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Women for Science: Inclusion and Participation in Academies of Science

A Survey of
the Members of IAP:
The Global Network of Science
Academies

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The Academy of Science of South Africa (ASSAf) was inaugurated in May 1996. It was formed in response to the need for an Academy of Science consonant with the dawn of democracy in South Africa: activist in its mission of using science and scholarship for the benefit of society, with a mandate encompassing all scholarly disciplines that use an open-minded and evidence-based approach to build knowledge. ASSAf thus adopted in its name the term 'science' in the singular as reflecting a common way of enquiring rather than an aggregation of different disciplines. Its Members are elected on the basis of a combination of two principal criteria, academic excellence and significant contributions to society.

The Parliament of South Africa passed the Academy of Science of South Africa Act *(Act 67 of 2001)*, which came into force on 15 May 2002. This made ASSAf the only academy of science in South Africa officially recognised by government and representing the country in the international community of science academies and elsewhere.

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Acronyms and Abbreviations

AAS	Australian Academy of Science
AASSA	Association of Academies and Societies of Sciences in Asia
AMC	*Academia Mexicana de Ciencias*
ASSAf	Academy of Science of South Africa
ASTII	African Science and Technology Indicators Initiative
BAS	Bangladesh Academy of Sciences
BIS	Department of Business Innovation and Skills, United Kingdom
CREST	Centre for Research on Evaluation, Science and Technology
CSTD	UN Commission on Science and Technology for Development
CWSEM	Committee for Women in Science, Engineering and Medicine
DRC	Democratic Republic of the Congo
Eurostat	Statistical Office of the European Union
FTE	Full-time equivalent
GAB	Gender Advisory Board of the UNCSTD
GAB-Brazil	Brazilian Chapter of the Gender Advisory Board
GenderInSITE	Gender in Science, Innovation, Technology and Engineering
IAC	InterAcademy Council
IAMP	InterAcademy Medical Panel
IANAS	Inter-American Network of Academies of Science
IAP	The Global Network of Science Academies
IAS	Islamic World Academy of Sciences
ICT	Information and communications technology
INSA	Indian National Science Academy
Lattes	Directory of Research Groups, Brazil
NAS	National Academy of Sciences, USA
NASAC	Network of African Science Academies
NEPAD	New Partnership for Africa's Development
NIST	National Institute of Standards and Technology, USA
OECD	Organisation for Economic Co-operation and Development
OWSD	Organisation for Women in Science for the Developing World
RICYT	*La Red de Indicadores de Ciencia y Tecnología:* Ibero- and Inter-American Network on Science and Technology Indicators
S&T	Science and Technology

SAGE	Science in Australia Gender Equity
SAHS	Swiss Academy of Humanities and Social Sciences
SAMS	Swiss Academy of Medical Sciences
SATW	Swiss Academy of Engineering Sciences
SCJ	Science Council of Japan
SCNAT	Swiss Academy of Sciences
SPRU	Science Policy Research Unit
STEM	Science, Technology, Engineering and Mathematics
STEMM	Science, Technology, Engineering, Mathematics and Medicine
STI	Science, Technology and Innovation
TWAS	The World Academy of Sciences
TWOWS	Third World Organisation for Women in Science (now OWSD)
UIS	UNESCO Institute for Statistics
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
US	United States
USA	United States of America
WAAS	World Academy of Art and Sciences
WfS	Women for Science
WG	Working group

Message from ASSAF President

Message from the ASSAf President

Academies of science play a critical dual role. They recognise scientific excellence through election into their membership, eminent scientists in a nation; and mobilise their members to provide objective evidence-based science advice on issues of national, regional and global importance. For academies of science to successfully fulfil their mandate, the inclusion of both male and female members in their operations is of utmost importance.

This report presents the first comprehensive survey of academies of science globally regarding women's representation in membership, governance and academy activities. The survey findings show that there continues to be low representation of women in all areas stated above.

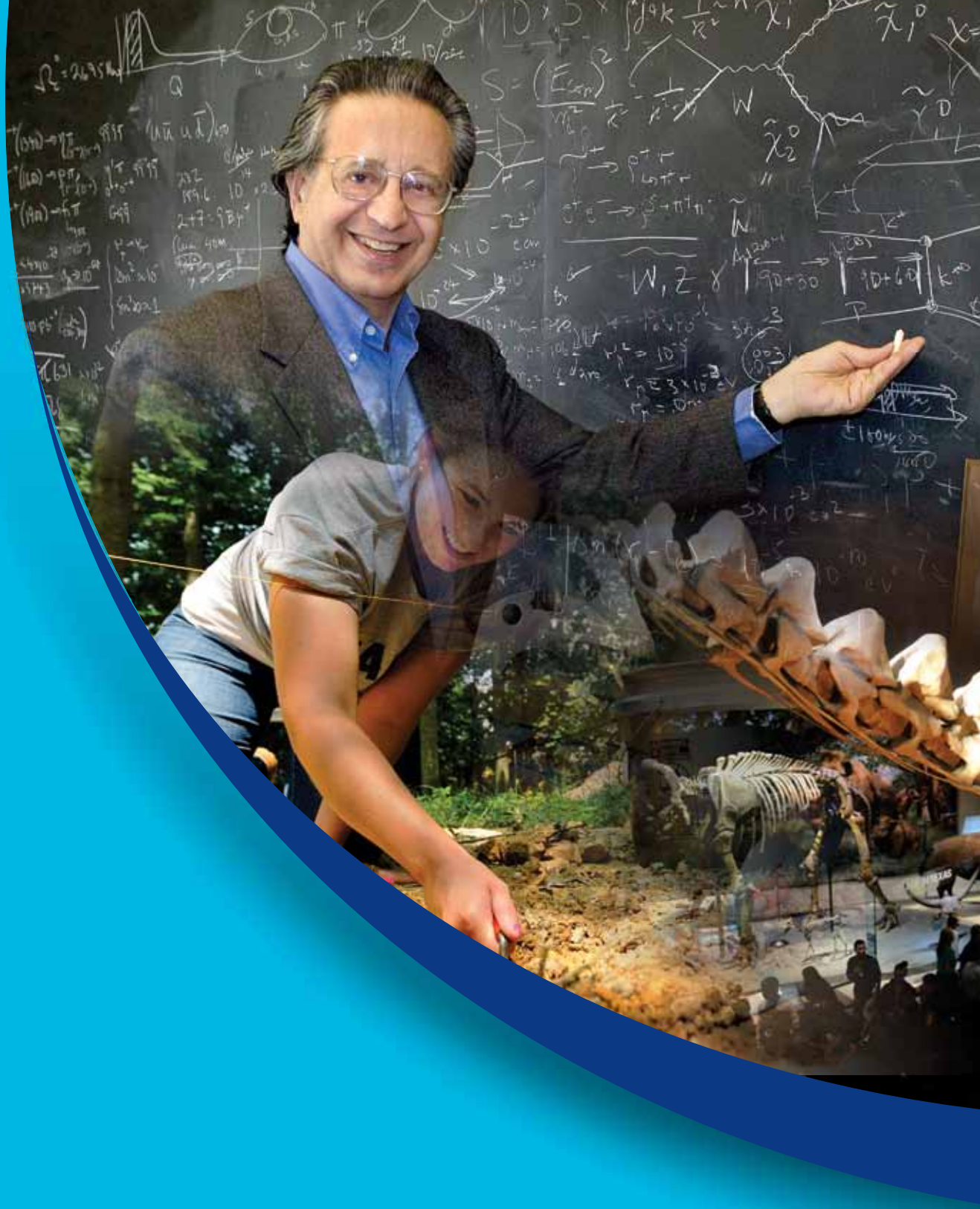
The findings of this report and its recommendations should be used as a guideline for academies of science, globally, to develop strategies on increasing women's participation in academy activities. It should also provide stimulus for action by IAP: The Global Network of Science Academies* and its member academies to collect and report gender-disaggregated data on an annual basis.

The collection, analysis and reporting of gender-disaggregated data allows academies to introspect on their role as advocates for the increased participation of girls and women, not only within themselves but also in a nation's science system. It also allows for increased discussions on the importance of applying the gender lens in the conceptualisation and implementation of academy activities, with a specific focus on their science advisory activities.

The Academy of Science of South Africa (ASSAf) is honoured to have participated in the implementation of this global project. The Organisation for Women in Science for the Developing World (OWSD), the Inter-American Network of Academies of Science (IANAS), and the Network of African Science Academies (NASAC) are thanked for partnering with the Academy in carrying out this task.

Professor Daya Reddy
President: Academy of Science of South Africa (ASSAf)

* Over the past two decades, academies of science and medicine have aligned themselves into three major global networks – IAP: The Global Network of Science Academies, the InterAcademy Council (IAC) and the InterAcademy Medical Panel (IAMP) – in order to build on and amplify their individual strengths when facing pressing global issues. These three inter-related organisations have now formed an umbrella organisation – the InterAcademy Partnership (IAP) – bringing together established global networks of academies with the goal of maximising the contributions of science toward understanding and solving the world's most challenging problems.



Foreword

Foreword

For many years, IAP – The Global Network of Science Academies – has promoted the role of women in science. Although great strides have been made in enrolling more women in undergraduate courses, especially in the biological and chemical sciences (success has been more limited in the areas of physics, mathematics and engineering), there remains significant challenges in ensuring that the best women scientists are able to have fulfilling careers with increasing levels of responsibility, eventually taking up leadership and decision-making positions. All too often we resort to metaphors such as the 'glass ceiling', 'sticky floor', or 'leaky pipeline', to describe how fewer and fewer women are present at advanced career levels.

As this report, *Women for Science: Inclusion and Participation in Academies of Science* demonstrates, this situation is reflected in the membership of academies – whereby members are elected based on their excellence in science.

IAP – The Global Network of Science Academies, is a network of 111 merit-based science academies, and aims to enhance the role of science academies in society. It seeks to do this by building the capacity of its member academies through the organisation of events on critical science-based issues, as well as through its affiliated regional networks of academies, and by forging partnerships with other scientific institutions that share our values and vision. Indeed, at the time of releasing this report, IAP is in a transition phase. We will be re-branded as 'IAP for Science' within the InterAcademy Partnership, a new umbrella organisation that brings together IAP, the InterAcademy Medical Panel (IAMP) and the InterAcademy Council (IAC).

A central focus of IAP's mission is to reach out to society and participate in discussions on critical global issues in which science plays a crucial role. In the 21st century, that means virtually every major issue facing society, and very much includes the active participation of women in science. We therefore are delighted to see the publication of the results of a survey of our member academies undertaken over the past year: Women for Science: Inclusion and Participation in Academies of Science.

We very much hope that the findings of this report and its recommendations will be used as a guideline for academies to develop strategies on increasing women's participation in their activities. We also hope that the recommendations will be heard, read and acted upon. We encourage the report to be made available to prominent decision-makers and the media across the globe, and to be presented to diplomats and public officials during international conferences and summits, discussed at conferences attended by national leaders, and translated into other languages to increase its visibility and impact. By distributing this report to the broadest audience possible, we expect that it will catalyse meaningful dialogue – and be converted into meaningful actions – on the issue of women's representation in leadership positions that continues to be of importance to society.

Finally, we wish to thank the cooperative efforts of the IAP secretariat in Trieste, Italy, the Academy of Science of South Africa and of course those IAP member academies that have contributed data to the survey. Without these contributions, the completion of this landmark report would not have been possible.

Mohamed Hassan and Volker Ter Meulen
Co-chairs

IAP, The Global Network of Science Academies (IAP for Science of the InterAcademy Partnership)

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- The study researcher, Dr Nelius Boshoff, for conceptualising and coordinating the finalisation of the online survey, analysing the survey results, and compiling the survey report. Dr Boshoff has a PhD in Science and Technology Studies from Stellenbosch University. Over the years he has worked extensively in the field of Science Studies, at the Centre for Research on Evaluation, Science and Technology (CREST), Stellenbosch University, where he is employed as a Senior Lecturer.
- The Inter-American Network of Academies of Sciences (IANAS), the Organisation for Women in Science for the Developing World (OWSD) and the Network of African Science Academies (NASAC) for partnering with ASSAf in implementing this project.
- Thought leaders who contributed to strengthening the draft report:

a. Shirley Malcom: Director, Education and Human Resources Programmes, American Association for the Advancement of Science; Co-chair, GenderInSITE; and Co-chair, UN Commission on S&T for Development.

b. Sudha Nair: Member, Gender Advisory Board, United Nations Commission on Science and Technology for Development, India.

c. Geoffrey Oldham: former Director of the Science Policy Research Unit (SPRU) at the University of Sussex; former Science Adviser, International Development Research Centre in Canada; former Chairman, Gender Working Group UN Commission on Science Technology for Development (CSTD); former Rapporteur of the Gender theme at UNESCO's World Science Conference in Budapest; member of Gender Advisory Board of CSTD; member of GenderInSITE Coordinating Committee; and member of the international panel that prepared the Council of Canadian Academies' report on *Strengthening Canada's Research Capacity: The Gender Dimension*.

d. Johanna Levelt Sengers: Scientist Emeritus, Material Measurement Laboratory, National Institute of Standards and Technology (NIST), USA; Co-chair, Women for Science Programme, 2010 through 2013 Inter-American Network of Academies of Science (IANAS); Co-chair, IAC Advisory Panel on Women for Science, 2004 – 2005; member, US National Academy of Sciences; and member, US Academy of Engineering.

e. Jennifer Thomson: Emeritus Professor, Department of Molecular and Cell Biology, University of Cape Town; L'Oréal/UNESCO prize for Women in Science for Africa in 2004; member, South African National Advisory Council on Innovation Board; Member, Academy of Science of South Africa; and chair, OWSD South Africa National Chapter.

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Executive Summary

Executive Summary

Background

This report documents the results of the first comprehensive survey of member academies of IAP: The Global Network of Science Academies to ascertain the inclusion and participation of women scientists. The report incorporates the findings of two related surveys, which focused on the following aspects of women's participation in science academies:

Both surveys were supported by IAP: The Global Network of Science Academies and enjoyed the support of the Organisation for Women in Science for the Developing World (OWSD) and the Network of African Science Academies (NASAC).

- Academy membership and women's participation in academy governance structures.
- Disciplinary breakdown in academy membership.
- Involvement of women in other academy activities.

The Inter-American Network of Academies of Sciences (IANAS) took responsibility for a survey of its 19 member academies of IAP (covering North America, Latin America and the Caribbean), whereas the Academy of Science of South Africa (ASSAf), conducted a survey of IAP member academies in the other world regions. The combined surveys generated 72 useable questionnaires: 69 from the national science academies and three from the global science academies. This corresponds to a response rate of 63% for the national science academies.

Findings

- The average share of women members, across 69 national science academies, was 12%.
- At 30 from a total of 69 science academies, the share of women members was either 10% or less.
- The two national academies with the largest shares of women members are both IANAS members: the Cuban Academy of Sciences (27%) and the Caribbean Academy of Sciences (26%). The national science academies of Mexico, Nicaragua, Peru, Uruguay and Honduras – all IANAS members – are among the list of the top 10 academies with the largest shares of women members.
- Women are 'best' represented in the social sciences, humanities and arts (16% of all members in this discipline, across all science academies, are women), followed by the biological sciences (15%) and the medical and health sciences (14%). Women's representation as academy members is least in the mathematical sciences (6%) and engineering sciences (5%).

- Figures for the three global science academies – Islamic World Academy of Sciences (IAS), the World Academy of Art and Science (WAAS) and The World Academy of Sciences (TWAS) – show a similar picture: women are 'best' represented among academy members in the social sciences and humanities.
- The share of women serving on the academy governing body (20%) markedly exceeded the share of women in the academy membership (12%).
- The average share of women on the governing body was lowest (17%) for the subset of national academies admitting members in all disciplines (compared to 20% for academies admitting members only in the natural/physical/pure sciences).
- The National Academy of Sciences in the US (47%), together with two European academies (in Switzerland and Sweden, both 47%), have the best representation of women as members of the governing body. Outside Europe, three IANAS members are also worth mentioning: Cuba (40%), Canada (38%) and Panama (38%). Relatively high shares are also recorded for three other European academies: the Netherlands (43%), the UK (40%) and Ireland (36%).
- Seventeen per cent of the 53 national academies surveyed by ASSAf reported either their current or previous president/chair to be a woman. The percentage of academies with a current/past female head was highest for academies that admit members in all disciplines (19%).
- The ASSAf survey asked whether the academy had any document (e.g. strategy, policy or founding document) that explicitly mentioned the need for increased participation by women in the academy's activities. A similar question was asked in the IANAS survey, where the focus was on whether the academy had a gender policy. Of the 68 academies that answered either question, 27 (40%) responded in the affirmative.
- Thirteen (26%) out of 50 academies in the ASSAf survey said that they had a programme(s) on "Women in Science". The notion of "programme" was broadly interpreted, although one could discern a focus on programmes and incentives to attract girls and young women to science careers, as well as how to ensure their continued participation in the science enterprise.
- The IANAS survey asked the academies to elaborate on the nature of activities that involve participation by women. Evidence-based panels and especially committees were mentioned by 12 academies. With regard to women chairing such committees, five academies stated that it was indeed the case and so specified the committees concerned: geography and environment; environment and health; women in science and education, social sciences; and humanities awards committee 2013. These reflect interests and disciplines that women are typically involved in. Women participate less in committees and structures that involve the natural and applied sciences such as physics, mathematics, engineering and related subjects according to the survey.
- Twelve (23%) out of 53 national academies in the ASSAf survey stated that they host a "Women in Science" award.

- Only 17% of academies in the ASSAf survey strongly agreed that they had increased their numbers of women scientists in the nomination pool for membership.
- About two-thirds of respondents in the ASSAf survey agreed that their national academy had made some progress in terms of the promotion of more women to decision-making levels (67%), the inclusion of more women in its panels and committees (65%) and in the academy's portrayal of science to the public (65%).
- Just over half (52%) agreed that the number of women in the nomination pool for prizes and awards had increased.
- For those national academies that also sponsor and evaluate research, the gender implications of such activities seem to be largely neglected. Only 38% and 28% of academies, respectively, reported sensitivity to the gender implications of their sponsored research and research evaluations.
- One of the key recommendations of the InterAcademy Council (IAC) report (2006) was the call for a gender-balanced committee to address gender/diversity issues, or at least someone to advise the academy on gender/diversity issues. Thirty-one (or 61%) of 51 science academies in the ASSAf survey did not have either of the above. A third of academies (33%; 17 academies) said that they have an established infrastructure (i.e. a dedicated committee), while the remainder (6%; three academies) relied on the input and guidance of individuals.
- The IANAS survey included an open question as to whether the academy actively promotes women and gender issues in its structures, decision-making and programmes. Five academies answered "no" to this question and three failed to answer. One stated that although they were not actively promoting women, they do not discriminate but welcome all members who are interested in pursuing science, regardless of race or gender. Of the remaining eight academies, the most common answers revolved around a number of internal and external efforts. Increased participation of women in the board of directors was mentioned several times as was the increasing participation in national and international events through personal activity, and also support to publish scientific papers. Supporting and nominating women for positions in larger international organisations was also mentioned.

Recommendations

1) IAP member academies should annually collect, analyse and report gender-disaggregated data on their respective membership and activities.
2) The IAP should publish gender-disaggregated data of its member academies in its annual report.
3) The IAP annual report should report on the gender dimensions of IAP's internal activities.
4) IAP member academies should establish permanent organisational structures that provide strategic direction and implement the academy's gender main-streaming activities. Where applicable, it is advised that either a "Women or Gender in Science, Technology and Innovation (STI) Committee" or a National Chapter of OWSD be established. Such an entity will, among others:

- **Data Collection:** Coordinate and advocate for the annual collection, analysis and reporting of gender-disaggregated data by the academy and within the nation's STI system.
- **Advisory Function:** Provide strategic direction to the academy's governing council on targets and appropriate strategies for including more women in the academy's membership, governance, and activities.
- **Gender Equality:** Ensure a gender analysis is included in the academy's science advisory function and that measures are implemented to ensure women's participation in the academy's advisory activities.
- **Partnerships:** Promote and develop activities, programmes and projects that seek to advocate for gender equality in STI.
- **Partnerships:** Engage in strategic partnerships in support of gender equality and the academy's gender mainstreaming activities.
- **Research:** Advocate for relevant research into women's participation in science academies and in STI in general.
- **Policy Analysis:** Propose strategies for policy analyses where gender is a key variable, such as in issues related to establishing research agendas, health, food, education, biodiversity, and development.

Introduction

1 Introduction

In 2006, the InterAcademy Council (IAC) published a report titled, *Women for Science: An Advisory Report*, aimed at providing information and recommendations to academies of science on the importance of the full inclusion of women in science, technology and innovation (STI) activities. Academies of science have a dual mandate, to honour scientific excellence and provide evidence-based scientific advice in support of policy development to their governments and stakeholders. In order for this mandate to be fully realised, the recognition through academy membership and participation of women scientists in academies' science advisory activities is important. One of the recommendations of the IAC report was the importance of continually collecting gender-disaggregated data from science academies, and reporting these data regularly.

The present study aimed at undertaking the first comprehensive survey of IAP member academies to ascertain the inclusion and participation of women scientists. The survey comprised two parts. The first was a survey undertaken by the Inter-American Network of Academies of Sciences (IANAS) in North America, Latin America and the Caribbean (Appendix 1), and the second a survey that the Academy of Science of South Africa (ASSAf) co-ordinated, and which studied IAP member academies in other world regions. Both surveys were supported by IAP: The Global Network of Science Academies and also enjoyed the support of the Organisation for Women in Science for the Developing World (OWSD) and the Network of African Science Academies (NASAC).

Before discussing the survey methodology (Section 3) and main results (Section 4), a global overview of women's participation in science is given. The focus of this brief discussion is on women's share of researchers worldwide.

2 Global Overview of Women's Participation in Science

A global and comparative perspective of the participation of women in science is only as good as the quality and availability of gender-disaggregated data. The online portal of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Institute of Statistics (UIS, as of 17 December 2014) includes data, specifically with regard to the share of women researchers per country, for 138 out of 153 countries. The available figures – mostly reported as headcounts but also as full-time equivalents (FTEs) – do not always reflect current figures, which hinders any systematic comparison. Closer inspection shows that for 66% of the 138 countries, the most recent reporting year falls within the period 2010 to 2012, whereas 20% of countries have a reporting year between 2005 and 2009 and 14% a year between 1997 and 2004. Also, relatively "big" global players are included among the 15 countries not covered by the UIS as far as the percentage of women researchers is concerned. These include Brazil, China and the United States of America (USA), as well as other countries such as Australia, Benin, Canada, the Democratic Republic of the Congo, Jamaica, Niger, Peru and the United Arab Emirates.

These challenges aside, in 2012, UNESCO released a fact sheet on the representation of women as researchers, based on available UIS figures at that point in time. The fact sheet included, among others, a global map of women's shares of researchers, which has been reproduced as Figure 1.

