Report

Gender, equality, disability and social inclusion analysis in Latin America: Panama 2025

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ODI Global

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Front cover image: A woman in a colorful dress and holding a vibrant umbrella at a fruit market in Bocas del Toro, Panama (2025) © Rafael de Gracia | Shutterstock ID: 2604681261

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About this report

The UK Foreign, Commonwealth & Development Office (FCDO) has commissioned ODI Global to conduct a gender, equality disability and social inclusion (GEDSI) analysis in Latin America, with a view to inform FCDO's efforts to support women, girls and other minority groups across the region. Focused on four countries: Chile, Guatemala, Panama and Uruguay, the analysis provides the latest high-quality evidence on the state of a number of GEDSI dimensions at national levels. The research also spotlights a range of salient issues including: gender-based violence, women's participation in politics, women's economic autonomy, feminist foreign policy, LGBTQ+ rights, children in alternative care, online violence and bioeconomy. For each country, the analysis provides:

- an overview of up-to-date data on gender equality, disability and social inclusion
- an analytical 'deep dive' into two/three topics of national relevance
- recommendations for relevant stakeholders to support national-level action and/or collaborate with potential international partners.

Contents

Acknowledgements / V

Display items / VIII

Acronyms and abbreviations / IX

Key terms / XI

1 Introduction and methodology / 1

1.1 GEDSI context overview in Panama / 1
1.2 About this report / 1
1.3 Limitations / 2
1.4 Structure of the report / 2

2 GEDSI statistical profile / 3

2.1 Overview / 3
2.2 Health / 9
2.3 Education / 11
2.4 Poverty, employment and economic empowerment / 13
2.5 Political representation / 16
2.6 Gender-based violence / 16
2.7 Data gaps and challenges / 18

3 Bioeconomy / 20

3.1 Introduction / 20
3.2 Current context of bioeconomy in Panama / 20
3.3 The participation of marginalised groups in the bioeconomy / 25
3.4 Key barriers to inclusive bioeconomy engagement / 28
3.5 International good practices and opportunities for Panama / 29

4 Government strategy: new technologies and innovation / 33

4.1 Introduction / 33
4.2 Status of women and girls in science, technology and innovation (ST&I) / 34
4.3 Policies, progress, and achievements / 39
4.4 Drivers, and enablers for women and girls' participation in ST&I / 47
4.5 Fintech and financial inclusion / 48

5 Future research agenda and policy recommendations / 50

5.1 Recommendations emerging from review of GEDSI data / 50

5.2 Bioeconomy / 51

5.3 Technology, science and innovation / 52

References / 54

Annexes / 67

Display items

Figures

Figure 1 Percentage of bioeconomy in aggregate supply transactions, in gross value of production: 13 countries in Latin America and the Caribbean (2018 data) / 22

Tables

Table 1 Key GEDSI indicators for Panama / 3
Table 2 Afro-descendant population aged over 15 years old, by region / 6
Table 3 Population by indigenous group / 7
Table 4 Type of disability by ethnic group / 7
Table 5 GEDSI criteria in bioeconomy strategies from the Latin American region / 23
Table 6 PISA results in mathematics and reading in Panama and OECD countries / 35
Table 7 Policy and legal framework for ST&I with a GEDSI focus / 39
Table 8 STEM initiatives for women, girls and other marginalised groups / 44
Table 9 Examples of fintech companies offering women-focused financial services / 49
Table A1 Key informant interviews / 67
Table A2 STEM Initiatives with GEDSI focus / 68
Table A3 Latin American Bioeconomy Network, members and key information / 71

Boxes

Box 1 Discrimination against LGBT+ people / 8
Box 2 Strategies for social sustainability in the bioeconomy / 27
Box 3 Examples of gender and socially inclusive bioeconomy projects in Latin America / 30
Box 4 Bioeconomy strategy in the UK / 31
Box 5 Lessons on gender and social inclusion in bioeconomy initiatives / 31
Box 6 Ministry of Education and SENACYT achievements in ST&I with a GEDSI focus / 41

Acronyms and abbreviations

CEPAL	Comisión Económica para América Latina y el Caribe (Spanish version of ECLAC)
ECLAC	Economic Commission for Latin America and the Caribbean
FAO	Food and Agriculture Organization of the United Nations
FCDO	Foreign, Commonwealth & Development Office
GDI	Gender Development Index
GEDSI	gender equality, diversity and social inclusion
GMO	genetically modified organisms
HIV	human immunodeficiency virus
ICTs	information and communication technologies
IICA	Instituto Interamericano de Cooperación para la Agricultura (Inter-American Institute for Cooperation on Agriculture)
IDB	Inter-American Development Bank
IDIAP	Instituto de Innovación Agropecuaria de Panamá (Agricultural Research Institute of Panama)
INAMU	Instituto Nacional De La Mujer (National Women's Institute)
INADEH	Instituto Nacional de Formación Profesional y Capacitación para el Desarrollo Human (National Institute of Vocational Training for Human Development)
INDICASAT	Instituto de Investigaciones Científicas y Servicios de Alta Tecnología de Panamá AIP (Institute for Scientific Research and High Technology Services)
INEC	Instituto Nacional de Estadistica y Censo (National Census of Population and Housing)
INGO	international non-governmental organisation
ITSE	Instituto Tecnico Superior Especializado (Higher Specialised Technical Institute)
KII	key informant interview
KoLFACI	Korea-Latin America Food and Agriculture Cooperation Initiative
LAC	Latin America and the Caribbean
LGBT+	lesbian, gay, bisexual, transgender, and other non-normative sexual orientations and identities
MEDUCA	Ministerio de Educación de Panamá (Ministry of Education)
MPI	Multidimensional Poverty Index
NGO	non-governmental organisation
OECD	Organisation for Economic Co-operation and Development

PENCYT	Plan Nacional Estratégico de Ciencia, Tecnología e Innovación (National Plan for Science, Technology, and Innovation)
PISA	Programme for International Student Assessment
R&D	research and development
SDG	Sustainable Development Goal
SIGI	Social Institutions and Gender Index
STI	science, technology and innovation
STEAM	science, technology, engineering, art and mathematics
STEM	science, technology, engineering and mathematics
SENACYT	Secretaria Nacional de Ciencia, Tecnologia e Innovacion (National Secretariat of Science, Technology and Innovation)
UN	United Nations
UNESCO	UN Educational, Scientific and Cultural Organization
UNDP	UN Development Programme
UNICEF	United Nations Children's Fund
WEF	World Economic Forum
WIPO	World Intellectual Property Organization

Key terms

Comarcas: In Panama's geopolitical structure, this is the denomination for special administrative regions designated for indigenous groups.

Bioeconomy: 'Bioeconomy' refers to the sustainable production, utilisation, conservation and regeneration of biological resources within integral ecosystems, fostering value chains in food, energy and industrial goods (ECLAC, 2023a).

Digital literacy: 'Digital literacy' is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, information and communication technologies (ICT) literacy, information literacy, and media literacy (UNESCO, n.d.).

Digital skills: This refers to the ability of a person to use information and communication technologies to achieve beneficial, high-quality outcomes in their everyday life.

Digital divide: This refers to the gap between individuals, households, businesses and geographic areas at different socioeconomic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities (UNESCO, n.d.).

Financial inclusion: 'Financial inclusion' means that individuals and businesses have access to and use affordable financial products and services that meet their needs, which are delivered in a responsible and sustainable way. Financial inclusion is a catalyst for achieving 7 of the 17 Sustainable Development Goals (SDGs) (World Bank, 2025a).

Gender Equality Seal: The 'Gender Equality Seal' is a global initiative celebrating public institutions and governments working towards gender equality. It measures progress against internationally validated standards and provides innovative tools and guidance. Participating institutions receive a Gold, Silver or Bronze Seal, recognising their progress and valuing equality. The programme works with national, regional and local institutions (UNDP, n.d.).

Meaningful connectivity: This refers to an individual or a business being able to engage in regular internet use, having an appropriate device, enough data, and a fast connection (World Wide Web Foundation, 2020).

1 Introduction and methodology

1.1 GEDSI context overview in Panama

Panama is a country of contrasts. While the economy is one of the most dynamic in the Latin American region, with gross domestic product (GDP) growth projections of close to 4% per year, there are recurrent disparities in access to opportunities and resources. The country remains one of the most unequal, with marked income, ethnic, geographical, gender and age gaps that highlight the challenges to achieving inclusive, lasting development with social justice and equity (World Bank, 2024b).

According to the most recent World Bank (2024b) 'Country Analysis' for Panama, significant inequalities affect specific regions, groups and populations whose rights to basic social services, income and infrastructure are not realised. These gaps constitute an obstacle to sustainable development, impacting the quality of life and access to opportunities of the most vulnerable social groups. Among the underlying causes of inequality in Panama are limited public investment, inadequate policies and cultural barriers that reinforce these inequities. The root causes identified for these inequalities include historical marginalisation, legislative gaps and the centralisation of resources, which together form a complex panorama of exclusion and inequality (ibid.).

Panama has signed and ratified various international instruments and protocols that strengthen and extend the promotion and protection of human rights, demonstrating the country's commitment at both the national and international levels. By being part of these treaties, Panama commits to fulfilling the obligations established in each one and to submitting to the scrutiny of the respective committees, which monitor the implementation of and compliance with human rights (ibid.). These are important tools for promoting a transition towards greater equity and social inclusion.

In terms of national legislation supporting gender equality, the National Women's Institute (Instituto Nacional De La Mujer; INAMU) was created through Law No. 71 in 2008. Law No. 4 of 1999 on Equal Opportunities for Women and its regulations prohibit all forms of sex-based discrimination, guarantee the protection of human rights, and condemn all types of violence against women. The Policy on Equal Opportunities for Women was established in December 2012. It recognises, prevents and sanctions all forms of violence against women in compliance with the obligations undertaken by the State through various laws, including Law No. 82 of 2013, which adopts measures for the prevention of violence against women. The Ministry of Women (Ministerio de la Mujer de Panamá) was created in 2003, and in 2024, the most recent Policy on Equal Opportunities for Women 2024–2034 (Plan de Igualdad de Oportunidades para las Mujeres 2024-2034) was published. In terms of broader social inclusion, it is worth highlighting Law No. 301 establishing Measures for the Comprehensive Development of the Indigenous Peoples.

1.2 About this report

This report provides updated data and analysis on key Panamanian gender equality, diversity and social inclusion (GEDSI) indicators, including poverty, education, health, digital inclusion,

gender-based violence (GBV), among others; showing data differences (where available) by key social groups (women, indigenous groups, migrants, people with disabilities) and disaggregated by regions/departments, where available. It also synthesises evidence on two topics of relevance for Panama where it is important to ensure a clearer GEDSI focus to improve related outcomes: the bioeconomy; and innovation and technology.

Data sources include secondary quantitative and qualitative literature, including global and government statistics, journal articles and grey literature (non-academic literature, including, for example, conference briefs, speeches, think tank papers, etc).

Analysis on the two topics is complemented by 15 key informant interviews (KIIs; see Annex 1) with representatives from various institutions, including State of Panama autonomous institutions (the National Secretariat of Science, Technology and Innovation (Secretaria Nacional de Ciencia, Tecnologia e Innovacion; SENACYT); Institute for Scientific Research and High Technology Services (Instituto de Investigaciones Científicas y Servicios de Alta Tecnología de Panamá AIP; INDICASAT); international organisations focused on gender issues (such as UN Women and the United Nations Development Programme (UNDP)); international research institutes, such as the Inter-American Institute for Cooperation on Agriculture (Instituto Interamericano de Cooperación para la Agricultura; IICA); and political representatives, among others.

This report does not aim to provide an in-depth analysis of the Panamanian GEDSI statistical landscape or the two topics of interest, but offers key insights to support the Foreign, Commonwealth & Development Office (FCDO) and relevant stakeholders to achieve GEDSI outcomes.

1.3 Limitations

The research team has found it difficult to contact stakeholders in key government ministries that would have relevant insights to inform the analysis – for example, the Ministry of Education (Ministerio de Educación de Panamá; MEDUCA); the Ministry of Agriculture (Ministerio de Desarrollo Agropecuario; MIDA), the Ministry of Environment (Ministerio De Ambiente; MiAMBIENTE) or the Council for Indigenous Peoples (Coordinadora Nacional de Pueblos Indígenas de Panamá; COONAPIP). In the case of the bioeconomy deep dive, as the sector is in its initial stages, particularly in terms of institutional support and strategic and policy development, there is limited information about it in relation to GEDSI in Panama. Conversely, this means there is a window of opportunity to ensure GEDSI issues are included in the policy agenda.

1.4 Structure of the report

Chapter 2 of the report includes an updated statistical profile of GEDSI in the country. The bioeconomy deep dive is presented in Chapter 3, while the deep dive on new technologies and innovation appears in Chapter 4. The report ends with recommendations for future research and for FCDO engagement in the two areas explored.

2 GEDSI statistical profile

To situate the research findings in the broader Panamanian context, this chapter presents data on key GEDSI indicators in Panama, including a comparison with the Latin America and Caribbean (LAC) region where available. It starts with a presentation of general gender equality data and then outlines available demographic data for key marginalised groups. The chapter then discusses how intersecting inequalities manifest in health, education and economic well-being, followed by political representation and gender based violence (GBV).

2.1 Overview

The indicators in Table 1 focus primarily on gender inequalities; intersectional inequalities are discussed in the narrative that follows. Table 1 provides a summary of results: yellow cells highlight the most favourable outcome in relation to each indicator.

Table 1 Key GEDSI indicators for Panama

Index / indicator	Panama	Region	Source
GEDSI indexes			
Gender Inequality Index	0.392	0.386	UNDP, 2022a
Women Peace and Security Index	0.757	0.626	Georgetown Institute for WPS, 2023
Social Institutions and Gender Index	15.2	20.9	OECD, 2023a
Gender Development Index	1.017	0.991	UNDP, 2024a
Human Development Index	0.82	0.763	UNDP, 2024a
Poverty			
Poverty headcount ratio at societal poverty line (% of population)	25.4	25.8	World Bank, 2023
Education			
Population with at least some secondary education (%, ages 25 and older)	Female 67%	Female 64%	UNDP, 2022a
	Male 66%	Male 64%	
Lower secondary completion rate (% of relevant of age group) (2021)	Female 93%	Female 76%	UNESCO, 2021; World Bank, 2024a
	Male 85%	Male 72%	

Table 1 Key GEDSI indicators for Panama (continued)

Index / indicator	Panama	Region	Source
Health			
Maternal mortality ratio (estimate per 100,000 live births of women aged 15–49) (2020)	50	88	World Bank, 2024a
Adolescent birth rate (births per 1,000 women aged 15–19) (2022)	68.5	52	UNDP, 2022a
Percentage of sexually active population using modern methods of contraception (women of reproductive age 15–49)	45%	55%	PAHO, 2024
Economic empowerment			
Labour force participation (+15 and older) (2022)	Female 50%	Female 52%	UNDP, 2022a
	Male 77%	Male 75%	
Gender gap in management positions (% of managers, men and women) (2022)	Female 46%	Female 38%	OECD, 2023a
(% of managers, men and women) (2022)	Male 54%	Male 62%	
Gender gap in top management positions (% of firms with a man or a woman as top manager) (2022)	Female 24%	Female 18%	OECD, 2023a
	Male 76%	Male 82%	
Women's political representation			
% of members of national parliaments, men and women (2022)	Female 23%	Female 34%	OECD, 2023a
	Male 77%	Male 66%	
Gender-based violence			
Prevalence of intimate partner violence in the last 12 months (% of women reporting)	16%	26%	OECD, 2023a
% of boys and girls aged 15–19 years who have been or are still married, divorced, widowed or in an informal union (2022)	Female 14%	Female 10%	OECD, 2023a
	Male 5%	Male 3%	
Women's deaths at the hands of their intimate partner or former partner (absolute number and rate) (2023)	15	3,897	ECLAC, 2024b
	Rate (per 10,000 women) 0.7	Rate (per 100,000 women) N/A	

Panama presents a mixed picture when analysing key GEDSI indicators compared to the regional averages. The Gender Inequality Index (GII) measures gender inequalities in three areas (reproductive health, empowerment, and economic activity), with a higher value representing a less gender equitable society. Panama has a GII value of 0.392, which is slightly higher than the regional average of 0.386 for LAC (UNDP, 2022a). The Women Peace and Security Index ranks countries based on 13 indicators under 3 dimensions: women's inclusion, justice,

and security. Countries score between 0 and 1, with 0 denoting the worst performance and 1 (or 100) denoting the best. Panama's score is 0.757, which is higher than the LAC region's average score of 0.626 (Georgetown Institute for WPS, 2023).

On the Social Institutions and Gender Index (SIGI)[1] Panama has a value of 15.2, which means that there is comparatively 'low' gender discrimination. Discrimination is rated 'very low' for the category 'discrimination in the family' (1.9); and discrimination is rated 'low' for 'restricted physical integrity' (25.2), 'restricted access to productive and financial resources' (20.6) and 'restricted civil liberties' (11.4) (OECD, 2023a).

A similar trend is observed in the Gender Development Index (GDI). The GDI is designed so that the closer a country's GDI value is to 1, the more gender equal it is. Among developing regions, the gender gap in human development is narrowest in the LAC region (UNDP, 2024a). Panama's GDI value is 1.017, compared to the LAC regional average of 0.991, using 2022 data. This places Panama in category 1 (5 being the worst and 1 being the best in terms of gender equality) (UNDP, 2024a). Likewise on the Global Gender Gap Index – which measures gender equality by assessing progress across four main areas: economic participation and opportunity; education; health and survival; and political empowerment – Panama's score was above the regional average. In 2022, Panama's Global Gender Gap Index score was 0.743, ranking it 9th in the region, with Latin America scoring 0.726 (WEF, 2022).

Even with Panama's high values, there are still gender disparities in the country – as will be detailed in the sections below. This is apparent if gender inequality is measured using a wider range of indicators. For example, the SDG Gender Index scores each country from 0 to 100, with 100 indicating full achievement, across 56 gender-related issues aligned with 14 of the 17 SDGs. Panama's performance on the 2022 SDG Gender Index showed a slight decline, scoring 64.4, compared to 65.4 in 2019 (Equal Measures 2030, 2024). This locates the country close to the 'very poor' performance and is one of the lowest scores in LAC. This is due to its low performance in indicators like Goal 17: Partnership for the Goals (130 out of 139 countries) or Goal 13: Climate Action (118 out of 139 countries).

Finally, in the case of the Human Development Index (HDI), Panama has a value of 0.82, higher than the regional average of 0.763 (UNDP, 2024a). This index summarises a country's average progress in key areas of human development: longevity and health; education; and standard of living. Higher HDI values indicate better overall development and quality of life. Panama occupies the 58th place in comparison with all the countries evaluated around the world.

