology and innovation system to achieve sustainable socio-economic development through the development and application of science and technology to improve the standard and quality of life of Malawians. Gender equality and gender equity in human capital development feature prominently in the policy.
- The **National Commission for Science and Technology (NCST)** advises the Malawian government on science and technology matters and coordinates the work of different STI stakeholders to achieve science and technology-led development strategies.
- Malawi's scientific **peer-reviewed publications and patents**, used as a measure of research and development (R&D), indicate the following (Scimago, 2023):
 - Malawi's scientific knowledge production has grown since 1996.
 - Malawian researchers increased their publication outputs from 102 papers in 1996 to 1250 in 2022 with a cumulative total of 12102, ranking 16th out of 59 African countries.
 - The country's percentage contribution to Africa's publications has grown from 0,73% in 2011 to 0,77% in 2022.

- The proportion of papers written with international partners has increased from 63,7% in 1996 to 89% in 2022.
- Publications in Medicine dominate, followed by the Social Sciences, the Agricultural and Biological Sciences, Veterinary Sciences, and Environmental Sciences.
- Patent and registrations granted decreased exponentially between 2005 and 2012. Contributing factors included limited awareness of intellectual property rights and the absence of a strong culture of innovation and invention, worsened by low investment in R&D innovation and commercialisation (Lemarchand & Schneegans, 2014).

