

The Right to Science

From Principle to Practice and the Role of National Science Academies

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12.1 INTRODUCTION

It is not primarily in the articulation of a human right that it is given life, but in its implementation. With the adoption by the United Nations (UN) of an authoritative statement on the meaning of the right to science,¹ the time is now to shift the focus of attention from conceptualization to implementation. To that end, this study moves beyond the previous work of the scientific, engineering, and health communities aimed at defining the right to science. The question at the heart of this study is whether there is potential for national academies to adopt a central role in the implementation of the right to science, serving as intermediaries to distill and frame key priorities regarding the right within their national context, and providing locally relevant and feasible recommendations for how their governments might fulfill their obligations under the right.

The “right to science” is a shorthand used to describe Article 15 of the International Covenant on Economic, Social and Cultural Rights (ICESCR). According to the text of Article 15, countries that are a party to the treaty (171 in total as of July 2021)² are obligated to recognize the right of everyone to “enjoy the benefits of scientific progress and its applications,” to ensure the “conservation, development and diffusion of science,” to protect “the freedom indispensable for

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¹ We use the term “science” to refer to the pursuit and application of knowledge and understanding of the natural, social, engineering, and medical worlds following an iterative and systematic methodology based on evidence.

² The current list of countries party to the treaty can be found here: <https://indicators.ohchr.org/>. The United States of America has signed but not ratified the treaty.

scientific research,” and to encourage “international contacts and cooperation” in science.³ Although the language of the right specifically addresses “science,” the provision is intended to be inclusive of all sciences, engineering and health.⁴

This study represents the third stage in a decade-long research endeavor led by the American Association for the Advancement of Science (AAAS) and AAAS Science and Human Rights Coalition. The first stage involved seventeen disciplinary-specific focus groups of United States-based scientists who were the first to explore what the right to science means from the perspectives of scientists.⁵ The second stage involved a global questionnaire of scientists, engineers, and health professionals to identify regional variations in scientists’ views regarding the actions necessary to ensure realization of the right to science, as well as targeted interviews of public health professionals about the value of the right to practice.⁶ This third stage involved a questionnaire of national academies of sciences and medicine, including national young academies, in countries that have ratified the ICESCR (and for senior academies, that are members of the InterAcademy Partnership), followed by interviews with a subsample of respondents to the questionnaire.

Multiple voices and perspectives are needed in the work to realize the right to science, including not only those of scientists, but also those particularly impacted by scientific progress or its absence, such as those affected by neglected diseases, those denied the benefits of scientific progress on religious or political grounds, and all children who stand to benefit from a quality science education. The focus of this study and decade of inquiry has been the engagement of the scientific community because, as the world’s largest multidisciplinary scientific membership organization, AAAS’s primary constituents, networks, and interlocutors consist of scientists. In addition, that engagement was explicitly encouraged by the UNESCO Venice Statement of 2009 which called on “scientists and their professional organizations to manifest their commitment to the right by . . . participating in the elucidation of the right.”⁷ That said, for the right to have meaning in practice, all relevant

³ UN General Assembly, International Covenant on Economic, Social and Cultural Rights, December 16, 1966, United Nations, Treaty Series, vol. 993, p. 3.

⁴ Farida Shaheed, “The right to enjoy the benefits of scientific progress and its applications,” May 14, 2012 (A/HRC/20/26, HRC, Geneva), p. 24.

⁵ AAAS Science and Human Rights Coalition, “Defining the Right to Enjoy the Benefits of Scientific Progress and Its Applications: American Scientists’ Perspectives” (Report prepared by Margaret Weigers Vitullo and Jessica Wyndham), October 2013. Note: we use the term “scientists” in the most inclusive sense, to include those who apply scientific methods within the natural, social, and physical sciences, engineering, and health fields.

⁶ J. M. Wyndham, M. W. Vitullo, K. Kraska, N. Sianko, P. Carbajales, C. Nuñez-Eddy, E. Platts. 2017. “Giving Meaning to the Right to Science: A Global and Multidisciplinary Approach.” (Report prepared under the auspices of the AAAS Scientific Responsibility, Human Rights and Law Program and the AAAS Science and Human Rights Coalition).

⁷ Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and Its Applications (2009), UNESCO Experts’ Meeting on the Right to Enjoy the Benefits of Scientific Progress and its Applications, 3rd Meeting, Venice, Italy, July 16–17, 2009.

communities, institutions, and authorities must be engaged to ensure the right, in its detail and nuance, is implemented and enjoyed by all.

12.2 LITERATURE REVIEW

The right to science was described by eminent international lawyer William A. Schabas as “tucked away at the tail end of the Universal Declaration of Human Rights,” occupying “a similarly neglected and obscure position” in the International Covenant on Economic, Social and Cultural Rights, and as a right that “has received little attention” even taking into account “the more general marginalization of economic, social and cultural rights.”⁸ The relegated importance of the right within the human rights framework is reflected in the fact that not until March 2020 was a General Comment defining the right adopted by the UN treaty body responsible for monitoring its implementation, that is three decades after the first General Comment was adopted by the same treaty body. It is also reflected in the relative lack of literature on the right to science, although an upward trend in scholarly consideration of the right is discernible as of the last decade.