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1 The SIGI uses 25 variables to measure discrimination in social institutions. These variables are grouped into four dimensions: discrimination in the family, restricted physical integrity, restricted access to productive and financial resources, and restricted civil liberties. The SIGI scale ranges from 0 to 100, with 0 being the best outcome and 100 being the worst. Countries are classified into five groups according to their SIGI score: (1) very low level of discrimination (SIGI < 20); (2) low level of discrimination (20 < SIGI < 30); (3) medium level of discrimination (30 < SIGI < 40); (4) high level of discrimination (40 < SIGI < 50); and (5) very high level of discrimination (SIGI > 50) (OECD, 2023a).

The remainder of the section is structured as follows. First, we present an overview of key data on socially and economically marginalised groups in Panama, including Afro-Panamanians, indigenous people, people with disabilities and migrants. Then we discuss how these inequalities manifest in health, education, poverty and economic empowerment in more detail. The limited available evidence on Panama's LGBT+ (lesbian, gay, bisexual, transgender, and other non-normative sexual orientations and identities) community is summarised in Box 1.

Overview of marginalised groups

Afro-Panamanians

In Panama, the Afro-descendant population totals 1,286,857 people, representing approximately 31.7% of the country's 4,064,780 inhabitants. Of this group, 645,215 are men and 641,642 are women (INEC, 2024). Afro-Panamanians have been included as a self-identified category in both the Population and Housing Censuses and Household Surveys since 2010 (UNFPA, 2023). Since then, self-recognition as Afro-descendant has increased significantly across all provinces and *comarcas,* leading to greater awareness and visibility of this population in national statistics (INEC, 2024). Changing trends in self-identification as Afro-descendant complicates, and may lead to over-estimates of, this group's level of well-being (see Section 2.7). Afro-Panamanians report widespread discrimination in all spheres of life (as detailed further in subsequent sections). These experiences are more pronounced in areas with higher Afro-descendant populations (UNDP, 2013).

Table 2 Afro-descendant population aged over 15 years old, by region

Province	Population
Bocas del Toro	20,761
Chiriquí	66,318
Coclé	79,055
Colón	127,607
Darién	12,604
Herrera	30,110
Los Santos	21,766
Panamá	419,657
Panamá Oeste	182,174
Veraguas	45,857

Source: Authors, based on INEC (2024)

Indigenous people

Panama is home to seven main indigenous peoples: Bri Bri, Buglé, Emberá, Guna, Naso Tjërdi, Ngäbe and Wounaan (MINSA, 2023b). Their ancestral territories are legally recognised through six *comarcas*, established under independent laws to uphold their constitutional rights. These *comarcas* are: Guna Yala, Emberá-Wounaan, Guna Madungandí, Ngäbe-Buglé , Guna Wargandí and Naso Tjër Di. Together, these *comarcas* span approximately 1.7 million hectares, providing indigenous communities with a degree of territorial autonomy (IWGIA, 2022). However, some of the territories are being affected by climate change, which is a growing problem for people living in islands along the coast of Panama (Cañada and Latourrette, 2025).

According to the 2023 Census, Panama's indigenous population totals 698,114 people, representing approximately 17.2% of the country's total population. Of the indigenous population, 345,822 are men and 352,292 are women, reflecting a nearly equal gender distribution (INEC, 2024).

Table 3 Population by indigenous group

	Bri Bri	Buglé	Emberá	Guna (Kuna)	Naso Tjërdi	Ngäbe	Wounaan
Indigenous group	766	23,898	51,657	112,319	5,568	444,878	10,634
Percentage (of total population)	0.02%	2.5%	1.2%	2.5%	0.1%	10.0%	0.2%

Source: Authors, based on INEC (2024)

People with disabilities

The total population with any mental or physical disability according to the 2023 Census in Panama is 173,079 (INEC, 2024). Disability is more prevalent in rural areas of Latin America (García Mora et al., 2021); equivalent data for Panama was not available. In Panama among indigenous groups, 17,802 individuals have disabilities, with 32% of them having physical disabilities, the predominant disability in this group. Additionally, the Afro-descendant population faces similar challenges, with 63,086 individuals having disabilities, 37% of whom have physical disabilities, also the predominant disability in this group (INEC, 2024).

Table 4 Type of disability by ethnic group

	Physical	Visual	Hearing	Cognitive	Mental	Visceral	Multiple
Indigenous	32%	20%	7%	10%	12%	7%	12%
Afro-descendant	37%	15%	6%	12%	11%	9%	10%

Source: Authors, based on INEC (2024)

Migrants

Panama has experienced a significant rise in migration, particularly since 2015, with 313,200 international migrants making up 7% of its population as of 2020 (Coppens, 2024). This puts pressure on its infrastructure in education, healthcare and social services. For example, by 2016, more than 24,000 migrant children were enrolled in schools (Loreto Correa, 2020). The trend intensified in 2021–2022, with Panama receiving a surge of refugees, particularly Venezuelans, as 151,582 migrants crossed the Darien Gap. This led to increased pressure on the country's healthcare, housing, education and legal assistance systems amid economic challenges following the COVID-19 pandemic (R4V, 2024).

Irregular migration through the Colombia–Panama border surged by 86% from 2021 to 2022, reaching 248,284, and continued to rise sharply in 2023, with 520,085 crossings (Coppens, 2024). Irregular migration then decreased in 2024 following the Panamanian Government's decision to close several migration centres along the Darien Gap route (Amerise, 2025; Quesada, 2025). By 2024, there was an estimated established population of 58,200 Venezuelans in the country (R4V, 2024). In early 2025, Panama witnessed a notable rise in reverse migration among Venezuelans, with many abandoning their northbound journey and returning southward. However, the lack of specific data filters in Panamanian records hinders the accurate tracking of this trend, complicating efforts to understand and address the underlying causes and implications of this movement of people at this stage (Guerra, 2025).

Box 1 Discrimination against LGBT+ people

There is limited statistical information on the situation of Panama's LGBT+ population. This box outlines data on the legal environment and changing social attitudes.

Panama's legal environment is only moderately supportive of LGBT+ rights. This is reflected in its Equality Index score of 38/100 and a Legal Rights score of 46/100, with both indicators measuring the current status of LGBT+ rights, laws and freedoms and public attitudes towards the LGBT+ community (Equaldex, 2023). For example, in 2022, Panama passed the General Adoption Law, which legally prohibits same-sex couples from adopting. Additionally, in 2023, Panama's Supreme Court concluded that same-sex marriage was not recognised as a constitutional guarantee or a fundamental human right, while only 12% of the population reported being in favour of same-sex marriage (Garralda et al., 2024).

However, recent studies reflect some shift in public perceptions regarding LGBT+ rights. According to a survey in 2023:

- 78% of Panamanians believe that same-sex couples should have certain legal protections, such as the right to visit their partner in the hospital or make legal decisions together
- 63.2% of respondents support allowing transgender individuals to update their identification documents to reflect their gender identity (Barahona, 2023).
- 70% of the population believe that the State has an obligation to provide legal protection for same-sex couples and their families, an increase in 16.9% from previous surveys conducted in 2020 and 2021 (Sumarse, 2023).

Over the past three years, the UN Free and Equal campaign in Panama has provided continuous support to LGBT+ organisations, which led to the establishment of the National Observatory of LGBT+ People within the Ombudsman's Office (Defensoría del Pueblo) in February 2023 (UNHR, 2023). The creation of this observatory reflects ongoing changes in how gender and sexual diversity issues are addressed in Panama, shaped by social movements and international developments on these topics. Public visibility of these struggles, along with the evolution of discourse in the media and everyday conversations, has helped bring attention to the rights and recognition of LGBT+ individuals.

The Observatory also highlights the ongoing challenges faced by the community, even as progress is made on legal and institutional fronts. For example, a significant number of name change requests from transgender people have been concentrated in Panama Centro, although some provinces have yet to process any such requests (Fundación Iguales, 2023), indicating a disparity in access to legal recognition across the country. This disparity may also be influenced by transgender people feeling safer in larger cities, where greater anonymity offers more protection, since LAC shows concerning trends accounting for 70% of global murders of trans people (TGEU, 2024).

Box 1 Discrimination against LGBT+ people (continued)

A regional survey conducted in Panama and four other Central American countries revealed that nearly half of LGBT+ respondents across the region had experienced discrimination based on their sexual orientation in the past year, and 30% reported knowing someone from the community who had died violently because of their sexual orientation (Dataccion, 2023). Though data on the perpetration of GBV against the LGBT+ community in Panama is scarce, there is emerging evidence on online violence. For example, in 2024, between 1 April and 1 July, during Panama's general elections and Pride Month, monitoring of LGBT+ discourse in the digital environment found that 92.7% of the monitored tweets contained hateful content, with 53.3% featuring explicitly anti-LGBT+ discourse (Fundación Iguales, 2024).

However, a total of 91.9% of respondents in a survey stated that they would be unlikely or definitely would not vote for a candidate who promoted violence or hate against the LGBT+ community (Sumarse, 2023). Furthermore, over the past 10 years, openly LGBT+ political leaders have begun to emerge, reflecting the early stages of a movement gradually gaining visibility and space in the political sphere (Caribe Afirmativo, 2015).

Regarding LGBT+ civil society in Panama, despite the dedicated efforts of activists and non-governmental organisations (NGOs), their influence remains limited due to the absence of protective legislation and the strong opposition from religious groups. While civil society has been instrumental in organising Pride events and advocating for same-sex marriage, their initiatives often lack support from government bodies and major Panamanian corporations. This lack of institutional backing underscores the constrained power and influence of LGBT+ civil society in effecting substantial legal and policy changes within the country (ReportOUT, 2023).

2.2 Health

In Panama, life expectancy at birth in 2023 was estimated at 78.6 years, slightly higher than the Latin America average of 75.8 years (ECLAC, 2024c). However, significant regional differences exist, particularly in indigenous areas, where life expectancy is lower. For example, in Guna Yala, it was estimated at 73.92 years (77.18 for women and 70.82 for men), while in Ngäbe-Buglé and Emberá-Wounaan, it was 72.9 years for both sexes (MINSA, 2023b). One factor that may contribute to the lower life expectancy in indigenous communities is limited healthcare coverage, as only 25.1% of Panama's indigenous population is covered by the Caja de Seguro Social (the Social Security Fund; Carrasquilla, 2023) compared to around 50% of the total population of the country (INEC, 2024), highlighting disparities in healthcare access. Other key health indicators for Panama in 2023 include a birth rate of 17.2 and a mortality rate of 5.3 per 1,000 people, both lower than the LAC averages of 14.0 and 6.6 per 1,000 people, respectively (ECLAC, 2024c).

Fertility trends in Panama have shown a steady decline over the years. The total fertility rate dropped from 2.3 children per woman in 2010 to 2.0 in 2023, reflecting broader demographic shifts (MINSA, 2023b). In comparison, the total fertility rate in the Latin America region was lower, at 1.8 in 2023 (ECLAC, 2024c). Despite this decline, indigenous communities continue to have higher fertility rates, influenced by cultural values that view large families as an economic asset – with men often migrating for work and children contributing as valuable labour for family land (Davis, 2010). For example, the number of children per woman reached 4.5 in the *comarca* of Ngäbé Buglé (INEC, 2024).

One factor that might be contributing to high fertility rates in some groups is the unmet need for family planning, which remains at 17.2% for women of reproductive age (15–49 years) (United Nations, 2024). This reflects gaps in access to reproductive health services and education, as seen in a study that included some of Panama's poorest areas along with other Mesoamerican countries, where limited access to quality care leaves young women's needs unmet. Some of the groups with the lowest use of contraceptives were those living over 30 minutes from a care facility and those not receiving family planning advice at a facility or from a community health worker (Rios-Zertuche et al., 2017).

Adolescent fertility remains a concern, with a rate of 68.5 births per 1,000 women aged 15–19 in 2022 – well above the Latin American average of 52.2 (World Bank, 2024b). While the percentage of adolescent mothers, compared to the overall population of that age, decreased from 15.4% in 2010 to 9% in 2023, challenges persist (ECLAC, 2024b). In part, this reflects patterns of early marriage/unions. In Panama, a total of 26.4% of women aged 20–24 were married or in unions before the age of 18 (UN Women, 2024), while 14% of Panamanian girls aged 15–19 have been or are still married, divorced, widowed or in an informal union, exceeding the regional average of 10%. Among boys, the trend is similar, with 5% in Panama compared to 3% in the region (OECD, 2023a).

In general, maternal health outcomes are significantly better in Panama, with a maternal mortality ratio of 50 per 100,000 live births, far lower than regional ratio of 88, demonstrating improved healthcare services for pregnant women (World Bank, 2024a). However, pregnancy remains a significant public health challenge, particularly among indigenous women, who face a mortality rate six times higher than non-indigenous women (UNFPA, 2018). Between 2018 and 2022, a total of 201 maternal deaths were recorded in the country, with indigenous *comarcas* accounting for a disproportionate share of these deaths – 28.9% in Ngäbe-Buglé (despite forming only 12.5% of the population), 3.9% in Guna Yala (compared to a 2.5% population share), and 0.5% in Emberá-Wounaan (MINSA, 2023b). One major factor contributing to these disparities is the geographic isolation of indigenous communities, which limits timely access to healthcare services (Davis, 2010). Other compounding factors include severe shortages of supplies and difficulties in implementing an intercultural approach in indigenous health centres, which is essential for integrating traditional beliefs with state healthcare (Hernández, 2020).

Since 2000, Panama has seen a significant decline in infant mortality, with the rate decreasing from 16.7 deaths per 1,000 live births in 2000 to 13.8 deaths in 2014 and 13.0 in 2022 (PAHO, 2024). This marks a major improvement in child survival over the past two decades. However, disparities remain, particularly among indigenous and Afro-descendant populations. The 2022 data indicates that indigenous *comarcas* continue to experience

higher infant mortality rates compared to the national average (MINSA, 2023b).[2] Census data from 2010[3] revealed ethnic and geographic disparities, as it was the first time specific data on Afro-descendant mothers had been gathered. This information was collected through testimonies from women of reproductive age (12 to 49 years) regarding the number of live births and infant deaths in the 12 months preceding the census (Solís and Rodríguez, 2022). Urban Afro-descendant communities reported 13.8 deaths per 1,000 live births, while non-Afro-descendant urban areas had a much lower mortality rate of 9.4. In contrast, rural Afro-descendants had a slightly lower death rate (13.6) per 1,00 live births compared to the rural non-Afro-descendants' rate of 12.4 deaths per 1,000 live births.

Some studies highlight discriminatory and racist practices in healthcare that impact service quality, and emphasise the need to integrate African-rooted knowledge and practices still present in Latin America (ECLAC, 2017; Costa et al., 2022). General recommendations include, for example, integrating intercultural health training and anti-racism tools into healthcare workforce development (Pino et al., 2020) and across health sector strategies and operations (WHO, 2022). Participatory approaches involving community approaches in shaping change also hold promise (TAIBU Community Health Centre, 2020).

Sexual and reproductive health in Panama faces challenges, particularly in contraceptive use and HIV (Human Immunodeficiency Virus) prevention. As shown in Table 1, the percentage of the sexually active population using modern methods of contraceptive use is 45% for women of reproductive age of 15–49 years old (PAHO, 2024). Though comparative data for different ethnic groups was not available for the present research, a focused survey of Afro-Panamanian women in 2021 found that 58.45% did not use contraceptives, while 22.37% did, with the highest use among those aged 40 to 49. A total of 58.45% had received counselling on sexual and reproductive health, with the 40–49 age group being the most informed (Solís and Rodríguez, 2022).

Meanwhile, HIV cases have risen, with new infections increasing from 1,400 in 2015 to 1,500 in 2023 (UNAIDS, 2024). HIV rates are nearly double in men compared to women, with diagnoses increasing due to expanded testing. Key groups, such as men who have sex with men, transgender people and sex workers, have prevalence exceeding 1% (MINSA, 2023a). Lack of access to healthcare is reported as one of the largest barriers to controlling the outbreak in indigenous communities (McCleland, 2018). Additionally, the total number of people living with HIV grew from 23,000 in 2015 to 30,000 in 2023 (UNAIDS, 2024). There is a continuing tendency that some studies originally showed in the early 2000s for some indigenous communities in Panama to have a prevalence of HIV six times higher than in the general population (Ponce et al., 2017).

2.3 Education

In education, Panama shows higher rates of secondary education completion than the regional average. Among individuals aged 25 and older, 67% of Panamanian women have attained at least some secondary education, compared to 64% in the region; the corresponding figures for men are 66% for Panamanian men against a regional average of 64% (UNDP, 2022a). Lower secondary completion rates follow a similar

2 Data is disaggregated by region rather than social group, so is not presented here.
3 We could find no data from the 2023 Census that was disaggregated in a comparable way.

pattern, with lower secondary completion at the national level at 93% for females and 85% for males. However, disparities by location and poverty are more marked: rural lower secondary completion rates are 79% against 93% in urban areas, and 75% among the poorest Panamanians while they are 99% among the richest (UNESCO, 2021). This compares to a regional level of lower secondary completion of 76%, with 72% of females completing lower secondary education in the region (World Bank, 2024a). These figures suggest Panama has a slight advantage in educational attainment from a regional perspective, though small gender disparities persist.

The average years of schooling in Panama have increased significantly, rising by 33.8% between 2000 and 2019 to reach 10.5 years (PAHO, 2024). However, disparities persist, particularly for people with disabilities. Across the region as a whole, they complete an average of only 4.8 years of schooling, compared to 7 years for those without disabilities. In Panama, this gap is especially pronounced, with a difference of 4 years (UNESCO, 2018). Regional data indicates that children with disabilities are four times more likely to be out of primary school than their non-disabled peers and face a significantly lower probability of attending school at all educational levels. Illiteracy is five times higher among people with disabilities (22.1% versus 4.3%) (García Mora et al., 2021). However, we could not find similarly disaggregated data for Panama.

Despite overall progress, educational exclusion persists among rural and indigenous populations. In rural areas, the percentage of children (aged 5–17 years) out of school across all levels is 10%, more than double the 4% in urban areas (INEC et al., 2024). Indigenous children are even more affected, with an out-of-school rate of 15%, compared to 4.5% for Afro-descendant and other ethnic groups. Grade repetition and over-age enrolment are also more common among indigenous youth, with more than 40% of those aged 8–19 falling behind in school (UNICEF, 2022c). This is due to their schools struggling with limited pedagogical resources, inadequate teacher training, and negative perceptions about students' abilities and family commitment (UNICEF, 2022a; 2022b). Additionally, children in single-parent households – where 90% of caregivers are women, and Afro-descendant and indigenous women are over-represented – face further educational barriers because they often need to start working at an earlier age (Freire et al., 2015).

Adolescent pregnancy exacerbates these differences, as 70% of indigenous young mothers are out of school, compared to 49% of Afro-descendant and 48% of non-Afro, non-indigenous mothers (INEC et al., 2024). More broadly, gender disparities in education and employment persist, with 21.4% of young women in Panama neither studying nor working, compared to just 9.17% of young men (World Bank, 2024b), largely as a result of teenage pregnancies (SENACYT, 2010).