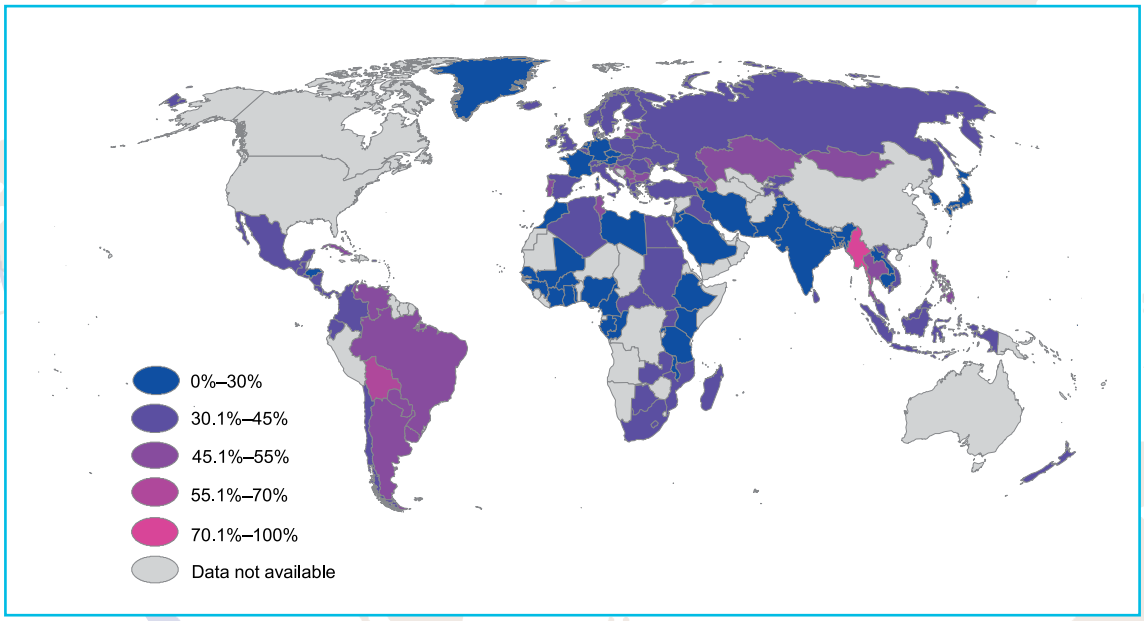

Figure 1: Women as a share of researchers

Source: UIS (2012). Women in science. UIS fact sheet, December 2012, No 23.

At the time of publication of the UIS fact sheet, only two countries in the world reported representation levels of women researchers that were significantly above the 50/50 mark (gender parity) – Myanmar in South East Asia and Bolivia in South America. In addition, only 25 countries (out of a total of 128) reported figures of between 45% and 55%. This means that altogether 27 countries (or 21%) either closely approached or exceeded the parity level, with 79% of countries falling just below or significantly below the parity level. The three countries with the smallest shares of women researchers were Ethiopia (7.6%, in 2010), Guinea (5.8%, in 2000) and Saudi Arabia (1.4%, in 2009). The same report also reported regional averages for 2009, based on then available data:

- Latin America and the Caribbean: 45%
- Oceania: 39%
- Africa: 35%
- Europe: 34%
- Asia: 19%

For the purpose of the current report, the online portal of the UIS (http://data.uis.unesco.org) was revisited (in June 2015) and data on the share of women researchers downloaded for all countries listed. Given the limitations of the UIS data, other sources were also consulted to extract data on the shares of women researchers. These

include the Organisation for Economic Co-operation and Development (OECD – stats.oecd.org), the European Commission (eurostat – ec.europa.eu/eurostat), the Ibero- and Inter-American Network on Science and Technology Indicators (RICYT – www.ricyt.org/comparatives), the African Science Technology and Innovation Indicators (ASTII) Initiative of NEPAD/African Union (www.astii.org), and the Directory of Research Groups in Brazil (Lattes-cnpq – http://lattes.cnpq.br/web/dgp/por-lideranca-e-sexo). Table 1 reports the relevant figures.

Table 1: Shares (%) of women researchers, by country

Country	%	Year	Source
Albania	44.3	2008	UIS
Algeria	34.8	2005	UIS
American Samoa			
Angola	27.1	2011	UIS
Argentina	51.2	2012	RICYT
Armenia	42.9	2011	UIS
Australia			
Austria	29.0	2011	eurostat
Azerbaijan	52.1	2011	UIS
Bangladesh	14.0	1997	UIS
Belarus	41.7	2011	UIS
Belgium	33.5	2011	eurostat
Benin			
Bermuda	45.5	2011	UIS
Bolivia	65.3	2010	RICYT
Bosnia and Herzegovina			
Botswana	30.8	2005	UIS
Brazil	49.7	2010	Lattes
Brunei Darussalam	40.6	2004	UIS
Bulgaria	48.6	2012	eurostat

Country	%	Year	Source
China, Macao Special Administrative Region	37.7	2011	UIS
Chinese Taipei (Taiwan)	22.0	2013	OECD
Colombia	37.8	2012	RICYT
Congo			
Costa Rica	43.0	2011	RICYT
Côte d'Ivoire	16.5	2005	UIS
Croatia	47.7	2012	eurostat
Cuba	48.4	2012	RICYT
Cyprus	37.3	2012	eurostat
Czech Republic	27.5	2012	eurostat
Democratic Republic of the Congo			
Denmark	34.8	2012	eurostat
Ecuador	37.6	2011	RICYT
Egypt	42.3	2011	ASTII
El Salvador	38.2	2012	RICYT
Estonia	44.0	2012	eurostat
Ethiopia	7.6	2010	UIS
Faeroe Islands	23.1	2003	UIS
Finland	32.2	2012	eurostat
France	25.6	2012	eurostat

Country	%	Year	Source
Honduras	26.5	2003	RICYT
Hungary	30.9	2012	eurostat
Iceland	37.3	2011	eurostat
India	15.0	2010	UIS
Indonesia	30.6	2005	UIS
Iran	26.6	2008	UIS
Iraq	34.2	2011	UIS
Ireland	32.4	2011	eurostat
Israel	23.5	2011	UIS
Italy	35.5	2012	eurostat
Jamaica			
Japan	14.6	2013	OECD
Jordan	22.5	2008	UIS
Kazakhstan	49.8	2011	UIS
Kenya	25.7	2010	ASTII
Korea Republic	18.2	2013	OECD
Kuwait	37.7	2011	UIS
Kyrgyzstan	43.2	2011	UIS
Lao People's Democratic Republic	23.0	2002	UIS
Latvia	52.8	2012	eurostat

Country	%	Year	Source
Burkina Faso	23.1	2010	UIS
Burundi	14.5	2011	UIS
Cabo Verde	39.8	2011	ASTII
Cambodia	20.7	2002	UIS
Cameroon	21.8	2008	UIS
Canada			
Central African Republic	41.5	2007	UIS
Chile	30.8	2012	RICYT
China			
China, Hong Kong Special Administrative Region			
Mauritius	19.9	1997	UIS
Mexico	31.6	2003	OECD
Moldova	48.0	2011	UIS
Monaco	50.0	2005	UIS
Mongolia	49.2	2011	UIS
Montenegro	49.9	2011	eurostat
Morocco	30.2	2011	UIS
Mozambique	32.2	2010	ASTII
Myanmar	85.5	2002	UIS
Namibia	43.7	2010	ASTII
Nauru	15.8	2003	UIS
Nepal	7.8	2010	UIS
Netherlands	24.1	2011	eurostat
New Zealand	52.0	2001	UIS

Country	%	Year	Source
Gabon	22.4	2009	UIS
Gambia	20.0	2011	UIS
Georgia	52.7	2005	UIS
Germany	26.8	2011	eurostat
Ghana	18.3	2010	ASTII
Greece	36.7	2011	eurostat
Greenland	27.4	2004	UIS
Guam			
Guatemala	44.7	2012	RICYT
Guinea	5.8	2000	UIS
Paraguay	51.7	2012	RICYT
Peru			
Philippines	52.3	2007	UIS
Poland	38.3	2012	eurostat
Portugal	45.0	2012	eurostat
Puerto Rico	42.0	2009	RICYT
Romania	45.1	2012	eurostat
Russia	40.9	2013	eurostat
Rwanda	21.8	2009	UIS
Saint Helena			
Saint Lucia	33.3	1999	UIS
Saint Vincent and the Grenadines			
Saudi Arabia	1.4	2009	UIS
Senegal	24.9	2010	ASTII

Country	%	Year	Source
Lesotho	31.0	2011	ASTII
Libya	24.8	2009	UIS
Lithuania	52.4	2012	eurostat
Luxembourg	24.0	2011	eurostat
Macedonia	52.6	2012	eurostat
Madagascar	35.4	2011	UIS
Malawi	19.5	2010	ASTII
Malaysia	48.7	2011	UIS
Mali	16.0	2010	ASTII
Malta	29.5	2012	eurostat
Sudan	40.0	2005	UIS
Sweden	37.2	2011	eurostat
Switzerland	32.4	2012	eurostat
Tajikistan	24.3	2011	UIS
Tanzania	25.4	2010	UIS
Thailand	51.1	2009	UIS
Togo	10.6	2010	ASTII
Trinidad and Tobago	43.8	2012	RICYT
Tunisia	47.4	2008	UIS
Turkey	36.2	2013	eurostat
Uganda	24.3	2010	ASTII
Ukraine	45.5	2011	UIS
United Arab Emirates			
United Kingdom	37.8	2012	eurostat

Country	%	Year	Source
Nicaragua	42.5	2002	RICYT
Niger			
Nigeria	23.3	2007	UIS
Norway	36.2	2012	eurostat
Oman	24.9	2011	UIS
Pakistan	27.2	2011	UIS
Palestine	24.9	2010	UIS
Panama	65.9	2011	RICYT

Country	%	Year	Source
Serbia	49.3	2011	eurostat
Seychelles	35.7	2005	UIS
Singapore	29.6	2012	OECD
Slovak Republic	42.7	2013	eurostat
Slovenia	35.8	2012	eurostat
South Africa	43.7	2012	OECD
Spain	38.8	2012	eurostat
Sri Lanka	36.8	2010	UIS

Country	%	Year	Source
United States of America			
Uruguay	49.6	2012	RICYT
Uzbekistan	40.9	2011	UIS
Venezuela	57.4	2011	RICYT
Vietnam	42.8	2002	UIS
Zambia	30.7	2008	UIS
Zimbabwe	25.3	2012	ASTII

Notes:
Headcounts of researchers are reported in all instances, except for India and Israel, where the reporting unit is the number of full-time equivalent researchers.

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned. The share of women researchers among total researchers in all institutional sectors is shown.

Shaded cells mean that no statistics on the shares of women researchers could be obtained for that country from any of the sources consulted. Figures are lacking for 18 countries: American Samoa; Australia; Benin; Bosnia and Herzegovina; Brazil; Canada; China; Congo; the Dominican Republic; the Democratic Republic of the Congo (DRC); Guam; Jamaica; Niger; Peru; St Helena; St Vincent and the Grenadines; the United Arab Emirates; and the United States of America. In the case of China, figures are available for only two special administration regions (Hong Kong and Macao).

Relevant figures are available for 137 countries in Table 1. For only 32 of these countries the share of women researchers exceeds 45%, which, depending on the figure, is either above or just below the parity mark. For a further 48 countries the corresponding figure is less than 30%. For the remainder of countries the shares of women researchers range between 31% and 44%. This wide-ranging set of figures (at country level) needs to be taken into account when viewing the shares of women members of science academies in the different countries.

The fact that information with regard to the shares of women researchers are "missing" for some countries in Table 1 does not mean that those countries do not collect any statistics about women's representation and participation in science. It could very well be because of different definitions and methodologies used in the measurement of a country's scientific workforce. The USA is a good example. The National Science Foundation reports gender-disaggregated figures but for categories of S&T workers other than researchers, such as employed scientists and engineers (http://www.nsf.gov/statistics/2015/nsf15311/tables.cfm). For instance, in 2013, women comprised 46% of all employed scientists and engineers in the USA.

3 Survey Methodology

The study was executed as two separate but related surveys. IANAS took responsibility for a survey of its 19 member academies of IAP (covering North America, Latin America and the Caribbean), whereas ASSAf, in South Africa, conducted a survey of IAP member academies in the other world regions. The two questionnaires used were not entirely identical but shared three common themes:

- Women's share of academy membership.
- Women's participation in academy governance structures.
- Academy-specific documents and initiatives that support the participation of women in the academy's activities.

The IANAS survey ran from January to June 2014. A relevant questionnaire was developed and forwarded to the presidents of the academies for completion. After several reminders, 17 of the 19 academies responded and submitted questionnaires. Most questionnaires were completed by the presidents, although academy staff members and IANAS Women for Science Working Group focal points also assisted when needed. Data analysis started in June 2014 and a first draft was presented to the Women for Science meeting in Ottawa, Canada, in September 2014. On the basis of the feedback received, additional data had to be requested from the academies. The two non-responding academies were also given a second chance to participate, which they did. The final report was sent to IANAS in May 2015, after consolidating and integrating the feedback received from individual academies.

The survey that ASSAf coordinated ran from June to September 2014, although the last completed response was only received in April 2015. An online questionnaire (See Appendix 2) was designed in *SurveyMonkey*. The IAP assisted with the survey by disseminating the call for participation among its respective member academies,

together with the hyperlink to access and complete the questionnaire online. However, 16 academies preferred to complete the MS Word copies of the questionnaire which they forwarded to the research team. These were then manually copied onto the online system. Member academies of IANAS were not directly targeted in the ASSAf survey although three IANAS members also submitted questionnaires (Brazil, Cuba and Guatemala).

ASSAf received a total of 53 useable questionnaires – or 50, if the three IANAS members that also participated in the other survey are excluded. In addition to the 50 usable submissions from national science academies, three global science academy members of IAP also submitted questionnaires.

Table 2 lists the 69 national academies that participated in either of the surveys. These academies are arranged by country and classified in terms of the nine world regions used by IAP. The three global academies (not reported in Table 2) are the Islamic World Academy of Sciences (IAS), the World Academy of Art and Science (WAAS) and The World Academy of Sciences (TWAS).

Table 2: The 69 national science academies that participated in the two surveys

Country	Academy	IAP world region
Albania	Academy of Sciences of Albania	South Eastern Europe
Argentina	National Academy of Exact, Physical and Natural Sciences	Latin America & the Caribbean
Australia	Australian Academy of Science	South East Asia & the Pacific
Austria	Austrian Academy of Sciences	Western & Northern Europe
Bangladesh	Bangladesh Academy of Sciences	South Asia
Bolivia	National Academy of Sciences of Bolivia	Latin America & the Caribbean
Bosnia and Herzegovina	Academy of Sciences and Arts of Bosnia and Herzegovina	South Eastern Europe
Brazil	Brazilian Academy of Sciences	Latin America & the Caribbean
Cameroon	Cameroon Academy of Sciences	Africa
Canada	Royal Society of Canada	North America
Caribbean	Caribbean Academy of Sciences	Latin America & the Caribbean
Chile	Chilean Academy of Sciences	Latin America & the Caribbean
China	Chinese Academy of Sciences	South East Asia & the Pacific
Colombia	Colombian Academy of Exact, Physical and Natural Sciences	Latin America & the Caribbean

Country	Academy	IAP world region
Costa Rica	National Academy of Sciences of Costa Rica	Latin America & the Caribbean
Croatia	Croatian Academy of Sciences and Arts	South Eastern Europe
Cuba	Cuban Academy of Sciences	Latin America & the Caribbean
Czech Republic	Academy of Sciences of the Czech Republic	Central & Eastern Europe
Dominican Republic	Academy of Sciences of the Dominican Republic	Latin America & the Caribbean
Egypt	Academy of Scientific Research and Technology	Africa
Ethiopia	Ethiopian Academy of Sciences	Africa
Finland	Finnish Academy of Science and Letters	Western & Northern Europe
France	*Académie des Sciences – Institut de France*	Western & Northern Europe
Georgia	Georgian National Academy of Sciences	Middle East & Central Asia
Germany	German National Academy of Sciences Leopoldina	Western & Northern Europe
	Union of the German Academies of Sciences and Humanities	Western & Northern Europe
Ghana	Ghana Academy of Arts and Sciences	Africa
Guatemala	Academy of Medical, Physical and Natural Sciences	Latin America & the Caribbean
Honduras	National Academy of Sciences of Honduras	Latin America & the Caribbean
Hungary	Hungarian Academy of Sciences	Central & Eastern Europe
India	Indian National Science Academy	South Asia
Ireland	Royal Irish Academy	Western & Northern Europe
Italy	*Accademia Nazionale dei Lincei*	Western & Northern Europe
Japan	Science Council of Japan	South East Asia & the Pacific
Kenya	Kenya National Academy of Sciences	Africa
Latvia	Latvian Academy of Sciences	Central & Eastern Europe
Malaysia	Academy of Sciences Malaysia	South East Asia & the Pacific
Mexico	*Academia Mexicana de Ciencias*	Latin America & the Caribbean

Country	Academy	IAP world region
Mongolia	Mongolian Academy of Sciences	South East Asia & the Pacific
Montenegro	Montenegrin Academy of Sciences and Arts	South Eastern Europe
Morocco	Hassan II Academy of Science and Technology	Africa
Netherlands	Royal Netherlands Academy of Arts and Sciences	Western & Northern Europe
New Zealand	Royal Society of New Zealand	South East Asia & the Pacific
Nicaragua	Nicaraguan Academy of Sciences	Latin America & the Caribbean
Nigeria	Nigerian Academy of Science	Africa
Pakistan	Pakistan Academy of Sciences	South Asia
Palestine	Palestine Academy for Science and Technology	Middle East & Central Asia
Panama	National Academy of Sciences of Panama	Latin America & the Caribbean
Peru	*Academia Nacional de Ciencias*	Latin America & the Caribbean
Poland	Polish Academy of Sciences	Central & Eastern Europe
Serbia	Serbian Academy of Sciences and Arts	South Eastern Europe
Slovenia	Slovenian Academy of Sciences and Arts	South Eastern Europe
South Africa	Academy of Science of South Africa	Africa
Spain	*Real Academia de Ciencias Exactas, Físicas y Naturales*	Western & Northern Europe
Sri Lanka	National Academy of Sciences of Sri Lanka	South Asia
Sudan	Sudanese National Academy of Sciences	Africa
Sweden	The Royal Swedish Academy of Sciences	Western & Northern Europe
Switzerland	Swiss Academies of Arts and Sciences	Western & Northern Europe
	Swiss Academy of Engineering Sciences	
	Swiss Academy of Humanities and Social Sciences	
	Swiss Academy of Medical Sciences	
	Swiss Academy of Sciences	
Tanzania	Tanzania Academy of Sciences	Africa

Country	Academy	IAP world region
Turkey	Turkish Academy of Sciences	Middle East & Central Asia
Uganda	Uganda National Academy of Sciences	Africa
United Kingdom	The Royal Society	Western & Northern Europe
United States	US National Academy of Sciences	North America
Uruguay	National Academy of Sciences of Uruguay	Latin America & the Caribbean
Venezuela	Venezuelan Academy of Physical, Mathematical and Natural Sciences	Latin America & the Caribbean

IANAS = "Latin America & the Caribbean" and "North America".

Two more academies (the Academy of Sciences of Mozambique and the Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten in Belgium) also provided online submissions in the ASSAf survey. However, the two academies are not included in the above table because of incomplete responses.

The Swiss Academies of Arts and Sciences is the "umbrella" academy in Switzerland. Its four constituencies (SATW, SAHS, SAMS and SCNAT) also completed and submitted individual surveys. Thus, a total of 69 completed (valid) surveys were received but only 65 of these represent "unique" organisations if the four Swiss constituencies are excluded and only the "umbrella" organisation counted.

The survey response (for national science academies) is 63%, according to Table 3. For the missing 37% it needs to be kept in mind that many of the IAP member academies targeted may not keep the requested gender-disaggregated statistics, or have limited staffing capacity to answer extensive requests. If one excludes the two regions covered by the IANAS survey, the regional representations are 'best' for South Asia (where four of the five IAP member organisations in the region completed questionnaires) and Western and Northern Europe (75%) and Africa (69%). Moreover, academies in Western and Northern Europe account for 18% of all questionnaires received, followed closely by African academies (17%). Together with the academies in Latin America and the Caribbean they are responsible for 61% of all questionnaires received.

Table 3: Survey response rates – Survey responses versus number of IAP national academy members, by world region

World region	Combined survey responses (Only national academies)		IAP members (Only national academies)		Survey response as % of IAP members
	Count	%	Count	%	
Africa	11	17%	16	16%	69%
Central & Eastern Europe	4	6%	11	11%	36%
Latin America & the Caribbean	17	26%	17	17%	100%
Middle East & Central Asia	3	5%	12	12%	25%
North America	2	3%	2	2%	100%
South Asia	4	6%	5	5%	80%
South East Asia & the Pacific	6	9%	13	13%	46%
South Eastern Europe	6	9%	11	11%	55%
Western & Northern Europe	12	18%	16	16%	75%
Total	**65**	**100%**	**103**	**100%**	**63%**

"Only national academies" means that global science academies have been excluded. The total survey count is listed above as 65 "unique" organisations (and not 69) because the four constituencies of the Swiss Academies of Arts and Sciences are excluded.

4 Results

4.1 Academy Membership

The science academies surveyed were asked to provide two sets of statistics. First, the total number of academy members and, second, the number of women academy members. In both instances a "member" was indicated to represent any person who is elected into the academy. It is recognised that various academies use different names for active members elected into an academy as part of the honorific function of academies. The two sets of statistics allowed for calculating the share of women academy members. Table 4 reports the share of women members for individual national science academies (63 academies in total) and Figure 2 presents the results in a global map. The two national academies ranked highest are both IANAS members; the Cuban Academy of Sciences (27%) and the Caribbean Academy of Sciences (26%). The national science academies of Mexico, Nicaragua, Peru, Uruguay, Honduras and Canada – all IANAS members – also feature on the list of the top ten academies with the largest shares of women members (between 23% and 16%). In terms of organisations ranked lowest, for 30 of the 63 science academies in Table 4 the share of women members is either 10% or less.

The average share of women members, across all 63 national science academies, is 12% (median = 11%).