In 2015, Wyndham and Vitullo identified four stages in the evolution of the literature on the right to science: passing mention of the right as it related to other rights; consideration of the right as a whole as it related to the interests of the scientific community; exploration of the right as it relates to other human rights; and “a cautious coinciding of concerns among both human rights practitioners and scientists.”⁹ In the past several years, that final strand has expanded to explore the practical significance of the right as a tool to affect change in law and practice, and to encourage and measure implementation of the right.

Building on and contributing to this final strand in the literature, collaborations with the scientific, engineering and health communities have made five substantive contributions. The first was in recognizing that the right to science “is not only a right to benefit from material products of science and technology. It is also a right to benefit from the scientific method and scientific knowledge.”¹⁰ As such, the right to science is more than a general restatement, for example, of the right to health, to water, or to the Internet, as suggested in the early literature.¹¹ Rather, science – its methods and the knowledge it generates – holds inherent value including by

⁸ W. A. Schabas, “Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Applications,” in Y. Donders and V. Volodin, *Human Rights in Education, Science and Culture: Legal Developments and Challenges*, UNESCO, 2007, pp. 273–274.

⁹ J. M. Wyndham and M. W. Vitullo, “The Right to Science – Whose Right? To What?,” *European Journal of Human Rights*, 2015, vol. 4, p. 433.

¹⁰ J. M. Wyndham and M. W. Vitullo, “Define the Human Right to Science,” *Science*, 2018, vol. 362, Issue 6418, p. 975.

¹¹ See, for example, Stephen P. Marks, “The Evolving Field of Health and Human Rights: Issues and Methods,” *The Journal of Law, Medicine & Ethics*, 2002, 30(4): 739–754; Martin R. Hilbert, “Latin America onits path to the digital age: where are we?” UN Doc. LC/L.1555-P, 1 June 2001.

providing an empirical basis for laws and policies, by providing understanding of personal behaviors, and as the basis for economic growth.¹² This point is specifically acknowledged in the General Comment.¹³

The second major contribution was in the development of a conceptual framework for understanding “access” in the context of the right to science. That framework was presented as a “continuum of access,” defined at one end as “access for general public” and at the other as “access for scientists.” “A person’s position on this continuum can change over time, depending on his/her social context, interests, ability, and training.”¹⁴ To move along the continuum of access from the general public to a scientist involves not only greater participation in the production of science, but also greater risks and responsibilities, and should depend on interest, ability, motivation, and training and the judgement of scientific peers, rather than socioeconomic position or government preselection. As such, support for the notion that the right to science includes a right to participate in science is another contribution of this preliminary body of work.¹⁵

The third contribution of the preceding work is that the right to science, though only using the language of “benefits” and of “freedoms,” must be “exercised in a manner consistent with scientific responsibility.”¹⁶ Such responsibilities are both internal in nature and align closely with ethical standards of practice as defined in most scientific disciplines, but also include responsibilities aimed at the larger community, or the “social responsibilities” of scientists, as recognized in the UNESCO Recommendation on Science and Scientific Researchers (2017) and by leading scholars in the field.¹⁷

Finally, previous research engaging the scientific community globally has demonstrated that the evolving meaning of the right to science, particularly the benefits of science to society and the government actions required to support the advancement of science, are generally shared by scientists across all regions of

¹² AAAS Science and Human Rights Coalition, “Defining the Right to Enjoy the Benefits of Scientific Progress and Its Applications: American Scientists’ Perspectives” (Report prepared by Margaret Weigers Vitullo and Jessica Wyndham), October 2013, p. 2.

¹³ UN Committee on Economic, Social and Cultural Rights (CESCR), *General Comment No. 25: On Science and Economic, Social and Cultural Rights*, April 7, 2020, E/C.12/GC/25, paragraphs 4–7.

¹⁴ *Ibid.* p.6.

¹⁵ J. M. Wyndham and M. W. Vitullo, “The Right to Science – Whose Right? To What?,” *European Journal of Human Rights*, 2015, vol. 4, p. 451. See also L. Shaver, “The Right to Science and Culture,” *Wisconsin Law Review*, 2010, p. 121; UNESCO, “The Right to Enjoy the Benefits of Scientific Progress and Its Applications,” 2009, p. 17.

¹⁶ J. M. Wyndham and M. W. Vitullo, “Define the Human Right to Science,” *Science*, 2018, vol. 362, Issue 6418, p. 975.

¹⁷ United Nations Educational, Scientific and Cultural Organization (UNESCO) Recommendation on Science and Scientific Researchers. In: United Nations Educational, Scientific and Cultural Organization. Report of the Social and Human Sciences Commission, 39C, November 11, 2017. Paris: UNESCO; 2017, pp. 31–47. See also M. S. Frankel, “Science as a Socially Responsibility Community,” Paper adapted from an address presented at a Conference on Scientific (Mis) Conduct and Social (Ir)Responsibility, Indiana University, Bloomington, May 27, 1994, p. 1.

the world.¹⁸ However, there is global variation across disciplines about the benefits of science to society, and the government actions that scientists in industry consider to be of most value are distinct from scientists in other sectors.¹⁹

Although the UN process to define the right has only just come to an end, literature on implementation of the right – how it could be achieved in specific domains, and how to measure implementation – is growing. For example, since 2016 the Luca Coscioni Association, together with the International Human Rights Clinic of the Loyola Law School, has developed reports on specific legislation and judicial measures that could be taken to implement the right. Topics of focus include access to *in vitro* fertilization,²⁰ and abortion and contraception.²¹ In addition, the Association has developed a set of preliminary indicators by which to measure realization of the right along five dimensions: access to benefits; opportunities to participate; scientific freedom; enabling environment; and international cooperation.²²

The shifting emphasis in the literature from conceptualization to implementation suggests growing consensus around foundational concepts at the core of the right. It also suggests that a pragmatic realization is emerging that only through testing the receptivity of domestic legislative bodies, national and regional judicial bodies, and UN treaty bodies to certain interpretations of the right will progress in its implementation in practice occur. It is to that end that this study examined the actual and potential role of academies in helping to realize the right to science.