More detailed disaggregated data is available for Afro-Panamanians than for other ethnic groups. Afro-descendant students generally achieve better educational outcomes in Panama than the population as a whole. Their average schooling years stand at 10.1 and their school enrolment rate is 92.2% (UNFPA, 2023). They also have higher secondary school attendance, peaking at 98% in 2019 (Freire et al., 2022). Afro-descendant women in Panama have an average of 11 years of schooling, nearly a year more than the rest of the population (UNFPA, 2023). Completion rates for upper secondary education remain low, and only 24% of Afro-Panamanians have completed secondary

education, compared to 19% of the non-Afro-Panamanian population. At the university level, 14% of Afro-Panamanians attain a degree, slightly lower than the 18% among non-Afro-descendants (Freire et al., 2022). Quality education has been a key factor in the social advancement of Afro-Panamanian women, with those accessing good quality education achieving upward mobility, while those without access face continued social decline (UNDP and INAMU, 2020).

2.4 Poverty, employment and economic empowerment

Panama's poverty headcount ratio at national poverty lines[4] was 21.8% in 2021 (World Bank, 2023). In indigenous territories, poverty levels increased from 2019 to 2021, with the comarcas of Guna Yala, Emberá-Wounaan and Ngäbe-Buglé experiencing significant rises in both general and extreme poverty rates (MINSA, 2023b), over a period when overall poverty rates declined. The rate for indigenous people was more than four times higher than for non-indigenous Panamanians in 2021 (ECLAC, 2023a).

Panama's Multidimensional Poverty Index (MPI)[5] showed a significant decrease from 18.4% in 2019 to 14.8% in 2022: a reduction of 3.6 percentage points. The average number of deprivations faced by those in poverty also declined, with the intensity decreasing from 42.4% to 41.5%. The MPI itself saw a reduction of 21.9%, from 0.078 in 2019 to 0.061 in 2022. Even with this improvement, there were still 689,106 people and 114,898 households in multidimensional poverty in 2022 (UNDP and Government of Panama, 2024). Poverty, in both its income and multidimensional forms, affects children aged 0-17 disproportionately, particularly in rural areas with high levels of deprivation (Anthropo Studio, 2018). Recent trends show a decrease in multidimensional poverty overall, though the gap between low- and high-poverty areas is widening (UNDP and Government of Panama, 2023). None of the MPI data is disaggregated by gender or ethnic group, nor could we find explanations for these trends.

In the region, there is a clear trend of women being increasingly over-represented in households living in poverty, as seen in the femininity index of poverty and extreme poverty.[6] In 2002, in LAC overall there were 105 women for every 100 men living in poor households, a number that rose to 118 women for every 100 men in 2022. In Panama, the corresponding figure was similar at 117.6 (United Nations and RCP LAC, 2024). Additionally, extreme poverty rates in urban and rural areas in 2022 reveal a notable gender disparity, with women facing higher levels of poverty in both settings compared to men (ECLAC, 2023a).

While rural women across the region are more likely to experience multidimensional poverty, the gap between rural and urban areas varies

4 The poverty headcount ratio at national poverty lines represents the percentage of a population living below a country's specific poverty line, which is determined by the national government to reflect local economic and social conditions.

5 The Multidimensional Poverty Index (MPI) is a measure of acute poverty that goes beyond income. It identifies people as 'multidimensionally poor' if they are deprived in at least one-third of the 10 indicators across health (nutrition and child mortality), education (years of schooling and school attendance), and living standards (cooking fuel, sanitation, drinking water, electricity, housing and assets) – equally weighted – that the MPI measures (Alkire et al., 2022).

6 The femininity index of poverty and extreme poverty indicates the extent to which poverty and extreme poverty affect women disproportionately compared to men.

at the regional level. Panama's gap is one of the biggest in LAC, with 22.9% of urban women facing multidimensional poverty compared to 64.2% of rural women (Madrigal et al., 2023). Additionally, the proportion of urban women without their own income in Panama is higher at 20.3%, compared to 7.2% for men (ECLAC, 2024b).

Households with people with disabilities also experience higher levels of multidimensional poverty. Across the region, 23% of these households live in poverty compared to 16% of those without disabilities. In Panama, the multidimensional poverty rates are higher in rural areas (46.8% of households with a person with a disability, compared to 38.9% of households without a person with a disability); however, the disparity is more pronounced in urban areas (23.9% of households with a person with a disability, compared to 12.7% of households without a disability) (García Mora et al., 2021).

As noted previously, indigenous populations also face stark economic disparities, as indigenous men earn, on average, 57% less than their non-indigenous counterparts, while indigenous women earn 70% less (Freire et al., 2015). Additionally, the indigenous population in Panama has increasingly migrated to urban areas in recent years because of development projects, forcing them into more vulnerable situations (MINGOB, 2020).

Economic empowerment

Economic empowerment indicators reveal a nuanced scenario. Labour force participation among women in Panama stands at 50%, slightly lower than the regional average of 52%, while male participation reaches 77%, exceeding the regional figure of 75% (UNDP, 2022a). One contributing factor is likely to be that women and girls aged 15+, from all population groups, spend significantly more time on unpaid care and domestic work, dedicating 18% of their time to these tasks compared to just 7.6% for men (UN Women, 2024).

With respect to economic leadership, women in Panama hold 46% of management positions, a notably higher rate than the regional figure of 38%, suggesting greater workplace inclusion (OECD, 2023). This trend extends to top management positions, where 24% of firms in Panama have a female top manager, compared to just 18% regionally, while 76% are led by men, lower than the regional figure of 82% (OECD, 2023a). These figures suggest that while Panama has stronger female representation in management than the regional average, women still face challenges in reaching top executive roles.

Despite having more years of education than both their male counterparts and the general female population, Afro-Panamanian women have fewer job opportunities and lower wages (UNFPA, 2023). In Panama, Afro-descendant workers earn more than Mestizos[7] workers with a primary education, but those with university degrees earn, on average, 11% less than their Mestizo counterparts (World Bank, 2018). Most territories with predominantly Afro-descendant populations, like Panamá, Colón, Coclé and Panamá Oeste (INEC, 2024), exhibit high levels of inequality and low development (Hamilton, 2021). This leads to Afro-Panamanians being over-represented in informal and precarious work, particularly in agriculture, manufacturing and hospitality, with household responsibilities driving Afro-Panamanian women, in particular, to these sectors (UNDP and INAMU, 2020). A survey of

7 A person of mixed race, especially one having Spanish and indigenous descent.

Afro-Panamanian women found that 50% of those who answered questions on discrimination had experienced it at work (Rodríguez et al., 2021).[8]

People with disabilities in Panama face significant, intersecting challenges in the labour market. Employment rates for individuals with disabilities are notably lower compared to those without, with 55.1% of people with a disability aged 25–34 and 59.1% of those aged 35–54 employed, compared to 69.4% and 72.0% for their non-disabled counterparts (Berlinski et al., 2021). The *Disability Data Report* (Mitra and Yap, 2021) shows that in most countries worldwide, adults with functional difficulties are over-represented in informal employment. In Panama, among employed people with disabilities (in both the formal and informal sectors), census data shows that 16.4% work in service jobs, 11.8% as professionals, 7.6% as technicians and 6.8% in office positions (INEC, 2024).

Men with disabilities have a higher labour force participation rate (26.5%) than women (14.4%) (INEC, 2024). Even when employed, women with disabilities often face higher barriers to entry and are over-represented in informal work, while men can access employment with lower education levels. Mirroring broader patterns, societal expectations and caregiving responsibilities limit the access of women with disabilities to paid work. For example, nearly 70% of female heads of households with disabilities in the region remain inactive due to unpaid domestic responsibilities (García Mora et al., 2021).

Contributing factors include poverty, lower education levels and societal discrimination. Among the employed population with disabilities in Panama, 21.7% have only completed primary education, compared to 24.3% of the general workforce who have at least finished secondary school. Furthermore, just 7.8% of employed individuals with disabilities have more than 4 years of higher education, whereas this figure is nearly double (14.8%) for the total workforce (Government of Panama, 2020). Among those employed, men with disabilities are more likely to have completed secondary education, while women with disabilities show a slightly higher rate of university education completion (INEC, 2024).

Additionally, many people with disabilities, particularly those from indigenous communities like the Ngäbe and Buglé, work in hazardous conditions, such as plantation labour, where they face chronic exposure to toxic pesticides (García Mora et al., 2021). While self-employment offers some flexibility, limited access to credit and business training makes entrepreneurship difficult for many individuals with disabilities. The same report states that globally, people with disabilities make up 15% of the population but account for only 0.5% of microfinance institution clients, reflecting systemic barriers to economic inclusion.

Although we could not find comparative data on different groups' experiences of sexual harassment at work, a focused study of Afro-Panamanian women reports that 27.4% had experienced sexual harassment in the workplace, such as sexual jokes or requests for sexual favours, further compounding the challenges they face. Race-based discrimination in both the public and private sectors is often reported and Afro-Panamanian women face additional challenges, including limited career advancement opportunities, lower wages, and physical and psychological abuse (Solís and Rodríguez, 2022).

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8 More than 50% of those surveyed declined to answer questions on experiences of discrimination.

2.5 Political representation

In the realm of political empowerment, political representation remains an area where Panama lags behind – although with a gradual evolution in recent years. Women hold just 23% of seats in the national Parliament, well below the regional figure of 34%, while men dominate with 77%, compared to 66% regionally (OECD, 2023a; UN Women, 2024). Furthermore, women elected to office do not represent the country's diversity – for example, as of 2021, only one congresswoman identified as Afro-descendant (Solís and Rodríguez, 2022) and as of 2022, only one indigenous female deputy (IWGIA, 2022). In 2022, women occupied 31.2% of ministerial positions (World Bank, 2024b), despite the fact that in internal party elections and primaries, candidate nominations must ensure that at least 50% of the positions are designated for women.

Furthermore, women's representation in local government in Panama remains significantly lower than the regional average. In 2021, only 14.8% of elected mayors in Panama were women, compared to 15.4% across Latin America. The gap is even wider in other local government roles; in 2020, women held just 9.0% of seats in Panama's local governments, far below the regional average of 27.2%. Similarly, in 2021, only 9.9% of city councillors in Panama were women, while the Latin American average stood at 32.7% (ECLAC, 2025). These figures highlight persistent gender disparities in political representation at the local level.

Although we could not find detailed data on Afro-Panamanian women's political representation, a UNDP study highlights the intersecting discrimination they often face in social movements. Despite being active in these movements, they are often excluded from leadership positions, political roles and budgeted projects. Their specific needs and concerns are often overlooked, with recognition limited to matters of Afro-Panamanian identity and national diversity (UNDP and INAMU, 2020).

2.6 Gender-based violence

Gender-based violence remains a significant issue in Panama, with disturbing statistics highlighting the vulnerability of women, particularly women with disabilities, indigenous and Afro-descendant women, and those living in poor and socially excluded neighbourhoods (Rodríguez et al., 2021). This section reports the available data on femicide,[9] intimate partner violence and sexual violence. It also briefly covers vulnerability to human trafficking.

From 2014 to 2024 the country registered 244 femicides and 135 attempted femicides (Defensoría del Pueblo, 2025). In 2023, 15 femicides were recorded, a rate of 0.7 per 10,000 women, one of the lowest rates in LAC (ECLAC, 2024a); in 2024, data from reported cases suggests this number rose to 23 femicides (Defensoría del Pueblo, 2025).

Domestic violence is also prevalent, with 15,536 cases reported in 2024, a slight decrease from 17,521 in 2023 (ibid.). In terms of prevalence rates, Panama reported 16% of women experiencing intimate partner violence in the last 12 months, significantly lower than the regional figure of 26%, indicating

9 Femicide, or feminicide, is defined as the killing of women and girls because of their gender. It is a form of gender-based violence, and is recognized as the most extreme manifestation of systemic violence and discrimination against women and girls.

better conditions or potentially lower reporting rates (OECD, 2023a). Violence is still embedded in children's experience in Panama, as 45% of children aged 1–14 years have experienced physical punishment and/or psychological aggression at home by caregivers, with 42.8% of females and 46.8% of males affected (UNICEF, 2014).

Data shows an increase in reported incidents of sexual violence over 2023–2024, with 6,143 cases reported in 2024, compared to 3,327 in 2023 (Defensoría del Pueblo, 2025).[10] Some disaggregated data is only available for the Afro-descendant population thanks to targeted studies, though reports also recognise that indigenous women are particularly vulnerable to sexual violence, followed by those with disabilities (Solís and Rodríguez, 2022). The issue of sexual violence among Afro-descendant women is also concerning, as surveys indicate that while more than 73% of women reported that their first sexual experience was consensual, 6.85% stated it was forced. Additionally, some women reported pressure from friends or family to engage in sexual activity (UNFPA, 2021).

While school is seen as a refuge from street violence, it has become a place where bullying, physical aggression, drug use and armed violence occur (Anthropo Studio, 2018). Moreover, bullying and school violence are widespread challenges affecting students of all ages. In-depth studies have probed the vulnerability of Afro-Panamanian girls and young women. Many of them report experiencing fear and insecurity in their school environments, with 41.55% afraid of sexual assault, 38.81% fearing physical attacks, and 18.72% stating they had been followed or watched when leaving school (UNFPA, 2021). These alarming figures highlight the deep-rooted discrimination and gender-based violence many students face, which not only affects their well-being but also impacts their school attendance and social integration. In addition, Afro-Panamanian men report widespread discrimination and harassment, especially from the National Police, reflecting negative intersecting gendered and racial stereotypes of young Black men (UNDP, 2013).

The risks faced by women in poor and socially excluded neighbourhoods include child sexual exploitation, physical violence and sexual assault, with marginalised groups such as girls, older women and those living with disabilities being the most affected (Rodríguez et al., 2021).

Regarding the digital realm, a survey taken in seven countries in Central America, showed that more than 70% of the total respondents in Panama suffered online harassment (Briancesco Arias, 2021). Furthermore, an analysis of the 2024 election campaign showed that women candidates suffered online violence related to their gender (UNDP, 2024e).

With that in mind, in 2024, Panama became the third country in Latin America to adopt the 'Ley Olimpia', a legislative framework that criminalises digital sexual violence, including the non-consensual distribution of intimate images, videos or audio – whether real or digitally altered (Rangel, 2024). This law, inspired by the activism of Mexican advocate Olimpia Coral Melo, addresses the growing threats posed by digital technologies, such as artificial intelligence (AI), which can be exploited to create and disseminate intimate content without consent (International IDEA, 2024). The enactment of this law is crucial

10 It is not clear whether this represents an increase in reporting or in the number of incidents, or both.

in Panama, where the absence of prior legal protections left victim-survivors of digital sexual violence without recourse, often leading to psychological harm, social stigma and impunity for perpetrators (Arroyo, 2024). By formally recognising and penalising these offences, the Ley Olimpia represents a significant advance in safeguarding individuals' rights and dignity in the digital realm, particularly for women and LGBT+ communities, who are disproportionately affected by such violations.

Meanwhile, migrants are also affected by gender-based violence, often facing heightened risks of exploitation and abuse. A report published in 2020 shows that migration has also been linked to human trafficking and exploitation, with 84 cases of sexual exploitation reported in 2016, primarily affecting Venezuelan and Colombian women, along with 33 cases of victim-survivors of male trafficking, all of whom were Colombian. While cases declined after 2017, vulnerable women, especially Colombians, continued to be trafficked (Loreto Correa, 2020).

According to an International Federation of the Red Cross and Red Crescent Societies (IFRC) report (Coppens, 2024), 18% of transit migrants experienced violence or abuse during their journey, highlighting the humanitarian challenges along this migration route. Furthermore, 71% of the pregnant women interviewed by the International Organization for Migration (IOM) reported not receiving any perinatal care, and 53% did not receive maternal and childcare services while traveling from Panama to Mexico (United Nations and RCP LAC, 2024). As mentioned, the impact of recent policies of the United States (US) administration on this issue are not yet known, and can only be gauged when more data is available.

2.7 Data gaps and challenges

Analysing Panama's data through an intersectional lens is challenging due to the lack of disaggregated information. The 2023 Census results were released in December 2024, but the data presented does not fully cover the possible range of intersectionalities, leading to the gaps detailed in this section. Because of this, we have relied on reports from international organisations for a deeper understanding of the situation of marginalised groups. Overall, a more inclusive approach to data collection, considering diversity and specific vulnerabilities, is essential for designing effective public policies that can improve the lives of all women, indigenous peoples, people with disabilities, sexual minorities and other marginalised populations, particularly those in rural or disadvantaged situations.

Gaps

The following key gaps were identified:

- Lack of comparative data on different ethnic groups compared with the general population. Focused studies of Afro-Panamanians and indigenous people are more common.
- Lack of data allowing disaggregation by rural and urban location (most geographical disaggregation is by province).
- There is very limited data on Panama's LGBT+ population.

Specific issues

Data on people with disabilities: The term 'disability' in surveys could have influenced response rates, especially in cultures where it carries stigma or is understood differently across age groups and societies (Berlinski et al., 2021). Similarly, people with invisible or under-

represented disabilities, such as intellectual or psychosocial impairments, often remain overlooked, particularly among marginalised groups like women, indigenous people and migrants (UNPRPD, 2021), those in detention or rural areas (Mitra and Yap, 2021). In general, data on disability is often inconsistent, hindering accurate measurement of poverty levels among these populations (García Mora et al., 2021).

Data on Afro-Panamanians: Afro-Panamanians have expressed concerns that national statistics underestimate their numbers and misrepresent their economic situation. Many believe that in population census and surveys, only the wealthiest and most empowered individuals identify as Afro-descendant, leading to an overestimation of the group's well-being. Recent efforts, such as including the '*moreno*[11]' variable in household surveys, have increased the recognition of the Afro-Panamanian population (UNDP, 2013; UNFPA, 2023). Improved question design and census implementation would help achieve more accurate representation and, in particular, would help capture the diversity of Afro-Panamanian women across different cultures, social classes and regions (UNDP and INAMU, 2020).

An intersectional approach to gender: Gaps on women's experience are not only present in areas like labour market indicators and gender-based violence but also in the specific needs of marginalised groups (UN Women/ONU Mujeres, 2020b; Ramos, 2023). Women with disabilities, particularly those in rural areas, remain under-represented in consultations and data collection efforts (CAF and UNDP, 2023). This lack of intersectional data further complicates the creation of policies and programmes that adequately address the unique challenges faced by these women (Ramos, 2023).

11 '*Moreno*' refers to dark skin.