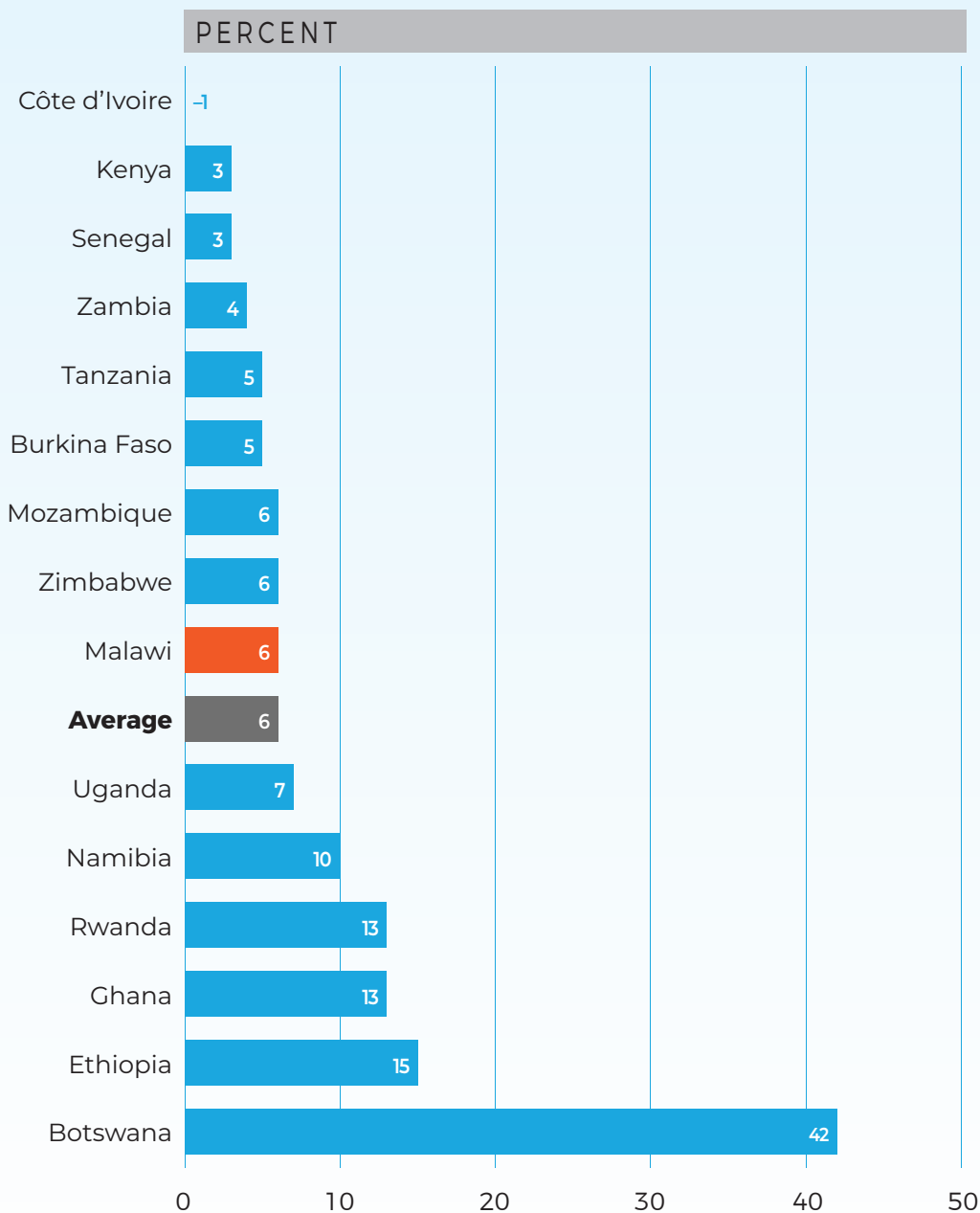


FIGURE 1: African SGCIs participating countries: percentage (%) increase in publications with gender-related content between 2008 and 2017

- Of the 15 SSA countries participating in the Science Granting Councils Initiative (SGCI), Malawi has the highest percentage (77%) of international collaborations on publications with gender-related content (Jackson et al., 2022).
- Between 2008 and 2017, Malawi increased the number of gender-related publications by 6% from 145 to 238, matching the 6% increase average of the 15 participating SGCI countries (Figure 1) (Jackson et al., 2022).

Status of human capital for STI

- Gender disaggregated data gaps paint an incomplete picture of the status of human capital for STI in Malawi. 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 2010 women constituted 20% of researchers in the country (Unesco Institute for Statistics, 2021).
- The latest available data (2010) show a 25% increase in the country’s Research and Development (R&D) personnel from 2 884 in 2007 to 3 809 in 2010 (Unesco Institute for Statistics, 2021).
- The total number of women in R&D was significantly lower than men for each category of R&D function of researchers, technicians and support staff (Table 2).
- Overall, women constituted only one fifth (20%) of the R&D workforce, showing a 1% decrease in their percentage proportion in the same period (Unesco Institute for Statistics, 2021).

TABLE 2: Total number of R&D personnel (headcount) by category and gender for 2007 and 2010

	2007			2010		
	Women	Men	Total	Women	Men	Total
Researchers	170	563	733	360	1 483	1 843
Technicians	115	907	1 022	352	1 196	1 548
Support Staff	325	804	1 129	39	379	418
Total	610	2 274	2 884	751	3 058	3 809

- Disaggregating R&D personnel by gender and function (Table 2) shows gender disparities, with women increasingly and negatively affected across the three functional positions as researchers, technicians and support staff (Unesco Institute for Statistics, 2021).
- The proportion of women technicians increased and the proportion of men decreased. While this appears to be a positive increment of women in technician positions, this gain is nonetheless still ambiguous, given that overall, the R&D personnel at all levels is predominantly and disproportionately male.
- Malawi's distribution of researchers by field of research in 2010 (Figure 2) illustrates gender disparities in the field of scientific research. Male researchers are prominent across the "hard sciences" of engineering and technology (94%), agriculture and veterinary sciences (87%) and natural sciences (78%). Women are more prominent (but still not as prominent as men) in the "soft sciences" of the humanities and arts (42%) and social sciences (28%) (Unesco Institute for Statistics, 2021).