12.3 NATIONAL ACADEMIES

National academies are merit-based organizations that champion the advancement of science, scientific exchange, and evidence-based decision-making.²³ They are

¹⁸ J. M. Wyndham, M. W. Vitullo, et al., “Giving Meaning to the Right to Science: A Global and Multidisciplinary Approach” (Report prepared under the auspices of the AAAS Scientific Responsibility, Human Rights and Law Program and the AAAS Science and Human Rights Coalition, 2017), pp. 3–4.

¹⁹ *Ibid.*, p.4.

²⁰ “NGO Report on Costa Rica’s Implementation of the International Covenant on Economic, Social and Cultural Rights,” Submitted to the UN Committee on Economic, Social and Cultural Rights for consideration in the formulation of the List of Issues during the 57th Pre-Sessional Working Group (March 7–11, 2016) (submitted by International Human Rights Clinic, Loyola Law School Los Angeles and and Associazione Luca Coscioni per la libertà di ricerca scientifica).

²¹ “NGO Parallel Report on the Republic of Estonia’s Third Report on the Implementation of the Covenant on Economic, Social and Cultural Rights,” submitted to the UN Committee on Economic, Social and Cultural Rights for consideration in the formulation of the List of Issues during the 62nd Pre-Sessional Working Group (April 3–6, 2018) (submitted by International Human Rights Clinic, Loyola Law School Los Angeles and and Associazione Luca Coscioni per la libertà di ricerca scientifica).

²² A. Boggio, “Right to Science Indicators: Methodological Notes” (May 28, 2018).

²³ We use the umbrella term “academies” to encompass a wide variety of arrangements of merit-based organizations that focus on the sciences, social sciences, technology, health, and medicine, and sometimes also include the arts and humanities.

typically independent of government and are found in most countries of the world. Building on the foundations of Plato's academy (387 BC),²⁴ the oldest existing science academies originated in Europe in the 1600s, while academies in the Americas, Asia, and Africa emerged later, beginning in the mid-1800s up until today.²⁵ The newest academies have emerged just in the last few years, especially within Africa, including for example the Rwanda Academy of Sciences (2016),²⁶ the Burundi Academy of Science and Technology (2017),²⁷ and the Eswatini Academy of Sciences (KEAS, 2018)²⁸ among others.

In addition to large differences in the number of years they have been in existence, academies vary significantly in terms of their national role(s) and visibility/recognition, their relationship with their government, their size (i.e., number of members and staff), and their resourcing level and source. National academies of science can broadly serve any number of four primary functions in their countries:

- (1) **Recognition:** members are typically elected by current members in recognition for their scholarship and achievements in their field.²⁹ In many countries, academy membership is among the highest honors a scientist can achieve in their career.
- (2) **Science programs and outreach:** through various grant and fellowship programs and school/public outreach, many academies deliver science programs for young scholars and the broader community, including science diplomacy programs.
- (3) **Independent science advice:** many academies provide high quality, independent advice to their governments on issues of policy importance through mechanisms such as consensus reports, statements, and other products.
- (4) **Research funding:** some academies have research funding or laboratory institutions under their jurisdiction (e.g., many of the academies of the former Soviet Union and those in China).

Common challenges include reliance on project-based grant funding for many of their activities, and poor gender balance and diversity (the Global Young Academy and many of the National Young Academies, described below, being exceptions in terms of gender balance and diversity). The first women were elected to national

²⁴ A. Bevan, "A Modern State Academy of Science," *The Scientific Monthly*, 1951, 73(4): 255–260.

²⁵ M. Clegg and J. Boright, "Adapting to the Future: The Role of Science Academies in Capacity Building," *Int. J. Technology Management*, 2009, 46(1/2).

²⁶ M. Waruru, "World Academy of Sciences Grows, Launches New Network," *University World News* (November 18, 2016). Available at: www.universityworldnews.com/post.php?story=20161118070128525.

²⁷ Academy of Science of South Africa Newsletter, 4th Quarter, "AMASA 13 Held in Nigeria" (December 5, 2017). Available at: <http://www.assaf.co.za/newsletter/?p=1837>.

²⁸ The InterAcademy Partnership Annual Report (2018), Available at: www.interacademies.org/57875/IAP-Annual-Report-2018?source=generalSearch.

²⁹ M. Hassan, V. ter Meulen, P. F. McGrath, and R. Fears, "Academies of Science as Key Instruments of Science Diplomacy," *Science & Diplomacy*, 2015, 4 [online]. Available at: <http://sciencediplomacy.org/perspective/2015/academies-science-key-instruments-science-diplomacy>.

academies beginning in the 1920s. A 2015 survey of sixty-nine academies found that, on average, women made up 12 percent of total membership, although this gender imbalance is beginning to shift.³⁰ Some academies are not completely independent from their governments, due to their national structure.