Table 4: Women as percentage of members of national science academies, by individual academy (N=63)

Academy	Country	Total members	Women members	% Women
Cuban Academy of Sciences [**]	Cuba	313	85	27%
Caribbean Academy of Sciences [*]	Caribbean	223	57	26%
Academy of Sciences of the Czech Republic	Czech Republic	250	60	24%
Academy of Science of South Africa	South Africa	423	101	24%
Academia Mexicana de Ciencias [*]	Mexico	2 499	587	23%
Nicaraguan Academy of Sciences [*]	Nicaragua	30	7	23%
Academia Nacional de Ciencias	Peru	114	23	20%
National Academy of Sciences of Uruguay [*]	Uruguay	26	5	19%
National Academy of Sciences of Sri Lanka	Sri Lanka	136	25	18%
Latvian Academy of Sciences	Latvia	393	70	18%
National Academy of Sciences of Honduras [*]	Honduras	29	5	17%
Finnish Academy of Science and Letters	Finland	715	123	17%
Science Council of Japan	Japan	2 101	361	17%
Swiss Academy of Medical Sciences	Switzerland	222	38	17%
Royal Society of Canada [*]	Canada	2 108	346	16%
Academy of Sciences Malaysia	Malaysia	265	41	15%
Academy of Sciences and Arts of Bosnia and Herzegovina	Bosnia and Herzegovina	55	8	15%
Royal Irish Academy	Ireland	480	69	14%
Venezuelan Academy of Physical, Mathematical and Natural Sciences [*]	Venezuela	50	7	14%
National Academy of Sciences of Costa Rica [*]	Costa Rica	43	6	14%
Royal Netherlands Academy of Arts and Sciences	Netherlands	547	74	14%
Colombian Academy of Exact, Physical and Natural Sciences [*]	Colombia	190	26	14%

Academy	Country	Total members	Women members	% Women
Austrian Academy of Sciences	Austria	790	105	13%
Academy of Sciences of the Dominican Republic [*]	Dominican Republic	168	22	13%
Brazilian Academy of Sciences [**]	Brazil	506	64	13%
Uganda National Academy of Sciences	Uganda	56	7	13%
The Royal Swedish Academy of Sciences	Sweden	624	78	13%
US National Academy of Sciences (NAS)	United States	2 252	294	13%
Academy of Medical, Physical and Natural Sciences [***]	Guatemala	68	8	12%
Chilean Academy of Sciences [*]	Chile	75	9	12%
National Academy of Exact, Physical and Natural Sciences [*]	Argentina	34	4	12%
Ghana Academy of Arts and Sciences	Ghana	105	12	11%
Cameroon Academy of Sciences	Cameroon	83	9	11%
Academy of Sciences of Albania	Albania	39	4	10%
Croatian Academy of Sciences and Arts	Croatia	150	15	10%
German National Academy of Sciences Leopoldina	Germany	1 534	152	10%
Hassan II Academy of Science and Technology	Morocco	71	7	10%
Australian Academy of Science	Australia	479	46	10%
Swiss Academy of Engineering Sciences	Switzerland	263	25	10%
Serbian Academy of Sciences and Arts	Serbia	141	13	9%
Montenegrin Academy of Sciences and Arts	Montenegro	44	4	9%
Nigerian Academy of Science	Nigeria	160	14	9%
Royal Society of New Zealand	New Zealand	446	39	9%
Turkish Academy of Sciences	Turkey	197	17	9%
National Academy of Sciences of Bolivia [*]	Bolivia	47	4	9%
Real Academia de Ciencias Exactas, Físicas y Naturales	Spain	49	4	8%
Académie des sciences – Institut de France	France	485	38	8%
Pakistan Academy of Sciences	Pakistan	90	7	8%

Academy	Country	Total members	Women members	% Women
Georgian National Academy of Sciences	Georgia	103	8	8%
Bangladesh Academy of Sciences	Bangladesh	85	6	7%
Kenya National Academy of Sciences	Kenya	146	10	7%
Palestine Academy for Science and Technology	Palestine	75	5	7%
The Royal Society	United Kingdom	1 419	92	6%
Sudanese National Academy of Sciences	Sudan	78	5	6%
Indian National Science Academy	India	864	52	6%
Chinese Academy of Sciences	China	741	42	6%
Accademia Nazionale dei Lincei	Italy	530	28	5%
Slovenian Academy of Sciences and Arts	Slovenia	95	5	5%
Hungarian Academy of Sciences	Hungary	776	39	5%
Ethiopian Academy of Sciences	Ethiopia	102	5	5%
Mongolian Academy of Sciences	Mongolia	63	3	5%
Polish Academy of Sciences	Poland	533	22	4%
Tanzania Academy of Sciences	Tanzania	130	5	4%

Notes:

- *Five national academies did not provide any statistics to calculate the shares of women academy members. These include the Academy of Scientific Research and Technology in Egypt, the Union of the German Academies of Sciences, and the Swiss Academies of Arts and Sciences and two of its four constituent members (the Swiss Academy of Humanities and Social Sciences [SAHS] and the Swiss Academy of Sciences [SCNAT]). In the case of the Swiss Academies of Arts and Sciences it is because the SAHS and SCNAT do not have the system of individual members – their members are scientific unions with individuals from the relevant disciplines.*
- *Although the National Academy of Sciences of Panama participated in the IANAS survey, statistics for this academy are not included in the above table. The membership entry process for this science academy in Latin America is by application rather than election, which accounts for its higher share of women members (40%).*
- *The reference year for the survey conducted by ASSAf, as far as membership statistics are concerned, is 2013/2014. Academies could use one of two sets of figures: the 2013 intake of members in cases where elections for the 2014 intake had not yet occurred, or the 2014 member intake in cases where the relevant elections had already occurred.*

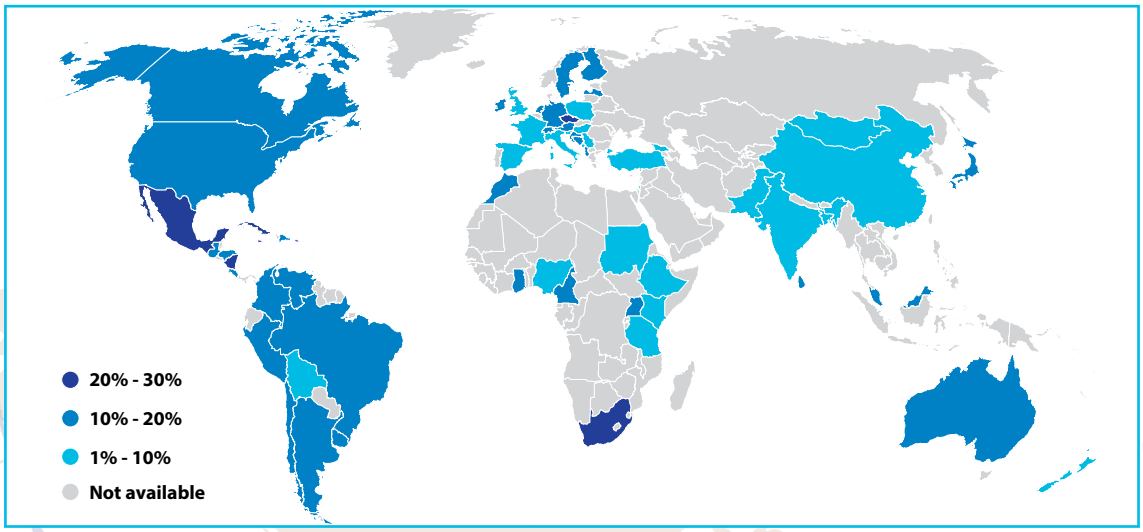

Figure 2 Women as percentage of members of national science academies, by individual academy

The ASSAf survey included an additional question as to whether the academy admits members in all disciplines or only members in the natural, physical or pure sciences. The share of women for the 33 academies that admit members in all disciplines, including the arts, engineering, humanities and social sciences, is 11%. The corresponding share in the case of the 15 academies that admit members only in the natural, physical or pure sciences is 10%.[1]

The IANAS survey, on the other hand, included a question as to whether an academy limits ('caps') its membership or is open to all newly qualified individuals. Seventeen of the 19 academies provided information. Of these, seven indicated that they restrict their membership whereas the rest maintain open membership.

The shares of woman members of the three global science academies appear in Table 5.

Table 5: Women as percentage of members of global science academies, by individual academy

Academy	Total members	Women members	% Women
World Academy of Art and Science	736	115	16%
The World Academy of Sciences	1 141	117	10%
Islamic World Academy of Sciences	105	9	9%

Table 6 compares the mean share of women academy members in each world region. Not surprisingly, based on what has already emerged from Table 4, the largest

[1] Forty-eight academies in the ASSAf survey completed this question – the 45 academies outside IANAS and the three IANAS members who also completed the ASSAf survey.

mean share (17%) is associated with Latin American and the Caribbean. Since the mean is sensitive to outliers, it is advisable to also focus on the median shares. The median represents the middle value and for that reason is unaffected by outliers at either end of the distribution of percentages. In terms of the median shares of women academy members, North America occupies the first place (15%), with Latin America and the Caribbean in close second place (14%). However, it needs to be remembered that the North American region includes only two national science academies. Both of these academies have exceptionally large membership figures, based on Table 4 above: the Royal Society of Canada (2 108, of which 16% are women members) and the US National Academy of Sciences (2 252, of which 13% are women members).

Table 6: Women as percentage of members of national science academies, by IAP world region

IAP world region	% Women		Number of academies	Standard deviation	Minimum	Maximum
	Mean	Median				
Africa	10%	10%	10	6%	4%	24%
Central & Eastern Europe	13%	12%	4	10%	4%	24%
Latin America & the Caribbean	17%	14%	16	5%	9%	27%
Middle East & Central Asia	8%	8%	3	1%	7%	9%
North America	15%	15%	2	2%	13%	16%
South Asia	10%	8%	4	6%	6%	18%
South East Asia & the Pacific	10%	10%	6	5%	5%	17%
South Eastern Europe	10%	10%	6	3%	5%	15%
Western & Northern Europe	11%	12%	12	4%	5%	17%
Total	**12%**	**11%**	**63**	**6%**	**4%**	**27%**

Note: The standard deviation refers to the variation in the shares of women members of the individual academies.

It was considered worthwhile to explore the relationship between, on the one hand, the share of women researchers in a country and, on the other hand, the share of women members of the national science academy in that country. This could only be done for a smaller subset (N=45), as only 45 of the science academies met the following criteria: the availability of a recent figure (i.e. a figure based on data for 2010, 2011, 2012 or 2013 – See Table 1) on the share of women researchers in the country where the academy is located, and a corresponding figure for the share of women members in the academy itself. Figure 3 visually displays the relationship by means of a scatterplot.

The correlation coefficient between the two variables is 0.223, which implies a relatively weak but positive correlation (Figure 3). This means that there is some relationship – although not very strong – for the share of women academy members to increase as the national share of women researchers also increases.[2] What seems clear, though, is that women's share of academy membership seldom exceeds 20%, and that the variations between academies are large.

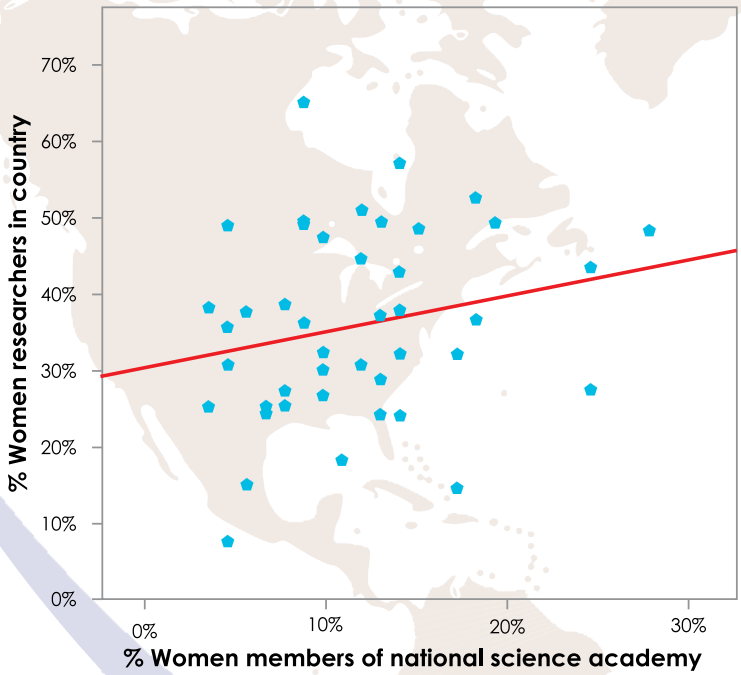

Figure 3: Relationship between the share of women researchers in a country and the share of women members of the national science academy in that country (N=45)

[2] If the correlation (Pearson r of 0.223) is squared to represent the coefficient of determination, a value of 0.050 is obtained (R^2). The latter means that only 5% of the variability in the percentages of women members of science academies can be accounted for by the shares of women researchers at national level. This still leaves 95% of the variability to be accounted for by other factors. Thus, other factors, other than women's representation as researchers at national level, seem to be relatively more important in explaining women's representation among members of science academies.

4.2 Academy Membership by Broad Discipline

The respondents in the survey that ASSAf co-ordinated were asked to specify the number of academy members in nine broad discipline groups. They also specified the number of women academy members in the same nine discipline groups. An "all other" option was included for when the academy's discipline did not match any of the nine groups provided. The IANAS survey, on the other hand, used 10 broad disciplinary groups, together with an "other" option. The alignment between the two classifications is as follows:

Broad disciplines used in survey by ASSAf		**Broad disciplines used in survey by IANAS**
Agricultural sciences	:	–
Biological sciences	:	Biology
Computer sciences/ICT	:	Computer science
Earth and environmental sciences	:	Earth sciences
Engineering sciences	:	Engineering
Mathematical sciences	:	Mathematics
Medical and health sciences	:	Life/health/medical
Physical and chemical sciences	: : :	Astronomy Chemistry Physics
Social sciences, humanities and arts	:	Social science
Other	:	Other

For the purposes of this report, the broad disciplines in the IANAS survey were mapped onto those in the ASSAf survey. Having two sets of figures (i.e. total number of all members *versus* total number of women members) for each of these nine disciplines, allowed for the calculation of the share of women academy members in each discipline group. Appendix 3 reports these shares by individual academy. However, in order to facilitate better understanding of Appendix 3, two summaries of the data are first presented (Figure 4 and Table 7).

Figure 4 shows, for each of the nine broad disciplines, the mean share of women members across all the science academies that completed the relevant items in the survey. The figure ranges from as high as 22% (biological sciences) to as low as 5% (engineering sciences). However, given that there are large size differences between the individual science academies as far as the mean share of women members is concerned (Table 8), it would be more appropriate to report the median share instead. Following this suggestion, we witness three broad disciplines where the median share of women members per science academy equals zero. These are computer sciences/ICT, mathematical sciences and engineering sciences, respectively. (See also the footnote to Figure 4.)

The objective of Table 7 is to further underscore the wide-ranging figures provided by the different science academies – not only with regard to the share of women members by broad discipline (top half of Table 7) but also in relation to the total number of members of science academies in those broad disciplines (lower half of Table 7). A focus on the set of minimum and maximum values illustrates this point well. For instance, in four of the nine broad disciplines the percentage of women members ranges between 0% (minimum) and 100% (maximum). This means that at least one academy reported zero women academy members in a certain field whereas another academy reported only women academy members (100%) in that same field. Moreover, in most cases at least one academy specified a broad discipline to be composed of a single academy member (See the lower part of Table 7 – agricultural sciences, biological sciences, computer sciences/ICT, etc.). Specific examples from Appendix 3 are, for instance, the Academy of Sciences of Albania (only one academy member in agricultural sciences – Appendix Table 3.5), the Academy of Sciences and Arts of Bosnia and Herzegovina (only one academy member in biological sciences – Appendix Table 3.5) and the Nigerian Academy of Science (only one academy member in computer sciences/ICT – Appendix Table 3.1).

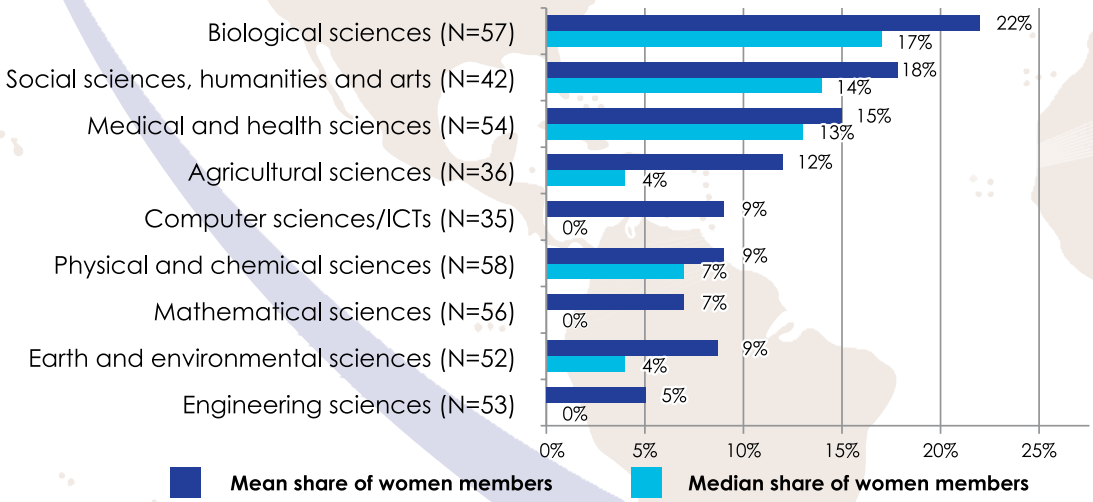

Figure 4: Women as percentage of members of national science academies, expressed as mean and median shares respectively, by broad discipline group

Note: A median value of 0% is possible. To illustrate: 35 academies reported that they have at least one member in the field of computer sciences/ICT. Of these 35 academies, 15 reported that at least 1% of members in this field are female; the remaining 20 academies reported 0% female representation. Since the median is the midmost value of a set of scores – in this case an even set of scores – it is calculated as sitting halfway between the 15th score (which is 0%) and the 16th score (also 0%), thus yielding a value of 0%.

Table 7: Descriptive statistics for women as percentage of members of national science academies, by broad discipline group

	Agricultural sciences	Biological sciences	Computer sciences/ICT	Earth & environmental sciences	Engineering sciences	Mathematical sciences	Medical & health sciences	Physical & chemical sciences	Social sciences, humanities & arts
Number of academies	36	57	35	52	53	56	54	58	42
Women as % of members of national science academies									
Mean % per academy	12%	22%	9%	9%	5%	7%	15%	9%	18%
Median % per academy	4%	17%	0%	4%	0%	0%	13%	7%	14%
Standard deviation	22%	22%	20%	11%	9%	16%	11%	9%	15%
Minimum %	0%	0%	0%	0%	0%	0%	0%	0%	0%
Maximum %	100%	100%	100%	40%	50%	100%	44%	40%	70%
Number of total members (men and women) of national science academies									
Mean number per academy	20	57	17	28	39	25	60	75	124
Median number per academy	11	17	7	14	16	12	26	31	49
Standard deviation	25	93	26	32	62	30	85	111	188
Minimum number	1	1	1	1	1	1	1	2	1
Maximum number	130	443	116	125	319	139	444	672	925

Note: The standard deviation refers to the (1) variation in the shares of women members reported by the individual academies in each broad discipline group and (2) variation in the numbers of total members reported by the individual academies in each broad discipline group.

Table 8 ignores the breakdown by individual academy and reports the share of women science academy members by broad discipline group. Women are 'best' represented in the social sciences, humanities and arts (16% of all members in this discipline, across all science academies, are women), followed by the biological sciences (15%), and the medical and health sciences (14%). Women's representation as academy members is least in the mathematical sciences (6%) and engineering sciences (5%). The latter comes as no surprise as it is commonly known that engineering and mathematics are two science areas where women's professional participation remains critically low. In the USA, for instance, women comprised only 15% of all employed engineers in 2013, according to the country's National Science Foundation (http://www.nsf.gov/statistics/2015/nsf15311/tables.cfm).

Table 8: Women as percentage of members of national science academies, by broad discipline group

Broad discipline	Total number of members (summed across 61 academies)	Total number of women members (summed across 61 academies)	% Women members
Social sciences, humanities and arts	5 218	858	16%
Biological sciences	3 276	493	15%
Medical and health sciences	3 246	457	14%
Agricultural sciences	705	69	10%
Physical and chemical sciences	4 351	342	8%
Earth and environmental sciences	1 474	119	8%
Computer sciences/ICT	599	43	7%
Mathematical sciences	1 401	80	6%
Engineering sciences	2 044	111	5%
Other disciplines	1 142	238	21%

Note: The broad discipline groups are not always mutually exclusive as the same individuals could have been counted in more than one discipline because of multiple disciplinary classifications.

Figure 5 presents the results of Table 8 differently in order to determine 'clusters' of broad disciplines. As can be seen, the fields of computer sciences/ICT and agricultural sciences are similar in that both have small membership totals (less than 1 000 if one sums the membership figures for all 61 national science academies). However, they also differ because of agriculture's markedly larger share of women academy members (10% *versus* 7%). The next "cluster" consists of three broad disciplines: mathematical sciences; earth & environmental sciences; and engineering sciences. What these fields have in common are membership totals of between 1 000 and 2 000 and an associated women representation of 5% – 8%. Next, biological sciences and the medical and health sciences tend to group together, with relatively 'high' shares of women representation (14% – 15%) and membership totals of above 3 000. The two largest broad disciplines – physical and chemical sciences, on the one hand, and the social sciences, humanities and arts, on the other – also represent two separate groups. Of these social sciences has the 'better' women representation (16% *versus* 8%).

As a follow-up to this study it would need to be established whether certain disciplines are under-represented in some academies because of the criteria for selection or, differently put, because of the fields of science that are eligible for membership

in academies. For example, a country may have a significant number of women researchers in the social sciences but the criteria for membership in that country's academy may not include the social sciences.

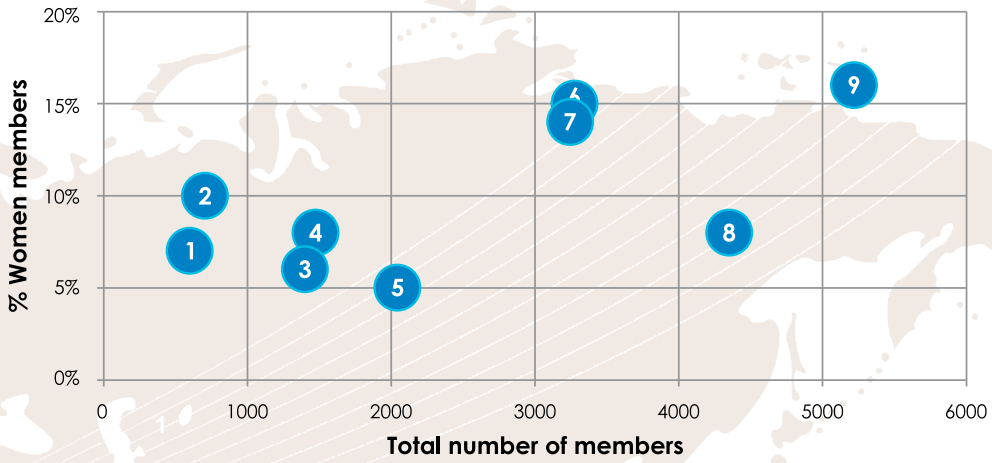

Figure 5: Women as percentage of members of science academies in nine broad disciplines, plotted against the total number of members in each discipline across 61 academies

Legend: 1 = Computer sciences/ICT (7% women); 2 = Agricultural sciences (10% women); 3 = Mathematical sciences (6% women); 4 = Earth & environmental sciences (8% women); 5 = Engineering sciences (5% women); 6 = Biological sciences (15% women); 7 = Medical & health sciences (14% women); 8 = Physical & chemical sciences (8% women); 9 = Social sciences, humanities & arts (16%)

Figures for the three global science academies (IAS, WAAS and TWAS) produce a similar picture: women are 'best' represented among academy members in the social sciences and humanities (Table 9). Respectively 37% and 20% of the total membership of TWAS and WAAS in this broad field are women. Women also appear to be well represented in discipline groups with small membership totals, e.g. biological sciences (IAS: 6 members, 50% women) and mathematical sciences (WAAS: 10 members, 30% women).