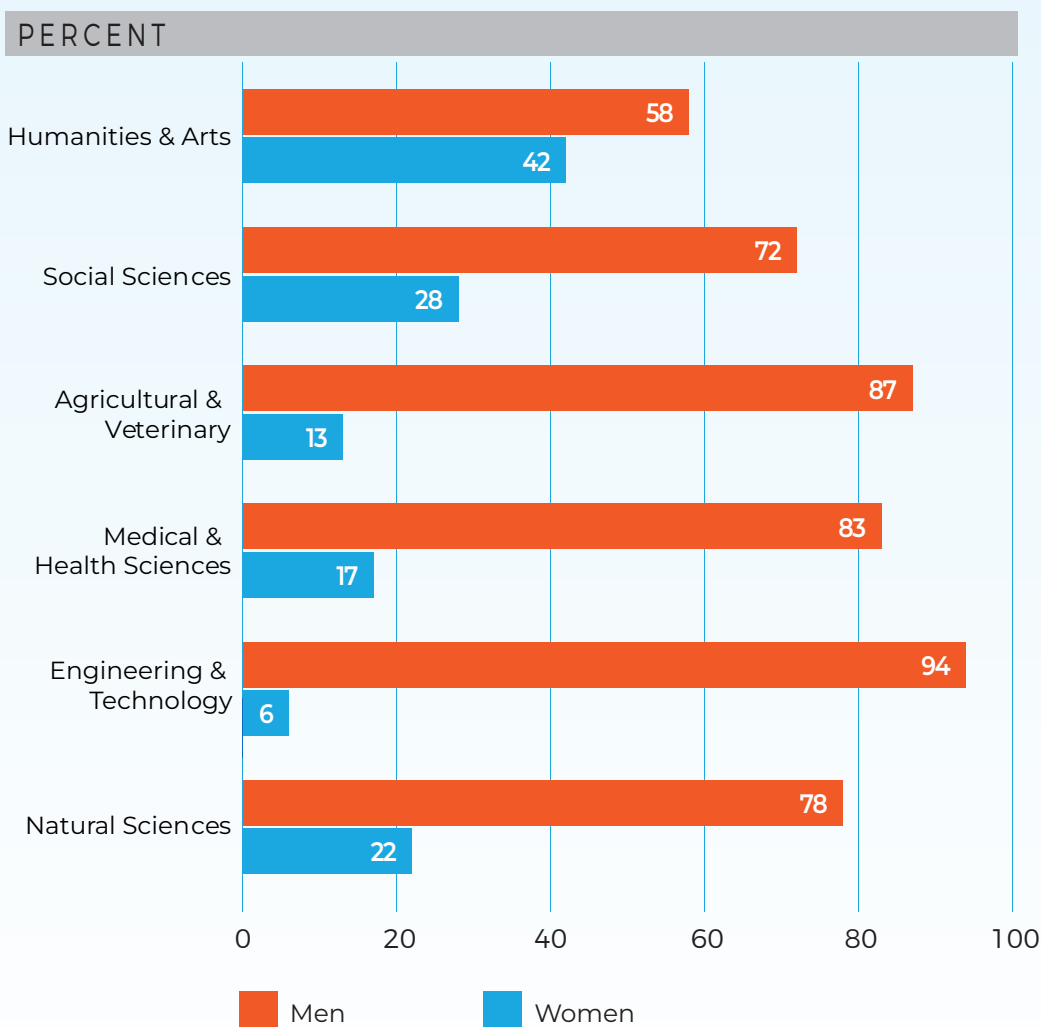


FIGURE 2: Malawi's distribution (%) of researchers (headcount) by scientific field and gender for 2010

- Overall, a decisive move away from the stereotypic notion and practice of the hard sciences as mainly a male domain is not yet apparent.
- Distribution by field of employment (Figure 3) shows that in 2007 women were more concentrated in higher education and private non-profit institutions. However, by 2010 this pattern changed, with a decrease in women researchers in government and higher education and an increase in women researchers in private non-profit institutions (Unesco Institute for Statistics, 2021).
- These decreases in women in research in the public sectors and increases in the private sector warrant further exploration, especially of how male-dominated academic and research cultures influence women’s sustainable engagement in research.