Serving a coordinating function across academies, the InterAcademy Partnership (IAP) is a global network of 145 academies, including 25 medical academies and three engineering academies. Founded in 1993, the IAP's vision is for the world's academies to play a vital role in ensuring that science serves society inclusively and equitably and underpins global sustainable development. Among its activities, the IAP supports the Global Young Academy,³¹ which, in turn, serves as a liaison among the independent National Young Academies (NYAs). In contrast to their "senior" academy counterparts, NYAs are made up of early- to mid-career scholars, often from a wider range of disciplines. Members apply and are competitively selected by their peers, often not only for their excellent scholarship and scientific achievement but for their commitment to serve society. Many NYAs are affiliated with and may receive funding or in-kind support from their country's senior academy, with various degrees of independence. Today there are more than forty NYAs, the majority having been established in the last ten years.³²

12.3.1 Academies and Human Rights

Historically, national academy engagement with international human rights has tended to focus on advocacy for individual scientific colleagues whose rights have been threatened or violated. In the latter half of the twentieth century, concern about the persecution of colleagues – including certain prominent scientists such as Soviet physicist and dissident Andrei Sakharov – led some national academies to create human rights committees charged with supporting colleagues under threat. The French National Academy of Sciences' Committee for the Defence of Scientists' Rights, created in 1978, is among the earliest of these bodies.³³

³⁰ G. Noordenboos, "Women in Academies of Sciences: From Exclusion to Exception," *Women's Studies International Forum*, 2002, 125(1): 127–137. Available at: www.sciencedirect.com/science/article/abs/pii/S0277539502002157; M. Galvin, "Historic Number of Women Elected to National Academy of Sciences," National Academies of Sciences Engineering and Medicine Press Release (April 30, 2019). Available at: www.eurekalert.org/pub_releases/2019-04/naos-hn0043019.php; M. Enserink, "In Bold New Step, Dutch Science Academy Holds Women-Only Elections," *Science* (November 15, 2016). Available at: www.sciencemag.org/news/2016/11/bold-new-step-dutch-science-academy-holds-women-only-elections.

³¹ More information about the Global Young Academy can be found at: www.globalyoungacademy.net.

³² A listing of the current National Young Academies can be found at: <https://globalyoungacademy.net/national-young-academies/>.

³³ *Standing Committee for the Defence of Scientists' Rights, French Academy of Sciences* [Online]. Available at: www.academie-sciences.fr/en/Experts-Committees/standing-committee-for-the-defence-of-scientists-rights-codhos-protecting-scientists-throughout-the-world.html.

In 1993, three Nobel Laureates in the sciences, Max Perutz (UK), Torsten Wiesel (USA/Sweden), and Francois Jacob (France), together with Dutch jurist Pieter van Dijk, established an international consortium of academies – the International Human Rights Network of Academies and Scholarly Societies (HR Network) – to enhance cooperation among national academies working on human rights.³⁴ The HR Network, which is not a formal membership body, has a mandate to “put into practice the professional duty of scientists and scholars to assist those colleagues whose human rights have been – or are threatened to be – infringed and to promote and protect the independence of academies and scholarly societies worldwide.”³⁵

The HR Network’s Secretariat, based at the Committee on Human Rights of the US National Academies of Sciences, Engineering, and Medicine, shares information with national academies participating in the HR Network concerning rights abuses involving scientists, engineers, and health professionals. The HR Network also has an Executive Committee (EC) composed of national academy members – including some former academy presidents – that issues public statements concerning threats to the rights of scientific colleagues and the autonomy of academic institutions. Such statements are issued in the name of the Executive Committee, rather than on behalf of the academies of EC members. To date, the outreach of the HR Network Secretariat has focused on senior academies, which respond to rights abuses largely through private actions, for example, sending appeals/private petitions to government officials and making confidential submissions to UN and other human rights complaint bodies.

Since its first formal meeting in 1995, the HR Network has held biennial meetings on science and human rights, which are open to all interested national academies. Violations of colleagues’ rights and freedoms is the major focus of these events, but increasingly – in response to interest from participating academies – they have also explored topical science and human rights themes, such as the relationship between sustainable development, climate change, and rights. More than ninety academies have attended at least one of the HR Network’s biennial meetings or participated in another HR Network activity. Broader engagement of these academies with human rights, however, is highly varied, as revealed by a review of the HR Network’s operations over time and described below.

12.3.1.1 Growing Number of Academy Structures for Human Rights Engagement

When the HR Network was established in 1993, half a dozen national academies had human rights committees. In response to a questionnaire distributed in June 2017 to

³⁴ *International Human Rights Network of Academies and Scholarly Societies* [Online]. Available at: www.internationalhrnetwork.org/. One of the authors of this study, Rebecca Everly, currently serves as Executive Director of the HR Network.

³⁵ International Human Rights Network of Academies and Scholarly Societies, *Proceedings – Symposium and Fifth Biennial Meeting, Paris, May 10–11, 2011*. Washington, DC: The National Academies Press, 2003.

more than eighty academies, nine academies reported having such a committee and fourteen others reported “sharing” a human rights committee with other national academies in their countries.³⁶ Others, such as the Swiss Academies of Arts and Sciences, reported that they have formally designated a member with overall responsibility for addressing human rights issues. Academies without such structures tend to engage with international human rights and the HR Network on an ad hoc basis.

Most academies with formal, internal human rights structures are based in Europe, with exceptions including the national academies in Korea and Costa Rica. Yet, the academies involved in hosting and attending recent biennial meetings indicate increased interest on the part of academies in the Global South in exploring human rights issues.