Table 9: Women as percentage of members of three global science academies, by broad discipline group

Broad discipline group		IAS – Islamic World Academy of Sciences	WAAS – World Academy of Art and Science	TWAS – The World Academy of Sciences
Agricultural sciences	Total members	1	11	96
	Women members	0	2	12
	% Women members	**0%**	**18%**	**13%**
Biological sciences	Total members	6	38	203
	Women members	3	3	25
	% Women members	**50%**	**8%**	**12%**
Computer sciences/ICT	Total members	--	33	--
	Women members	--	0	--
	% Women members	**--**	**0%**	**--**
Earth and environmental sciences	Total members	--	94	122
	Women members	--	13	11
	% Women members	**--**	**14%**	**9%**
Engineering sciences	Total members	16	36	107
	Women members	1	5	4
	% Women members	**6%**	**14%**	**4%**
Mathematical sciences	Total members	9	10	105
	Women members	0	3	5
	% Women members	**0%**	**30%**	**5%**
Medical and health sciences	Total members	16	77	146
	Women members	3	9	25
	% Women members	**19%**	**12%**	**17%**
Physical and chemical sciences	Total members	29	66	350
	Women members	2	6	25
	% Women members	**7%**	**9%**	**7%**
Social sciences, humanities and arts	Total members	--	363	27
	Women members	--	71	10
	% Women members	**--**	**20%**	**37%**
Other	Total members	19	7	--
	Women members	0	3	--
	% Women members	**0%**	**43%**	**--**

A question was put to TWAS as to how many members the academy has in each of the respective IAP regions, with specific reference to the numbers of women members. Table 10 expresses the numbers of women as shares of the total membership in each of the nine IAP regions. If one considers only the seven regions with at least 50 members each, women are under-represented in the North American (3%) and

Western and Northern European (1%) membership profiles and 'best' represented in the membership for the Middle East and Central Asian region (17%). This is explained by the fact that until recently, TWAS elected membership predominantly from the developing world.

Table 10: Women as percentage of TWAS membership, by IAP region

IAP region	Total number of members from region	Number of women members from region	% Women
Africa	95	12	13%
Middle East & Central Asia	77	13	17%
South Asia	249	18	7%
South East Asia & the Pacific	304	34	11%
Latin America & the Caribbean	242	35	14%
North America	103	3	3%
Western & Northern Europe	68	1	1%
South Eastern Europe	1	1	100%
Central & Eastern Europe	2	0	0%

4.3 Academy Governance

Turning to women's representation in the governance of national science academies, the average share of women serving on the governing body (20%, based on Table 11) is markedly higher than the share of women in the academy membership (12%, based on Table 4). The corresponding median shares are 18% and 11%, respectively. Further investigation is required to uncover the reasons for this apparent difference. At this stage one can only speculate on possible reasons. For instance, it could point to the fact that there is a general recognition among academies that women need greater representation and a logical first step would be to include those already elected into the academy in the governing body. An equally plausible hypothesis is that women volunteer their time more readily than men do and hence are better represented in the governance of academies.

According to Table 11, the National Academy of Sciences in the US (47%), together with two European academies (in Switzerland and Sweden, both 47%), have the best representation of women as members of the governing body. Outside Europe, three IANAS members are also worth mentioning: Cuba (40%), Canada (38%) and Panama (38%). Relatively high shares are also recorded for three other European academies: the Netherlands (43%), the UK (40%) and Ireland (36%).

Table 11: Women as percentage of members serving on the governing body, by national academy

Academy	Country	Governing body			How is governing body elected?
		Total members	Women members	% Women	
Swiss Academies of Arts and Sciences (#)	Switzerland	19	9	47%	By all members
Royal Swedish Academy of Sciences (*)	Sweden	15	7	47%	By all members
US National Academy of Sciences	United States	17	8	47%	No information
Royal Netherlands Academy of Arts and Sciences	Netherlands	7	3	43%	By a group of members
Cuban Academy of Sciences (#)	Cuba	10	4	40%	Other
The Royal Society	United Kingdom	20	8	40%	By all members
Royal Society of Canada	Canada	16	6	38%	No information
National Academy of Sciences of Panama	Panama	8	3	38%	No information
Royal Irish Academy (*)	Ireland	22	8	36%	By all members
Swiss Academy of Engineering Sciences	Switzerland	11	4	36%	By all members
National Academy of Sciences of Honduras	Honduras	3	1	33%	No information
Academy of Science of South Africa	South Africa	13	4	31%	By all members
Finnish Academy of Science and Letters (*)	Finland	10	3	30%	By all members
Academia Mexicana de Ciencias #	Mexico	10	3	30%	No information
National Academy of Exact, Physical and Natural Sciences	Argentina	7	2	29%	No information
Australian Academy of Science (#)	Australia	17	5	29%	By all members
Caribbean Academy of Sciences	Caribbean	7	2	29%	No information
Colombian Academy of Exact, Physical and Natural Sciences	Colombia	7	2	29%	No information
Academy of Sciences of the Dominican Republic	Dominican Republic	17	5	29%	No information
Swiss Academy of Medical Sciences	Switzerland	14	4	29%	By all members
Swiss Academy of Sciences	Switzerland	7	2	29%	By all members
Swiss Academy of Humanities and Social Sciences	Switzerland	18	5	28%	By all members

Academy	Country	Governing body			How is governing body elected?
		Total members	Women members	% Women	
Academy of Sciences Malaysia	Malaysia	16	4	25%	By all members
Austrian Academy of Sciences	Austria	4	1	25%	By a group of members
Science Council of Japan	Japan	16	4	25%	Other
Academy of Sciences of the Czech Republic	Czech Republic	17	4	24%	By all members
National Academy of Sciences of Sri Lanka	Sri Lanka	17	4	24%	By all members
Latvian Academy of Sciences	Latvia	30	7	23%	By all members
Nicaraguan Academy of Sciences	Nicaragua	30	7	23%	No information
Croatian Academy of Sciences and Arts	Croatia	5	1	20%	By all members
Sudanese National Academy of Sciences	Sudan	5	1	20%	By all members
National Academy of Sciences of Uruguay	Uruguay	5	1	20%	No information
Academy of Sciences and Arts of Bosnia and Herzegovina	Bosnia and Herzegovina	16	3	19%	By all members
Ghana Academy of Arts and Sciences	Ghana	11	2	18%	By all members
Academy of Medical, Physical and Natural Sciences (#)	Guatemala	6	1	17%	By all members
Chilean Academy of Sciences	Chile	6	1	17%	No information
German National Academy of Sciences Leopoldina	Germany	12	2	17%	By a group of members & non-members
Hassan II Academy of Science and Technology	Morocco	6	1	17%	By all members
Palestine Academy for Science and Technology	Palestine	6	1	17%	By all members
Real Academia de Ciencias Exactas, Físicas y Naturales	Spain	6	1	17%	By all members
Tanzania Academy of Sciences (*)	Tanzania	6	1	17%	By all members
Venezuelan Academy of Physical, Mathematical and Natural Sciences	Venezuela	6	1	17%	No information

Academy	Country	Governing body			How is governing body elected?
		Total members	Women members	% Women	
Bangladesh Academy of Sciences	Bangladesh	13	2	15%	By all members
Académie des sciences – Institut de France	France	7	1	14%	By all members
Academy of Sciences of Albania	Albania	7	1	14%	By all members
Kenya National Academy of Sciences	Kenya	14	2	14%	By all members
Royal Society of New Zealand	New Zealand	7	1	14%	By a group of members
National Academy of Sciences of Costa Rica	Costa Rica	8	1	13%	No information
Pakistan Academy of Sciences	Pakistan	17	2	12%	By a group of members & non-members
National Academy of Sciences of Bolivia	Bolivia	9	1	11%	No information
Ethiopian Academy of Sciences	Ethiopia	11	1	9%	By all members
Uganda National Academy of Sciences	Uganda	11	1	9%	By all members
Brazilian Academy of Sciences	Brazil	13	1	8%	By all members
Serbian Academy of Sciences and Arts	Serbia	13	1	8%	By all members
Academy of Scientific Research and Technology	Egypt	27	2	7%	Other
Chinese Academy of Sciences	China	16	1	6%	By a group of members & non-members
Mongolian Academy of Sciences	Mongolia	17	1	6%	By a group of members
Georgian National Academy of Sciences	Georgia	20	1	5%	By all members
Polish Academy of Sciences	Poland	24	1	4%	By all members
Hungarian Academy of Sciences	Hungary	33	1	3%	Other
Accademia Nazionale dei Lincei	Italy	8	0	0%	Other
Cameroon Academy of Sciences	Cameroon	9	0	0%	By all members
Indian National Science Academy	India	31	0	0%	By all members
Montenegrin Academy of Sciences and Arts	Montenegro	7	0	0%	By all members

Academy	Country	Governing body			How is governing body elected?
		Total members	Women members	% Women	
Slovenian Academy of Sciences and Arts	Slovenia	13	0	0%	By all members
Turkish Academy of Sciences (*)	Turkey	11	0	0%	By all members
Union of the German Academies of Sciences and Humanities	Germany	8	0	0%	By a group of members

(*) = Academy's current president is a woman; (#) = Academy's past-president was a woman.
Other procedures to elect the governing body include the following:

- *Cuban Academy of Sciences: "The President is nominated by the Cuban Government, by secret voting".*
- *Science Council of Japan: "The SCJ Board consists of President, 3 Vice-Presidents, and 12 Council Members. President is elected by election, who appoints the 3 VPs. The remaining 12 members are elected by three disciplinary divisions".*
- *Hungarian Academy of Sciences: "The elected officials (6) (president, secretary-general, deputy secretary-general, 3 vice presidents) and the 3 General Assembly delegates and 3 non-General Assembly delegates are elected by the General Assembly (all members and 200 selected members of the public body), the heads of scientific section (11) are elected by the sections, the delegates of the research institute network (3) are elected among the heads of research institution of the Academy, the delegate (1) of the Regional Academy Committees is elected by the heads of regional committees and there are invited external members (6)".*
- Accademia Nazionale dei Lincei: "*All national members elect the Governing Body*".

Table 12 provides matching figures for the three global science academies that participated in the survey.

Table 12: Women as percentage of members serving on the governing body of three global academies

Academy	Governing body			How is governing body elected?
	Total members	Women members	% Women	
The World Academy of Sciences	14	3	21%	By all members
World Academy of Art and Science	21	2	10%	By all members
Islamic World Academy of Sciences	11	1	9%	By all members

The ASSAf survey also collected additional information with regard to academy type, i.e. whether the academy admits members in all disciplines or only members in the natural, physical or pure sciences. Figure 6 gives the result for the subset of 52 national academies. The average share of women on the governing body is lowest (17%) for the 37 national academies that admit members in all disciplines.

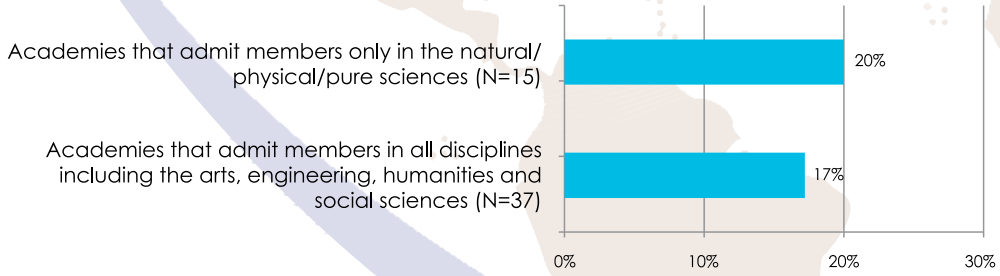

Figure 6: Women as percentage of members serving on the governing body, by national academy type (averages reported)

About 17% of the 53 national academies surveyed by ASSAf, reported either their current or previous president/chair to be a woman (Figure 7). The percentage of academies with a current/past female head is highest for academies that admit members in all disciplines (19%). Moreover, none of the three global academies (IAS, TWAS and WAAS) had either a past or present president who was/is a woman.

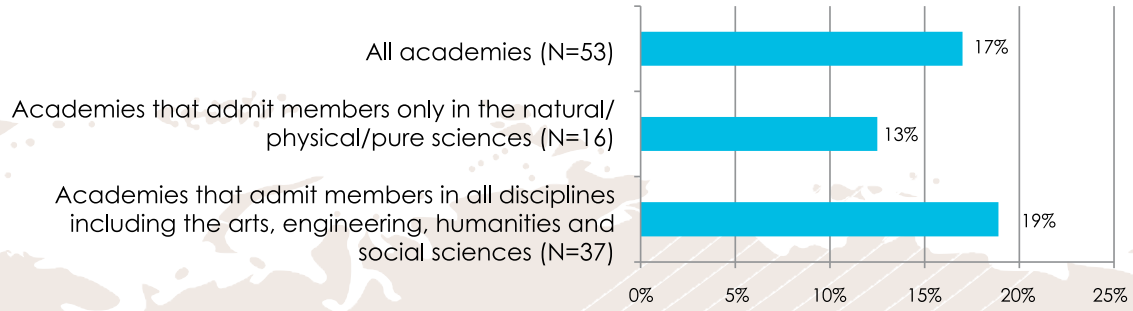

Figure 7: Percentage of national academies with a woman president/chair (currently or previously), by academy type

4.4 Other Academy Activities

Academies in the ASSAf survey were asked about the existence of academy-specific documents and initiatives that could accelerate women's participation in the academy's activities. The first was whether the academy had any document (e.g. strategy, policy or founding document) that explicitly mentions the need for increased participation of women in the academy's activities. A similar question was asked in the IANAS survey, where the focus was on whether the academy had a gender policy. Of the 68 academies that answered either question, 27 (40%) responded in the affirmative (Figure 8).

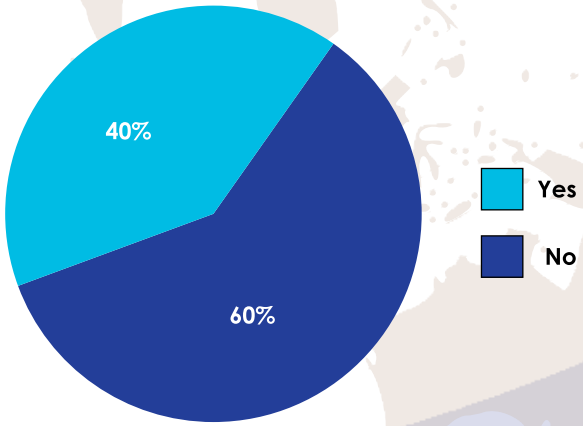

Figure 8: Existence of a gender policy or any document (strategy, policy, founding document, etc.) that explicitly mentions the need for increased participation of women in the academy's activities (N=68)

Of the 27 academies that confirmed the presence of a gender policy or document that argues for more participation by women, only 19 also specified the document. The details appear in Table 13 and illustrate a variety of documents. In some cases increased participation of women is enshrined in the charter, statute or constitution

of an academy (Cameroon, Ethiopia, Japan and Uganda). In other instances it is embedded in the procedures for electing members (Australia, Switzerland, South Africa, the UK, and Uganda), decision statements by the governing body or presidency (Guatemala and Hungary), high-level strategies, policies and development plans (Austria, Finland and Palestine), an agreement or commitment to establish a gender forum, commission or working group (Australia, Brazil and Cuba), discussion papers and research reports dealing with gender equity and female representation in the sciences (Australia, Egypt, France and India), or periodic references to gender in annual reports, minutes and newsletters (Germany).

Table 13: Documents that mention the need for increased participation by women in the national academy's activities

Academy	Document
Académie des Sciences – Institut de France	*"Note de rentrée".*
Academy of Medical, Physical and Natural Sciences (Guatemala)	A decision or governing board.
Academy of Science of South Africa	Each year when membership elections take place the call for nominations makes explicit mention of the need to increase women's membership. The Strategic and Annual Performance Plans include sections on Women in Science activities.
Academy of Scientific Research and Technology (Egypt)	Empowering of women and youth in science through the Egyptian Young Academy of Sciences.
Australian Academy of Science	There are three Academy-related strategies/activities of relevance. (1) Election policies and procedures – sectional committees for different disciplines are established and assess potential candidates for Fellowship of the Academy. Sectional committees put forward a shortlist of two candidates for their discipline, however if they nominate one female candidate, they are allowed to make an additional nomination. (2) Gender equity: current issues and best practice and new ideas – The Academy's Early and Mid-Career Researcher Forum has developed a discussion paper that looks at current issues and best practice in relation to gender equity. (3) Science in Australia Gender Equity Forum – The Academy has established the Science in Australia Gender Equity (SAGE) Forum Steering Committee to find ways to address issues of gender equity in science.

Academy	Document
Austrian Academy of Sciences	Development Plan 2015 – 2017.
Brazilian Academy of Sciences	www.abc.org.br/rubrique.php3?id_rubrique=241: Refers to the establishment of a Working Group on Women in Science. The group brings together prominent Brazilian scientists to take actions that will contribute to building a more inclusive environment for women in the Brazilian science system.
Cameroon Academy of Sciences	Statutes of the Academy.
Cuban Academy of Sciences	Agreement of 1999 creating the Commission of Women in Sciences of the Cuban Academy.
Ethiopian Academy of Sciences	EAS Statute.
Finnish Academy of Science and Letters	Academic research policy.
German National Academy of Sciences Leopoldina	Annual Report to the Senate.
Hungarian Academy of Sciences	Position of Statements of the Presidency of the Hungarian Academy of Sciences on 24 February 2009 (No 13/2009. II. 24).
Indian National Science Academy	Science career for Indian women – An examination of Indian women's access to and retention in scientific careers – A Report – 2004.
Palestine Academy for Science and Technology	Palestine Academy Strategy 2014 – 2016 in Arabic version.
Science Council of Japan	Charter of SCJ; Code of Conduct for Scientists.
Swiss Academy of Engineering Sciences	Election procedure (Wahlreglement).
The Royal Society (United Kingdom)	Our web page on election to the Fellowship specifically mentions that women are underrepresented in the Fellowship and that we have set up four Temporary Nominating Groups to identify candidates in areas where the Fellowship is under-represented, covering industry, clinical science, female candidates and 'General' or 'Honorary' candidates.

Academy	Document
Uganda National Academy of Sciences	The Constitution of the Uganda National Academy of Sciences Article 6.7. When determining the eligibility of a candidate for election as a Fellow of the Academy, the Council shall consider not only the individual qualifications of the candidates, but also the overall balance between disciplines, age and gender in the total Membership of the Academy.

Moreover, two of the three global science academies indicated the presence of a document that speaks to increased participation of women in their academy's activities. These documents were a strategic report (TWAS) and Board of Trustees meeting minutes and newsletter announcements (WAAS), respectively.

The second initiative enquired about in the ASSAf survey was whether the academy had any programme(s) on "Women in Science". Fifty national academies responded, of which 13 (or 26%) responded in the affirmative (Figure 9). As can be seen in Table 14, the notion of 'programme' was widely interpreted. That said, one could discern a focus on programmes and incentives to attract girls and young women to science careers, as well as how to ensure their continued participation in the science enterprise (Austria, Brazil, Japan and the UK).

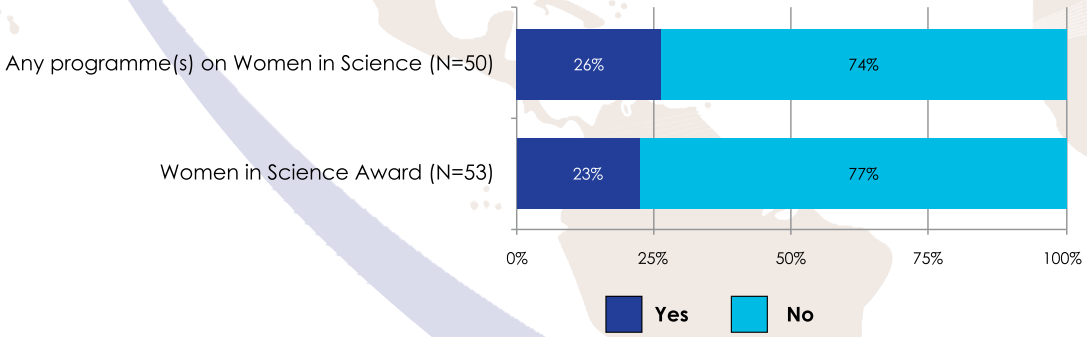

Figure 9: Initiatives supporting the participation of women in the national academy's activities

In the case of the three global academies, both IAS and TWAS reported having a programme on "Women in Science". Sessions at the IAS annual conferences are often dedicated to the topic whereas TWAS hosts the Organisation for Women in Science in the Developing World (OWSD).

The IANAS survey, on the other hand, asked the academies to elaborate on their activities that involve participation of women. Evidence-based panels and especially committees were mentioned by 12 academies (between 30% and 60% of these committee/panel members were women). With regard to women chairing

such committees, five academies stated that it was indeed the case and also specified the committees concerned: geography and environment; environment and health; women in science and education, social sciences; and Humanities Awards Committee 2013. These names reflect interests and disciplines that women are typically involved in. Women participate less in committees and structures that involve the natural and applied sciences such as physics, mathematics, engineering and related subjects.

Table 14: Details about programmes on Women in Science

Academy	Details about the programme(s)
Academy of Medical, Physical and Natural Sciences (Guatemala)	A decision or governing board.
Academy of Science of South Africa	The Academy's gender activities are managed through the Organisation of Women in Science for the Developing World National Chapter which was established in 2009.
Academy of Sciences of Albania	Project proposal submitted to IAP but not financed.
Academy of Scientific Research and Technology (Egypt)	No details provided.
Australian Academy of Science	Science and Gender Equity Forum.
Austrian Academy of Sciences	Fellowship programme for young female scientists from medicine, mathematics, natural and life sciences, financed by L'Oréal Österreich and the Federal Ministry for Science, Research and Economy.
Brazilian Academy of Sciences	A first step given by the Brazilian Academy in the effort to collaborate more effectively in the development of a more inclusive environment for women in Brazilian science was the establishment of a partnership with L'Oréal Brazil in January 2006, when a national "For Women in Science" prize was launched. With the objective of stimulating the participation of Brazilian women in science, each year a group of talented young researchers receive a USD 20 000 grant to support their work. Annually, young PhDs working in Brazilian institutions – in the areas of physics, chemistry, mathematics, medicine, biology, and health – have their work recognised by the prize, which is awarded at a gala ceremony. Since 2006, 54 women researchers from different regions of the country have received this prize, honouring a new generation of Brazilian scientists who, by their example, inspire new talents and future generations.

Academy	Details about the programme(s)
Brazilian Academy of Sciences	In June 2010, the Brazilian Academy of Sciences hosted the 7th Meeting of the National Focal Points of the Inter-American Network of Academies of Science Science Education Programme in Rio de Janeiro. Understanding the shortcomings of traditional science education that affect girls and women, the meeting focused on gender issues in science education and discussed the empowerment of girls and women in S&T, and the role of the academies in removing obstacles to this enterprise. The synergy created by this meeting – which assembled participants from the Brazil National Ministry (Secretariat) for Policies for Women, the Third World Organisation for Women in Science , the Brazilian Chapter of the Gender Advisory Board (GAB-Brazil), the UNESCO Regional Chair "Women, Science & Technology in Latin America", IANAS, and IANAS WfS-WG, as well as a hundred science teachers from public schools in Rio de Janeiro – motivated the Brazilian Academy to establish a Women for Science Working Group and provide the necessary funding for it. In 2013, the Academy's WfS-WG organised its first workshop, which discussed topics such as: (a) Gender Barriers in the Scientific Career – Myth or Reality?; (b) Gender an (In)Equality in Science: the Scenario in Brazil; and (c) Attracting Girls and Young Women to S&T Careers – the Challenge of Building the Future. Participants also discussed strategies for the sensitising of the Brazilian scientific community, S&T institutions and S&T governmental agencies to the need of promoting a more favourable environment for the participation of women in the areas of S&T in Brazil. It is important to highlight that the five Brazilian laureates of the L'Oréal for Women in Science Prize are engaged on the Academy's WG.
Chilean Academy of Sciences	Yearly prize for outstanding young women scientists (under 40 years of age) consisting of a diploma and a cash prize.
Hassan II Academy of Science and Technology (Morocco)	No details provided.