3 Bioeconomy

3.1 Introduction

'Bioeconomy' refers to the sustainable production, utilisation, conservation and regeneration of biological resources within integral ecosystems, fostering value chains in food, energy and industrial goods (ECLAC, 2023b). The concept of bioeconomy used in Latin America includes the following elements (IICA, 2024a):

- conservation – valuing biodiversity and the sustainable use of biomass
- incorporation of science, technology and innovation, including local, ethnic and ancestral knowledge
- cascading value addition and circularity;
- promotion of environmental sustainability (positive nature), and
- social inclusion in rural territories and local-indigenous communities through bioeconomic developments at source.

Given its rich biodiversity and strategic location, Panama has significant potential to develop a thriving bioeconomy. However, the sector has remained underdeveloped, including with regard to ensuring inclusive and equitable engagement of marginalised groups such as indigenous communities, Afro-descendant populations, rural communities, women and other vulnerable groups. These groups mainly participate mainly in the early, lower-value stages of bioeconomic value chains (raw material collection and extraction, basic agricultural and livestock production, primary drying and storage, manual labour in traditional methods without technological advancements, etc.). This reflects structural barriers such as the low level of education, limited infrastructure, inadequate access to technical and business training, exploitation by market intermediaries, and exclusionary institutional policies (KII, INGO). These challenges hinder vulnerable groups' ability to fully benefit from bioeconomic opportunities (KIIs, INGO; Academic; ECLAC, 2023b; IICA, 2024a; SENACYT and UNDP, 2023; MIDA, 2023; Meza and Rodríguez, 2022; Ólives, 2024).

3.2 Current context of bioeconomy in Panama

Panama's Strategic Plan 2025–2029 (Plan Estratégico 2025–2029) (Government of Panama, 2024a) incorporates bioeconomy within its sustainability agenda, though specific mechanisms for inclusive participation remain underdeveloped (Government of Panama, 2024b). This strategic plan is based on four pillars as follows:

1. **Boosting economic sectors for growth and job creation:** As part of this strategy, Panama is prioritising the adoption of precision agriculture[12] techniques, biotechnology and value chain innovations to enhance food security, productivity and the resilience of the agricultural sector in response to climate change

12 Precision agriculture (PA) is a farming management concept based on observing, measuring and responding to inter- and intra-field variability in crops. PA is also sometimes referred to as 'precision farming', 'satellite agriculture', 'as-needed farming' and 'site-specific crop management (SSCM)'. Precision agriculture uses information technology (IT) to ensure that crops and soil receive exactly what they need for optimum health and productivity. This also ensures profitability (see: www.techtarget.com/whatis/definition/precision-agriculture-precision-farming).

(ibid.). This is crucial given that agriculture and agro-industrial sectors remain fundamental for rural employment and economic diversification (USDA, 2024; IICA, 2024b).

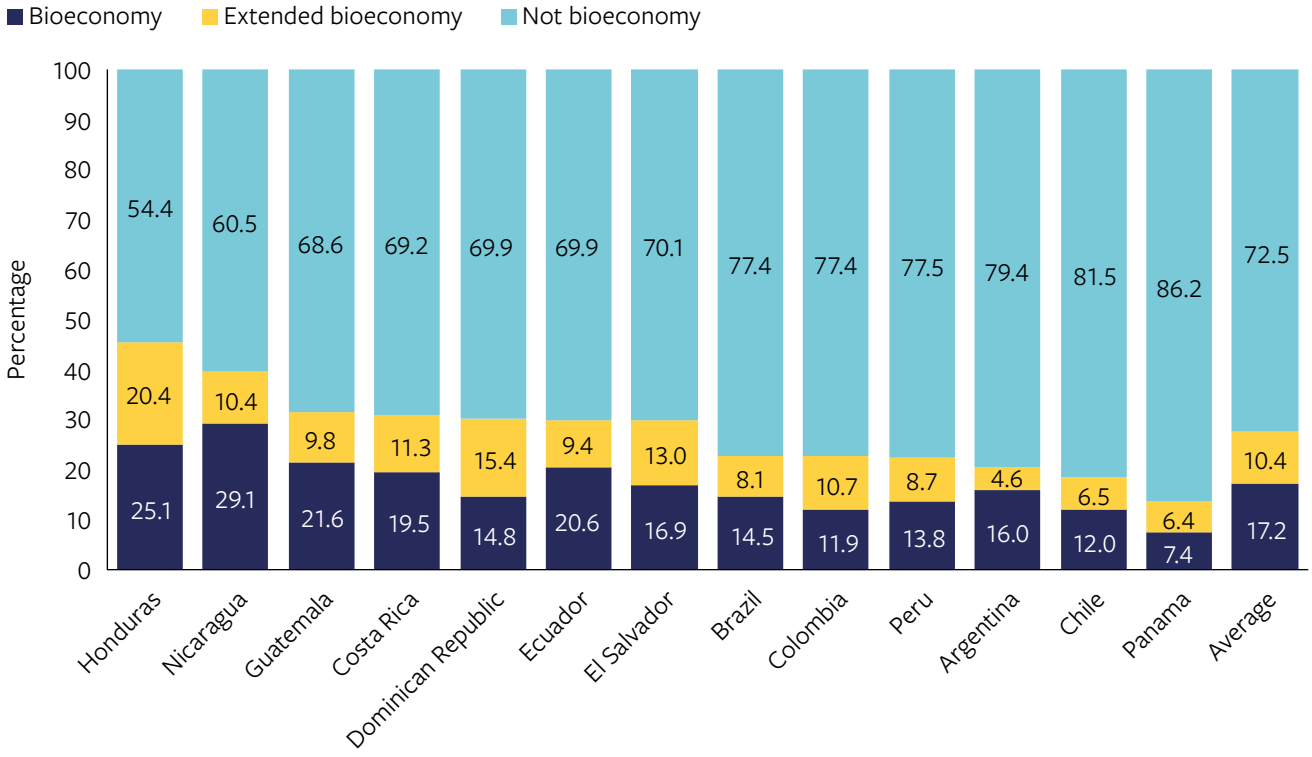
2. **Ensuring access to quality education and services**: Innovation in bioeconomic sectors requires a trained workforce, particularly in rural and indigenous communities. Strengthening institutional support for agritech and fostering the adoption of emerging technologies are key priorities for increasing participation in bio-based industries and enhancing economic inclusion (Government of Panama, 2024b).
3. **Strengthening governance and institutions:** The institutional framework for bioeconomy remains fragmented given that it is multisectoral, involving agriculture, forestry, the environment and health. Strengthening governance mechanisms to integrate sustainable agricultural and industrial policies with bioeconomic strategies will be essential for ensuring equitable participation and efficient market access (Government of Panama, 2024b; Global Climate Action NAZCA, 2024).
4. **Promoting environmental sustainability:** The bioeconomy is linked directly to sustainability policies and responsible resource management. The government has recognised the need for adaptation to climate change challenges, ensuring that bioeconomic development aligns with national environmental commitments and long-term sustainability objectives (Government of Panama, 2024b; MiAMBIENTE, 2024).

The Strategic Plan articulates the ambition for the economy to diversify and grow using its bioeconomy potential. However, there are no explicit links in the strategy that highlight the bioeconomy as an engine to promote social inclusion and reduce the marginalisation of vulnerable communities, particularly women, indigenous peoples and the Afro-Panamanian population, who could potentially benefit from this new area of economic opportunity – as we will see in the next section. The Government's approach to bioeconomy nonetheless aligns with broader socioeconomic benefits, including employment generation, rural development and economic diversification (Government of Panama, 2024b). Thus, ensuring the successful integration of marginalised communities into bioeconomic markets is not only a social equity concern but also a key driver for national economic growth, sustainability and long-term resilience.

Panama's bioeconomy is still emerging, with bioeconomic products[13] accounting for only about 12% of national production and 4% of total exports – one of the lowest proportions in Latin America (ECLAC, 2023b). As Figure 1 illustrates, Panama has the lowest gross value of production in bioeconomy of 13 countries in Latin America and the Caribbean studied by ECLAC (2023b). Despite its potential, the country remains highly dependent on agricultural imports, totaling approximately $879 million annually – due in part to insufficient biotechnology infrastructure and limited local production capacity (USDA, 2023). It is estimated that around 66% of Panama's agricultural imports originate from the United States, where yellow corn, wheat and 'paddy' rice are the main products sourced (Olson, 2024; USDA, 2023; International Trade Administration, 2023).

13 'Those wholly or partly derived from biological resources (like plants, animals, and microorganisms) and include a wide range of sectors, from food and textiles to chemicals and construction materials, aiming to reduce reliance on fossil fuels and promote sustainability' (Biopro, 2025).

Figure 1 Percentage of bioeconomy in aggregate supply transactions, in gross value of production: 13 countries in Latin America and the Caribbean (2018 data)



Source: ECLAC 2023b: 30

While the Government of Panama has enacted key policies – such as Law 48 (2002), which established the National Commission of Biosafety for GMOs (Genetically Modified Organisms) (Comisión Nacional de Bioseguridad para los Organismos Genéticamente Modificados) to regulate biotechnology and mitigate environmental risks, and the State Agrifood Policy Act (2023), which aims to ensure food security and promote sustainable agricultural practices – there remain critical gaps in implementation (USDA, 2023). Participation in international initiatives, such as the Bonn Challenge and KoLFACI (Korea-Latin America Food and Agriculture Cooperation Initiative)[14] highlight Panama's commitment to land restoration and climate change mitigation. However, Panama does not currently have a bioeconomy policy framework or strategy, and the considerations of such a framework to date still lack mechanisms for inclusivity and equitable access to opportunities (SENACYT and UNDP, 2023).

In an effort to articulate the vision and the plan of action to develop the bioeconomy in Panama over the next decade, the National Secretariat

14 'The Bonn Challenge is a global goal to bring 150 million hectares of degraded and deforested landscapes into restoration by 2020 and 350 million hectares by 2030' (Global Climate Action NAZCA, 2024). The KoLFACI Cooperation Initiative is a regional project that aims to promote and increase sustainable production of coffee in nine countries (Panama included). The Panamanian Government has been praised for its efforts and active participation in project activities (MIDA, 2024).

for Science, Technology and Innovation (Secretaria Nacional de Ciencia, Tecnologia e Innovacion; SENACYT) is currently engaged in developing a national strategy for bioeconomy. It is in the process of creating a roadmap for this in collaboration with the Inter-American Institute for Cooperation on Agriculture (Instituto Interamericano de Cooperación para la Agricultura; IICA), following a series of milestones that will lead to the successful development of the strategy. These include:

- **mapping** what has been done in Panama in relation to the bioeconomy, which in many cases is not classified as such due to a lack of knowledge on the part of those involved (including many companies, researchers and bioeconomy projects who may not know that what they are doing is 'bioeconomy')
- **identifying success stories**
- **identifying capacity gaps**
- **reviewing and developing regulations** and standards
- **consulting with the different actors involved** to ensure that it is a multi-sector and multi-actor strategy (KII, SENACYT).

Other Latin American countries have already developed bioeconomy policies or strategies that address important issues of inclusion that Panama can build on as it develops its own. Table 5 outlines three of the most salient examples from the region.

Table 5 GEDSI criteria in bioeconomy strategies from the Latin American region

Country and name of strategy	Emphasis on gender equality and social inclusion
Colombia Bioeconomy for a Living and Diverse Colombia: Towards a Knowledge-Driven Society (Bioeconomía para una Colombia Potencia viva y diversa: Hacia una sociedad impulsada por el conocimiento) (Government of Colombia, 2020)	**1. Equity and gender in the social justice approach** An inclusive and equitable bioeconomy must recognise and address existing inequalities in access to resources, land, knowledge and benefits. This includes gender inequalities, as well as those affecting indigenous peoples, rural communities and other historically marginalised groups (p. 27). **2. Recognition of knowledge and participation of indigenous peoples and women** The justice-based approach to the bioeconomy also entails recognising different forms of knowledge, including traditional knowledge held by indigenous peoples, women and local communities (p. 28). **3. Inclusive participation and representation** Governance mechanisms must ensure the effective participation of women, indigenous peoples and rural communities in decision-making processes related to the bioeconomy (p. 30). **4. Fair distribution of benefits** Bioeconomy policies must ensure that benefits are distributed fairly, especially to those groups that have been historically excluded, such as women, indigenous peoples and small-scale producers (p. 31). **5. Intersectional dimension** It is essential to apply an intersectional approach that considers how gender, class, ethnicity and other factors intersect to create different forms of vulnerability or privilege in participating in the bioeconomy (p. 32).

Table 5 GEDSI criteria in bioeconomy strategies from the Latin American region (continued)

Country and name of strategy	Emphasis on gender equality and social inclusion
Costa Rica Costa Rica's Bioeconomy Strategy 2020–2030 (Estrategia Nacional de Bioeconomía Costa Rica 2020–2030) (Government of Costa Rica, 2020)	**1. The strategy is guided by the following principles:** Social inclusion (gender, youth, indigenous populations) and balanced territorial development (p. 35). **2. Inclusive and sustainable development measure** The bioeconomy strategy is proposed as a socially inclusive and sustainable economic development measure [...] it seeks to stimulate job and wealth creation, more equitable income distribution, and to reduce gaps between central and peripheral regions of the country (p. 36). **3. Prioritisation of gender equality and equalising opportunities** The strategy will prioritise gender equality, the creation of opportunities for youth and indigenous communities in the country, and will promote balanced territorial development (p. 36). **4. Position Costa Rica as a model for sustainable development** Strategic Objective 1. Position Costa Rica as a model country in sustainable development by leveraging its biological resources to promote social inclusion and equity, balanced territorial development, conservation, and the sustainable use and knowledge of its biodiversity (p. 38). **5. Gender equality and empowerment** Goal 5: Achieve gender equality and empower all women and girls (p. 39).
Brazil National Bioeconomy Strategy (Estratégia Nacional de Bioeconomia) (Government of Brazil, 2024)	**1. Definition of bioeconomy with focus on justice and inclusion** Bioeconomy is defined as a productive and economic development model based on values of justice, ethics and inclusion, capable of generating products, processes and services efficiently, based on the sustainable use, regeneration and conservation of biodiversity, guided by scientific and traditional knowledge, innovation and technologies (Article 2). **2. Guiding principles: rights and inclusion** Key principles include: – V – Respect for the rights of indigenous peoples and traditional communities to self-determination and the use and traditional management of their territories – VI – Reduction of inequalities, aimed at regional development – VII – Fair and equitable sharing of benefits from access to genetic heritage and associated traditional knowledge, in accordance with Law No. 13.123/2015 – VIII – Promotion of the participation of women and youth in the bioeconomy (Article 3). **3. Strategic objectives: indigenous and traditional peoples** Objectives include: – II – Promoting forest and socio-biodiversity-based economies through the identification, innovation and valorisation of their socioeconomic, environmental and cultural potential, with increased market participation and income generation for indigenous peoples, traditional communities and family farmers (Article 4).

Panama's bioeconomy strategy is being developed by SENACYT as a 'neutral' actor, so it can be intersectoral, interministerial and multi-stakeholder rather than over-representing the priorities of an individual sector. To this end, the participation of multiple stakeholders in the sector is being promoted (KII, SENACYT). Importantly, SENACYT has made relevant efforts over the past few years to increase the gender equality and social inclusiveness of the institution, developing, for example, the National Policy for Gender Equality in Science, Technology, and Innovation,[15] and adding social inclusion criteria to its processes, such as promoting the participation of researchers from indigenous origins in the research projects it funds.

There is also an awareness by the team in SENACYT leading the bioeconomy strategy process of the need to ensure the strategy serves as a tool to promote social inclusion (KII, Think Tank). In addition, there is awareness by SENACYT and key actors in relevant ministries (those for agricultural development and the environment) that Panama's regulatory frameworks on the bioeconomy require further enhancement to promote equitable market access, reduce structural inequalities and improve financing mechanisms for bioeconomy enterprises (Villalaz, 2023; SENACYT and UNDP, 2023).

At the same time, SENACYT is strengthening research centres and think tanks so that there is more innovation behind the strategy. In particular, it is working on the development of a think tank on bioeconomy in Panama, supported by funds from the IDB, as a platform for national and international actors to contribute expertise and resources.

The Government's vision of a well-developed bioeconomy is that it has the potential to yield significant benefits for the country, including:

- employment generation and rural development: This will involve creating jobs and economic opportunities in rural areas (Government of Panama, 2024b)
- economic diversification: This will include expanding economic sectors beyond traditional industries (ibid.)
- environmental sustainability: The bioeconomy will ensure responsible management of natural resources (ibid.)
- social prosperity: This invoves enhancing quality of life through equitable bioeconomic growth (ibid.).

3.3 The participation of marginalised groups in the bioeconomy

A regional vision on the bioeconomy in Latin America and the Caribbean could be built on the following four pillars (Rodríguez et al., 2019).

1. **Promote sustainable development,** taking Agenda 2030 as a frame of reference.
2. **Promote climate action,** taking as a frame of reference the Paris Agreement and the proposals of the countries in their Nationally Determined Contributions (NDCs).
3. **Promote social inclusion** (for example, family farming, youth and women, indigenous peoples) and the reduction of territorial development gaps within countries.
4. **Promote innovation processes** that contribute to the diversification of economies and generate new value chains, especially those that contribute to regional development, are in high-growth market segments, or offer opportunities to young people and women.

15 See: www.senacyt.gob.pa/wp-content/uploads/2021/06/PGCTI_20230703.pdf

In this vision of how to make the bioeconomy in the region act as a motor of development, the role of social inclusion and territorial development is central.

International research on the bioeconomy indicates that marginalised groups primarily engage in the lower-value stages of bioeconomic value chains, such as harvesting and basic processing of non-timber forest products. For instance, some indigenous groups in Panama are engaged in the collection of açaí and camu camu,[16] which are widely used in the cosmetics and food industries (KII, INGO).

While indigenous and rural communities contribute significantly to bioeconomy-related activities, they face challenges – such as limited infrastructure, inadequate access to training, exploitation by market intermediaries, and limited representation in decision-making bodies (stemming from historical discrimination and weak institutional support and policy implementation gaps) – in advancing to higher-value processes such as commercialisation and industrial transformation (SENACYT and UNDP, 2023). Women's participation in the bioeconomy remains concentrated in informal and low-wage sectors, with limited access to capacity-building initiatives that would enable them to advance into leadership roles or innovative ventures (KII, SENACYT).

While indigenous communities have been involved in bioenergy projects and reforestation initiatives, long-term governmental support and access to financial mechanisms remain insufficient (IICA, 2024a). Panama lacks structured policies to integrate marginalised groups into the bioeconomy, limiting their participation and economic opportunities. There is no analysis on the involvement of other marginalised groups in the bioeconomy, such as Afro-Panamanian populations. Given that the country's bioeconomy strategy is currently being developed, now is a good time for actors such as the UK Embassy – in collaboration with other international actors involved in the sector such as the IDB and the FAO – to engage to promote a gender and social inclusion perspective on the strategy, building on what other bioeconomy policies and strategies in the region have done.