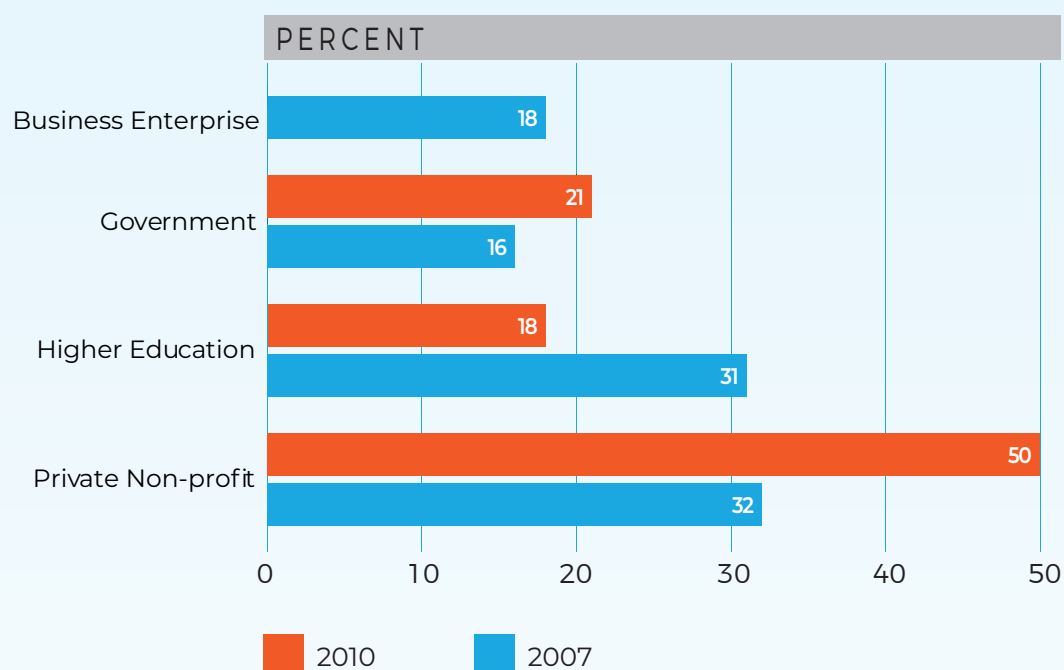


FIGURE 3: Proportion (%) of women in R&D by employment sector for 2007 and 2010

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

Policy and frameworks

- Various frameworks and policy instruments emphasise equal rights for men and women and prohibit discrimination based on gender or marital status. These flow from sections 20 and 41 of the **1995 Constitution of Malawi**.
- **Vision 2020 and Vision 2063** both emphasise the importance of reducing gender inequalities and improving opportunities for people living with disabilities. This aligns with the Malawian government's definition of vulnerable and marginalized segments of society, whose interest it seeks to promote (Malawi National Economic Council, 2000; Malawi National Planning Commission, 2020). **Vision 2063** regards gender equality as one of the key human capital development enablers driving economic growth and a vibrant, knowledge-based, digital economy that exemplifies a modern, developed economy. It recognises the impact of gender inequality in all sectors of the economy and social life, aiming to end all gender-based discrimination and harmful practices by 2063. The plan commits to reducing the Gender Gap Index from 0,671 in 2020 to 0,832 in 2030, 0,916 in 2040, and 1 in 2050, reflecting a fully gender-egalitarian Malawi.
- Malawi's **Gender Equality Act No. 13 of 2013** protects women's human rights to end all forms of harmful cultural and social practices (Republic of Malawi, 2013). The Act limits discrimination based on sex, using the terms "sex discrimination" and "discrimination" interchangeably. However, the Act does not consider other forms of discrimination against women based on intersecting identities, e.g. age, disability, ethnicity and sexual orientation, among others. Overall, it reflects the state's definition of gender equality as relating to male-female inequality in terms of rights and access to power by women and the eradication of discrimination against women. The Act does provide women with redress for rights violations; however, lack of knowledge about laws and remedial actions is still a challenge for women in Malawi.
- The revised **National Gender Policy of 2015** addresses entrenched gender inequality structural drivers that negatively impact girls' and women's participation in many sectors, including the country's national STI systems (Republic of Malawi, 2015). The policy provides guidelines for mainstreaming gender in various sectors of the economy, including in education. Its overall goal is reducing gender inequalities by enhancing the participation of women and girls, together with men and boys, in socio-economic and political development.

- The **2002 Science, Technology and Innovation Policy** recognises the need for science and technology human capital development and the urgent need for the participation of women, youth and other “special interest groups” in the development and utilisation of science and technology in Malawi (Republic of Malawi, 2002). Unfortunately, the policy does not unpack the category “special interest groups”, again precluding intersectional considerations regarding social identities, including girls’ and women’s. The policy does call for gender- and disability/age- disaggregated data across all STI activities and highlights strengthening of STI curricula in schools as well as encouraging girls to take up these subjects.
- The **National Science, Technology and Innovation Monitoring Evaluation Framework (2013)** acknowledges that very little STI information is captured nationally, resulting in limited contributions to international data sets for benchmarking. The Framework proposes gender-disaggregated data for each point along the education and research pipeline (Malawi National Commission for Science & Technology, 2013).
- Notably, in August 2021, the Ministry of Education signed into being the **SADC Women in Science, Engineering and Technology Organisation (WISETO) Chapter for Malawi**. This Chapter seeks to enhance the participation and recognition of Malawian women in Science, Engineering and Technology (SET). Importantly, it also seeks to integrate Malawian women scientists into regional research and STI programmes and provide support to Malawian women scientists at all stages of their careers.
- A School Re-entry or Continuation Policy gap exists in protecting girls’ right to remain in school during and after pregnancy. Currently the country does not have a continuation policy, only allowing girls to return to school 12 months after pregnancy, thereby contributing to girls’ negative educational outcomes and / or attrition from education post-pregnancy (Human Rights Watch, 2022).