Academy	Details about the programme(s)
Indian National Science Academy	AASSA-Indian National Science Academy (NSA) joint Workshop on Women in Science Education and Research was organized at INSA premises on 24 September 2013. During the workshop a panel discussion on "Gender Equity in Science and Research: status, goals and how?" was deliberated. The panel consisting of Indian and international representatives attended by special invitees (India's leading women scientists, women fellows of the academies, women heads of laboratories, etc. and policymakers). The panel discussion was audio recorded and was used to publish a summary document containing recommendations and commendations.
Palestine Academy for Science and Technology	They are initiatives, but these have not yet been implemented.
Science Council of Japan	Canada-Japan Women in Science, Engineering and Technology Exchange Programme: Summer School for High and Junior High School Girls (co-hosted with National Women's Education Centre of Japan): Symposia which are open for public relating to gender issues.
Slovenian Academy of Sciences and Arts	A committee is in preparations.
The Royal Society (United Kingdom)	Recently made a number commitments for the Your Life Campaign to work with some objectives which include reviewing the effectiveness of the groups charged with increasing the number of women and the diversity of candidates nominated for election to the Fellowship. The Royal Society is concerned with excellent science wherever and by whomever it is done. We are committed to promoting diversity in UK science, technology, engineering, mathematics, and medicine (STEMM) by seeking to increase participation from underrepresented groups. A lack of diversity across the scientific community represents a large loss of potential talent to the UK. Restricted opportunity and diversity limits not only UK competitiveness and prosperity, but also vitality in the wider scientific workforce and creativity in society. Individuals from lower socio-economic backgrounds, certain ethnic minorities, women, and disabled people are all currently under-represented in education, training and employment related to STEMM.

Academy	Details about the programme(s)
The Royal Society (United Kingdom)	The Royal Society and the Royal Academy of Engineering are funded by the Department for Business, Innovation and Skills (BIS) to run a programme of work aimed to address the issue of diversity in the STEM workforce. The programme will run over four years from 2011 and is made up of two strands, one run by the Royal Society and the other by the Royal Academy of Engineering. There are a number of areas of overlap including comprehensive data gathering, pilot activities, and showcasing role models. Both academies are making the most of opportunities to work together on events when launching research findings and programme activities. The Royal Society's diversity programme is investigating ways to remove barriers to entry, retention and progression within the scientific workforce. It focuses on gender, ethnicity, disability and socio-economic status in the first instance and aims to cultivate leadership in the scientific community towards removing barriers to increased diversity. We are particularly focused on individuals making key career transitions for example from further education to university or to the workforce or from one level within the workforce to another. For the purposes of the project, the 'scientific workforce' is taken to comprise all those for whom their scientific knowledge, training, and skills are necessary for the work that they do.

The ASSAf survey also asked whether the academy hosts any "Women in Science" award. Twelve (23%) out of 53 national academies responded that it was indeed the case (See Figure 9 above). Table 15 below lists the academies by country, together with an indication as to how often the award is presented. In most cases it is presented annually. Of the three global science academies, only TWAS reported having a "Women in Science" award that is presented annually. Although responses from IANAS member academies are excluded it is believed that, by the end of 2013, at least half a dozen IANAS countries had a "Women for Science" prize or recognition.

Table 15: Surveyed national academies that present a "Women in Science" award, and how often the award is presented

Country	Academy	Frequency
Australia	Australian Academy of Science	Annually
Brazil	Brazilian Academy of Sciences	Annually
China	Chinese Academy of Sciences	Annually
Croatia	Croatian Academy of Sciences and Arts	Annually
Cuba	Cuban Academy of Sciences	Annually
France	*Académie des Sciences – Institut de France*	Annually
Hungary	Hungarian Academy of Sciences	Annually
India	Indian National Science Academy	Every three years
Latvia	Latvian Academy of Sciences	Annually
Morocco	Hassan II Academy of Science and Technology	Annually
Switzerland	Swiss Academies of Arts and Sciences	Every two years
UK	The Royal Society	Annually

From the IANAS survey it emerged that about half of the academies in that world region had women members serving on the prize and awards committees; ranging from four to six in one case to only one in another. Nine academies provided information on the number of prize recipients who were women. The numbers ranged from 15 women recipients in the last three years, to five, 12 and 17 (over a given time period), with several saying that about two to five awards had been given to women in recent years. In one academy out of a total of 60 prizes, 25 were awarded to women. In another academy, 54 women had received a prize that specifically targeted women. Although the giving of awards and prizes to men and women was considered a common form of honouring achievement by academies, the range of awards varied considerably, thereby making it difficult to determine how many awards were given within a specific time period.

Additional Information obtained from IANAS also revealed that in the USA, for instance, the Committee for Women in Science, Engineering and Medicine (CWSEM) of the US National Academy of Science has since the 1990s been working and publishing on the topic of women's representation and participation in science. A recent report by the CWSEM's recent report is titled *Women in Science and Engineering Statistics*. As of December 2013, the majority of IANAS academies also had in place active

Women for Science committees. It could be argued that this trend has been given impetus by the existence of a strong IANAS Women for Science Programme.

5 Progress towards Inclusiveness?

The survey results presented thus far have provided an overview of women's participation in the membership and governance structures of science academies, in addition to highlighting a number of academy-specific documents and initiatives to strengthen the participation of women in the activities of the academy. In this concluding section, the emphasis is on the progress made by academies towards inclusiveness, especially progress that was made in response to the consensus report by the Advisory Panel on Women for Science under the auspices of the InterAcademy Council (IAC, 2006).[3] This IAC report proposed the following broad recommendations for immediate action:

> *The Advisory Panel asks academies to declare their intentions by formally committing to 'good management practice' – procedures designed to ensure the inclusion of women scientists and engineers – within all levels of their organisations and research institutes.*
> *The Advisory Panel asks all academies to designate a dedicated member – or, preferably, a gender-balanced committee – to be responsible for gender issues within the organisation. This committee's duties should include proposing actions, collecting gender-disaggregated data, and monitoring and reporting progress – or the lack of it – to the president and council of the academy on a regular basis.*
> *The Advisory Panel calls upon all academies to address the underrepresentation of women in their memberships by enlarging their membership nomination pools to include more women scientists and engineers, and to work to enhance the role of women as senior academy officials* (IAC, 2006:xxi).

A brief inspection of the annual reports of some science academies, where available and in English, reveals a certain degree of commitment towards electing more women members into the science academy. The recent annual reports of the Australian Academy of Science (AAS) and the Indian National Science Academy (INSA) illustrate this point well:

> *The Council was concerned and disappointed that no women were elected in 2013 and, following discussion at the Annual General Meeting of the Fellowship in May 2013, implemented a range of actions to ensure that eligible female scientists were nominated for the 2014 election round. These changes resulted in an overall increase of new nominations, about half of which were for women (AAS, 2014:34).*[4]

[3]IAC (2006). *Women for Science: An Advisory Report*. InterAcademy Council (IAC).
[4]AAS (2014). *Annual Report 2013-14*. Australian Academy of Science, Canberra, Australia.

> *The Academy is also conscious about induction of women scientists in the Fellowship. At present, only 49 women Fellows are in the Academy. Out of a total of 374 nominations, only 39 nominations of women scientists were received by the Academy for consideration of Fellowship (INSA, 2013:16).*[5]

A statement in this regard ("The academy has increased its number of women scientists in the nomination pool for membership") was also put to the respondents in the survey that ASSAf co-ordinated. They had to express their extent of agreement on a five-point scale, ranging from strongly agree to strongly disagree. As can be seen in Table 16 (the second statement), only 17% of academies strongly agreed with the statement. Three academies (6%) indicated that the statement was not applicable. These were the SAHS and SCNAT in Switzerland, which do not follow the individual membership system (as their members are scientific unions with individuals from the relevant disciplines) and hence also the Swiss Academy of Arts and Sciences as the umbrella organisation (See the note for Table 3). It is therefore more meaningful to consult Figure 10 as it excludes all non-applicable responses. Accordingly, 64% of 50 academies either strongly agreed or agreed that their academy has increased the number of women scientists in the nomination pool for membership.

Table 16: Extent of agreement with statements about the participation of women in the national academy's activities

Statements	Extent of agreement						Number of Academies that responded
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Does not apply to Academy	
The Academy has included more women in its panels and committees	17%	47%	26%	6%	2%	2%	53
The Academy has increased the number of women scientists in the nomination pool for membership	17%	43%	30%	4%	0%	6%	53
The Academy is promoting more women members to decision-making levels	15%	46%	25%	6%	0%	8%	52
The Academy has increased the number of women scientists in the nomination pool for prizes and awards	13%	30%	32%	8%	0%	17%	53
The Academy pays attention to the gender implications of the research that it sponsors	9%	17%	34%	9%	0%	30%	53
Women are visible in the Academy's portrayal of science to the public	8%	56%	27%	8%	0%	2%	52

[5]INSA (2013). Annual Report 2012-13. Indian National Science Academy, New Delhi, India.

Statements	Extent of agreement						Number of Academies that responded
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Does not apply to Academy	
The Academy pays attention to the gender implications of the research that it evaluates	6%	15%	42%	11%	0%	26%	53

Similarly, the remainder of statistics in Figure 10 shows that about two-thirds of respondents agree that their national academy has made some progress in terms of the promotion of more women to decision-making levels (67%), the inclusion of more women in its panels and committees (65%) and in the academy's portrayal of science to the public (65%). However, only just more than half (52%) agreed that the number of women in the nomination pool for prizes and awards has increased. For those national academies that also sponsor and evaluate research, the gender implications of such activities seem to be largely neglected. Only 38% and 28% of academies, respectively, reported sensitivity to the gender implications of their sponsored research and research evaluations. Thus, there appears to be lack of attention to the fact that scientific research may affect men and women differently (has a gender dimension) and that evaluations of proposals, papers and job applications may be affected by unconscious gender bias.

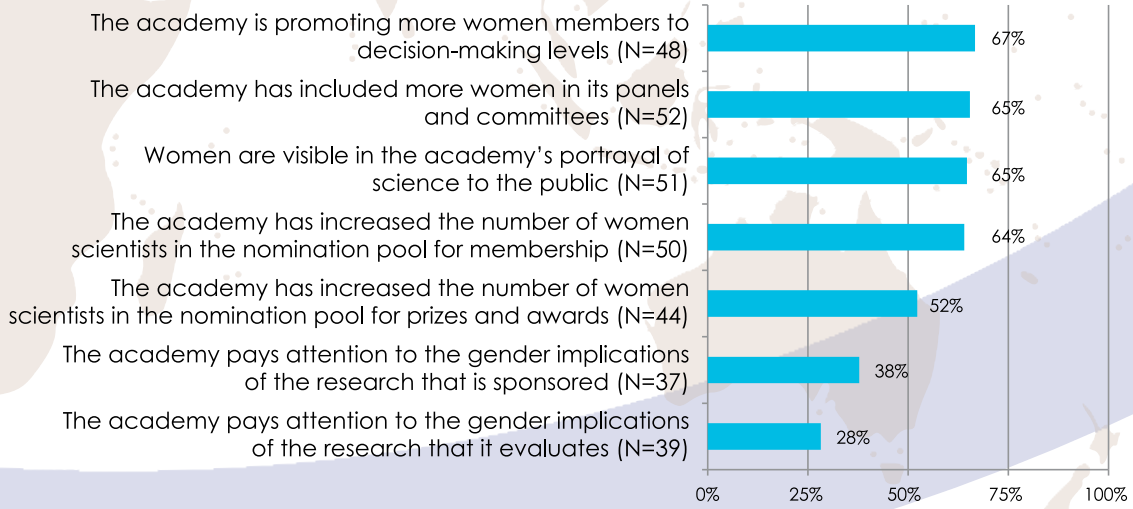

Figure 10: Percentage agreement with statements about the participation of women in the national academy's activities

Notes:
(1) Agreement = "strongly agree" and "agree" combined.
(2) The percentages differ slightly from those in Table 16 because different totals (N) were used in the computation. In Table 16 grand totals were used (N = all respondents who completed an item). Figure 10 uses valid totals (N = the grand total minus the number of respondents who stated that the item does not apply to their academy).

Moreover, two of the three global science academies strongly agreed with all seven statements. The third global academy agreed with only five of the seven statements as the remaining two (involving prizes/awards and research evaluation) did not apply.

One of the key recommendations of the IAC report (2006) was the call for a gender-balanced committee to address gender/diversity issues, or at least someone to advise the academy on gender/diversity issues. A question on this development was also included in the ASSAf survey. Thirty-one (or 61%) of 51 science academies did not have any of the above. A third of academies (33%; 17 academies) said that they have an established infrastructure (i.e. a dedicated committee) while the remainder (6%; 3 academies) relied on the input and guidance of individuals (Figure 11).

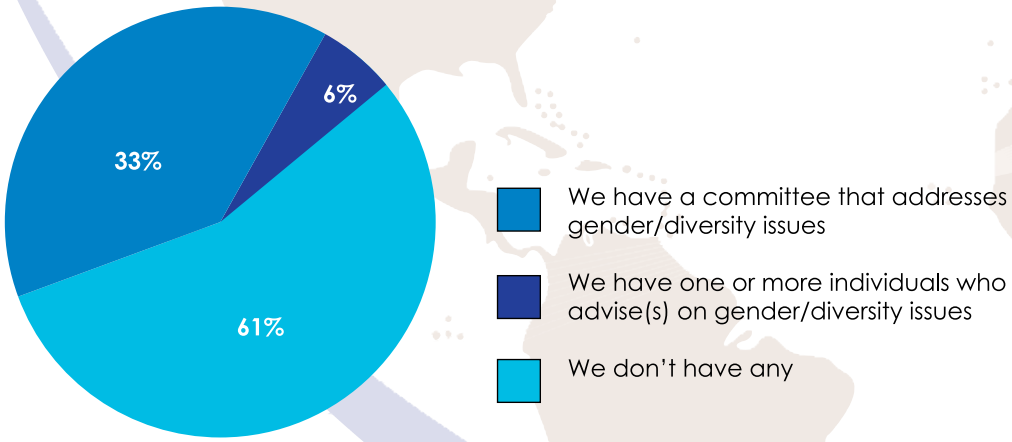

Figure 11: Existence of a committee that addresses gender/diversity issues or anyone advising the academy on gender/diversity issues (N=51)

The fact that only about 40% of national academies have a committee or an individual that addresses gender/diversity issues, means that they may be missing opportunities to include the talents and fresh perspectives that women could bring to their organisations. Of the three global academies, two mentioned that they have one or more individuals who advise on gender/diversity issues, while the third academy has a dedicated committee for that purpose.

Finally, some of the action steps originally advocated in the IAC report of 2006 (See Table 17 below) may require modification, or even replacing by more effective ones as conditions change. One could argue that women's awards and gender committees have been effective in awareness-raising, networking and breaking isolation; but the need for such actions may diminish as women scientists become more numerous and prominent in the sciences. The action steps therefore need to be revisited with ever-changing conditions in mind.

Table 17: Actions advocated in the IAC report of 2006

Broad action points	Action steps
Academies as honorific societies	Put gender issues on the agenda
	Increase the number of women academy members
	Increase the visibility of women scientists and engineers
	Offer awards, grants, and fellowships
Academies as advocates of global capacity building	Create S&T 'knowledge centres' for women in rural areas and urban enclaves
	Educate S&T professionals
	Networking
Academies as employers	Commitment at the top
	Create an inclusive working environment: Good management practice
Academies as sponsors of research and as evaluators of research institutes	Establish evaluation criteria
	Gender in scientific research
Academies as national advocates for education, science, and engineering	Establish a national office
	Raise public awareness
	Educational reform
	Eliminate barriers to full inclusion
Academies acting in concert	Global coordination
	Dissemination

Source: IAC (2006). Women for Science: An Advisory Report. *Published by the InterAcademy Council (pp. 55-58).*

Finally, the IANAS survey also included an open question as to whether the academy actively promotes women and gender issues in its structures, decision-making and programmes. Five academies answered "no" to this question and three failed to answer. One stated that although they were not actively promoting women, they do not discriminate but welcome all members who are interested in pursuing science, regardless of race or gender. Of the remaining eight academies, the most common answers revolved around a number of internal and external efforts. Increased participation of women in the board of directors was mentioned several times as was

the increasing participation in national and international events through personal activity, and also support to publish scientific papers. Supporting and nominating women for positions in larger international organisations was also mentioned. Another popular strategy was providing for prizes that target women scholars and especially younger scholars. Several academies have such programmes in place, including Brazil's well known support of the L'Oréal prize for women scientists. Several academies mentioned that they had established committees for women and gender, which implemented activities on themes related to women. One academy reported that they had created a task force on diversity to study ways for more women and racial minorities to be appointed. Following the task force's recommendations, a nine-member Committee on Equity and Diversity was established. The latter consequently argued for a 30% quota for women.

6 Concluding Comments

Science academies have a dual mandate: to honour scientific excellence and to provide evidence-based scientific advice to their governments and stakeholders. In order for this dual mandate to be fully realised, women's recognition through academy membership and participation in the academy's advisory activities can no longer be overlooked.

This report presented an initial analysis of 'how inclusive' academies have been in respect of women since publication by the IAC of a report (in 2006) emphasising the importance of continually collecting gender-disaggregated data in STI. The present study therefore undertook the first comprehensive survey of IAP member academies to ascertain the inclusion and participation of women scientists. It was pointed out that a global comparative perspective of women's participation in science is only as good as the quality and availability of gender-disaggregated data. Although the international comparison of shares of researchers together with the IAP survey results portray a situation that is well known, it nevertheless remains a worthwhile exercise. In fact, it is an exercise that would need to be repeated at regular intervals to keep the momentum going and to give policymakers as comprehensive a picture as possible of women's participation in science.

Particularly encouraging is the number and spread of academies that participated in the two surveys. Although not optimal, it represents a good base for future surveys. The results will help both the participating (and non-participating) academies to comprehend the extent of the gender challenges they are dealing with. The collection of data carried out for this report is considered a useful contribution to creating the evidence base required by academies to meet their objectives. Although there are large variations among the IAP science academies with regard to women's membership and participation in governance, the report also reveals a number of common features:

- Women academy members remain far below parity with men – women's membership is typically about 12%.

- In the natural sciences and engineering, women's membership remains well below 10%.
- Women members are better represented in the social sciences, humanities and arts, but rarely over 20%.
- Two-thirds of academies reported increases in women in the nomination pools for membership, and for academy distinction, as well as for serving on committees and in governance.
- Academies' awareness of women's under-representation may be rising, but 60% of the responding academies do not address gender/diversity issues at all, do not check that the research they sponsor or evaluate (where applicable) and the studies and activities they undertake and convene respectively, may affect men and women differently.

The report does not provide the full picture of women's participation in science academies, but does provide several pieces of a narrative that has been long overdue. Seen together these pieces may even produce several story lines. These include the challenges faced by science academies to become more inclusive and the tremendous amount of regional, country and discipline variability.

At the same time there are several aspects of women's participation in science that the current survey did not explore. For instance, it is not clear what the main criteria for academy member selection/election are: honouring a lifetime body of work, or honouring scientific excellence and achievement even if that has been reached at an earlier career stage. It is often believed that women have a different age structure within the scientific community; they tend to be younger, having more recently gained access to select science fields. To the extent that there is reliance on a body of work as opposed to significant achievement at an earlier career stage, women may be forced to "wait their turn". Another pattern we may see for women is where they have had career interruptions, for example, due to family responsibilities, so that their record of work is less comprehensive when it comes to consideration for academy membership. It is also not clear to what extent the fields are given equal weight/priority when selecting women for academy membership. If there is positive bias towards engineering, computer science or the physical sciences, then fewer women will appear among those nominated since fewer are present among the share of researchers in those fields. If there is negative bias towards the biological, medical, social and behavioural sciences then women's higher representation in those fields will not be reflected in the overall academy representation.

Cultural effects that may affect women's election into the science academies were also not addressed through the mainly quantitative findings presented here. An argument could be made that the (mostly) male academy members nominate and elect colleagues from their established male professional networks that were formed during past decades. Also, to what extent is unconscious bias against women shared by both men and women scientists? Most cultures have male and female work-spheres, confine girls to less valued "women's work" and underestimate women's intellectual and technological capacities. Social scientists' experiments have demonstrated that this creates gender bias in science education, employment,

faculty hiring and promotion, and nominations for prestigious distinctions. Natural sciences and engineering have been male occupations traditionally. There are few women faculty as role models at Western research universities. However, in cultures such as Latin America, Eastern and Southern Europe and the Middle East, girls are better represented and expected to do as well as boys in these fields, and there are more female science faculty. More in-depth discussions around the socio-political context of the questionnaire responses may reveal several cultural effects.

Moreover, a number of questions warrant further investigation to better contextualise the findings of the IAP survey. Five examples are the following:

- What is the age (mean and median) of women and men at time of election into the academy?
- Does an award announcement include a statement that highlights the academy's interest in nominations of women candidates? Can anyone apply for an award or does one have to be nominated, and how does the share of women awardees differ according to these conditions? From which fields are the women who are applying for the prizes and awards given by the academies?
- Are the national governments of the science academies actively addressing gender equality in science?
- Do women researchers in some fields (e.g. social sciences and humanities) have less expectation of being nominated into the academy, given historical reasons on how academies are structured?
- Are all members of the science academies amenable to the development and implementation of gender policies to ensure gender equality in academies of science regarding membership and participation of women in the academies? Do both female and male academy members agree with this direction? According to the academy members, what type of policies should be developed and implemented?

In summary, then, although the statistics present a picture of the status of women's membership of and participation in academy structures, they do not reveal the underlying reasons. It is essential to address the "why" questions through further studies and discussions before policies can be designed and implemented to bring about needed changes. An example will bring the point across. The introductory section of this report gave the percentage of women researchers in the different countries, whereas the results section reported on the percentage of academy members who are women. It is notable that the latter figure is substantially lower than the former. However, the statistics cannot tell us why this is the case. One possible explanation relates to the distribution of women researchers in terms of age and seniority. Is it the case that women researchers are concentrated in the younger and more junior categories? In other words, is there a sharp decrease of women researchers in the senior ranks and more mature age categories? If so, it presents a serious challenge to science academies as they tend to select their members from the more mature age categories. To the extent that potential academy members are indeed coming from the pool of mature women scientists it means that fewer women are available for membership than when considering the total pool of women scientists (young and old).