From the perspective of experts involved in developing the roadmap for the bioeconomy strategy in Panama, there is certainly scope for the greater engagement and participation of rural communities, indigenous groups and women's groups in rural localities, considering their intersectionalities. For this, the plan of action would be to involve them in the different stages of the roadmap, from identifying the types of activities these groups are already undertaking in relation to the bioeconomy through consultations and visits to the field, to exploring how they want to be integrated to different production chains as different sectors of the bioeconomy develop.

One of the experts interviewed noted that it cannot be assumed that indigenous populations will want to participate in the bioeconomy. Rather, it is necessary to foster conversations and share more information on what these processes entail and what they could gain from them, so they can make informed decisions about their participation (KII, Think Tank). Similarly, an expert involved in the development of the bioeconomy think tank noted that, based on international experiences, it is important to understand where in the bioeconomy value chain these groups would be best placed and interested to participate. Projects have often failed when there has been an

16 Açaí and camu camu are berries considered 'super foods'.

ambition that indigenous communities or women's cooperatives, for example, participate across the whole production, marketing and sales process, whereas they may not be interested in engaging or they may not have a competitive advantage (KII, Academic). As such, as part of the road map and the strategy, it is important to identify the potential for the successful participation of different groups to ensure that the bioeconomy is designed in a socially inclusive manner, knowing where and how groups that have been marginalised from these processes in the past want to engage, and supporting capacity development so they can engage on their own terms.

Experts involved in the roadmap have already identified examples of indigenous bioeconomy projects delivering positive results. One case is 'Futuro Forestal'[17] a company that commercialises environmental services, carbon bonds and biodiversity. Its greenhouses across Panama are managed by indigenous communities. These communities grant the use of part of their territory where the greenhouses are set up; they then manage and use the greenhouses to develop agroforestry systems with indigenous plants, in addition to producing services for the company.

This example illustrates that there are different dimensions and opportunities for inclusion within the bioeconomy. SENACYT, as the body moving the agenda forward, is mainstreaming social inclusion – and particularly gender equality – across all plans and discussions related to the bioeconomy, with a focus on just transitions. It is seen as a strategy that can help reduce some of the entrenched inequalities of some marginalised groups due to its economic potential (KII, SENACYT). For instance, SENACYT has had discussions about genetic resources and the inclusion of indigenous peoples given the genetic biodiversity of the land belonging to these groups. SENACYT is also promoting mentorships by senior scientific researchers to support researchers from indigenous communities to bolster their understanding and engagement in science.

Box 2 Strategies for social sustainability in the bioeconomy

While there is a potential for the bioeconomy to be socially inclusive, this process is not automatic. Work in this area suggests that the transformational potential of bioeconomy solutions to advance environmental sustainability rests on whether governments and communities can deploy strategies for social sustainability (Sarmiento Barletti et al., 2021). Work in the bioeconomy can learn important lessons on social inclusion from previous research on the redistribution, recognition and representation concerns of forest-based climate initiatives. For instance:

- initiatives should recognise indigenous peoples and local communities as rights-holders in the initiatives' design and implementation
- they should ensure that enabling conditions are in place for women, youth and indigenous peoples and local communities to participate effectively throughout an initiative's lifetime
- initiatives should also provide mechanisms to promote a just and fair distribution of costs and benefits between stakeholders.

17 See: https://futuroforestal.com/the-generation-forest-cooperative/

3.4 Key barriers to inclusive bioeconomy engagement

Social inclusion does not happen automatically in the development of the bioeconomy, even when many of the resources used are owned by indigenous and other native populations. Based on the experiences of violations of human rights in Latin America promoted by the extractivist policies of multinational corporations and states, there is a risk that the development of the bioeconomic market could lead to further violations. These can include, for instance, the illegal dispossession of the land, erosion of the social fabric when markets are introduced, conflict and violence over land ownership and control, degradation of land and resources that are the sole assets of indigenous communities (Bordenave, 2017), and harassment and intimidation. There is, therefore, a need for a sustainable agriculture-oriented bioeconomy that takes into account the needs as well as the barriers faced by these communities (Gallego-Marín, 2016).

Marginalised groups face multiple structural and institutional barriers that hinder their meaningful participation in Panama's bioeconomy. These include the following.

- **Limited infrastructure:** Inadequate storage, transportation, digital networks and laboratory facilities severely restrict market access and the ability to add value to bioeconomic products (KII, INGO; IICA, 2024a; MIDA, 2023).
- **Educational and capacity gaps:** Low levels of formal education, limited technical training programmes, and a lack of specialised curricula in biotechnology and sustainable practices prevent effective participation by all (KII, Academic; UNESCO, 2023a; SENACYT and UNDP, 2023). Moreover, marginalised groups have higher rates of school dropout and are less likely to reach higher levels of education where these curricula are more available, so the risks of exclusion from the bioeconomy are higher.
- **Economic exploitation by intermediaries:** Many producers, particularly those in rural areas, face unfair pricing and exploitative practices from market intermediaries, significantly reducing their profitability and limiting financial sustainability (KII, INGO; MIDA, 2023).
- **Institutional and policy gaps:** The under-representation of marginalised groups in policy-making processes results in a lack of inclusive regulatory frameworks that could ensure their effective participation in bioeconomic activities (IICA, 2024a; Sanz-Hernandez et al., 2022; SENACYT and UNDP, 2023).
- **Financial barriers:** Limited access to financing mechanisms, such as microcredits and investment funds, constrains the ability of marginalised groups to expand their bioeconomic ventures (IICA, 2024a; SENACYT and UNDP, 2023).

Further, analysis by the United Nations Development Programme (UNDP) indicates that women in Panama, as in other countries around the world, have historically had little participation in land ownership and/or control. The predominant patriarchal culture has generated hierarchical, unequal, inequitable and discriminatory relationships between men and women. This has excluded many women from land ownership, both in the past and today, making it difficult for them to access opportunities and generate their own income.

For this reason, it is essential that women have access to land ownership or use rights, as this allows them to control, manage and decide on everything related to land use. Such access to land

is a precondition for women, particularly women in rural areas, to benefit from the development of the bioeconomy (UNDP, 2022a). Recognition of land ownership and use may vary between women who are household heads and those who have a male partner, but women's status and access to land should be recognised in both cases.

Active policies to promote inclusion as well as to protect socially and economically vulnerable groups, while promoting human capital and opportunities, are a way of mitigating these barriers and promoting the inclusion of traditionally vulnerable populations into the bioeconomy. For example, Brazil's Bolsa Verde (Green Grant) combines Bolsa Familia (a pre-existing social protection programme) with the payment for environmental services, where eligible families receive 300 Brazilian reals every three months for up to two years and simultaneously agree to engage in sustainable activities.

These types of programmes include training in sustainable development and environmental management, which – as in the case of Bolsa Verde – could be used to promote decent work and green job opportunities for indigenous communities. Moreover, enforcing changes to practices or prohibition of corrosive activities that are identified by indigenous populations has the potential to protect the territory's biodiversity, as well as boost cooperation and foster the creation of sustainable and green economies. These approaches have prioritised the exchange of knowledge, mutual recognition, and the integration of traditional and scientific knowledge, where strategies are based on adopting existing activities and habits led by local people, leading to an increase in the effectiveness of adaptations (ILO, 2017).

3.5 International good practices and opportunities for Panama

The Latin American Bioeconomy Network, which is made up of more than 60 institutions from 10 countries, was launched in July 2023. Its technical secretariat is at IICA and it is a space for discussion, coordination and construction of the bioeconomy (see list of members in Annex 3). The Network generates an opportunity for the region to move forward with a development model based on the sustainable use of its natural resources. Seven guiding principles were agreed within the Network, one of which is that: '*The countries and territories of Latin America and the Caribbean demand that their bioeconomies promote sustainability, foster food and nutritional security for their inhabitants, respect local values and cultural diversity, and promote the sustainability of biodiversity and the equitable distribution of its benefits, among other points*'.[18]

While Panama is not yet a member of the Network, it can become one and, given its close collaboration with IICA, is likely to do so as it develops its bioeconomy strategy. This Network offers an interesting opportunity for Panama to work on the development of its bioeconomy strategy, building on the knowledge and lessons learned from other countries in the Network who have already gone through the process.

18 See: https://iica.int/es/press/noticias/la-red-latinoamericana-de-bioeconomia-dio-conocer-los-principios-rectores/

Box 3 Examples of gender and socially inclusive bioeconomy projects in Latin America

Uruguay's Agroecological and Climate Resilient Systems project leverages technical support from the FAO Investment Centre and financial support from the World Bank. In order to build sustainable agricultural productivity and promote climate change adaptation, the project aims to create practices that consider specific social, environmental and economic conditions. Inclusion is regarded as a key factor in the project's expected success, which looks to boost the inclusiveness of women-led farming systems through access to technical assistance and knowledge to improve 'digital literacy' regarding tools like GPS (global positioning system)-enabled devices for plant disease management. It is estimated that around 2,000 rural women will benefit from the project's efforts. This inclusive farming environment is expected to provide improved products, more competitive prices, and better food and water quality (FAO, 2022).

Ecuador's 'La Chakra' is an agro-forestry system spearheaded by the Kichwa indigenous population. The system allows for the sustainable use of the tropical jungle via the combination of planting aromatic cacao, controlled extraction of wood, the production of basic foods and the conservation of medicinal plants. Some of La Chakra's species have garnered commercial value, which has led to the creation of a series of commercial certifications (organic, fair trade, GMO free, among others), and the support of production associations. The latter have resulted in the creation of a social support fund, increased commercialisation and international collaboration. This sustainable and inclusive production cycle has allowed for climate change adaptation, biodiversity conservation, and improved quality of life and empowerment of indigenous communities (Meza and Rodríguez, 2022).

International experiences offer valuable insights into how Panama could strengthen its bioeconomy inclusivity from a GEDSI perspective. The Latin America Bioeconomy Network also fosters cross-sector collaboration and public–private partnerships (PPPs), ensuring that indigenous and Afro-descendant communities are integrated into high-value production chains (KII, INGO).

Brazil, Colombia and Costa Rica have successfully implemented inclusive PPPs, gender-sensitive policies and comprehensive capacity-building programmes, demonstrating how targeted interventions can enhance marginalised groups' participation in the bioeconomy (IICA, 2024a).

Additionally, frameworks that integrate GEDSI principles into policy design are essential for ensuring equitable access to bioeconomic opportunities (anz-Hernandez, et al., 2022).

Further, the Network has been collaborating with the UK Science and Technology Network to promote regional exchanges. Together with other stakeholders (such as Alliance Biodiversity and the International Center for Tropical Agriculture (CIAT), and the Consultative Group on International Agricultural Reseach (CGIAR)), in February 2025, they organised a workshop in Colombia to discuss how to bring the climate, biodiversity and financing agenda closer together. SENACYT participated on behalf of Panama.

Box 4 Bioeconomy strategy in the UK

The previous UK Government developed a bioeconomy strategy for the years 2018 to 2030. However, the current Government has withdrawn the strategy and a new one has not yet been published. In this sense, there is currently no all-encompassing bioeconomy plan of action. However, regional initiatives have been paving the way to sustainable economies. For instance, Scotland's National Plan for Industry Biotechnology integrates bio-based produce to national policy-making. One of the country's most successful schemes involves linking traditional food sectors with industrial bio-based production.[19]

There are several international organisations leading the Latin American bioeconomy movement. FAO is one of the most important contributors – mainly in Brazil – having presented investment programmes throughout the region focused on strengthening information management systems and developing digital ecosystems (FAO, 2023). In addition, ECLAC has proved to be an essential theoretical and research partner, allowing for the analysis of case studies and offering replicable best practices. Furthermore, the IDB has not only contributed theoretically to the advancement of bioeconomies in Latin America, but has also begun to support the creation and implementation of timely programmes and initiatives – for instance, 'ARPA for Communities' in the Amazon.[20]

Box 5 Lessons on gender and social inclusion in bioeconomy initiatives

Based on analysis of social inclusion initiatives that have explored progress and gaps in social inclusion, some of the issues observed are as follows.

- **Redistribution and land tenure:** Inequality arises from how resources, costs and benefits are distributed, including entitlements and decision-making power. Addressing these imbalances is crucial for fairness.
- **Recognition and gender inequalities:** Acknowledging diversity means valuing different identities, interests and knowledge systems. Barriers preventing marginalised groups from participating effectively must be addressed to ensure inclusive engagement.
- **Representation and participation:** Fair decision-making processes require inclusive participation, yet indigenous peoples and local communities are often excluded from bioeconomy initiatives. More equitable representation is needed in multi-stakeholder platforms.

19 See: https://pmc.ncbi.nlm.nih.gov/articles/PMC10959757

20 This is a 2024 initiative that looks to promote sustainable economic development while combating deforestation, with particular interest in the Amazon region (IDB, 2024).

Box 5 Lessons on gender and social inclusion in bioeconomy initiatives (continued)

This means that to support transformational change, initiatives must:

1. **recognise indigenous peoples and local communities** as rights-holders in the design and implementation of bioeconomy solutions
2. **ensure enabling conditions are in place** for the meaningful participation of indigenous peoples and local communities – and women and youth in those groups – in all relevant decision-making processes
3. **provide clear mechanisms** that allow for a just and fair distribution of costs and benefits stemming from bioeconomy applications.

Source: Sarmiento Barletti, et al. (2021)

While Panama is not part of the Amazonia region, its rich and biodiverse rainforest could be an entry point to engage more actively with countries in that region that are promoting social inclusion within their vibrant bioeconomy. For example, a recent expression of regional commitment was the Pan-Amazonian Bioeconomy Conference in Belém, Brazil, in July 2023. The outcome declaration included 30 proposals to Heads of State, including achieving a sustainable economic future in which subsidies are reallocated away from harmful practices and towards bioeconomy activities that support indigenous, Afro-descendant and traditional communities. The declaration also included a call for the creation of a Pan-Amazonian financing platform and a regional fund to bolster ethical science and innovation in the bioeconomy sector, aiming to enhance the value of its products and services while fostering skills development (Lesenfants et al., 2024).

4 Government strategy: new technologies and innovation

4.1 Introduction

The COVID-19 pandemic has accelerated significant changes in Latin America and the Caribbean, particularly the 'Fourth Industrial Revolution', which includes technological advances, machine learning and artificial intelligence (UNESCO, 2022). However, the limitations experienced by women, children and marginalised groups in accessing digital infrastructure have reinforced existing inequalities due to restrictions on access to public goods and services, health information, online education, social assistance services, e-commerce, and financial products, particularly for women-owned businesses (ECLAC, 2023c). Despite efforts to promote the participation of women, girls and marginalised groups in science, technology and innovation (ST&I), such as education policies and initiatives to promote science, technology, engineering and mathematics (STEM), various factors still hinder gender equality and social inclusion in these fields.

In Panama, women are not only under-represented in ST&I fields (horizontal segregation), but their representation also decreases as they advance in their careers as researchers (vertical segregation) (UN Women, 2020a; Blanco et al., 2018). Factors such as gender stereotypes from early childhood, unpaid care work, obstacles in professional advancement, lack of female role models, lack of digital skills and structural inequalities have a negative impact on women and girls within ST&I fields (KIIs, Academic; Think Tanks). Persistent poverty and high socioeconomic inequality between rural and urban areas affect access to information and communication technology (ICT) resources (including digital competencies, communication infrastructure and computational appliances) (UNESCO, 2023b). Educational disparities – gender and especially ethnic inequalities (see Chapter 2) – are particularly critical, not only in literacy but also in terms of educational attainment and dropout rates (SENACYT and UNDP, 2023).

Various initiatives have been implemented in Panama to reduce these disparities. At an institutional level, one of the most important milestones for the Government is the first Science, Technology, and Innovation Gender Policy 2040 and Action Plan 2023–2025 (Política nacional de género en Ciencia, Tecnología e Innovación de la República de Panamá al 2040 (Política Género-CTI 2040) y el Plan de Acción 2023-2025), led by the National Secretary of Science, Technology, and Innovation (SENACYT). This institution is pivotal in promoting gender equality, diversity and social inclusion in all ST&I programmes, projects and initiatives.

This chapter will focus on the status of women and girls in the ST&I sector and efforts to overcome gender inequalities, as this is where most evidence exists. It explores the Government's progress in advancing gender equality and social inclusion within ST&I initiatives at the educational level. It also delves into the factors that drive and enable the participation of women, girls and young people – particularly those from marginalised groups – in STEM initiatives. Finally, it highlights examples of technological innovations that foster the financial and digital inclusion of women.

4.2 Status of women and girls in science, technology and innovation (ST&I)

STEM

Globally, the proportion of women in STEM and non-STEM workforces has increased gradually since 2016. However, in 2024, women continued to have lower representation in the STEM workforce than in non-STEM fields, with representative shares of 28.2% and 47.3%, respectively (WEF, 2024). In Latin America and the Caribbean (LAC), women's participation in education and the labour force has increased gradually in recent decades. However, this process has not always extended to the fields of ST&I (López-Bassols et al., 2018). Despite efforts to bridge gender gaps in ST&I, such as educational policies and initiatives aimed at promoting science, technology, engineering, and mathematics (STEM) disciplines, gaps still exist at different levels of education and career stages in almost every country (López-Bassols et al., 2018; UNESCO, 2022; UN Women, 2020a).

Worldwide, women have made gains in the last two decades, and as of 2022, they represented 41% of all active researchers across all disciplines, with strong representation in health sciences; for example, women represent 68% of researchers in nursing, 52% in immunology and microbiology, and 50% in neuroscience. However, gender diversity has not progressed equally in all fields; in computer science, engineering and mathematics, women represent just 29%, 28% and 27% of researchers, respectively (Van der Linden et al., 2024). Central Asia and Latin America are the two regions predicted to achieve gender parity among female and male researchers (48% and 45% of all researchers are women, respectively) (UN Women, 2020a). Panama has also followed this trend in recent years. In 2024, of the total number of men and women working in research and development (R&D), male researchers accounted for 52.69%, while female researchers accounted for 47.31% (SENACYT and Observatorio Panameño de Ciencia, Tecnología e Innovación, 2024).

Despite these gains, women's underrepresentation remains. According to 2018 figures, only 28% of university rectors are women. None of the research centres with the highest scientific output are headed by women (Blanco et al., 2018). In 2025, among Panama's five main research centres,[21] only the Agricultural Research Institute of Panama (Instituto de Innovación Agropecuaria de Panamá; IDIAP) has a woman as general director, the engineer Alexandra Rodriguez. At the Smithsonian Tropical Research Institute (STRI) (Instituto Smithsonian de Investigaciones Tropicales)in Panama City, scientist Oris Sanjur currently serves as the deputy director. In other cases, women have held temporary leadership positions; for example, the Institute for Scientific Research and High Technology Services (INDICASAT AIP) had a woman as a director, but only on an interim basis or as a temporary person in charge in Panama City (SENACYT and UNDP, 2023).