Gender social norms and the education pipeline

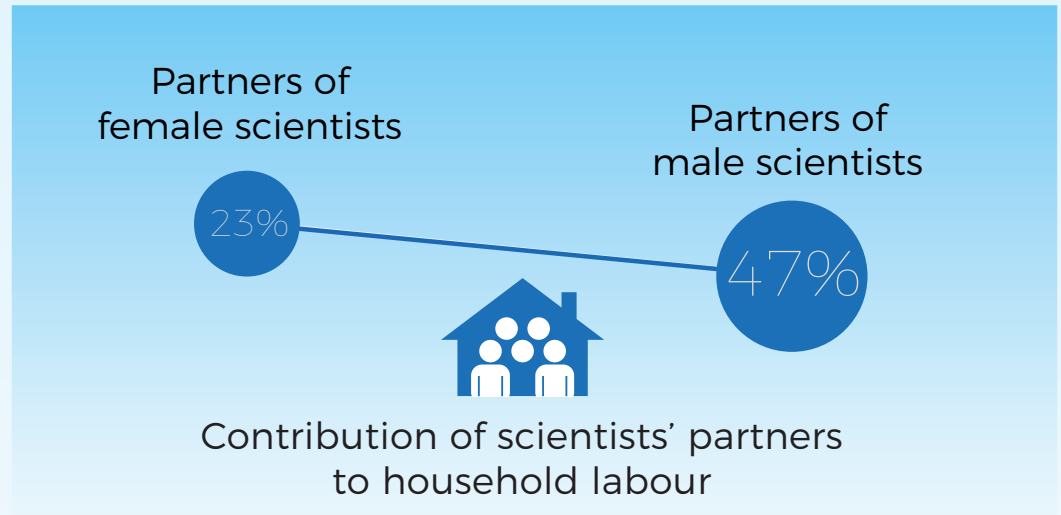
- Malawi appears to have largely achieved gender parity in primary and secondary education attainment rates. Even if parity exists in enrolment, adult Malawians perceive worsening access for girls to post-secondary or tertiary education (Manbo et al., 2016).
- Only 38,4% of children transition from primary to secondary school (40,9% for boys and 35,8% for girls) and only 8% of secondary school children move on to tertiary education. This indicates a leaky education pipeline for youth, including for girls (Manbo et al., 2016).
- Enrolment of women in tertiary education programmes is low, ranging from 35% in 2005 to 39% in 2011 (according to the latest available data) (Manbo et al., 2016).

- Gender disparities and other intersectional characteristics, such as wealth and location, disadvantage tertiary enrolment, especially for women. In 2012, 81,9% of students in higher education were from the richest quintile of households, compared with 1,5% from the poorest quintile. In 2016, the gross attendance ratio (GAR) for tertiary education was lower for women (2%) than for men (3%). When disaggregated by rural location, the GAR drops for both women and men, but more so for women (0,53%) than for men (0,82%) (Manbo et al., 2016).
- Available data show that graduation from first degree programmes is 0,52%, inclusive of men and women. This ratio drops when disaggregated to 0,35% for women and, 0,69% for men suggesting a poorer completion rate for Malawian women in tertiary education (Manbo et al., 2016).
- Data gaps for tertiary education enrolment and graduation rates disaggregated by gender, degree type and field of scientific study frustrate a nuanced understanding of the gender-based, leaky pipeline in tertiary education, including for STI.
- Indicators tracking gender equality in human development (Table 1), though, do reveal contributing factors for gender gaps and disparities linked to Malawi's loss of human development potential across the life course, including relating to STI.

Gender science norms and the STI career progression environment

- In 2010, women constituted 20% of researchers in the country.
- 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 Malawi, 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 Malawi exist within the National Commission for Science and Technology. The NCST hosts the Organisation for Women in Science for the Developing World via its Malawi Chapter. The Women in Science and Technology Network (WISTNET) was established by the Malawian government in 2006 to explicitly support STI gender-related activities. Development partners also support gender-focused activities in Malawi, even if not expressly STI. Some of these aid partners are: the United Kingdom, the United States Agency for International Development (USAID), Irish Aid, the African Development Bank, the Royal Norwegian Embassy, UN Women, the European Union, the World Bank Group and the Millennium Development Challenge (African Development Bank, 2020).

Conclusion

Harnessing 100% of the country's human development for accelerated socio-economic development is entrenched in policy instruments across the STI pipeline. The Malawian 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 Malawi'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 Malawi is making strides in growing knowledge production and to some extent 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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