7 Recommendations

In the light of the above discussion a number of recommendations are proposed:

1) IAP member academies should annually collect, analyse and report gender-disaggregated data on their respective membership and activities.
2) The IAP should publish gender-disaggregated data of its member academies in its annual report.
3) The IAP annual report should report on the gender dimensions of IAP's internal activities.
4) IAP member academies should establish permanent organisational structures that provide strategic direction and implement the academy's gender mainstreaming activities. Where applicable, it is advised that either a "Women or Gender in STI Committee" or a National Chapter of OWSD (where applicable) be established. Such an entity will, among others:
   - Coordinate and advocate for the annual collection, analysis and reporting of gender-disaggregated data by the academy and within the nation's STI system.
   - Provide strategic direction to the academy's governing council on targets and appropriate strategies for including more women in the academy's membership, governance and activities.
   - Ensure a gender analysis is included in the academy's policy advisory function and that measures are implemented to ensure women's participation in the academy's advisory activities[6].
   - Promote and develop activities, programmes and projects that seek to advocate for gender equality in STI.
   - Engage in strategic partnerships in support of gender equality and the academy's gender mainstreaming activities[7].
   - Advocate for relevant research into women's participation in science academies and in STI in general[8].
   - Propose strategies for policy analyses where gender is a key variable, such as in issues related to establishing research agendas, health, food, education, biodiversity, and development[9].

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[6]This may include advice on how to encourage more girls to study scientific subjects and help women follow scientific careers. It might also include advice on how to provide a gender friendly environment for scientific research. A second area of advice, identified by the Gender Advisory Board (GAB) of the UN Commission on Science and Technology for Development (UNCSTD), is how scientific innovations can benefit the lives of both women and men. This applies to many sectors of government. Including "women at the grass roots" in the S&T enterprise is a prominent goal of the IAC report. The current study does not address this issue. IAP is founded on the conviction that S&T are keys to human survival and an improved life; and strong science academies must serve as catalysts. All women, including those living in poverty, need to be welcomed and empowered as participants in the S&T enterprise.

[7]IAP member academies should engage more actively with OWSD, UNCSTD GAB and UNESCO amongst other actors in gender and STI matters to develop good programmes, interventions and templates for assessments which not only give mere numbers but also try to elicit the changes made in policy, programmes and progress to obtain a better picture. Within a country, academies should seek closer partnerships with the education sector to implement strategies for gender equality in STI.

[8]The main effort must be on engineering and those natural sciences where women's participation remains below 10% in academies, and is still far below parity in society. Moreover, since it appears important for academies to increase their pool of senior women scientists it is important to understand why in some countries so many women appear to leave their scientific careers before reaching senior levels. A number of hypotheses can already be suggested. Prominent among them is the claim that university departments and research laboratories are gender unfriendly places to work.

[9]GenderInSITE (Gender in Science, Innovation, Technology and Engineering) – an initiative funded by the Swedish International Development Agency and that is closely aligned and linked to OWSD goals – encourages governments and other decision makers to make gender assessments of their science, technology and innovation policies. There is scope for collaboration between the IAP, IAP member academies, OWSD and GenderInSITE with this important task.

Appendices

Survey of Women in the Academies of the Americas

Report prepared by FRANCES HENRY
For the IANAS WOMEN for SCIENCE PROGRAM

May 2015

IANAS
INTERAMERICAN NETWORK OF ACADEMIES OF SCIENCES

Sciences Academies working together to promote science and technology for development, prosperity and equity in the Americas

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Survey of Women in the Academies of the Americas

Report prepared by FRANCES HENRY
For the IANAS WOMEN for SCIENCE PROGRAM

I. Introduction, History, Methodology

For some time, the Inter-American Network of Academies of Sciences (IANAS) Women for Science group had wanted to conduct a census of its member Academies in order to determine their proportion of women members. There was an earlier attempt at collecting these data but these were now in need of updating. Accordingly at its meeting in Santiago, Chile in 2013, a committee was struck to develop a census and the task was headed by Frances Henry who, as a social scientist had considerable experience in the design, analysis and write up of surveys. A series of questions were developed and some, from an earlier census undertaken by the South African Academy of Science were included. The final questionnaire was concluded in December 2013 and sent out to the Presidents of the nineteen member Academies in January 2014. After several reminders, seventeen were returned although some of the newer Academies who had just been organized were not able to answer all of the questions. Two were not returned.[1] Most of the questionnaires were filled out by Presidents of the Academies, some by staff members with the help of Presidents and some by IANAS focal points also helped by staff or their Presidents. Analysis of the data collected began in June 2014.

A final report was presented to the Women for Science meetings in Ottawa, Canada on Sept. 21, 2014. Some additional data and a few revisions were requested at this meeting. These were incorporated into the report. Subsequently, two academies who had not replied to the initial questionnaire submitted data now included in this report which was sent to the IANAS secretariat at the end of December 2014. IANAS sent this version to the Academies for approval and two requested minor changes which were incorporated and sent to IANAS on January 21, 2015. After some delay, two further changes were requested and this final version was sent to IANAS on May 28, 2015.

1. One of these, the National Academy of Sciences in the U.S. has subsequently provided some data which has now been included in this report. Similarly, Peru has also now submitted some data.

II. Limitation and Constraints of these Data

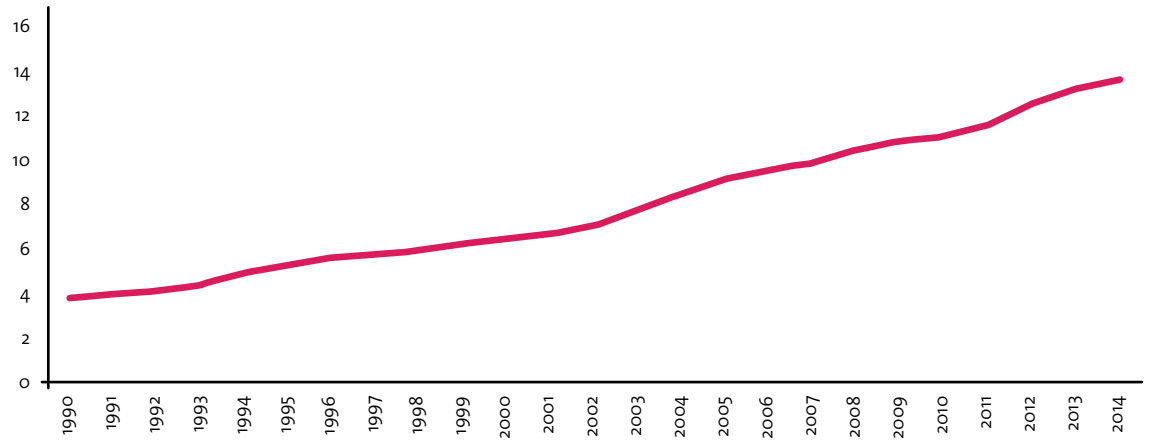
In the first instance, the sample is very small and results can therefore not be overly generalized nor can more sophisticated statistical analysis be undertaken. Moreover, as in any study which attempts to compare institutions which are located in different countries and have had different histories, exact comparisons cannot readily be made because not all differences can be controlled. Our Academies under study differ in many ways; they have different structures, are organized in several ways, some include all disciplines while others have a more limited number of disciplines; have different rules and regulations in their governance structure; include several types of membership and the like. For example, in the case of Panama the study was done by an Association- the Panamanian Association for Advancement of Sciences (APANAC) which is not an Academy. Given our small number of answers, we are not able to control for all of these differences. This constraint or disclaimer is common to comparative analysis and should not be viewed as undermining the study's results. Despite all the variations within our sample, the main finding in this study - as in most other gender related research - is that women are under-represented.

TABLE 1: ACADEMY MEMBERSHIP

Academy	Number of Women Members	Total Number of Members	Percentage of Women Members	Type of Membership[2]	Has Gender Policy
Argentina	4	34	11.76	Capped	
Bolivia	4	47	8.51	Open	
Brazil	64	506	12.65	Open	
Canada	346	2108	16.41	Capped	
Caribbean	57	223	25.56	Open	✓
Chile	9	75	12.00	Capped	✓
Colombia	26	190	13.68	Open	
Costa Rica	10	53	18.87	-	
Cuba	85	313	27.16	Open	✓
Dominican Republic	22	168	13.10	Capped	
Guatemala	8	68	11.76	Open	
Honduras	5	29	17.24	Open	
Mexico	587	2499	23.49	Open	✓
Nicaragua	7	30	23.33	Open	
Panama[3]	50	124	40.32	Open	
Peru	23	114	20.18	-	-
United States (NAS)	294	2252	13.06	Open	
Uruguay	5	26	19.23	Capped	
Venezuela	7	50	14.00	Capped	
TOTAL	**1613**	**8909**			
AVERAGE TOTAL	**18.11%**				
MEDIAN[4]	**22**				

2. Costa Rica and Peru did not provide information on whether their membership is capped or open.
3. It should be noted that Panama's entry process into the Scientific Association is by application rather than election which accounts for their higher number of women members.
4. The median denotes the middle value in a distribution. In this particular case the median was chosen over the mean due to the wildly varying sample of women members in the 19 Academies (Range from 4-587). The mean is sensitive to outliers in a way that the median is not. In order to get the median, the number of women members were arranged from lowest to highest and the middle number was selected using the formula $\frac{n+1}{2}$.

GRAPH 1A: PERCENTAGE OF WOMEN IN THE NATIONAL ACADEMY OF SCIENCES (US) BY YEAR



III. Analysis of Results

Table 1 illustrates that Mexico, the United States, Canada and Brazil are the larger Academies with over 500 members. Five Academies: Uruguay, Honduras, Nicaragua, Argentina and Bolivia have fewer than 50 members.

Women represent less than 20% of total members in the Academies. Panama, Cuba and the Caribbean have the highest proportion of women members whereas Bolivia, Argentina and Guatemala have the fewest (see Graph 1). Panama has the highest proportion of women members.[5] Of its total of 124 members, 50 or slightly more than 40% are women. Mexico has the largest numbers of total members at 2499 and a significant number of women at 587 (24%) whereas the smallest Academies in our sample are Uruguay with 26 members of whom 5 or 19% are women and Honduras with 29 members and only 5 women but that translates to 17% of its total membership. These new and smaller Academies nevertheless have a higher proportion of women than do many of the larger and more established Academies. Other large Academies include Cuba which also has the second highest proportion of women members at 27%; the Caribbean where 26% of its members are female; Brazil which has the fourth highest total number of members but only 13% of whom are women. Canada is a special case because its Royal Society contains three separate Academies including Arts and Humanities, Social Sciences and Science. Its total membership is 2108 of whom 346 or 16% are women. However the number of women within each Academy vary considerably with Arts/Humanities having the highest (28%) but Science the lowest at a mere 9%.

The National Academy of Sciences in the United States is in a similar position since it has the second highest total number of members but only 13% of its members are women. The National Academy of Sciences has provided figures to show the rate of increase in female membership over the years as well as the numbers of women (and men) elected in the last 24 years. We have graphed these numbers below. Looking at Graph 1a (see below), we can see that there has been a steady increase in women members over the years, from just under 4 percent in 1990 to under 14 percent in 2014. Graph 1b looks at the number of women and men elected each year into the US National Academy of Sciences from 1990

5. Panama is a special case since it does not have an Academy but an Association called "La Asociación Panameña para el Avance de la Ciencia". As such, membership is open to anyone who applies by sending in an application form and a curriculum vitae. The application is reviewed by a committee who evaluates the application. There is no cap on potential members and applicants are not voted on in the rigorous peer assessments used by many of the Academies. This open and easier selection procedure is the reason for the substantial number of women members in this science association.

TABLE 1B: ELECTED WOMEN MEMBERS FOR THE NATIONAL ACADEMY OF SCIENCES (US) 1990-2014

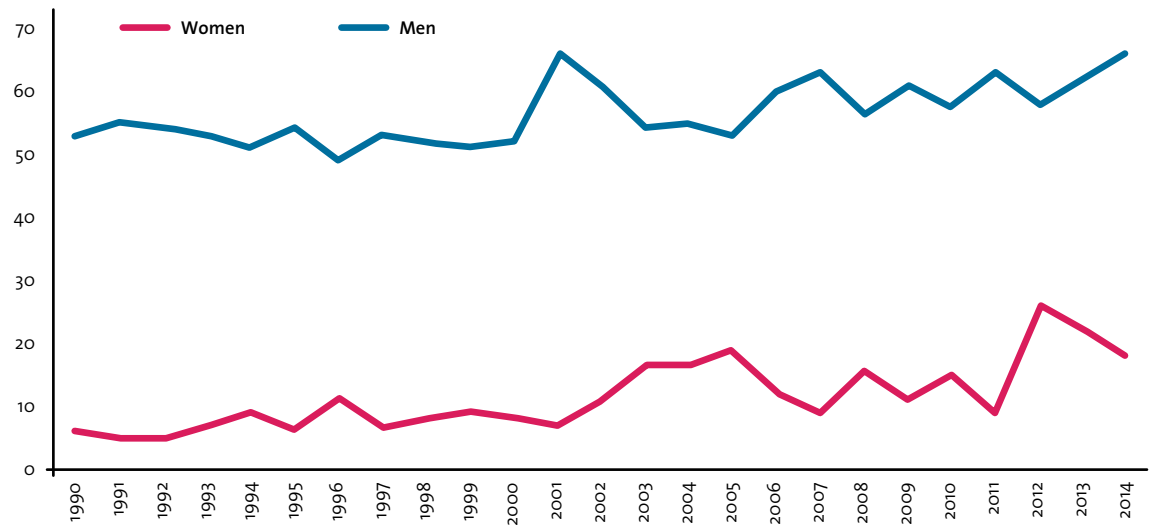
Election Year	Total Elected	Women Elected	Women (%)
1990	59	6	10.2
1991	60	5	8.3
1992	59	5	8.5
1993	60	7	11.7
1994	60	9	15.0
1995	60	6	10.0
1996	60	11	18.3
1997	60	7	11.7
1998	60	8	13.3
1999	60	9	15.0
2000	60	8	13.3
2001	73	7	9.6
2002	72	11	15.3
2003	71	17	23.9
2004	72	17	23.6
2005	72	19	26.4
2006	72	12	16.7
2007	72	9	12.5
2008	72	16	22.2
2009	72	11	15.3
2010	72	15	20.8
2011	72	9	12.5
2012	84	26	31.0
2013	84	22	26.2
2014	84	18	21.4

to 2014. These two graphs (Graph 1a and 1b) confirm that the National Academy of Sciences is now more actively increasing its female membership.

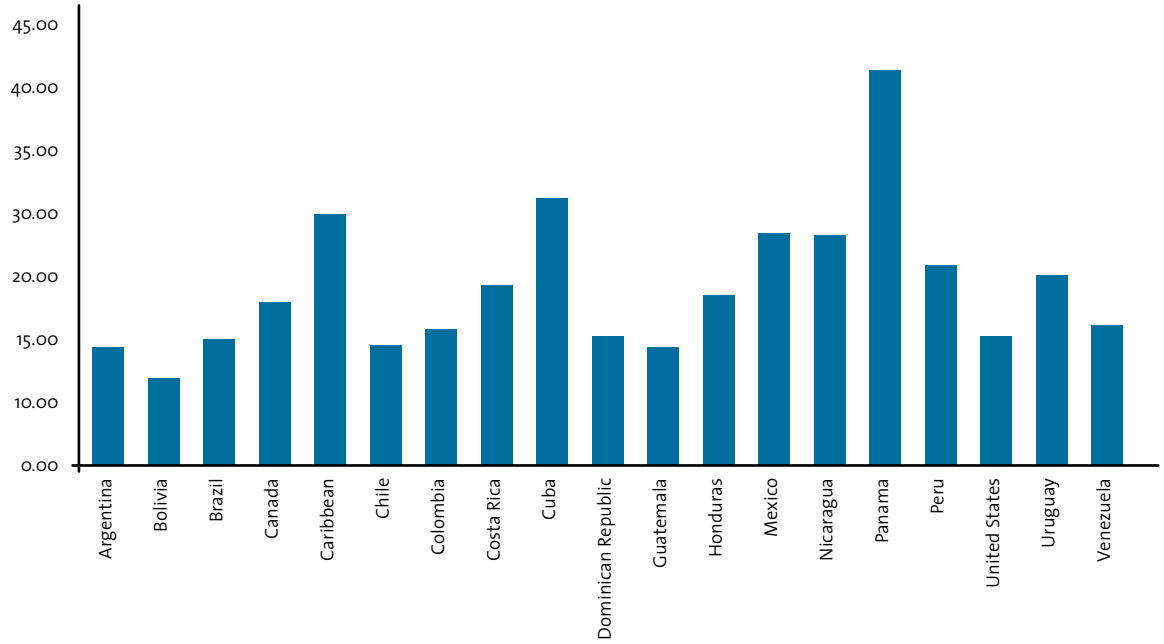
Going back to the figures presented in Table 1, we can see that there does not seem to be a correlation between the size of Academies and the number of women members. Some very large Academies have relatively small proportions of women members but for a few such as Panama, Cuba and the Caribbean, women constitute about one quarter or more of their total membership. It might have been expected that the two large and very scientifically advanced countries in North America – the U.S. and Canada – would have far more female members in their science Academies, yet that does not seem to be the case. Similarly, it might have been expected that Brazil, with its immense size and its increasing role in the global economies of the world might also have a far larger proportion of women members in its science Academy than it does. It must also be noted that 100% of the Academies currently have a male president although Cuba, Canada, Guatemala and Mexico have had female presidents in the past and some of its vice presidents are women.

Age of the Academy may have some significance since some of the larger ones with relatively small proportions of women may have been influenced by the barriers and restrictions placed on women not having similar access to higher education as men and

GRAPH 1B: NUMBER OF NATIONAL ACADEMY OF SCIENCES (US) MEMBERS ELECTED BY YEAR AND SEX



GRAPH 1: PERCENTAGE OF WOMEN MEMBERS BY ACADEMY



this was, and still is, particularly true of the science disciplines. More recently established Academies, limited in size because of their lack of educational and economic resources, are nevertheless open to the increasing ideology of feminism and the importance of educating women in their societies.

An important variable that influences the overall numbers of Academy members and may also play a role in assessing their numbers of women is that some limit or cap their membership while others are open to all new qualified persons. In our sample, seven Academies maintain a limit on their membership whereas the rest maintain open membership. There is a slight trend in these data indicating that most, but not all, of the larger Academies maintain open membership.

A question of some importance to us was whether an Academy had established a gender policy as part of its guiding legislative or policy framework. Only 4 out of the 18 Academies surveyed (22%) indicated that they had a gender policy (see Table 1). It might also be assumed that Academies with gender policies in place might have larger numbers of women members but this also does not always seem to be the case. Three of the Academies who do have such policies - Cuba, Mexico and the Caribbean - do have fairly high numbers of women members. However, Chile also has a gender policy in place yet only 12% of its total members are women. Moreover, Panama which has the highest proportion of women members does not have a gender policy but as noted earlier, their organization is a science association rather than an Academy. It is probably safe to assume that local economic, social and political conditions play a more significant role in increasing women's membership than does merely having a gender policy.

Another important dimension of women's participation in the work of Academies of science is their role in management or governing councils. Governing councils (see Table 2) vary in size from very large ones such as Nicaragua, which seems to include all its members on its council to smaller ones such as Honduras. The range is between 3 to 30 members. On average, women make up a little more than one-quarter of all those on the governing council. The United States (47%), Cuba (40%), Canada (38%) and Panama (38%) have the largest proportions of women council members whereas Brazil has the lowest at 8% followed by Bolivia (11%) and Costa Rica (13%). Of the four countries with the highest proportion of women on the governing council, Cuba is the only one with a gender policy (see Table 1). It is noteworthy again that the size

of the Academy does not necessarily predict the council participation of women. For example, Brazil which has over 500 total members (as seen in Table 1) also has the lowest proportion of women on the governing council. It should also be noted that the number of women members in an Academy does not necessarily predict the participation rate of women on the governing council. For example, of all the Academies surveyed, Canada has one of the highest proportion of women on its governing council yet does not have a high proportion of women who are members of the Academy. This is also the case with the US National Academy of Sciences.

Since governing councils are the active governing and policy making bodies of Academies, increasing women members in governance would probably be of critical importance. At this point in time, none of the Academies surveyed had a female president although at least four, Canada, Cuba, Guatemala and Mexico have had women presidents some years ago. Canada had, until recently, a female president of the Royal Society and some of the disciplinary sub-sections such as social science have been women (However, the science academy has not had a woman president). Almost all the Academies indicated that they were actively promoting the interests of women although very few had gender policies in place. Of interest also is that 4 out of the 18 Academies (22%) surveyed stated that they were not actively promoting women and gender issues. Panama, which not only has the largest percentage of women members (see Table 1) but also the largest percentage of women on their governing council, indicated that they did not actively promote women and gender issues.[8]

TABLE 2: GOVERNING COUNCIL[6]

Academy	Men on Governing Council	Men on Governing Council (%)	Women on Governing Council	Women on Governing Council (%)	Total Number on Governing Council	Actively Promoting Women and Gender Issues[7]
Argentina	5	71.43	2	28.57	7	
Bolivia	8	88.89	1	11.11	9	✓
Brazil	12	92.31	1	7.69	13	✓
Canada	10	62.50	6	37.50	16	✓
Caribbean	5	71.43	2	28.57	7	-
Chile	5	83.33	1	16.67	6	-
Colombia	5	71.43	2	28.57	7	
Costa Rica	7	87.50	1	12.50	8	✓
Cuba	6	60.00	4	40.00	10	✓
Dominican Republic	12	70.59	5	29.41	17	✓
Guatemala	5	83.33	1	16.67	6	✓
Honduras	2	66.67	1	33.33	3	
Mexico	7	70.00	3	30.00	10	✓
Nicaragua	23	76.67	7	23.33	30	✓
Panama	5	62.50	3	37.50	8	
United States (NAS)	9	52.94	8	47.06	17	-
Uruguay	4	80.00	1	20.00	5	-
Venezuela	5	83.33	1	16.67	6	✓
TOTAL	135		50		185	
AVERAGE TOTAL	72.97%		27.03%			
MEDIAN	5.5		2.0			
MEAN	7.5		2.78			

6. Peru did not provide information on its governing council.

7. The Caribbean, Chile, Uruguay and the NAS in the United States did not answer this particular question.

8. Although this appears to be anomalous, there may be a particular reason for this or it may simply be the result of an error in answering the question.