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21 The Smithsonian Tropical Research Institute (STRI) (Instituto Smithsonian de Investigaciones Tropicales); The Institute for Scientific Research and High Technology Services (INDICASAT-AIP) (Instituto de Investigaciones Científicas y Servicios de Alta Tecnología de Panamá. Asociación de Interés Público; the Institute of Agricultural Innovation of Panama (IDIAP) (Instituto de Innovación Agropecuaria de Panamá); the Gorgas Memorial Institute for Health Studies (GMI) (Instituto Conmemorativo Gorgas de Estudios de la Salud (ICGES); and the Dr. José Renán Esquivel Children's Hospital (Hospital del Niño Dr. José Renán Esquivel).

Challenges to women's participation in ST&I emerge at an early age. According to the latest report of the Programme for International Student Assessment (PISA) 2022, boys outperformed girls in mathematics by 9 points, whereas girls surpassed boys in reading by an average of 24 points across Organisation for Economic Co-operation and Development (OECD) countries.

In Panama, boys and girls performed at similar levels on average in mathematics, but girls outperformed boys in reading by a score of 19 points (Table 6) (OECD, 2023b). Gender disparities between girls and boys are more prominent when they attend college, where women are concentrated in social sciences and specific areas of natural or medical sciences.

Globally, only 18% of young women in tertiary education pursue fields in STEM, compared to 35% of boys, with the most significant gender gaps in engineering and ICT (UNICEF, 2020). Across the region, women make up 11.9% of those graduating from higher education in STEM fields, compared to 31.2% of men. In Panama, the figures stand at 8.2% and 22.6%, respectively (World Bank, 2025a).

Table 6 PISA results in mathematics and reading in Panama and OECD countries

Indicator	Panama	OECD Average
Mathematics: boys versus girls	Similar performance	Boys +9 points
Reading: boys versus girls	Girls +19 points	Girls +24 points

Source: Authors based on OECD data (2023b)

In Panama, learning gaps, as mentioned in Section 2.3, are exacerbated in rural areas, particularly for indigenous communities. Educational disparities – gender and especially ethnic inequalities – are particularly critical in terms of literacy, educational attainment and dropout rates (SENACYT and UNDP, 2023). People with disabilities face unique barriers to education and career development in STEM, including stigma, underestimation of their skills, and lack of access to education, labour markets and digital facilities (UNICEF, 2020).

Technology and innovation

Globally, according to the most recent *Future of jobs report 2025*, technology-related roles are the fastest-growing jobs in percentage terms, including big data specialists, fintech engineers, AI and machine learning specialists, and software and application developers (WEF, 2025). Recent statistics show that women comprise approximately 25% of the tech workforce. This disparity is even more pronounced in leadership positions, where women hold only 11% of executive roles (Robinson, 2024). According to data compiled by SENACYT and UNDP in 2023, globally women comprise no more than 26% of the workforce in AI; 12% in machine learning; 14% in cloud computing; 6% in mobile applications; less than 6% of software designers; 20% of the workforce in the cybersecurity industry; and just 10% of those setting metaverse standards, among other emerging fields (SENACYT and UNDP, 2023).

Data on employment in STEM is limited in the LAC region; however, looking at ICT sector, for instance, on average, only 3 in 10 employees are women, with significant variations across countries (UNDP, 2024a). In 2019, the International Labour Organization (ILO) reported that 32% of women in the region were employed in the ICT sector, and in Panama, women held 33% of jobs in the IT sector (ILO, 2019). Furthermore, women are over-represented in non-STEM occupations in all industries. This configuration gives women a double disadvantage regarding technological and

workforce transitions; as they continue to occupy lower-growth, lower-paying jobs, they are more likely to be negatively affected economically in the short term (WEF, 2025). Across the region, the gender pay gap in the digital sector was 21% and 15% in Panama (ILO, 2019). When women join the ICT workforce, they often find themselves in lower-paying roles like ICT project managers, as opposed to the more lucrative positions in ICT software development (ibid.).

According to a recent study published by the recruitment platform Get on Board, based on more than 25,000 job applications in the tech field, of all applications submitted for STEM roles, only 10% were from women. The study further revealed a substantial disparity in salary expectations. Women in senior positions anticipated a monthly salary of $2,000, whereas their male counterparts expected $2,500 – reflecting a 25% gap in earnings expectations (Get on Board, 2025).

Digital technologies have transformed economies, work and people's lives. However, while they are an important factor in development, they also create inequalities, such as the digital divide. Household demand for the internet and individual internet use depends on income and other sociodemographic factors. The most relevant factors are education, gender, geographic location (urban or rural), and the presence of school-age children in the household (UNESCO, 2017; UNDP, 2024b; 2024c). From 2018 to 2022, household access to home internet in LAC increased from 50.7 to 68.4%, with higher access rates in urban areas than in rural areas. In most LAC countries, there are pronounced disparities in internet access between poor and non-poor households. There are also notable gender disparities. Men generally have better access to the internet than women (World Bank, 2025b).

Although progress has been made in promoting equal access to the internet across the region, women continue to encounter specific barriers that prevent them from benefiting fully from digital connectivity. Obstacles include disparities in digital skills and education, financial barriers amplified by income inequality, and online violence. In countries such as Colombia, for instance, overall internet access is nearly equal between men and women, yet there is a 17% gender gap in terms of meaningful connectivity. According to information available, men have access to consistent, higher-speed internet connections, and benefit from better devices, faster internet speeds, greater data availability and more frequent internet usage. Notably, 51% of men in Colombia have a 4G connection, compared to only 36% of women (World Wide Web Foundation, 2020).

In the LAC region, 4 in 10 women either lack access to the internet or are unable to afford it. Among the lowest income groups, the cost of mobile and fixed broadband services represents 14% and 12% of monthly income, respectively. Given that a larger proportion of women reside in low-income households, many remain unconnected to the internet (ECLAC, 2023a). Multiple factors continue to hinder women's participation in the digital sphere, with lack of digital skills being particularly significant. This gap is further exacerbated by intersecting factors such as age, educational attainment, income level and access to digital devices. Women are often less familiar with using smartphones, browsing the internet, interacting on social media platforms and protecting information on digital platforms (Dalio et al., 2023; Vaca and Valenzuela, 2022).

Access to the internet, technology and digital tools is unevenly distributed in Panama. According to the National Census of Population and Housing (Instituto Nacional de Estadística y Censo;

INEC) conducted in 2023, approximately 70% of households in Panama were connected to the internet. However, this percentage is much lower in rural and indigenous areas. In the *comarcas* of Emberá and Ngäbe-Buglé, the percentages drop to 12.6% and 6.9%, respectively. Similarly, these *comarcas* had the lowest use of computers (5.2% and 3.8%, respectively) and mobile phones (46.1% and 33.9%, respectively) (INEC, 2023). The geographic digital divide stems from a lack of adequate infrastructure in rural or remote areas, which prevents access to technology in these areas. Approximately 80% of urban households have access to the internet, compared to 46% of the rural population (UNDP, 2024b). Among Afro-descendant women, 46% of those belonging to the most disadvantaged socioeconomic groups do not have access to the internet (UNDP and INAMU, 2020). To put the data in context, across the LAC region as a whole in 2022, 67.3% of households had internet access, but 46.4% of the poorer households in the region had a fixed connection, compared to 84.6% for wealthier households. Urban households in LAC have double the internet access of rural ones (74.8% versus 35.8%) (UNDP, 2024d).

Globally, evidence shows that a lack of digital skills prevents people from accessing the internet and using online services, especially women, girls and the most marginalised groups. In Panama, the demand for digital skills in the labour market has increased significantly since the COVID-19 pandemic. In fact, 75% of employers consider such skills essential for employment. However, training in digital skills is unevenly distributed across the country. Urban areas, where educational and technological resources are concentrated, are better suited for digital skills development (UNDP, 2024b). Urban areas have greater internet access, but the leading research centres and universities are concentrated mainly in the capital (KII, Academic).

Regarding innovation, Panama ranks 84th among 132 economies, according to the Global Innovation Index 2023 (WIPO, 2023). Innovation in the country is at an early stage. Progress is much more evident in the areas of technology, especially computer systems engineering, artificial intelligence and semiconductors; however, *'innovation is not deep-rooted and longstanding in our country'* (KII, Academic).

Most innovators in the country are men. To address this gender gap, initiatives such as the **Canal de Empresarias programme** have been established to support and promote women's entrepreneurship. However, there remains a critical need to expand opportunities for women in high-tech entrepreneurship to ensure greater inclusion in innovation- and technology-driven sectors (KII, SENACYT). The under-representation of women in innovation is significant worldwide; in 2022, three-quarters of patent applications were filed by men alone or by male teams (Van Der Linden et al., 2024).

Key challenges to the participation of women, girls and other marginalised groups in ST&I

Girls, women, indigenous and Afro-descendant communities, and persons with disabilities face a range of complex challenges in participating, succeeding and progressing in ST&I careers. In Panama, some key challenges are discussed below.

Gender stereotypes

Families, communities, educational institutions and the mass media influence scientific and technological aspirations from childhood. Global evidence shows that during the primary years of socialisation, children internalise gender representations and norms that build their first cultural background regarding feminine and

masculine roles (UNESCO, 2022). Self-selection bias is considered the primary reason girls opt out of STEM, as girls often do not consider STEM professions compatible with their gender (UNESCO, 2017). STEM-related stereotypes, such as '*girls are not as good at math as boys*' or '*I am not a math person*' may be inadvertently transmitted to children by their parents, caregivers and teachers.

STEM education is neither culturally nor gender neutral. It is subject to the same types of cultural influences, racial and class biases, and stereotypes as other fields of education (Early Childhood STEM Working Group, University of Chicago, 2017). Panama is not an exception; women within ST&I face stereotypes during childhood and throughout their professional careers. Skills such as thinking logically and using mathematics to understand the natural world are still perceived as masculine. In addition, authority and leadership continue to be seen as masculine attributes in the private and public sectors as well as in ST&I, hampering the progression of women students, academics and professionals in STEM disciplines and affecting their access to senior and leadership positions (Blanco et al., 2018; UNESCO, 2022).

Work–life and family (im)balance

In the context of the digital divide, understanding unpaid care work as one of the origins of inequality between men and women is key because the disparate burden of these tasks results in a greater scarcity of time for women (ECLAC, 2023a). This affects women in STEM careers in the same way as women in the workforce more broadly. As we mention in the gender section in relation to statistical profiles, care work remains a critical barrier to gender equality and economic participation. The absence of co-responsibility means that women must spend more time on these unpaid tasks and may have less time to devote to their careers than men. Claudia Goldin, last year's Nobel laureate in economics, argues that there will be no equality in any area of life until there is equality at home (KII, Academic). The absence of care policies is not only a governmental issue but also an institutional one, affecting the operations of academic institutions. In the words of one of the academics interviewed:

> 'At least in the university where I work, childcare facilities are available. Other universities have not considered establishing childcare centres' (KII, Academic).

Obstacles in professional advancement

Once women obtain their first academic position, various obstacles affect their advancement. The 'family-or-science' dilemma discourages many young women from pursuing scientific careers and produces early system dropouts, which acts as a filter (UNESCO, 2022). Lack of childcare and family-friendly policies in academia and ST&I companies impacts women particularly and may result in a significant number of them leaving the profession. However, most available research on this issue comes from the US, where contextual and family dynamics are different to those in Panama.

Despite an increased presence among researchers, women experience a strong 'glass ceiling' effect that prevents them from reaching high levels of seniority (vertical segregation). This long march, which starts in high school, continues in higher education, and ends with a degree and career in STEM, has been characterised as the 'STEM pipeline': the single pipeline or pathway that students must follow to enter STEM careers (Clark Blickenstaff, 2005, cited in Makarova et al., 2016). Key transition points along the STEM pipeline are where students 'leak out' of or decide to leave their path toward a STEM career in formal and non-formal education (Maltese and Cooper, 2017, cited in Makarova et al., 2016).

Lack of women role models to change stereotypes and increase interest in STEM, particularly among indigenous and Afro-descendant children

Global challenges, such as stereotypes and a lack of role models, affect girls' interest in STEM from an early age. Female teachers acting as role models have the potential to mitigate traditional barriers for women to persist in the pipeline, thereby contributing to closing the STEM gender gap (Sevilla et al., 2023).

Women and girls facing ethnic, racial and linguistic discrimination are not only excluded from ST&I learning because of gender issues. They also have no role models who look or talk like them or share their experiences. In Latin America, traditional knowledge and technologies have been developed and perfected by indigenous and Afro-descendant communities over millennia; however, these knowledge systems are often belittled and invalidated in schools (UNICEF, 2020; Giraldo and Zamudio., 2024). In Panama, the lack of role models and representation affects the perception of girls and boys as future scientists. This was mentioned by one of the scientists interviewed in connection with research on stereotypes of ST&I in indigenous and Afro-descendant children (not yet published):

> 'The study on gender stereotypes and science was carried out with indigenous and Afro-descendant girls. The findings revealed that indigenous and Afro-descendant girls lack representation and role models among women scientists from their communities. When we asked them to draw a scientist, these girls typically depicted women in general, but not women from their own racial backgrounds.' (KII, Academic).

4.3 Policies, progress, and achievements

Policy framework

The policy framework in Panama provides an environment enabling the development of the ST&I sectors to promote equal opportunities for women, girls and most marginalised groups. The National Plan for Science, Technology, and Innovation 2019-2024 (Plan nacional estratégico de ciencia, Tecnología e Innovación (PENCYT) 2019 – 2024), as well as the Science, Technology and Innovation Gender Policy 2040 and Action Plan 2023–2025, reflect the Government's commitment to consolidate a gender-inclusive technology and digital innovation ecosystem. Table 7 provides a summary of the main policy measures in this area.

Table 7 Policy and legal framework for ST&I with a GEDSI focus

Policy framework	Key content regarding Gender Equality, Diversity, and Social Inclusion
Government Strategic Plan 2025–2029	The **Government Strategic Plan 2025–2029** (Plan Estratégico de Gobierno 2025-2029) includes a strategic pillar on new technologies and the innovation ecosystem. This strategic axis highlights the adoption of new technologies, the importance of educational programmes to meet the demands of the international market and innovation in financial services. In addition, a legal framework for developing technologies related to blockchain, fintech, greentech and biotechnology should be created (Government of Panama, 2024b).

Table 7 Policy and legal framework for ST&I with a GEDSI focus (continued)

Policy framework	Key content regarding Gender Equality, Diversity, and Social Inclusion
National Plan for Science, Technology, and Innovation (PENCYT 2019–2024)	The **PENCYT** (Plan Nacional Estratégico de Ciencia, Tecnología e Innovación (PENCYT) 2019 – 2024) recognises the importance of education and training of highly qualified human resources in the ST&I sector. It aims to strengthen research knowledge transfer and develop skilled professionals in science and technology to solve local and global challenges (SENACYT, 2020).
Public Policy on Education for Sustainable Development (ESD) (2024–2029)	The **Public Policy on Education for Sustainable Development (ESD)** (2024–2029) (Política educativa nacional para el desarrollo sotenible (2024–2029)) promotes the importance of digital education and STEAM (science, technology, engineering, art and mathematics) by updating curricula through the integration of STEAM and digital education while improving teacher training and professional development (MEDUCA, 2024a).
Science, Technology, and Innovation Gender Policy 2040 and Action Plan 2023–2025	This policy places women and girls, in all their diversity, at the centre of its action. The **ST&I-Gender Policy 2040** (Política Nacional de Igualdad de Género en Ciencia, Tecnología e Innovación de la República de Panamá al 2040) is based on three axes: women and girls in ST&I, ensuring their full participation; gender in ST&I, integrating the gender approach into ST&I sectors; and ST&I for equality, promoting inclusive development. It also strengthens governance and institutionality, thereby strengthening gender equality in the ST&I ecosystem (SENACYT and UNDP, 2023).
The Public Policy on Equal Opportunities for Women 2024–2034	The **Public Policy on Equal Opportunities for Women 2024–2034** promotes the importance of women and girls' participation in ST&I, the outcome of which is that mechanisms, policies and actions are in place to promote and encourage the integration of women in science, technology, research and innovation. The essential strategic goals that will be achieved are: • 10.1 Ensure access to and use of all technological forms for the comprehensive development of women • 10.2 Strengthen women's economic empowerment through digital, technological, and STEM infrastructures (Ministry of Women's Affairs and UN Women, 2024).
The Economic Agenda of Rural Women of Panama (AEMR) (2023)	The **Economic Agenda of Rural Women of Panama** (Agenda Económica de Mujeres Rurales; **AEMR**) (2023) defines strategic and operative goals for enhancing women's capacity to use information and communication technologies to promote their enterprises at the local, national and global levels (Ministry of Women's Affairs et al., 2024).
The National Strategic Plan for People with Disabilities: Inclusion and Opportunity 2020–2024	The **National Strategic Plan for People with Disabilities: Inclusion and Opportunity 2020–2024** (Plan Estratégico Nacional para las Personas con Discapacidad. Inclusión y oportunidad 2020–2024) highlights the importance of digital inclusion for people with disabilities. It includes a strategic area of digital accessibility and equal opportunities: people with disabilities and their families have access to public spaces and low-cost technical and technological aids, as well as adapted information and communication technologies to facilitate their social participation (National Secretariat for People with Disabilities, Secretaría Nacional de Discapacidad (SENADIS), 2020).

Achievements and initiatives integrating ST&I in education

According to the PENCYT 2019–2024, the National Science, Technology, and Innovation System comprises different actors, including public institutions, universities, research centres and the private sector, which generate scientific knowledge, technological developments and innovations. The Gender ST&I 2040 Policy Board (Junta General de la Política de Género-CTI 2040) is the institutional body responsible for its implementation, bringing together public and private actors, NGOs, international organisations, academia, and experts, and is chaired by the National Secretariat of SENACYT. This section highlights the achievements of Panama's Ministry of Education (MEDUCA) and SENACYT in science, technology and innovation in education, as listed in Box 6.

Box 6 Ministry of Education and SENACYT achievements in ST&I with a GEDSI focus

Improved connectivity and digital resources

Ester – a digital platform to support remote learning – was a highly successful emergency strategy during the COVID-19 pandemic, which evolved into a comprehensive ecosystem. It integrates various educational resources, including platforms, tools, projects, courses and books, covering subjects like chemistry, physics, mathematics, biology, Spanish, English, business and information technology (Ministry of Education, 2024b).

Teacher training and attracting children and youth to scientific and technological careers

STEAM initiatives have been implemented in public and private schools, including robotics Olympiads, the delivery of robotic kits and teacher training ibid.). The educational robotics project has organised national and international competitions to encourage girls' participation in technology and innovation. The targeting of more than 300 primary schools and colleges includes communication strategies and requirements for mixed-gender teams in competitions. In addition, teachers are trained to address gender bias and prevent harassment in these spaces (KII, UN).