While, for the most part, the HR Network continues to focus on responding to violations of the civil and political rights of colleagues and threats to the autonomy of academic institutions, outside the HR Network some academies have explored topics related to economic, social, and cultural rights. As an example, in 2016, the Academy of Science of South Africa (ASSAf) joined with the country’s Department of Science and Technology to host a conference for young scientists that addressed the relationship between rights and genomics and the relevance of human rights for protection of indigenous knowledge systems.³⁷ A 2015 consensus study led by ASSAf, in collaboration with the Uganda National Academy of Sciences, considered both scientific evidence and human rights standards in assessing arguments used to make same-sex relationships illegal.³⁸ The Human Rights Committee of the German National Academy of Sciences Leopoldina³⁹ since 2010 has organized human rights symposia for the European scientific community, in cooperation with other European academies. Notably, a 2015 symposium held by the Leopoldina and the Swiss Academies of Arts and Sciences examined the right to science.⁴⁰

Though the trend for academy engagement with economic, social, and cultural rights is upward, at present, national academies more frequently report undertaking activities on scientific topics that have *implications* for such rights (e.g., issues related to education, the environment) without explicitly using an international human rights lens.

³⁶ The questionnaire was administered by the HR Network’s Secretariat.

³⁷ Academy of Science of South Africa, *Annual South African Young Scientists’ Conference 2016*. Pretoria: Academy of Science of South Africa, 2016.

³⁸ Academy of Science of South Africa, *Diversity in Human Sexuality: Implications for Policy in Africa*. Pretoria: Academy of Science of South Africa, 2015.

³⁹ *Human Rights Committee of the Leopoldina* [Online]. Available at: www.leopoldina.org/en/international-issues/human-rights-committee/.

⁴⁰ Swiss Academies of Arts and Sciences and Leopoldina, *The Human Right to Science: New Directions for Human Rights in Science, International Conference, 22 May 2015*.

12.4 METHODOLOGY

As the first step in determining academies' views on how the right to science could be used to address core concerns at the intersection of science and society, the project team developed a fifteen-item questionnaire that was sent to all IAP member academies and National Young Academies in countries that have ratified the ICESCR. The questionnaire, deployed using the SurveyGizmo online platform, was sent by IAP to 128 senior national academies and by the Global Young Academy to 44 NYAs. Responses were received over approximately three weeks in June and July of 2019. Representatives of ninety-two academies total responded to the questionnaire, a response rate of 53 percent. Questionnaire responses were entered into SPSS for analysis.

Questionnaire respondents were asked if they would be willing to participate in a follow up interview. In total, fifty-three of the ninety-two respondents volunteered to be interviewed. Of the fifty-three, twenty senior and young academy respondents were selected. The selection was made to ensure diversity across multiple factors: region, academy size, the degree to which the academy did or did not already engage in human rights activities, and the respondents' opinion about whether the right to science may or may not be relevant to their work. Of these twenty, fourteen interviews were conducted. The remaining six respondents were either unavailable during the study timeframe or could not be reached. The interviews varied in length from approximately fifteen to sixty minutes, although most took about thirty minutes. The interviews were divided among several project team members and conducted by phone, Skype, or web conference. Interviewers took detailed notes during the conversations. Audio recordings made during the conversations were used to verify notes, as needed. The research team reviewed and verified interviewer notes before three members (M. Vitullo, N. Weisenberg, J. Wyndham) participated in the process of coding the interview notes. Excerpts from the interviewers' notes (with occasional quotations from the interviewees themselves) are included in the "Results" section.

The interview data analysis process had several stages. First, three members of the research team each closely read a subset of interview notes and used an inductive process⁴¹ to identify concepts that appeared in those interviews. The results were then compiled into a single list of codes. Next, the interview notes were uploaded to the qualitative analysis software package Dedoose. The codes became the basis for an iterative coding process in which one member of the team (M. Vitullo) read and coded all of the interviews, including those from the first stage of the analysis, comparing the compiled list of codes with additional concepts and themes that emerged subsequently. As themes emerged, codes were

⁴¹ K. Charmaz, *Constructing Grounded Theory* (2nd ed.) London: SAGE, 2014.

added or removed. Finally, results from the coding process were then shared with the entire team for further discussion and refinement.

12.5 RESULTS

12.5.1 Characteristics of Responding National Academies

As indicated previously, there is wide variation in the characteristics of national academies, including the number of years in which they have been in existence, the size of their membership as well as the size of their staff. The characteristics of the responding senior and young national academies for this study reflected those same patterns (see Table 12.1):

- the number of academies per region ranged from a low of seven academies in the Middle East and North Africa to thirty-seven academies in Europe;
- the 19 African academies averaged 16 years of existence, while the 37 European academies, on average, were founded more than 150 years ago; and

TABLE 12.1 *Characteristics of Responding National Academies*

	Africa	Americas	Asia-Pacific	Europe	Middle East & North Africa
Number of Academies					
Senior	13	14	10	33	6
Young	6	1	4	4	1
Total	19	15	14	37	7
Average Years Since Founded	16	92	45	151	30
Members*					
0–50	42%	27%	29%	11%	0%
51–100	21%	20%	21%	8%	29%
101–200	11%	7%	14%	19%	29%
201+	21%	40%	29%	54%	29%
Staff*					
0–50	89%	87%	64%	43%	57%
51–100	0%	7%	21%	8%	29%
101–200	0%	0%	0%	19%	0%
201+	5%	0%	7%	22%	0%

*Due to missing data, regional percentages do not total 100.