In addition to governing councils, most Academies have, as part of their infrastructure, a secretariat which handles its day to day business. 17 of the total sample of 18 Academies stated that they had secretariats.[9] On average, women comprise 71% of its staff and are therefore highly represented

GRAPH 2: PERCENTAGE OF WOMEN AND MEN ON GOVERNING COUNCIL BY ACADEMY

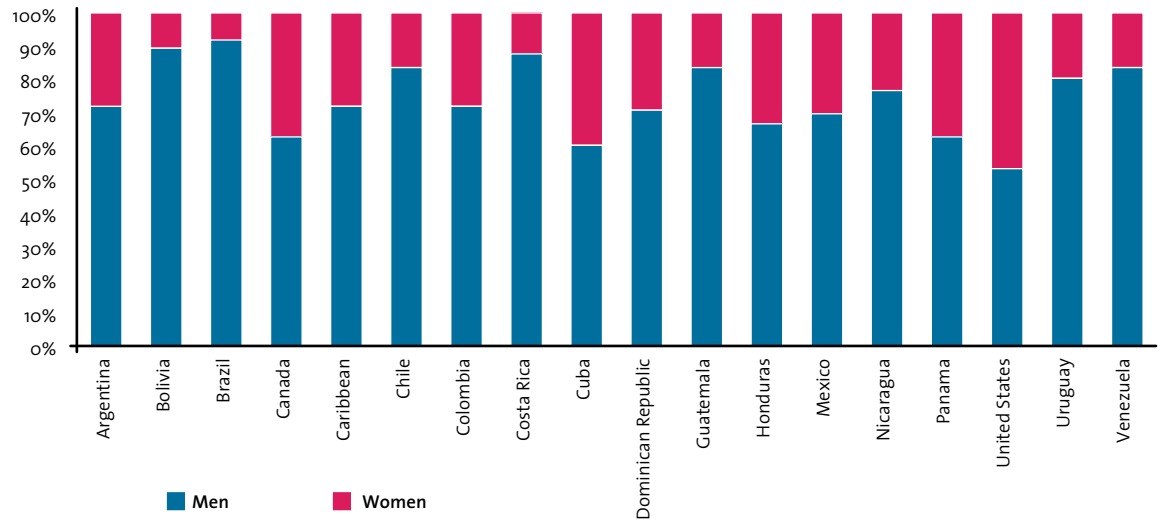


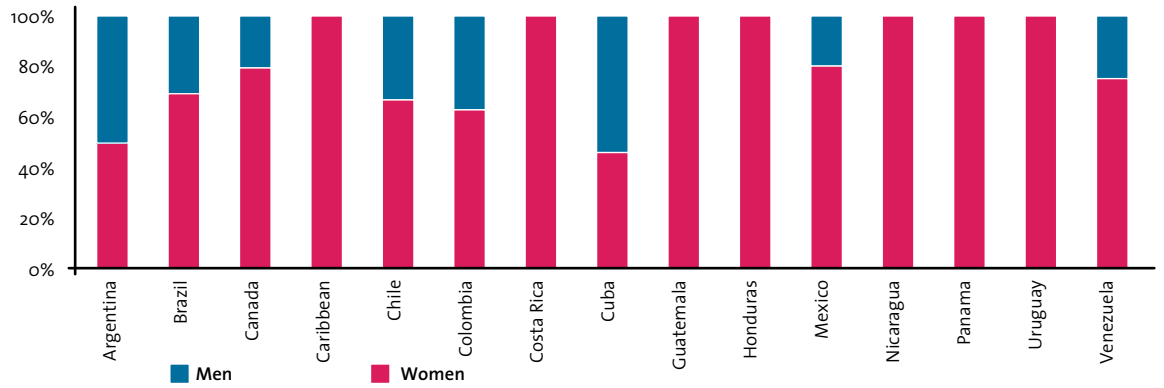
TABLE 3: SECRETARIAT[10]

Academy	Total	Number of Women	Women (%)	Men (%)
Argentina	2	1	50.00	50.00
Brazil	36	25	69.44	30.56
Canada	10	8	80.00	20.00
Caribbean	1	1	100.00	0.00
Chile	3	2	66.67	33.33
Colombia	8	5	62.50	37.50
Costa Rica	4	4	100.00	0.00
Cuba	11	5	45.45	54.55
Guatemala	2	2	100.00	0.00
Honduras	1	1	100.00	0.00
Mexico	5	4	80.00	20.00
Nicaragua	1	1	100.00	0.00
Panama	1	1	100.00	0.00
Uruguay	1	1	100.00	0.00
Venezuela	4	3	75.00	25.00
TOTAL	90	64		
AVERAGE TOTAL		71.11%		
MEDIAN		2.00		
MEAN		4.27		

9. Bolivia did not have a secretariat. The National Academy of Sciences in the United States and the Dominican Republic do have a secretariat but did not report the number of women working in the secretariat and therefore was omitted from Table 3.

10. Bolivia did not have a secretariat. Peru did not answer this question. The National Academy of Sciences (US) and the Dominican Republic did not report the number of women working in the secretariat and therefore were omitted from Table 3.

GRAPH 3: PERCENTAGE OF WOMEN AND MEN IN SECRETARIAT



in the secretariat (see Table 3). In fact, almost half of the Academies reporting, that is, 7 out of 15 have a secretariat comprised only of women (see Graph 3 for an illustration). Only Argentina and Cuba have an almost equal number of men and women in the secretariat. As the secretariat is essentially a corporate office, the high proportion of women workers is to be expected as much of the work is routine and secretarial.

13 of the 19 Academies surveyed are also structured in terms of different categories of membership. In addition to full members, many Academies are differentiated by disciplines such as divisions of Life Sciences, Earth Sciences, Applied Sciences, etc or by specific divisions such as Mathematics, Physics and Astronomy. Other common categories of membership include Corresponding members who are typically foreigners, Honorary members chosen for their unique achievements, Affiliates or Associates and a few Academies have a special division for younger scientists.

In terms of disciplinary affiliations, there were some clear cut trends (see Table 4 and Graph 4). Men were most likely to be working in the areas of Physics (15%), Life, Health, Medical Sciences (15%), Biology (13%) and Social Sciences (13%). Men were, however, least likely to be found in Astronomy and Computer Sciences as compared to other scientific disciplines. These areas were also the least likely for women.

The majority of women (71%) were working in four fields: Social Sciences (21%), Biology (18%), Life, Health, Medical Sciences (16%) and other (16%). The hard sciences such as Physics, Mathematics, Computer Science and others have attracted far fewer women. These findings are entirely consistent with overall world wide trends. An interesting exception is that the field of chemistry, usually considered a hard science is the only one in which there is a fairly substantial female representation. The higher numbers of women in Biological Sciences may be due to the belief that these areas of study are more closely related to emotions such as the desire to help people and thus considered to be 'feminine'.[12]

Looking at the disciplinary differences for the US National Academy of Sciences (Table 4a), we can

TABLE 4: DISCIPLINARY PROPORTIONS BY GENDER[11]

Discipline	Men (%)	Women (%)
Physics	15.05	5.28
Chemistry	8.04	9.24
Mathematics	8.29	3.39
Astronomy	1.99	1.60
Biology	13.32	18.10
Life/Health/Medical	15.33	16.12
Social Science	13.14	21.02
Earth Science	6.54	4.15
Engineering	10.75	5.00
Computer Science	0.22	0.38
Other	7.33	15.74

11. Nicaragua was omitted from Table 4 and Graph 4 due to the fact that they do not organize their Academy by discipline. Peru did not provide complete information on disciplinary differences and therefore were omitted from Table 4 and Graph 4.

12. http://gendersociety.wordpress.com/2013/09/13/why-scientists-think-there-are-more-women-in-biology-than-physics/

GRAPH 4: DISCIPLINARY PROPORTIONS BY GENDER

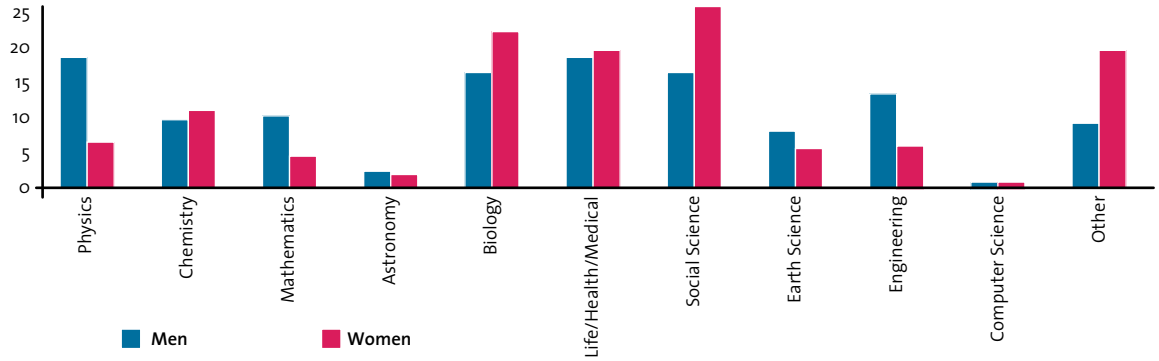


TABLE 4A: NUMBER OF WOMEN BY DISCIPLINE FOR NATIONAL ACADEMY OF SCIENCES (US)[13]

	Total	Women	Women (%)
Class I (Physical)	662	63	9.52
Class II (Biological)	589	108	18.34
Class III (Applied Physical)	260	23	8.85
Class IV (Biomedical)	269	25	9.29
Class V (Social sciences)	228	49	21.49
Class VI (Applied Biology, Ecology)	180	34	18.89
TOTAL	**2188**	**302**	**13.80**

TABLE 5: WHERE WOMEN WORK

	Do Women Members Work in the Following Institutions:				
Academy	**Universities**	**Research Centers**	**Private Laboratories**	**Government Agencies**	**Other**
Argentina	✓			✓	
Bolivia	✓	✓		✓	
Brazil	✓	✓			
Canada	✓	✓	✓	✓	✓
Caribbean	✓	✓	✓	✓	
Chile	✓				
Colombia	✓	✓			✓
Costa Rica	✓	✓	✓		
Cuba	✓	✓		✓	✓
Dominican Republic	✓	✓	✓	✓	
Guatemala	✓				
Honduras	✓		✓		
Mexico	✓	✓		✓	
Nicaragua	✓	✓			✓
Panama	✓	✓	✓	✓	✓
United States	✓	✓	✓	✓	
Uruguay	✓				
Venezuela	✓	✓			

13. The US data for disciplinary differences was organized differently and so it was made into a separate table.

see that the majority of women members are from the Social Sciences (21%). This is followed by Applied Biology and Ecology (19%) and the Biological Sciences (18%). This is similar to the results found above for the aggregated data of disciplinary differences for the remaining Academies.

The Academies surveyed were also asked to indicate in what institutions women members currently worked in. Results indicated that women members of the Academies worked primarily in universities (see Table 5). Every Academy surveyed had women members who were academics. Some Academies had women members working in a mix of university and research institutes and a few worked for government and/or private industry. Women were least likely to work in private laboratories.

IV. Summary of Quantitative Results

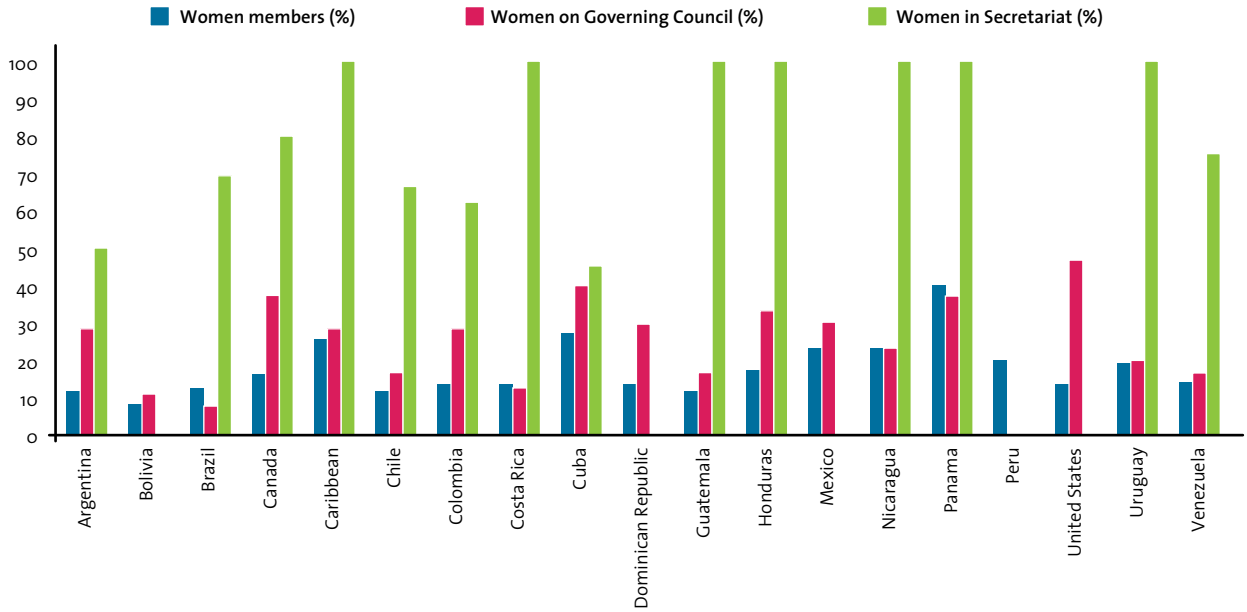
Table 6 summarizes the results of women's participation as members of Academies and as members of the Governing Council and the Secretariat cross referenced by whether or not the Academies actively promote women's issues and have gender policies. Despite the large number (71%) of Academies that indicated that they were promoting women and gender issues in their respective Academies, only 4 of the 18 Academies (22%) had a gender policy in place.[14] Moreover, we can see that having a gender policy in place does not necessarily amount to equal representation of women as members in the Academy or as members on the governing council. Looking at Graph 6, we can clearly see the high representation of women in the secretariat in comparison to their representation on the governing council and/or as members of the Academy.

TABLE 6: WOMEN AND PARTICIPATION

Country	Women Members (%)	Women on Governing Council (%)	Women in Secretariat (%)	Actively Promoting Women and Gender Issues	Has Gender Policy
Argentina	11.76	28.57	50.00		
Bolivia	8.51	11.11	Not Applicable	✓	
Brazil	12.65	7.69	69.44	✓	
Canada	16.41	37.50	80.00	✓	
Caribbean	25.56	28.57	100.00	-	✓
Chile	12.00	16.67	66.67	-	✓
Colombia	13.68	28.57	62.50		
Costa Rica	18.87	12.50	100.00	✓	
Cuba	27.16	40.00	45.45	✓	✓
Dominican Republic	13.10	29.41	-	✓	
Guatemala	11.76	16.67	100.00	✓	
Honduras	17.24	33.33	100.00		
Mexico	23.49	30.00	80.00	✓	✓
Nicaragua	23.33	23.33	100.00	✓	
Panama	40.32	37.50	100.00		
Peru	20.18	-	-	-	-
United States (NAS)	13.06	47.06	-	-	
Uruguay	19.23	20.00	100.00	-	
Venezuela	14.00	16.67	75.00	✓	
AVERAGE TOTAL	**18.11%**	**27.03%**	**71.11%**		

14. Peru did not answer this question.

GRAPH 6: PERCENTAGE OF WOMEN WHO ARE MEMBERS, GOVERNING COUNCIL AND SECRETARIAT BY ACADEMY



V. Qualitative Questions

As part of our survey, a number of open-ended questions were asked in which the respondents were able to elaborate on their answers. Answers were read and categorized into major themes to reflect their content.[15]

Is your Academy Aware of the Low Participation Rate of Women in Science and What are they Doing About it

This question elicited a 100% affirmative response. All Academies are therefore aware of the need to recruit women into science and ultimately into science Academies as members. When asked what attempts were being made by their Academy, one Academy said "no" attempts were being made and three Academies did not answer the question. Several varied answers were given by the remaining 13 Academies. In fact, three Academies stated that their participation in the IANAS Women for Science program were indicators of their Academies' concern and support for gender issues.

One of the most popular answers cited by four of the Academies surveyed was that they liaise and lobby ministries of government to make greater attempts at promoting women in science. For example one Academy indicated that "As a society we lobby to influence government bodies to increase the participation of women in science and invest in science and technology". Another said that their Academy, " Actively participate as members, in the meetings of the National Council for Science and Technology to try to influence national policy for Science and Technology". Or, "we promote gender policies in science and technology inside the Academy and also with the Federal agencies that run S&T policies". Another Academy stated that they coordinate with the vice minister in charge of Science and Technology in Belarus and China "to strengthen scientific and technological projections. Among these efforts, we scheduled the exchange of scientists and doctoral training in S & T".

Another popular response relates to the internal work of the Academy in promoting women's issues. For example, some Academies indicated that they were supporting research and work on women's issue in various disciplines such as Medicine, Environmental and Social Sciences and Linguistics or promoting forums on Women's issues. One small

15. Peru and the US did not answer these questions.

Academy cited its goals of requesting that 75% of newly elected members should be women which resulted in the election of three new women in the last three years. Another said that they had instructed their new fellows selection committee to take special notice of diversity and gender. Also mentioned were visits to primary and high schools by Academy members and two Academies noted that they sponsored prizes to young women scientists or school children studying Science and Technology. Promoting women onto various internal and external scientific committees was also mentioned.

Is your Academy Actively Promoting Women and Gender Issues in its Structures, Decision Making and Programs

Five Academies answered 'no' to this question and three did not answer it. One stated that although they were not actively promoting women, they do not discriminate and welcome all members who are interested in pursuing science, regardless of race or gender. Of the remaining eight, the most common answers revolved around a number of internal and external efforts that were being made. Increased participation of women in the board of directors was mentioned several times as was the increasing participation in national and international events through personal activity as well as the Academy's support in their publication of scientific papers. Supporting and nominating women for positions in larger international organizations was also mentioned. Another popular strategy was providing for prizes to be given to women scholars and especially younger scholars. Several Academies have such programs in effect including Brazil's well known support of the L'oreal prize for women scientists. Several Academies mentioned that they had established committees for women and gender and implemented activities on themes related to women. Two Academies specifically noted that they had had a woman president in the past and that women had served as vice presidents and/or directors of scientific divisions. One Academy reported that they had created a Task Force on Diversity to study the ways more women and racial minorities could be appointed and following its recommendations, a nine-member Committee on Equity and Diversity was established to implement their recommendations. (A 30% quota for women was recommended).

What Measures are Already in Place in your Country to Promote Increased Participation of Women

More than half of our sample said either 'none', or again cited the IANAS program, or did not answer this question. Of the remainder, one specifically mentioned that their universities were actively recruiting women to enter the engineering programs and another noted that there were more research awards and grants being given to young people. Another country specifically mentioned that one government prize was given annually to a woman. Also cited was the work of their Academies in attempting to promote participation of women by visiting and lecturing in schools. Five countries mentioned specific grant, research and equity related programs initiated by ministries of government to encourage and promote women in science. These countries are also those who have explicitly recognized the need for gender parity at all levels of government and society. All told, only about one third of our sample described ministerial or government actions.

What Measures do you Think Would be Most Effective to Encourage Young Women to Enter a Career in Science

This questions elicited many answers and the most often mentioned was that encouragement should be provided through schools by teachers, counselors and other educational officers. The provision of role models for young women students was also considered important and it was specifically noted that there should be increased interaction between established women in science and younger women and students in order to make them more aware of the life stories of women scientists and technologists. Another set of answers stated that governments should take a bigger role in implementing policies directed to scientific and technological programs. Providing more funding to schools and universities to promote science education was considered an

important step. Eliminating political discrimination and bias in the allocation of research was also mentioned. Identifying the barriers against women's participation such as discrimination in Science, Technology and in particular Physics and Mathematics was referred to, as was the need for non-sexist and inclusive language policies.

What Academy Activities were Women Involved in

Evidence based panels and especially committees were identified by 12 Academies and some mentioned the specific panel/committee by name. Thirty to 60% of these committee/panel members were women. In regard to women chairing such committees, five respondents cited between 25-100%.[16] Five Academies cited Geography and Environment, Environment and Health, Women in Science and Education, Social Sciences and Humanities Awards Committee 2013, The Commission of Women in Sciences and Women in Science as the largest of the committees/panels.

Again, these results support the kinds of interests and disciplines that women are involved in which includes Health, Environment, Education, and the specific focus on women and science that is characteristic of a few countries. Women are not involved in committees and structures that involve sciences such as Physics, Mathematics, Engineering and related subjects to any great extent.

Were Women Involved in Academy Science Engagement Activities such as Lectures and School Outreach Programs

This question received a positive response from seven Academies primarily those with larger numbers of members. Presenting lectures on science and science education at schools was cited by most of them but other activities included, evaluating the content of science books for use in primary schools, and the writing of a book. One Academy cited a special Science Teachers Training Programme where 90% of the facilitators were women. Another mentioned the science in education program inspired by IANAS. One Academy sponsors public lecture series, symposia and other meetings on a wide variety of topics ranging from studies of the brain to historical analysis of important events in history to discussions of feminism in which many of the participants and chair persons were women.

Awards and Prizes Committee Members and Recipients

About half the sample of Academies had women members on their prize and awards committees ranging from 4-6 in one case to only one in another. Nine Academies provided information on the number of their prize recipients who were women. The numbers ranged from 15 women recipients in the last three years, to 5, 12 and 17 (over a given time period) with several saying that about 2-5 awards had been given to women in recent years. In one Academy out of a total of 60 prizes, 25 were awarded to women. In another, 54 women had received a prize specifically for women ever since its inception many years ago. Although the giving of awards and prizes to men and women was a common form of honoring achievement by Academies, the range of awards varied considerably and it was difficult to determine how many awards were given within a specific time period.[17]

What Would you Estimate is the Average Percentage of Female Involvement in the Academy Activities Selected Above

This question was answered by the total sample surveyed. One Academy stated "25%"; 8 Academies selected "25-50%" and the same number chose "less than 25%". There was therefore almost an even split. Among those who chose the category of "25-50%" for average female involvement, several noted that the rate of involvement was closer to 25%, perhaps within the 30-35% range. None of the Academies surveyed self reported that the percentage of female involvement exceeded 50%. The conclusion that one can reach is that although some Academies are doing better on various criteria related to women's activities, most still have a long way to go to reach even parity with male members.

16. This question seems to have been poorly understood and the numerical replies should not be considered reliable.
17. These kinds of questions require a more detailed formulation than the present format allowed.

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Appendix 2: Questionnaire

IAP SURVEY

Women for Science: Inclusion and Participation in IAP Member Science Academies

1. Consent to participate

I hereby agree to participate in this survey, titled: Women for Science: Inclusion and Participation in IAP Member Science Academies.

I understand that I am participating freely and without being forced in any way to do so. I also understand that I can stop completing the questionnaire at any time and withdraw as a participant in the research.

Although the results will be reported by Academy, my name will be treated as confidential and will not be mentioned in any report. I understand that direct quotations from my Academy's completed questionnaire may be used but without mentioning my name in order to protect my anonymity.

I have received the details of a person to contact should I need to voice any issues which may arise from this survey.

If you agree with all of the above, please select "Yes" and proceed

Yes, I agree – take me to the survey	
No, I do not agree – take me out of here	

A GENERAL INFORMATION

2. *Please provide the following information:*

a. Name of your Academy:	
b. Country where Academy is located:	
c. Your title, name and surname:	
d. Your email address:	
e. Postal address:	
f. Telephone:	
g. Fax:	
h. Skype:	
i. URL/web link to your Academy's website:	

B ACADEMY MEMBERSHIP

NOTE: A 'member' represents any person who is elected into the Academy. Some Academies may use the term 'fellow' instead.

3. How many members are there in your Academy? (Write the number in the space provided.)			
4. How many of these members are women? (Write the number in the space provided.)			
5. Which ONE of the following best describes your Academy? (Tick the appropriate box.)			
The Academy admits members only in the natural/physical/pure sciences		The Academy admits members in all disciplines including the arts, engineering, humanities and social sciences	

6. How many members does your Academy have in the broad discipline groups listed below? (Approximate if you don't know the exact number.)

Broad discipline group	TOTAL number of members in discipline
Agricultural Sciences	
Biological Sciences	
Computer Sciences/ICT	
Earth & Environmental Sciences	
Engineering Sciences	
Mathematical Sciences	
Medical and Health Sciences	
Physical and Chemical Sciences	
Social Sciences, Humanities & Arts	
All other	

7. How many FEMALE MEMBERS does your Academy have in the broad discipline groups listed below? (Approximate if you don't know the exact number.)