Creation of specialised centres

The Higher Specialised Technical Institute (Instituto Tecnico Superior Especializado; ITSE) approved a Centre for Educational Innovation, Science and Technology to boost Panama's knowledge economy. It will foster research, innovation and 21st-century skills development (ITSE, 2021).

Gender equality in technical and vocational education and training (TVET)

The National Institute of Vocational Training for Human Development (Instituto Nacional de Formación Profesional y Capacitación para el Desarrollo Human; INADEH), participated in the 'Gender Equality Seal' for Public Institutions (see key terms) and was recognised in the bronze category. It conducted a study of women's participation in its courses, particularly in the fields of technology and innovation. A significant gender gap was identified, and specific calls for women, including young and adult women, were implemented in traditionally male-dominated courses (KII, UN)

Box 6 Ministry of Education and SENACYT achievements in ST&I with a GEDSI focus (continued)

In addition, both INADEH and ITSE have worked to ensure equal gender representation from the start and have included measures to address women's needs, such as creating childcare spaces. This responds to one of the main barriers female students face, especially those who have dropped out of the educational system. These measures aim to facilitate their access to, and permanence in, technical and technological training (ibid.)

Improved connectivity and digital resources in technical and vocational education and training (TVET)

UNDP supports INADEH to incorporate technology and artificial intelligence in its vocational education processes, contributing to the strengthening of the institution in its function of providing technical vocational training (UNDP, 2023).

Policy framework

In 2018, the first Panama assessment of gender and ST&I was carried out with the support of UNDP, which identified barriers and challenges. Concrete actions have been promoted, leading to the publication of the Science, Technology, and Innovation Gender Policy 2040 and Action Plan 2023–2025 , a national document that aims to include women and most marginalised groups such as indigenous communities, Afro-descendants and girls. The policy covers universities, schools, public institutions and training centres (KII, UN).

Promotion of gender in scientific research

Gender equality can be promoted through selection criteria for gender mainstreaming in research initiatives. This takes place in some public calls for R&D or business innovation, which add criteria about gender mainstreaming to research projects and gender equality in research teams. Before 2018, research project funding did not consider equity in team composition or gender perspectives in methodology. SENACYT gradually introduced these aspects without penalties in project evaluations. Training sessions were conducted for the scientific community and SENACYT staff, and current calls for proposals include a section on integrating gender perspectives into research (KII, SENACYT).

The L'Oréal[22] prize is another initiative that has been in place for years looking to reward a woman in science and technology, at the same time encouraging this woman to join a network of other women at the international level (KII, SENACYT). The International Awards L'Oréal-UNESCO[23] for Women in Science honours five eminent women scientists yearly from five regions of the world. Alternating every other year, these researchers are rewarded for their contributions to science progress, either in life sciences or physical sciences, mathematics and computer science.

22 See: www.forwomeninscience.com/
23 See: www.forwomeninscience.com/authority/international-awards

Box 6 Ministry of Education and SENACYT achievements in ST&I with a GEDSI focus (continued)

Improved connectivity and digital resources

Another initiative is the expansion of the coverage of Infoplazas.[24] This initiative aims to facilitate access to new ICTs in communities that are difficult to access remotely. These centres (*kioskos*) provide internet access, document printing, text scanning, short training courses, digital encyclopaedias and more (KII, SENACYT).

Improvements have also taken place in technological laboratories in technical and vocational schools (KII, SENACYT).

Promotion of scientific and technological careers

The education and training of Panamanian girls and young women in ST&I also takes place through initiatives such as Campementos Tecnólogicos, Technovation Girls, academic research and scholarships, and STEM training in vocational education (KII, SENACYT).

Other initiatives includes a mentorship programme, JULIA (young university students led by women researchers in action, known by its acronym in Spanish, Jóvenes Universitarias Lideradas por Investigadoras en Acción), in which women scientists mentor university students from their fourth year (eighth semester) onwards to help them expand their networks, plan their career goals, and develop their leadership and communication skills.

Gender equality at the institutional level

In 2018, SENACYT joined Panama's Gender Parity Initiative (GPI) to reduce economic gender gaps and promote the 'Gender Equality Seal' led by UNDP.[25]

STEM initiatives in education

Several strategies have been implemented in Panama to promote interest in ST&I among women, girls and the most marginalised groups. These initiatives involve girls, students, women, the elderly and indigenous people. They have been funded by SENACYT, foundations and international organisations, such as UNDP and the IDB. However, these are primarily one-off initiatives that are not integrated into the academic curriculum. Even in the studies that

24 See: www.infoplazas.org.pa

25 The UNDP Gender Equality Seal is a certification process that recognises UNDP Country Offices for their commitment and performance in advancing gender equality.

have been carried out on the nature of these initiatives, there were no impact assessments to allow an analysis of the fundamental changes or effects of these short-term projects. Annex 2 summarises the main STEM initiatives implemented in Panama with key results drawn from completed evaluations. Impact evaluations are not yet available as most initiatives were still being implemented at the time of writing.

In Latin America, several STEM initiatives have been implemented in formal and informal education, with different funding sources (the government, NGOs, the private sector, academia and international organisations), coverage types (national or regional), and target groups (fathers, mothers, caregivers, teachers, girls and women) (UNESCO, 2023b; UNICEF, 2023; Villavicencio et al., 2022; UN Women, 2020a).

Table 8 STEM initiatives for women, girls and other marginalised groups

Initiative/strategy/country/ implementer/ target/ partners	Description/outcomes
Girl Power Codefest Americas **Strategy**: Supporting women in STEM careers **Countries:** Chile, Colombia, Mexico and Peru **Implementer**: Colombia Ministry of Technology **Target**: Girls and young women **Partner**: Funded by the British Council	Girl Power Codefest empowers girls in Pacific Alliance countries with coding skills and trains teachers in 21st-century competencies to enhance STEM access. Launched in 2018, it engaged 250 girls in a simultaneous 'Codefest' across four countries. **Impact** The British Council in Colombia has partnered with the Ministry of Technology to implement the second phase of the project, Coding for Kids. The project aims to reach 30 municipalities in the country and train a total of 260 public school teachers in computer programming. They will be able to incorporate programming in their classrooms and engage their students in new ways of learning. The project aims to impact 15,600 students who will develop the skills to use this innovative practice. The partnership has helped to increase the visibility of the UK as a leader in STEM and to promote UK foreign policy priorities, such as women and girls' education (Girl Power Codefest Americas).[26]
Women in Science (Mulheres na Ciência) **Strategy:** Attracting girls and young women to STEM **Country(ies):** Brazil **Implementer**: Municipality of Rio de Janeiro, Institute for Development and Management, Museum of Tomorrow **Target**: Girls **Partner**: Funded by the British Council	Women in Science is an initiative created by the British Council Brazil that aims to promote more diverse and gender-representative science and strengthen female leadership in scientific and technological innovation. The programme brings together techniques and resources for school teachers to encourage girls' interest in subjects in the areas of STEM (Mulheres na Ciência).[27]

26 See: www.britishcouncil.org/partner/international-development/track-record/girl-power-codefest-americas
27 See: www.britishcouncil.org.br/mulheres-na-ciencia/material-didatico

Table 8 STEM initiatives for women, girls and other marginalised groups (continued)

Initiative/strategy/country/ implementer/ target/ partners	Description/outcomes
Inspire Science (Inspira Ciência) **Strategy:** Attracting girls and young women to STEM **Country:** Brazil **Implementer**: Municipality of Rio de Janeiro, Institute for Development and Management, Museum of Tomorrow **Target**: Teachers in primary education **Partner**: Funded by the British Council and IBM	Inspire Science is a teacher training programme launched in 2018 by the Museum of Tomorrow and the British Council, later sponsored by IBM. It offers workshops and debates on science education, covering topics like astronomy, geology and pedagogy. The programme aligns with Brazil's Common Core Curriculum (BNCC) and provides teachers with resources to enhance classroom learning. In 2020, it moved online, reaching teachers nationwide, and launched the Inspire Science platform, a repository of lesson plans, experiments and expert contributions. The initiative also emphasises gender inclusion in STEM through partnerships like one with the Women in Science programme (Inspira Ciência).[28] **Impact** The programme actively encourages teachers to connect science to the students' daily lives. This shift is facilitated through various aspects of the programme, such as exposure to scientific experts, experiencing new methodologies and technologies, collaborative learning and interdisciplinary approaches, and focusing on student autonomy and critical thinking. The first four editions of Inspire Science brought together more than 300 primary education teachers selected based on elements that reinforce the plurality of genders, races/ethnicities, diversity of networks (public and private), and territorialities (Rio de Janeiro municipality and other municipalities). Across the four editions of the programme, 63% of selected teachers are women, 60% are afro-Brazilians and 80% teach in the public sector.
The International Mentoring Network for Women in STEM **Strategy:** Supporting women in STEM careers **Country**: Peru **Implementer**: Inova Consulting **Target**: Academics and researchers in higher education **Partner**: Funded by the British Council	'The focus of the Network is to offer a space for promoting continuous improvement, experience exchange, and international connection in mentoring and research. Individual and institutional members are encouraged to have access to benefits such as funded courses, networking activities, funding information, and participation in the international mentoring conference' (The International Mentoring Network for Women in STEM).[29]

28 See: www.britishcouncil.org.br/en/programmes/schools/inspire-science
29 See: www.britishcouncil.pe/en/international-mentoring-network-women-stem

Table 8 STEM initiatives for women, girls and other marginalised groups (continued)

Initiative/strategy/country/ implementer/ target/ partners	Description/outcomes
WeXchange **Strategy**: Training and strengthening women entrepreneurs in innovation and STEM **Countries:** LAC region **Implementer**: NA **Target**: Women entrepreneurs, investors, mentors, experts, social businesses and institutions **Partners**: Funded by Inter-American Development Bank (IDB)	'WeXchange was founded in 2013 as an initiative of the IDB Lab,[30] the innovation laboratory of the Inter-American Development Bank (IDB), with the aim of unleashing the growth potential of women entrepreneurs in STEM (science, technology, engineering and mathematics) in Latin America and the Caribbean. WeXchange organises annual forums in various Latin American countries, offering regional entrepreneurs the opportunity to: • **access** mentors and investors • **expand** their network • **participate** in trainings and inspirational talks • **apply to the Pitch Competition**, a business competition that rewards the most dynamic entrepreneur in the region.' (IBD, WeXchange)[31]
Laboratoria bootcamp **Strategy**: Training and strengthening women entrepreneurs in innovation and STEM **Countries**: Brazil, Chile, Colombia, Ecuador, Mexico and Peru **Target**: Young women from low-income backgrounds **Partner**: N/A	Laboratoria was founded with the mission of transforming the lives of thousands of women in Latin America through careers in technology. **Impact** Laboratoria offers young women from low-income backgrounds a tech career that transforms their future. Since 2015, more than 4,000 young women have graduated from this bootcamp programme, with over 77% of its students securing jobs in +1,300 tech companies (Laboratoria).[32]
Ingenious (Ingeniosas) **Strategy:** Enabling STEM potential through education, training workshops and studies **Country:** Chile **Target:** Girls and adolescents **Partner:** N/A	Ingenious: Science and Techology for All (Ingeniosas: Ciencia y Tecnología para Todas) is a foundation that aims to bring the world of science, technology, engineering, art and mathematics closer to girls and young women between the ages of 12 and 16. **Impact** Each year, Ingeniosas reaches more than 3,000 girls with workshops and activities that stimulate their interest in STEM disciplines. The numbers are compelling: 8 in 10 participants who attend at least one Ingeniosas workshop report a renewed interest in exploring new experiences in science, technology, engineering and mathematics. Around 17,000 students and 1,400 teachers have participated in STEM training and workshops.[33]

30 See: https://bidlab.org/
31 See: https://wexchange.co/en/
32 See: www.laboratoria.la/en
33 See: https://ingeniosas.org/

4.4 Drivers, and enablers for women and girls' participation in ST&I

This section provides key examples of drivers and enablers contributing to advance gender equality in ST&I.

Institutional leadership

In recent years, Panama has achieved important successes in promoting gender equality and social inclusion in ST&I, although, as mentioned above, there are still significant gaps to be reduced. Government institutions, universities, vocational training institutions, research centres and the academic community have committed themselves to strengthening gender equality policies, eliminating gender gaps in their institutions, and attracting girls and young women to STEM careers, among other mentioned efforts. According to the interviewees, institutions such as SENACYT have played a central role. As one interviewee mentioned:

> 'The professionals in this field (ST&I) can feel quite satisfied because we have always received strong support and positive reception since we started women and girls in science as a research line five years ago. The authorities within the scientific system, including research centre directors, university rectors and SENACYT, have been clear about the need to work towards equality in science for the past decade' (KII, Academic).

Equitable and inclusive STEM education

Gender-responsive STEM education includes the transformation of teaching practices grounded in real-life problems and lived experiences, while giving girls every opportunity to achieve the highest levels of success (UNESCO, 2020). This is particularly important for indigenous communities, as integrating indigenous knowledge systems into the school curriculum has the potential to create a supportive environment for equitable and sustainable education – that is, for education programmes relevant to local contexts (Matindike and Ramdhamy, 2024). For example, ethnomathematics in Panama builds on the knowledge that students bring to the classroom, allowing them to better understand formal mathematics from their own not-yet-formalised knowledge (Näslund-Hadley, 2025).

Female teachers and women mentors

In some settings, female teachers have been found to have a differential impact on their female students' pursuit of STEM studies, with female teaching having had a positive effect on girls (UNESCO, 2017). For example, in a study conducted in Chile, female students with at least one female vocational training and education teacher transitioned from non-STEM to STEM diplomas or from not enrolling in higher education to enrolling in STEM post-secondary diplomas (Sevilla et al., 2023). Professors of the same gender or race play an important role as mentors; women and minority students may be at a disadvantage, as both groups are also under-represented as faculty members in STEM departments (Griffith, 2010). In Panama, initiatives such as the Pioneers of Science (Pioneras de la Ciencia) project aim to promote women scientists as role models and to overcome stereotypes for girls who are interested in science (KII, Academic).

Engaging parents, caregivers and communities

Girls' interest and motivation in STEM fields are influenced by the social context, which encompasses the educational level and profession

of fathers and mothers, the socioeconomic level of the family, the expectations of parents with traditional beliefs, and the media (Sevilla, 2021; UNESCO, 2019, cited in ECLAC, 2023c). Parents, caregivers, families, community members and teachers play key roles in early primary socialisation when children internalise traditional gender identities, representations, stereotypes and social norms. In Panama, mothers working in ST&I serve as role models, sources of inspiration and encouragement for their daughters (Blanco et al., 2018).

Building self-confidence

For women in ST&I sectors, personality and character – characterised by self-confidence and determination – are key factors for their careers (ibid.). Girls' and women's empowerment should be strengthened prior to or alongside STEM skills acquisition. Girls and women with stronger self-confidence and belief in their own capacities in STEM perform better in school and have better opportunities to pursue STEM careers (UNESCO, 2017; Villavicencio et al., 2022).

4.5 Fintech[34] and financial inclusion

In recent years, Latin America has experienced improved financial inclusion, which has reshaped the region's economic and social landscape. In 2017, only 55% of the population had an account at a financial institution or a mobile money service provider. By 2021, the level of account ownership had increased to 74% (World Bank Global Findex Database, cited in Mastercard and PCMI, 2024). Despite this, segments of the population have traditionally been neglected or underserved by the financial system. One group is women, who are more exposed to economic and financial shocks (Diez et al., 2023; UN Women, 2021). This situation is particularly critical for low-income women with limited access to education, technology and skilled jobs. For these women, access to quality financial and non-financial services represents an opportunity for their transformation, the transformation of their families, and a chance to access financing facilities and digital literacy (UN Women, 2021). With the accelerated digitalisation triggered by the pandemic, many women and girls were able to explore new internet tools and platforms to stay connected, including by using digital financial services, shopping online, learning at a distance and by doing business online (OAS, 2021).

In this context, factors such as high fees and costs, lack of financial knowledge, possible risk aversion, distrust in financial institutions, limited connectivity and insufficient information prevent women from accessing financial services (Diez et al., 2023; Mastercard and PCMI, 2024). The gender gap in financial services and products in LAC is vast. According to the World Bank, 49% of women have bank accounts, 11% save and 10% have access to loans (UN Women, 2021) in LAC. In Panama, in contrast to the regional trend, there is parity in access to savings accounts (47% of men say they have a savings account as do 48% of women); regarding online transactions, 29% of women check their balance and make online account transactions, while men are more likely to do this (34%). Moreover, 43% of men and 39% of women agree that digital tools make it easier to manage personal finances (Mejía et al., 2023).-

Fintech companies play a crucial role in driving financial inclusion in Latin America by offering

34 Financial technology, commonly known as fintech, shapes the way in which financial services are delivered and consumed

accessible and innovative financial services, particularly to the region's underserved populations, including women, youth, rural communities, low- and middle-income individuals, and micro and small women entrepreneurs (Mastercard and PCMI, 2024). Some of the benefits of digital financial services are as follows:

> '1) Salary payments through bank accounts improve women's ability to control their income; 2) digital services improve women's ability to make commercial investments; 3) these services improve women's ability to navigate a crisis by facilitating bank transfers and the use of their savings' (Global Partnership for Financial Inclusion, 2020, cited in UN Women, 2021).

Moreover, some fintech companies have also invested in educational initiatives as part of efforts to build trust and address security concerns. As a result, they have helped empower low-income and young individuals with the knowledge to engage confidently with financial services (Mastercard and PCMI 2024).

Table 9 Examples of fintech companies offering women-focused financial services

Strategy	Description
Financial Women (Mujer Financiera) Argentina	Financial Women is a start-up providing financial education, business support, personal financial management, and savings and investment products to help women improve their financial literacy. This platform provides services to different segments, including companies, by offering financial education talks, workshops for female customers and employees, personal financial coaching, and savings plans for women entrepreneurs. It also offers online business finance courses and downloadable spreadsheets (UN Women, 2021).
Banacamia Colombia	'Bancamía is a financial institution, part of the BBVA Microfinance Foundation group that developed the Nosotros con Ellas ('We are with the women') programme. It focuses on meeting women's financial needs through loans, savings, investments, insurance, credit card products, non-financial services and training for women microentrepreneurs. These products and services are designed to help women realise their work potential and increase their financial inclusion' (UN Women, 2021).
Yappy Panama	'There's no doubt that the Yappy application has been important for financial inclusion in the country. People use it all the time, even to pay small amounts of money at shops. It has become part of everyday slang, with words like "yappiame" used to send and receive money' (KII, Academic). Although the digital payment platform has made a significant contribution to financial inclusion in Panama, the present research was unable to determine whether it has a specific focus on gender or social inclusion.

5 Future research agenda and policy recommendations

5.1 Recommendations emerging from review of GEDSI data

Strengthening data and evidence

The present review of available information highlights several data and policy-related gaps that limit a comprehensive intersectional understanding of GEDSI in Panama. The following could be considered by FCDO and the UK Embassy in Panama as areas for future focus.