- among the 37 European academies that participated in the study, more than half have 200 or more distinguished scientists as members. Similarly, 40 percent of the academies in the Americas reported having 200 or more members. In the other regions, less than one-third of responding academies are that large.
- Less variation in staff size is visible across the regions, with the vast majority reporting 100 or fewer staff. Again, European academies are the outliers, where 41 percent report having staffs that are larger. These differences have implications for the academies' potential role in working toward the fulfillment of the right to science, as will be explored below.

12.5.2 *Academies' Prior Engagement with Human Rights*

One indicator of academies' potential for serving as central actors in the implementation of the right to science may be their prior engagement on human rights issues. The questionnaire asked respondents how frequently their academy engaged in six possible activities related to human rights: (1) organizing panels or inviting speakers; (2) hosting a full program of activities; (3) referencing human rights in publications; (4) referencing human rights when trying to inform government policy; (5) referencing human rights when trying to inform public discussion; and (6) referencing human rights in an official statement.

The results from the prior engagement question were used to calculate an index score indicating the level of human rights engagement within each academy. Scores could range from zero (indicating no engagement with any of the activities) to six (indicating the academy often engaged in all six activities). Across all the academies the average human rights activity score was 2.1 (see Table 12.2). Given that respondents were answering these questions within the limits of their own personal knowledge as well as their own subjective evaluation of the frequency of activities, and acknowledging that within the HR Network there have been discussions regarding the imperfect nature of communication within academies, it is reasonable to assume that some respondents were not fully informed about all aspects of their academy's human rights engagement. Their responses nonetheless provide a window into academies' prior engagement with human rights activities, and how levels of activity vary across regions.

During the follow up interviews, respondents were asked to elaborate on their academy's engagement with human rights. Those discussions provide insight on at least part of the reason human rights activity was described as minimal: respondents were more likely to equate human rights activity with private actions in response to violations of civil and political rights rather than

TABLE 12.2 *National Academies Engagement with Human Rights and Article 15*

	Africa	Americas	Asia-Pacific	Europe	Middle East & North Africa	Mean	Standard Deviation
Human Rights Activity – average score							
Possible Range = 0 to 6	1.1	2.4	1.3	3.1 ¹	1.0	2.1	1.2
Right to Science-Prior Awareness							
Percent that had prior awareness	33%	36%	15%	62%	43%	44% ²	50%
Influence on gov policy – average score							
None=0; Significant=3	1.4	1.6	1.2	1.5	1.1	1.4	.77
Influence on public discourse – average score							
None=0; Significant=3	1.6	1.7	1.4	1.6	1.4	1.6	.77
Potential role in Article 15 fulfillment – average score							
None=0; Significant=3	2.8 ³⁺⁴	2.1	1.5 ¹	1.8 ¹	2.0 ³	2.0	.91

1. Across region difference significant at .005 in 1-way ANOVA tests. Due to unequal variances within groups, Welch tests of the equality of means were employed. For the same reason, in post-hoc analysis, Africa was used as the reference category and between group differences were tested using the Dunnett (2-sided) method.

2. Across region differences significant at .005. Tested using Chi Square.

3. Within region difference significant at .005 between “Influence on Government Policy” and “Potential Role in Article 15 fulfillment”. Tested using Wilcoxon Signed-Rank Test for non-parametric samples.

4. Within region difference significant at .005 between “Influence on Public Discourse” and “Potential Role in Article 15 fulfillment”. Tested using Wilcoxon Signed-Rank Test for non-parametric samples.

with public actions taken to advance economic, social and cultural rights. As discussed above, the HR Network exists to encourage and help coordinate academies' human rights activities. To date, those activities most frequently focus on violations of civil and political rights and take the form of private appeals and submissions to human rights complaint bodies, in contrast to the six categories of public-facing human rights activity measured in the questionnaire. For example, when discussing their efforts on behalf of persecuted scientists, including those targeted, detained, or jailed for their scientific activities, respondents almost always described these efforts in the context of human rights. However, when describing work related to science education, advancing women in science, working toward socioeconomic development, the eradication and control of disease, or scientifically informed policies, respondents were less likely to frame that work explicitly in terms of human rights. An excerpt from a project interviewer's notes illustrate this point.

He gave the example of a workshop that [the academy] helped to organize in 2017 concerning challenges facing female scientists and the impact of these challenges on career progression. He was on the organizing committee for this event, which provided an opportunity for female scientists (members of the academy and others) to share their experiences, hear the experiences of their colleagues, and discuss how challenges might be addressed. The academy also brought a resource person from the United States for this activity. He said that, in thinking further about our questionnaire, he sees this as an activity with a connection to human rights.

12.6 THE RIGHT TO SCIENCE IS LITTLE KNOWN YET PERCEIVED BY MANY AS CORE TO THE ACADEMIES' MISSIONS

Academies possessed limited prior knowledge of the right to science. Fewer than half of the ninety-two questionnaire respondents had heard of the right prior to receiving the questionnaire. There were, however, significant differences across regions. Academies in the Asia-Pacific region were the least likely to be aware of the right, where 33 percent reported prior knowledge. Academies in Europe were the most likely to report prior awareness, with 62 percent reporting having heard of the right before receiving the questionnaire.