Broad discipline group	Number of FEMALE members in discipline
Agricultural Sciences	
Biological Sciences	
Computer Sciences/ICT	
Earth & Environmental Sciences	
Engineering Sciences	
Mathematical Sciences	
Medical and Health Sciences	
Physical and Chemical Sciences	
Social Sciences, Humanities & Arts	
All other	

8. Do the figures in questions 6 and 7 include "double counts"? In other words, are the same individuals counted in more than one broad discipline group because of multiple disciplinary classifications? (Tick the appropriate box.)

Yes			No	

9. Do members of your Academy have to pay for membership?
(Tick the appropriate box.)

Yes			No	

10. Approximately what percentage of your members attended the last Annual General Meeting? (Write the percentage in the space provided.)

C. GOVERNANCE OF ACADEMY

11. Is the current president/chair of your Academy a man or a woman?
(Tick the appropriate box.)

Man			Woman	

12. Was the previous president/chair of your Academy a man or a woman?
(Tick the appropriate box.)

Man			Woman	

NOTE: Questions 13 to 17 ask about your Academy's Governing Body. The latter is sometimes referred to as the Board, Council or Governing Council, and determines the strategic direction of the Academy.

13. How many members sit on the Governing Body? (Write the number in the space provided.)	
14. How many of the members on the Governing Body are female? (Write the number in the space provided.)	

15. How often does the Governing Body meet? (Tick only ONE box.)

Monthly	
Every quarter	
Twice a year	
Once a year	
Every two years	
Less frequent	

16. How often is the Governing Body elected? (Tick only ONE box.)

Annually	
Every two years	
Every three years	
Every four years	
Less frequent	

17. How is the Governing Body elected? (Tick only ONE box.)

All members elect the Governing Body	
A group of members elect the Governing Body	
A group of both members and non-members elect the Governing Body	
Other, specify:	

D. ACTIVITIES OF ACADEMY

18. Does your Academy have any document (strategy, policy, founding document, etc.) that explicitly mentions the need for increased participation by women in your Academy's activities?

Yes			No	

If yes, what is the name of the document?

19. Does your Academy have a "Women in Science Award"?

Yes			No	

If YES, answer Question 20 and continue with Question 21.
If NO, skip Question 20 and answer Question 21.

20. How often does your Academy present the "Women in Science Award"? (Tick only ONE box.)

Annually	
Every two years	
Every three years	
Less frequent	

21. Does your Academy have any programme(s) on Women in Science?

Yes			No	

If yes, please provide details about the programme(s):

22. Does your Academy have a committee that addresses gender/diversity issues, or is there anyone who advises the Academy on gender/diversity issues?

We have a committee that addresses gender/diversity issues	
We have one or more individuals who advise(s) on gender/diversity issues	
We don't have any	

23. Please rate your extent of agreement with EACH of the following statements. (Tick only ONE box for each statement.)

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Does not apply to Academy
The Academy is promoting more women members to decision-making levels						
The Academy has included more women in its panels and committees						
The Academy has increased the number of women scientists in the nomination pool for membership						
The Academy has increased the number of women scientists in the nomination pool for prizes and awards						
Women are visible in the Academy's portrayal of science to the public						
The Academy pays attention to the gender implications of the research that it sponsors						
The Academy pays attention to the gender implications of the research that it evaluates						

24. Is there anything else about the role of women in your Academy's activities that you would like to raise? Please do so in the space provided.

E. REQUEST FROM IAP: THE GLOBAL NETWORK OF SCIENCE ACADEMIES

25. Does your Academy have any programmes or activities in science diplomacy?

Yes			No	

26. (a) Did your Academy undertake any activities/projects in science literacy PRIOR TO the Rio Letter-2013?

Yes			No	

(b) Has your Academy undertaken any activities/projects in science literacy SINCE THE Rio Letter-2013?

Yes			No	

27. Has your Academy ever published a report on doctoral (PhD) graduates in your country?

Yes			No	

28. Does your Academy know how many doctoral (PhD) students in science graduate in your country every year?

Yes			No	

29. (a) Does your Academy produce an annual report?

Yes			No	

(b) If YES and if it is available online, please provide the web link/URL:

THE END

THANK YOU FOR TAKING THE TIME AND EFFORT.

Appendix 3: Academic Membership by Broad Discipline

Appendix Table 3.1: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 1 – "Africa")

Academy	Agricultural sciences			Biological sciences			Computer sciences/ICT			Earth and environmental sciences			Engineering sciences		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
AFRICA															
Academy of Scientific Research and Technology (Egypt) [*]	15	2	13%	15	4	27%	15	2	13%	15	1	7%	15	2	13%
Cameroon Academy of Sciences [*]	10	0	0%	14	2	14%	1	0	0%	3	0	0%	5	0	0%
Ethiopian Academy of Sciences	25	0	0%	18	1	6%	--	--	--	4	0	0%	7	0	0%
Ghana Academy of Arts and Sciences	11	0	0%	3	3	100%	2	0	0%	4	1	25%	5	0	0%
Hassan II Academy of Science and Technology	--	--	--	2	1	50%	1	1	100%	1	0	0%	1	0	0%
Kenya National Academy of Sciences [*]	--	--	--	70	1	1%	--	--	--	--	--	--	--	--	--
Sudanese National Academy of Sciences [*]	12	1	8%	14	2	14%	4	0	0%	5	2	40%	5	0	0%
Tanzania Academy of Sciences [*]	7	1	14%	6	0	0%	11	0	0%	9	0	0%	24	0	0%
The Academy of Science of South Africa	9	2	22%	101	19	19%	--	--	--	19	4	21%	43	7	16%
The Nigerian Academy of Science	14	1	7%	8	2	25%	1	0	0%	12	0	0%	29	0	0%
Uganda National Academy of Sciences [*]	13	1	8%	9	2	22%	1	0	0%	--	--	--	3	0	0%

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.

Appendix Table 3.2: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 2 – "Africa")

Academy	Mathematical sciences			Medical and health sciences			Physical and chemical sciences			Social sciences, humanities and arts			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
AFRICA															
Academy of Scientific Research and Technology (Egypt) [*]	15	2	13%	15	0	0%	15	6	40%	15	4	27%	375	40	11%
Cameroon Academy of Sciences [*]	3	0	0%	13	1	8%	7	1	14%	22	7	32%	1	0	0%
Ethiopian Academy of Sciences	--	--	--	22	2	9%	7	0	0%	19	2	11%	--	--	--
Ghana Academy of Arts and Sciences	4	0	0%	21	1	5%	9	1	11%	46	6	13%	--	--	--
Hassan II Academy of Science and Technology	2	0	0%	--	--	--	--	--	--	--	--	--	--	--	--
Kenya National Academy of Sciences [*]	--	--	--	--	--	--	45	1	2%	31	1	3%	--	--	--
Sudanese National Academy of Sciences [*]	5	0	0%	25	2	8%	5	1	20%	6	0	0%	--	--	--
Tanzania Academy of Sciences [*]	11	0	0%	23	3	13%	9	0	0%	13	1	8%	17	0	0%
The Academy of Science of South Africa	19	2	11%	33	11	33%	56	6	11%	103	29	28%	40	21	53%
The Nigerian Academy of Science	7	0	0%	58	9	16%	30	2	7%	--	--	--	1	0	0%
Uganda National Academy of Sciences [*]	5	0	0%	8	2	25%	12	0	0%	4	1	25%	10	1	10%

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.
The Uganda National Academy of Sciences included "law", "economics and banking" and "veterinary sciences" as part of "other disciplines".

Appendix Table 3.3: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 1 – "Middle East & Central Asia", "South Asia" and "South East Asia & the Pacific")

Academy	Agricultural sciences			Biological sciences			Computer sciences/ICT			Earth and environmental sciences			Engineering sciences		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
MIDDLE EAST & CENTRAL ASIA															
Georgian National Academy of Sciences	6	0	0%	11	1	9%	5	0	0%	7	0	0%	7	0	0%
Palestine Academy for Science and Technology [*]	4	0	0%	5	1	20%	4	0	0%	10	1	10%	16	1	6%
The Turkish Academy of Sciences	--	--	--	--	--	--	--	--	--	--	--	--	37	2	5%
SOUTH ASIA															
Bangladesh Academy of Sciences (BAS)	6	0	0%	9	3	33%	2	0	0%	--	--	--	6	0	0%
Indian National Science Academy	57	1	2%	230	21	9%	--	--	--	69	3	4%	103	0	0%
National Academy of Sciences of Sri Lanka	10	0	0%	33	10	30%	--	--	--	6	0	0%	15	0	0%
Pakistan Academy of Sciences	8	0	0%	27	7	26%	--	--	--	4	0	0%	8	0	0%
SOUTH EAST ASIA & THE PACIFIC															
Academy of Sciences Malaysia	17	8	47%	17	4	24%	29	1	3%	17	2	12%	29	0	0%
Australian Academy of Science	27	1	4%	174	26	15%	13	2	15%	49	2	4%	42	1	2%
Chinese Academy of Sciences	43	6	14%	42	6	14%	32	2	6%	122	6	5%	106	0	0%
Mongolian Academy of Sciences [*]	6	0	0%	5	2	40%	--	--	--	5	0	0%	5	0	0%
Royal Society of New Zealand	18	0	0%	85	9	11%	--	--	--	49	3	6%	36	0	0%
Science Council of Japan	130	16	12%	286	43	15%	102	11	11%	90	13	14%	319	26	8%

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.

Appendix Table 3.4: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 2 – "Middle East & Central Asia", "South Asia" and "South East Asia & the Pacific")

Academy	Mathematical sciences			Medical and health sciences			Physical and chemical sciences			Social sciences, humanities and arts			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
MIDDLE EAST & CENTRAL ASIA															
Georgian National Academy of Sciences	9	0	0%	12	1	8%	15	1	7%	30	5	17%	--	--	--
Palestine Academy for Science and Technology [*]	2	0	0%	5	1	20%	12	0	0%	7	0	0%	6	0	0%
The Turkish Academy of Sciences	--	--	--	49	5	10%	48	2	4%	63	8	13%	--	--	--
SOUTH ASIA															
Bangladesh Academy of Sciences (BAS)	3	0	0%	5	1	20%	21	0	0%	--	--	--	--	--	--
Indian National Science Academy	72	6	8%	74	15	20%	250	6	2%	--	--	--	--	--	--
National Academy of Sciences of Sri Lanka	1	0	0%	27	11	41%	34	3	9%	7	1	14%	3	0	0%
Pakistan Academy of Sciences	4	0	0%	8	0	0%	31	4	13%	--	--	--	--	--	--
SOUTH EAST ASIA & THE PACIFIC															
Academy of Sciences Malaysia	33	0	0%	43	10	23%	24	9	38%	--	--	--	30	0	0%
Australian Academy of Science	45	3	7%	10	2	20%	105	6	6%	--	--	--	14	3	21%
Chinese Academy of Sciences	37	1	3%	47	2	4%	312	19	6%	--	--	--	--	--	--
Mongolian Academy of Sciences [*]	3	0	0%	9	1	11%	13	0	0%	11	0	0%	6	0	0%
Royal Society of New Zealand	45	1	2%	51	7	14%	74	3	4%	88	16	18%	--	--	--
Science Council of Japan	44	8	18%	309	62	20%	178	23	13%	643	156	24%	--	--	--

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.

Appendix Table 3.5: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 1 – "Central & Eastern Europe", "South Eastern Europe" and "Western & Northern Europe")

Academy	Agricultural sciences			Biological sciences			Computer sciences/ICT			Earth and environmental sciences			Engineering sciences		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
CENTRAL & EASTERN EUROPE															
Academy of Sciences of the Czech Republic	12	NG	30%	50	NG	50%	12	NG	5%	38	NG	15%	25	NG	5%
Hungarian Academy of Sciences	58	3	5%	107	6	6%	12	0	0%	59	1	2%	68	1	1%
Latvian Academy of Sciences	11	7	64%	27	5	19%	21	0	0%	16	3	19%	31	0	0%
Polish Academy of Sciences	58	2	3%	62	6	10%	116	2	2%	32	0	0%	--	--	--
SOUTH EASTERN EUROPE															
Academy of Sciences and Arts of Bosnia and Herzegovina	3	0	0%	1	0	0%	--	--	--	--	--	--	9	1	11%
Academy of Sciences of Albania [*]	1	1	100%	2	0	0%	3	0	0%	1	0	0%	2	0	0%
Croatian Academy of Sciences and Arts	2	0	0%	7	1	14%	3	0	0%	9	0	0%	8	1	13%
Montenegrin Academy of Sciences and Arts [*]	--	--	--	2	0	0%	--	--	--	5	0	0%	7	0	0%
Serbian Academy of Sciences and Arts	2	0	0%	6	2	33%	2	0	0%	8	0	0%	16	0	0%
Slovenian Academy of Sciences and Arts [*]	12	2	17%	12	2	17%	21	0	0%	12	2	17%	21	0	0%
WESTERN & NORTHERN EUROPE															
Académie des Sciences – Institut de France	--	--	--	125	15	12%	59	5	8%	62	9	15%	--	--	--
Accademia Nazionale dei Lincei (Italy)	--	--	--	86	5	6%	--	--	--	34	4	12%	4	0	0%
Austrian Academy of Sciences	5	0	0%	82	14	17%	10	1	10%	41	1	2%	49	2	4%
Finnish Academy of Science and Letters	56	11	20%	40	10	25%	17	2	12%	58	1	2%	--	--	--

Academy	Agricultural sciences			Biological sciences			Computer sciences/ICT			Earth and environmental sciences			Engineering sciences		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
German National Academy of Sciences Leopoldina	27	2	7%	443	46	10%	37	6	16%	83	5	6%	28	4	14%
Real Academia de Ciencias Exactas, Físicas y Naturales (Spain)	--	--	--	10	2	20%	--	--	--	7	0	0%	3	0	0%
Royal Irish Academy	5	0	0%	--	--	--	--	--	--	18	4	22%	31	1	3%
Royal Netherlands Academy of Arts and Sciences	--	--	--	45	5	11%	--	--	--	29	0	0%	46	1	2%
Swiss Academy of Engineering Sciences [*]	2	1	50%	11	3	27%	25	4	16%	15	2	13%	190	6	3%
Swiss Academy of Medical Sciences	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
The Royal Swedish Academy of Sciences	--	--	--	95	15	16%	--	--	--	47	5	11%	47	7	15%
Union of the German Academies of Sciences and Humanities	3	0	0%	102	0	0%	25	0	0%	61	0	0%	69	0	0%

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.
The Royal Netherlands Academy of Arts and Sciences included "earth & environmental sciences" as part of "agricultural sciences"; and "engineering sciences" as part of "computer sciences/ICT".

Appendix Table 3.6: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 2 – "Central & Eastern Europe", "South Eastern Europe" and "Western & Northern Europe")

Academy	Mathematical sciences			Medical and health sciences			Physical and chemical sciences			Social sciences, humanities and arts			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
CENTRAL & EASTERN EUROPE															
Academy of Sciences of the Czech Republic	12	NG	5%	13	NG	40%	63	NG	20%	20	NG	70%	5	NG	50%
Hungarian Academy of Sciences	75	3	4%	95	6	6%	139	5	4%	163	14	9%	--	--	--
Latvian Academy of Sciences	8	0	0%	37	11	30%	83	2	2%	151	41	27%	8	1	13%
Polish Academy of Sciences	30	0	0%	65	5	8%	91	1	1%	81	6	7%	--	--	--
SOUTH EASTERN EUROPE															
Academy of Sciences and Arts of Bosnia and Herzegovina	2	1	50%	9	4	44%	2	0	0%	29	2	7%	--	--	--
Academy of Sciences of Albania [*]	2	0	0%	5	0	0%	6	1	17%	17	2	12%	--	--	--
Croatian Academy of Sciences and Arts	5	0	0%	20	2	10%	13	0	0%	83	11	13%	--	--	--
Montenegrin Academy of Sciences and Arts [*]	2	1	50%	4	0	0%	3	0	0%	--	--	--	26	0	0%
Serbian Academy of Sciences and Arts	11	2	18%	23	2	9%	19	0	0%	54	7	13%	--	--	--
Slovenian Academy of Sciences and Arts [*]	21	0	0%	11	0	0%	21	0	0%	51	3	6%	--	--	--
WESTERN & NORTHERN EUROPE															
Académie des Sciences – Institut de France	53	2	4%	64	5	8%	122	5	4%	--	--	--	34	2	6%
Accademia Nazionale dei Lincei (Italy)	59	1	2%	--	--	--	64	2	3%	255	13	5%	28	3	11%
Austrian Academy of Sciences	45	4	9%	66	3	5%	121	10	8%	367	70	19%	4	0	0%

Academy	Mathematical sciences			Medical and health sciences			Physical and chemical sciences			Social sciences, humanities and arts			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
Finnish Academy of Science and Letters	36	0	0%	109	21	19%	93	10	11%	306	68	22%	--	--	--
German National Academy of Sciences Leopoldina	65	6	9%	444	32	7%	227	16	7%	180	35	19%	--	--	--
Real Academia de Ciencias Exactas, Físicas y Naturales (Spain)	15	1	7%	1	0	0%	13	1	8%	--	--	--	--	--	--
Royal Irish Academy	18	0	0%	80	8	10%	75	2	3%	234	54	23%	4	0	0%
Royal Netherlands Academy of Arts and Sciences	30	0	0%	76	7	9%	114	3	3%	249	58	23%	--	--	--
Swiss Academy of Engineering Sciences [*]	1	1	100%	--	--	--	35	9	26%	--	--	--	16	5	31%
Swiss Academy of Medical Sciences	--	--	--	222	38	17%	--	--	--	--	--	--	--	--	--
The Royal Swedish Academy of Sciences	42	2	5%	89	14	16%	132	15	11%	136	17	13%	36	3	8%
Union of the German Academies of Sciences and Humanities	94	0	0%	130	0	0%	315	0	0%	925	0	0%	--	--	--

T = Total members; W = Women members; %W = Women as % of total members.
[*] Figures for this academy include "double counts", i.e. the same individuals are counted in more than one broad discipline group because of multiple disciplinary classifications.

Appendix Table 3.7: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 1 – "Latin America & the Caribbean" and "North America")

Academy	Astronomy			Biology			Chemistry			Computer science			Earth science		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
LATIN AMERICA & THE CARIBBEAN															
Academia Mexicana de Ciencias (Mexico)	68	14	21%	415	125	30%	176	47	27%	0	0	--	125	31	25%
Academy of Medical, Physical and Natural Sciences (Guatemala)	0	0	--	2	2	100%	0	0	--	0	0	--	0	0	--
Academy of Sciences of the Dominican Republic	0	0	--	0	0	--	5	1	20%	1	0	0%	4	0	0%
Brazilian Academy of Sciences	0	0	--	32	9	28%	57	11	19%	0	0	--	47	3	6%
Caribbean Academy of Sciences	0	0	--	12	2	17%	9	1	11%	2	1	50%	6	2	33%
Chilean Academy of Sciences	5	2	40%	21	3	14%	6	1	17%	1	0	0%	10	1	10%
Colombian Academy of Exact, Physical and Natural Sciences	4	0	0%	38	9	24%	27	6	22%	0	0	--	23	0	0%
Cuban Academy of Sciences	0	0	--	15	3	20%	29	16	55%	7	3	43%	4	1	25%
National Academy of Exact, Physical and Natural Sciences (Argentina)	0	0	--	2	0	0%	6	1	17%	0	0	--	3	1	33%
National Academy of Sciences of Bolivia	3	0	0%	1	1	100%	2	0	0%	1	0	0%	10	0	0%
National Academy of Sciences of Costa Rica	0	0	--	18	3	17%	5	1	20%	0	0	--	1	0	0%
National Academy of Sciences of Honduras	0	0	--	5	3	60%	0	0	--	0	0	--	0	0	--
National Academy of Sciences of Panama	0	0	--	16	6	38%	11	5	45%	1	0	0%	0	0	--
National Academy of Sciences of Uruguay	1	0	0%	7	1	14%	3	1	33%	0	0	--	0	0	--

Academy	Astronomy			Biology			Chemistry			Computer science			Earth science		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
Venezuelan Academy of Physical, Mathematical and Natural Sciences	0	0	--	11	3	27%	10	2	20%	1	0	0%	4	1	25%
NORTH AMERICA															
Royal Society of Canada	26	1	4%	198	22	11%	115	5	4%	0	0	--	102	4	4%

T = Total members; W = Women members; %W = Women as % of total members.
Three academies are excluded: Nicaragua does not organise its academy by discipline; Peru did not provide complete information on disciplinary differences, and the NAS in the USA has a different disciplinary breakdown.

Appendix Table 3.8: Women as percentage of members of national science academies, by individual academy, broad discipline group and IAP region (Part 2 – "Latin America & the Caribbean" and "North America")

Academy	Engineering			Life/health/ medical			Mathematics			Physics			Social science			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
LATIN AMERICA & THE CARIBBEAN																		
Academia Mexicana de Ciencias (AMC) (Mexico)	272	24	9%	228	58	25%	139	15	11%	428	37	9%	243	83	34%	405	153	38%
Academy of Medical, Physical and Natural Sciences (Guatemala)	12	0	0%	31	4	13%	13	0	0%	0	0	--	0	0	--	8	0	0%
Academy of Sciences of the Dominican Republic	0	0	--	40	7	18%	0	0	--	7	0	0%	0	0	--	27	2	7%
Brazilian Academy of Sciences	39	1	3%	142	23	16%	62	3	5%	81	5	6%	22	5	23%	24	4	17%
Caribbean Academy of Sciences	23	4	17%	22	4	18%	16	2	13%	13	3	23%	0	0	--	0	0	--
Chilean Academy of Sciences	4	0	0%	0	0	--	10	1	10%	13	1	8%	0	0	--	5	0	0%
Colombian Academy of Exact, Physical and Natural Sciences	13	0	0%	22	5	23%	22	0	0%	30	3	10%	6	2	33%	0	0	--
Cuban Academy of Sciences	45	10	22%	70	12	17%	9	1	11%	28	3	11%	58	28	48%	0	0	--

Academy	Engineering			Life/health/ medical			Mathematics			Physics			Social science			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
National Academy of Exact, Physical and Natural Sciences (Argentina)	10	1	10%	0	0	--	6	0	0%	7	1	14%	0	0	--	0	0	--
National Academy of Sciences of Bolivia	0	0	--	6	2	33%	2	0	0%	8	0	0%	8	1	13%	4	0	0%
National Academy of Sciences of Costa Rica	0	0	--	8	2	25%	2	0	0%	8	0	0%	1	0	0%	0	0	--
National Academy of Sciences of Honduras	1	0	0%	5	1	20%	1	0	0%	5	1	20%	8	0	0%	5	0	0%
National Academy of Sciences of Panama	14	5	36%	47	21	45%	4	3	75%	4	0	0%	7	3	43%	20	8	40%
National Academy of Sciences of Uruguay	2	1	50%	0	0	--	2	0	0%	3	0	0%	4	2	50%	0	0	--
Venezuelan Academy of Physical, Mathematical and Natural Sciences	5	0	0%	3	0	0%	5	1	20%	3	0	0%	0	0	--	0	0	--

Academy	Engineering			Life/health/ medical			Mathematics			Physics			Social science			Other		
	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W	T	W	%W
NORTH AMERICA																		
Royal Society of Canada	98	7	7%	239	32	13%	117	10	9%	97	2	2%	459	99	22%	0	0	--

T = Total members; W = Women members; %W = Women as % of total members.
Three academies are excluded: Nicaragua does not organise its academy by discipline; Peru did not provide complete information on disciplinary differences, and the NAS in the USA has a different disciplinary breakdown.