- The FCDO and the UK Embassy in Panama could support research into emerging migration trends, particularly the evidence of reverse migration linked to recent US policies. Given the recency of this phenomenon, deeper research is needed as comprehensive data is not yet available.
- They could also promote intersectional data collection for ethnic groups, ensuring that information on indigenous peoples is not limited to but reflects broader realities across different locations and social contexts.
- The Embassy could support civil society in advocating for increased data disaggregation by rural and urban areas, as current information is mostly limited to provincial levels and does not fully capture local disparities.
- They could also advocate to strengthen data on Panama's LGBT+ population, addressing the lack of information and the disconnect between public narratives, experiences and available statistics.

Policy framework for social inclusion

- The Embassy could advocate for comprehensive anti-discrimination laws and legal recognition of same-sex partnerships and gender identity rights, focusing on protections that are currently missing in Panama's legal framework.
- It could also work with civil society to support capacity-building initiatives for LGBT+ organisations and facilitate high-level dialogues between civil society, government actors and international bodies, helping strengthen advocacy efforts and amplify community voices. The civil society organisations identified as part of this research that could be reached out to, to identify pathways of collaboration are:
  - Observatorio Nacional de Derechos Humanos de las personas LGBTIQ+ de Panamá
  - Convive Panama
  - ILGA – LAC
  - Fundacion Iguales
  - Asociacion Hombres y Mujeres Nuevos de Panama
  - Asociacion Nuevos Horizontes Panama
  - Hombres Trans Panama.

- The Embassy, with the support of FCDO, could share the UK's experience in advancing digital rights protections with the Government, particularly around online harassment and privacy laws, to support the implementation and enforcement of Ley Olimpia in Panama.

- It could support reducing maternal mortality by partnering with existing actors such as UNFPA, UNICEF and UN Women, to expand healthcare access in indigenous and remote communities.
- The Embassy could engage with the Government to support the expansion of access to comprehensive sexual and reproductive health education for adolescents, particularly in indigenous and rural areas, in partnership with local and international actors, to contribute to reducing the high adolescent pregnancy rate. Organisations that could be part of this include:
  - Coordinadora Nacional de Pueblos Indigenas de Panama (COONAPIP)
  - Fundacion Para la Promocion del Conocimiento Indigena
  - Asociacion Kunas Unidos por Nabguana
  - Orgsanizacion de Mujeres Indigenas Unidas por la Biodiversidad de Panama (OMIUBP).

- The Government of Panama needs to strengthen access to family planning services and prioritise efforts on sexual and reproductive health. Actors such as the UK Embassy can support these efforts, recognising their cross-cutting impact on gender equality, education and public health outcomes.
- Similarly, it can support the development of evidence-based public policies that promote the economic inclusion of people with disabilities, with a focus on addressing the barriers faced by women and indigenous communities.
- Currently, Panama does not have an official women's parliamentary caucus, although efforts have been made to establish one. In this context, partnering with the Foro Nacional de Mujeres de Partidos Políticos (FONAMUPP) – a national forum of women from political parties – could be instrumental in enhancing women's political participation through initiatives such as capacity building, policy development and networking.

5.2 Bioeconomy

Research agenda

- The UK Embassy and FCDO could support inclusive pilot projects: these include scalable pilot projects with equitable participation across all bioeconomic sectors. FCDO could consider doing this through the through the Science and Technology Network (STN).
- Given the UK's experience promoting knowledge exchange, FCDO could consider facilitating science partnerships/collaboration in this space, with actors such as those within the Government and the Latin American Science and Technology Network.
- The Embassy could work with NGOs to investigate existing bioeconomy initiatives in which women from vulnerable contexts – as well as indigenous, Afro-Panamanian and other vulnerable rural groups – are already participating and how, to inform the development of the bioeconomy roadmap.
- The Embassy could work with the Government to support research into possible bioeconomy sectors or entry points that could favour the participation in different levels of the value chain of indigenous and Afro-Panamanian groups, and particularly of women in these contexts, including in agroforestry, environmental sustainability, fisheries and energy. This could be a regional piece of work, which could be discussed with other UK embassies in the region, such as in Colombia, that are already engaging with regional actors to develop the bioeconomy sector.

Areas of potential diplomatic cooperation and influence

The UK embassy could become an active stakeholder in promoting the visibility of gender and social inclusion analyses during the development of the bioeconomy roadmap and strategy, drawing on academic and practical experiences from the UK and other Latin American countries, which it can tap into through its well-connected network.

International actors, such as the UK Embassy, can provide technical knowledge by leveraging the support of UK experts in the field, as well as partnering on virtual courses and initiatives, for instance on bioeconomy for policy-makers and researchers, and exchanges on how to include marginalised groups in these processes. Researchers and practitioners can be identified through UK networks.

The UK Embassy can facilitate knowledge exchanges in the region and continue to promote efforts through the Latin American bioeconomy network to harmonise regional work and leverage shared principles (KII, Government). There are also opportunities for technical exchange visits to the UK for Panamanian innovators to understand more about how companies operate in the bioeconomy space and the opportunities there are for this sector across the world.

UK development cooperation could support the development of the bioeconomy think tank, either financially or technically.

Capacity-building initiatives: FCDO could develop specialised training programmes targeting marginalised communities to increase their participation in bioeconomy value chains.

It may be possible to draw on UK-based expertise to expand access to microcredits and investment funds tailored to bio-entrepreneurs from marginalised communities.

5.3 Technology, science and innovation

Research agenda

The UK Embassy could support the government and civil society to generate more evidence on the following.

- The active participation of indigenous and Afro-descendant communities in the fields of ST&I, their academic trajectories and integration into these fields.
- The experiences of people with disabilities in STEM initiatives, and of older people in digital skills training.
- Women's and young people's experience in technology and technical fields, in addition to their experiences in science.
- The impact and scalability of STEM initiatives aimed at women and girls. Outcomes, in terms of adolescents' career choices, the academic and professional progress of university students in ST&I, and the effects of initiatives on transforming gender norms.

Areas of potential diplomatic cooperation and influence

It is recommended that the FCDO takes the following actions, engaging with the Government of Panama, ST&I ecosystem, and civil society as required.

Strengthen partnerships between the public and private sectors and civil society to reduce the impact of the care economy on women's training, employment and career advancement. Create an enabling ecosystem that supports

women's participation in the ST&I sector by investing in childcare. Additionally, encourage the redistribution of caregiving responsibilities within families to expand opportunities for women and girls in education and careers in ST&I, and support the agenda for more family-friendly policies to help women who are returning from maternity leave.

Encourage partnerships with the Ministry of Education of Panama (MEDUCA) to integrate gender-responsive and inclusive ST&I into national curricula to promote gender equality, disability and social inclusion in education policy in a more sustainable manner. Furthermore, prioritise STEM training for teachers, ensuring access to adequate resources and professional development.

Enhance gender equality, disability and social inclusion dimensions in research, data systems and knowledge generation, to analyse and understand the impact and scalability of STEM initiatives, especially in terms of the academic trajectories of women and youth and their integration into these fields.'

Expand digital infrastructure and scale up STEM initiatives, including digital skills training initiatives, with a particular focus on indigenous and Afro-descendant communities, women and girls, people with disabilities, and other marginalised groups. Support programmes like *Info Plazas* to bridge the digital divide, increase access to digital environments in remote and rural areas, and promote digital literacy at the home, school and community levels.

Strengthen partnerships with the national Government, academic institutions, vocational training centres and private sector technology companies to offer targeted mentorship, internships and career development programmes in the ST&I sectors specifically designed for women, girls and marginalised groups.

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Annexes

Table A1 Key informant interviews

Person/role/organisation	Topic(s) covered during interview
Nelva Arauz-Reyes, Gender Specialist, UNDP	Gender and social inclusion in ST&I in Panama
Jorge Bloise, Representative, National Assembly	Legislation in support of sustainable development
Hugo Chavarría, Manager, Innovation and Bioeconomy Programme, IICA; Executive Secretary, LATAM Bioeconomy Network	Understanding the work of the LATAM Bioeconomy Network and Panama's participation
Aura Cifuentes, Fellow, Investments Team, Co-Develop	Women's participation in innovation in LAC
Nadia de Leon, Researcher, International Centre for Political and Social Studies (ICPSS)	STEM initiatives in the education system
Ediner Fuentes, Deputy Director, Scientific Research and Technological Development, SENACYT	Collaboration with IICA on bioeconomy development
Maria Heller, Director of Innovation and Learning for Science and Technology, SENACYT	Gender and social inclusion in ST&I in Panama
Milagro Mainieri, Director for Research and Development, SENACYT	Gender and inclusion in scientific research and development
Carlos Maynor, Innovation Policy Adviser, SENACYT	Gender and social inclusion in ST&I
Eugenia Rodríguez Blanco, Professor, Researcher, International Centre for Political and Social Studies (ICPSS)	Gender and social inclusion in ST&I
Sandra Sharry, Director, National Research System (Sistema Nacional de Investigación), SENACYT	Development of the bioeconomy strategy
Adriana Sigüenza, Sustainable Development Officer, British Embassy in Panama	Support of the FCDO to the Latinamerican Bioeconomy Network and Panama's participation
Timothy Thomson, Director, Institute for Scientific Research and High Technology Services of Panama (INDICASAT)	Development of the bioeconomy think tank in Panama
Ivonne Torrez, Professor, University of Panama	Gender and social inclusion in ST&I
Francisco Trejos, Education Officer, UNICEF	STEM initiatives in the education system

Table A2 STEM Initiatives with GEDSI focus

Initiative/strategy/implementer/target/ partners	Description
Campamento STEAM en ROSA **Strategy**: Attracting girls and young women to STEM / mentorship **Implementers**: MEDUCA, SENACYT and ITSE **Target**: ITSE young students **Partners**: N/A	'STEAM en ROSA Camp is a programme that brings together young women students from professional and technical institutes passionate about STEAM fields. Participants will engage in interactive workshops, lab sessions, and talks from STEAM experts.' (Campamento STEM en rosa del ITSE)[35]
Campamentos STEM (STEM Camps) and Mentorship **Strategy**: Attracting girls and young women to STEM **Implementer**: SENACYT and Fundación Ciencia en Panama **Target**: Women, girls and adolescents **Partners**: N/A	'Workshops and meetings are organized between high school girls, university students, scientists, and engineers. One of the most important things is that the girls feel close to this role models.' (KII, Academic) 'STEM Camps have been organized for school-age girls and boys from the interior of the country , including indigenous students . Some of the participants have already graduated in medicine and others disciplines and had access to international scholarships and study abroad.' (KII Academic)
Chicas CampTech **Strategy**: Attracting girls and young women to STEM **Implementer**: SENACYT, City of Knowledge Foundation (Fundacion Ciudad del Saber) **Target**: Girls in secondary school **Partners**: N/A	CampTech is an initiative that aims to inspire college students girls to pursue STEM careers: 'Each year, 40 young women participate in a training programme that includes mentorship, technology workshops led by women engineers or engineering students. At the end of the program, they travel to Panama City for a week to finalize their projects,and connect with women entrepreneurs.' (KII, SENACYT)
Campeonas Solares (Solar Champions) **Strategy**: STEM training for energy transition **Implementer**: National Secretariat of Energy of Panama **Target**: Indiginous women in Ngabe-Buglé *comarca* **Partner**: IDB	As part of the Energy Transition Agenda 2020–2030, Panama launched the Solar Champions programme to address both gender and energy access disparities. Campeonas Solares has successfully graduated three cohorts of women in 2022, 2023 and 2024, with training sessions led by expert instructors from INADEH. Participants in this initiative have received training in the installation, operation and maintenance of isolated photovoltaic systems (solar panels), as well as in women's empowerment, personal finance and entrepreneurship. The project has employed 12 women from the region, providing them with economic compensation to serve as assistants to INADEH teachers. Notably, one of the solar champions is already employed at Empresa de Transmisión Eléctrica, S.A. (ETESA) (Campeonas solares).[36]

35 See: www.itse.ac.pa/Campamento-STEAM-en-Rosa-del-ITSE-empoderando-a-las-jovenes-a-aprender-carreras-enfocadas-en-ciencia-matematicas-y-tecnologia

36 See: www.youtube.com/watch?v=6bPMLeY8p7g&t=60s

Table A2 STEM Initiatives with GEDSI focus (continued)

Initiative/strategy/implementer/target/ partners	Description
Cybersecurity training **Strategy**: Attracting young women to STEM **Implementers**: ITSE, NUMU Group and BeDisruptive **Target**: ITSE young students **Partners**: IDB Lab	Through its Regional Center of Excellence in Cybersecurity (CREC), the Cybersecurity training initiative has certified 290 graduates (40% women) in managed security services (MSS), security operations centres (SOC) and ethical hacking. In response to the growing cyber threats in Panama, the programme links graduates with industry leaders. By promoting digital literacy and gender inclusion, this initiative contributes to closing the cybersecurity talent gap and creating more job opportunities for young professionals (Cybersecurity. NUMU, ITSE y IBD Lab).[37]
Hacia la U **Strategy**: Encouraging indigenous people to pursue a STEM career **Implementer**: SENACYT **Target**: Indigenous communities, Comarca Ngäbe Buglé **Partners**: N/A	'Hacia la U is an initiative that facilitates access to higher education for indigenous young people. To date, 35 students have received financial, logistical, and support in the education process to continue their university studies in engineering.' (KII, SENACYT)
JADENKÄ **Strategy**: Ethnomathematics **Implementer**: Ministry of Education **Target**: Indigenous children **Partners**: IDB Japan Special Fund; and the Organization of Ibero-American States (OEI)	JADENKÄ is a bilingual preschool mathematics programme in Panama that incorporates ethnomathematics, a cultural application of mathematics, into the national curriculum. **Impact** This approach enhances students' understanding of formal mathematics, boosts self-esteem and motivation to learn, values their cultural heritage, provides them with the skills students need to succeed within the two (or more) cultures they inhabit, and provides them with a sense of mastery and efficacy – self-confidence that improves learning in general (Näslund-Hadley et al., 2025).
Operación Solar **Strategy**: STEM training for energy transition **Implementer**: National Secretariat of Energy of Panama, **Target**: Young women university graduates **Partner**: Sustainable Energy for All (SEforALL), Ministry for Foreign Affairs of Iceland and the Austrian Development Agency	This initiative provided soft skills and activity-based technical training to three young women university graduates through their participation in Operación Solar, a national solar photovoltaic (PV) electrification project. Roselina Lindo, National Secretary of Energy of Panama, highlighted that '36% of professionals who started working in Panama's Energy Sector during the last 3 years were women. SEforALL's support for STEM trainees is a key building block to bring female talent in the energy transition era'. The project aims to provide solar power to 600 families, 10 schools and 5 communities across Panama with PV systems (SEforALL)[38]

37 See: www.itse.ac.pa/En-el-2024-mas-de-400-jovenes-capacitados-en-ciberseguridad-gracias-a-la-alianza-estrategica-NUMU-ITSE-y-BID-Lab

38 See: www.seforall.org/news/seforall-partners-with-government-of-panama-to-launch-stem-traineeship-in-panama

Table A2 STEM Initiatives with GEDSI focus (continued)

Initiative/strategy/implementer/target/ partners	Description
Pioneras de la ciencia (Pioneering women in science) porque fueron, somos; porque somos, serán' and Pelaítas de Ciencia: 9 Historias de nuestras pioneras (Gilrs in science : 9 stories from our pioneering women) **Strategy**: Awareness actions and eradication of gender stereotypes **Implementer**: SENACYT **Target**: All, specially women and girls **Partners**: N/A	Pioneras de la ciencia:[39] 'This is a biographical research project with a gender focus on the first women scientists in Panama and their contributions. The project aims to generate knowledge about gender inequalities in science through the analysis of the lives and careers of these pioneering women while at the same time creating references to stimulate or promote the scientific careers of young Panamanian women.' (KII, SENACYT, Academic) This initiative includes the books *Pioneras de la Ciencia en Panamá* and *Pelaítas de Ciencia*:[40] Nine stories of our pioneers for children, through the biographies of women scientists whose lives are an inspiration for the promotion of scientific careers from childhood (SENACYT, 2023).
Red Nacional de Rincones Club House **Strategy**: Digital skills development **Implementer**: SENACYT **Target**: Children and adolescents **Partners**: N/A	The National Network follows the learning model of The Club House Network.[41] It has eight locations across the country, including one in the Ngäbe-Buglé region, where the Nuäre ni Jakwe Clubhouse ('small technological family') provides access to technological facilities (tools, equipment and gadgets) (Red Nacional de Rincones Clubhouse).[42]
Technovation Girls **Strategy**: Attracting girls and young women to STEM **Implementer**: SENACYT **Target**: Girls in secondary school **Partners**: N/A	Technovation Girls[43] Panama equips young women (ages 8–18) to become tech entrepreneurs and leaders. With the support of volunteer mentors and parents, girls work in teams to code mobile apps that address real-world problems (Technovation).

39 See: https://pionerasdelaciencia.senacyt.gob.pa/
40 See: https://pionerasdelaciencia.senacyt.gob.pa/wp-content/uploads/2023/05/LIBRODECUENTOSPELAITASDECIENCIASFINAL.pdf
41 See: https://theclubhousenetwork.org/
42 See: https://rinconesclubhouse.org/
43 See: https://technovationgirlspanama.org/

Table A3 Latin American Bioeconomy Network, members and key information

Participating countries	1. Argentina 2. Bolivia 3. Brazil 4. Chile 5. Colombia 6. Costa Rica 7. Ecuador 8. Mexico 9. Uruguay 10. Paraguay
Types of member institutions	1. National ministries and secretariats (for example, environment, agriculture, economy) 2. Research centres and universities 3. Agricultural sector guilds and associations 4. International and cooperation organisations
Participating international organisations	1. AAPRESID 2. Allbiotech 3. Biointropic 4. Biotec Corporation of Cali 5. CREA 6. German Development Cooperation (GIZ) 7. Getulio Vargas Foundation 8. Global Green Growth Institute (GGGI) 9. Grid Exponentia 10. Humboldt Institute 11. iGEM 12. Inter-American Development Bank (IDB) 13. RedBio 14. SF500 15. Stockholm Environment Institute (SEI) 16. Tropical Agricultural Research and Higher Education Center (CATIE) 17. UNDP's BIOFIN Initiative 18. UNESCO
Objectives and priorities	The main objective of the network is to unite public and private efforts to advance sustainable development in the region through bioeconomy. Its priorities include: • defining metrics for measuring and evaluating bioeconomy • governance of regional, national and local bioeconomies • promoting bioeconomy positioning in international negotiation spaces • awareness-raising and communication on the potential and risks of bioeconomy • accelerating and scaling up bioeconomy solutions • developing country-specific, territorial and value-chain bioeconomy approaches The network also aims to develop a joint strategic plan and to create an international advisory committee to strengthen regional and global cooperation in bioeconomy.

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