After learning about the right to science, respondents described the ways the concept captured their attention. One respondent immediately sent the information to his academy's Executive Council. Other respondents asked for more information about the right, how it was defined, and what other countries were doing on the topic. One respondent told the project interviewer that she thought that there was a

tacit understanding of the right to science within her academy, but that it had never been directly expressed as such.

She mentioned that, when she viewed our questionnaire, this was the first time she had thought about a human right to science. She indicated that she has thought about scientific advancement almost as a privilege but would like to learn about the notion of science as a right. She mentioned that there is something powerful about this idea.

Although in most cases the academies had not engaged in activities explicitly tied to the right to science, many respondents viewed the concept as central to their missions and seemed to believe that future activity on this topic would be fully in alignment with their priorities.

I think in many respects the academies are ideally placed to [work on the fulfillment of the right to science]. For two reasons. The one is that, most academies see themselves as offering policy advice to a range of role players who may in the first instance be legislators of some kind. But [they] may also be the general public, or business, or whatever. I think academies, by the reports that they produce, have the opportunity to influence people in these matters, and influence them to think of having a right to science. Second aspect of it, is that individual members of academies have expertise, and can use that expertise to highlight these issues and make them more available to the broader public.

On a scale of 0 to 3 (with 0 representing no influence, and 3 representing significant influence), academies across the globe reported an average government influence level of 1.4, and an average public discourse influence of 1.6. Regional variations in these two influence scores were not significant in one-way ANOVA tests of difference in means. The questionnaire respondents in Africa and in the Middle East evaluated their academies' potential role in the fulfillment of the right to science more positively than their ability to influence government policy generally. Academies in Africa also saw their potential role in the fulfillment of the right to science as greater than their potential to influence public discourse. Compared to the academies in Africa, academies in Asia-Pacific and Europe saw significantly less of a role for themselves in the fulfillment of the right to science.

12.7 BARRIERS

While the right to science resonated with the interview respondents once they were aware of it, and in many cases, it was concordant with the activities of their academy, that does not suggest a simple or easy path from nascent interest to meaningful engagement. Other parts of the interviews brought to

light a variety of challenges that would have to be addressed in any such efforts.

12.7.1 *Lack of Knowledge*

While both the questionnaire responses and the interviews provided evidence that there was interest in the right to science, as noted above there was little basic understanding of its history, meaning, or implications. Interviewer notes reveal a variety of basic questions: What precisely is the right to science? Is it the right to human knowledge that has already been discovered? How could an academy go about taking action on the right to science? Who are the key stakeholders?

He mentioned that it would be useful for the academy to have a better understanding of the right to science, particularly as many people are not conversant on this topic. It would, for instance, be useful . . . to know what is being done in other countries on this issue.

One respondent thought that some of her academy's members might not have a strong interest in the right to science initially because of their lack of familiarity with the topic. But she thought others would be interested in learning more about the right and exploring its implications. She said that additional information, perhaps in the form of seminars and workshops, was needed to help members better understand the right.

12.7.2 *Organizational Structure*

Academies' ability to work toward the fulfillment of the right to science will be influenced by their organizational structures. The question of whether the right most appropriately fell within the purview of the physical sciences, the social sciences, or even philosophy and the humanities arose in several interviews. In one academy, the respondent was concerned that working on the right to science would seem to be too focused on the physical sciences and not sufficiently applicable to the other parts of the academy's mission. In another case, where the respondent's academy was focused exclusively on the physical sciences, the respondent was concerned that other academies in that country would see the right as more appropriately within their purview.

A few academies reported having standing committees on human rights with high-level members. In those academies, human rights activities were prioritized and acted upon. The fact that few academies have such a committee or office represents another potential organizational barrier to academies' engagement on the right to science. Still, the above-mentioned example of the South African

Academy of Science demonstrates that human rights committees are not a requirement for meaningful academy human rights engagement.⁴²

Available resources can also be a barrier to engagement on the right to science. While the academies in Africa saw themselves as having the most potential for working toward the fulfillment of the right, nearly 90 percent of them had fifty or fewer staff and on average they had existed for the shortest time. And in a variety of cases from across the globe, relatively newly formed academies were in a very tenuous state of existence, with limited capacity to take on activities beyond their own actualization as a viable organization.

This is a very “young” academy; it was created [about 20 years ago], and government only recognized the academy by presidential decree [a few years ago]. The first 10 years of the academy are primarily devoted to anchoring the foundations of the academy, to be recognized and establish the pillars.

Any effort to engage national academies in the right to science will need to consider the wide disparities in organizational structures and resources available across nations and between senior and young academies.

12.7.3 *Government Relations*

Ninety-five percent of respondents to the questionnaire said that informing policy at the national level was within the scope of their mission. Yet, in the interviews, lines of communication with government actors were often described as missing and, in some cases, openly hostile. Lack of government funding was an issue that was raised by several respondents, whose academies struggled to establish a program of activities without financial resources. The respondents also discussed political constraints on the academies related to both civil and political rights and economic, social, and cultural rights. When speaking out on behalf of persecuted scientists, some respondents mentioned experiencing pressure from the government not to endanger relationships with other offending countries by speaking out on human rights. One respondent mentioned receiving pressure from the government because the academy's recommendations regarding a major international development project were in contradiction to the government's plans.

12.8 APPROACHES TO OVERCOMING BARRIERS

While the data discussed here points to a variety of potential barriers to academies' engagement in the fulfillment of the right to science, it also provided insights on possible approaches to overcoming those barriers.

⁴² See Section 12.3.1.3 above.

12.8.1 *Working with Partners in Collaborative Efforts*

When academies engaged in human rights-related activities, they often did so in partnership with other organizations and the value of collaboration was mentioned by respondents from a wide range of academies. Respondents spoke of collaborations with entities within their own countries, including their counterparts in government departments of science and technology as well as other government ministries, national museums, foreign offices, and embassies. They spoke of partnerships with other academies within their own countries. Creating partnerships with senior academies was seen as essential for young academies with fewer resources and less supporting infrastructure. One member of a young academy described its relationship with the country's senior academy as "symbiotic." Partnerships with other organizations were also commonly mentioned, including the ALLEA (European Federation of Academies for the Sciences and Humanities), the GYA, the HR Network, the IAP, Scholars at Risk, The World Academy of Sciences (TWAS), and the UN/UNESCO.

12.8.2 *Identifying Strong Shared Interests across Regions*

The questionnaire asked whether, over the past three years, the academy had engaged in activities related to any of eight specific topics: science education, health care, climate change, sustainable development, emerging technologies, ethics, scientific freedom, and open access. We were interested to see if there was regional variation in levels of interest in these topics. Within each region, the activity engaged in by the highest proportion of academies in that region was ranked first. The activity engaged in by the next highest proportion of academies was ranked second, and the one following third. If two activities enjoyed engagement in the same proportion of academies in a region, multiple activities could have the same rank. We then examined areas of overlap across regions.

The results of this analysis are presented in Table 12.3. Science education and sustainable development appeared among the first or second ranked topical activities for academies in every region examined. Conversely, open access was ranked just third in Europe, and scientific freedom did not rank in the top three for any region. This suggests that introducing the right to science as a tool for working on the areas of science education and sustainable development might be widely perceived as important and useful. On the other hand, focusing on the right to science as applied to open access and scientific freedom are topics that would be less likely to receive broad support.

TABLE 12.3 Ranking and Overlap in Academy Activities by Region

	Africa	Americas	Asia-Pacific	Europe	Middle East & North Africa
Rank 1					
Top three ranked activities by region	Science Education				Scientific Ethics
			Sustainable Development	Climate Change	
	Sustainable Development	Climate Change		Sustainable Development	
			Emerging Tech		Science Education
	Health Care	Sustainable Development	Scientific Ethics	Open Access	Climate Change
				Scientific Ethics	
Rank 2					
Rank 3					

Note: If within a region, the proportion of academies engaging in a specific activity were equal, this could result in two activities being “tied” within a rank.

12.9 CONCLUSION

The central question at the core of this study was whether, and to what extent, there existed the potential for national academies to adopt a central role in the implementation of the right to science. The right has been recognized as lying at the “heart of the mission” of the world’s largest scientific membership organization⁴³ and it is a right that all countries that are a party to the International Covenant on Economic, Social, and Cultural Rights are bound to respect, to protect, and to fulfill. The UN General Comment on the right to science reveals conceptual agreement around the general scope of the right. Building on the growing literature on the right, and the

⁴³ AAAS Board of Directors, “On the human right to the benefits of scientific progress,” Statement, April 16, 2010.

nascent UN efforts, the imperative now is to give the right life by applying it in practice.

The results of this study reveal that, to the extent that academies engage in activities adopting an explicit human rights frame, they are most often focused on civil and political rights, and particularly the rights of scientists. Yet, there is considerable work being undertaken by academies that addresses policy concerns directly related to the full scope of human rights, and a recognition that the right to science in particular is relevant, if not even core, to the work of the academies.

Although academies identified several actual and perceived barriers to greater engagement in human rights, they also provided examples of ways such barriers can be overcome, suggesting a roadmap for future engagement by academies with the right to science. The first and most vital step will be the provision of resources, including training and opportunities for dialogue about the right to science among academies, their staff, and their members to lay the groundwork for future engagement.

The findings also make clear that building upon existing partnerships and collaborative efforts on human rights would be the appropriate approach for any effort to engage academies in activities related to the fulfillment of the right to science. Moreover, such an approach has the benefit of leveraging the greater resources of some academies in ways that empower action on the part of those that are less robust organizationally. In addition to the HR Network, another specific mechanism that was mentioned in the interviews was for IAP to consider issuing a statement on the right to science; such a statement could be issued jointly with the GYA and the National Young Academies.

The right to science is articulated in an international treaty that binds states, and those states are required periodically to report to the UN about their efforts toward the fulfillment of their obligations. In that context, if national academies initiate new activities and frame existing activities in terms of the right to science, this could provide a unique benefit to states party, helping foster the progressive realization of the right in ways that could be documented to the United Nations but also building more positive relationships between academies and governments.

As such, the right to science could be a valuable tool to assist national academies in strengthening their current activities and furthering their overall goals. As multiple academies recognized the right to science as relevant to, if not central to, their activities, the opportunity exists for academies to explore how the framework of the right could be used to inform the cultivation of relationships with relevant interlocutors at the national level. Academies could also build bridges regionally and internationally with academies in countries bound by the right and potentially facilitate prioritization of organizational policy goals. Furthermore, as one respondent from a young academy said, connecting the activities of the academy to human rights might provide a way to respond to the interest of members to connect with something larger than themselves. Indeed, implementation of the right to science would be of great benefit not only to scientific enterprise, but also to all of society.