

Cathleen A. Campbell et al., "Science Diplomacy in Arab Countries: The Need for a Paradigm Shift," *Science & Diplomacy*, Vol. 6, No. 1 (March 2017).*

<http://www.sciencediplomacy.org/article/2017/science-diplomacy-in-arab-countries-need-for-paradigm-shift>

This copy is for non-commercial use only. More articles, perspectives, editorials, and letters can be found at www.sciencediplomacy.org. SCIENCE & DIPLOMACY is published by the Center for Science Diplomacy of the American Association for the Advancement of Science (AAAS), the world's largest general scientific society.

The complete issue will be posted and available in hard copy in March 2017.

Science Diplomacy in Arab Countries: The Need for a Paradigm Shift

Nart Dohjoka, Cathleen A. Campbell, and Brenna Hill

The twenty-two Arab nations in the Middle East and North Africa (MENA)¹ face a range of intense economic, political, social, and security challenges. Many are struggling to recover from the impacts of the 2008 global financial crisis and declining oil and gas prices while dealing with growing demands for investment in jobs and security at home. Unemployment is high, particularly among young people, who constitute an increasingly large share of Arab countries' populations.^{2,3} Political upheaval following the Arab Spring events that began in 2011 has produced change in Tunisia, Egypt, Iraq, Syria, Libya, and Yemen, much of it undesirable and leaving many disillusioned about the prospects for reform. The civil war in Syria in particular has produced nearly five million refugees; many have settled in Jordan, which is already struggling to meet the needs of its existing population. Tunisia's reforms have been a bright spot in the post-Arab Spring era, yet the threats of terrorism and conflict in the region are a constant concern for Arab governments, many of which have responded by investing more heavily in military budgets and overall security.⁴

Nart Dohjoka is the Program Manager of the Science Diplomacy Program at the Royal Scientific Society.

Cathleen A. Campbell is the former President and CEO of CRDF Global and a current scholar with the AAAS Center for Science Diplomacy.

Brenna Hill is the Director of Marketing and Communications at CRDF Global.

Science alone cannot solve the many political, security, and economic problems that Arab countries face today. However, science diplomacy has an important role to play in addressing the health, environmental, energy, water, and food challenges that contribute to regional instability. These are shared problems that transcend national borders, and solving them will require collaboration. In turn, encouraging scientific collaboration among Arab countries can strengthen their diplomatic ties and build a base of scientific expertise and resources, enabling the incorporation of science into regional decision making to address these shared problems.

Several notable endeavors illustrate the potential of science diplomacy in the region. The project known as SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) involves Israel, Iran, and several Arab countries among its members, and demonstrates the potential for scientific collaboration to build bridges between countries with strained relationships and to strengthen the regional scientific enterprise. Another noteworthy example of science diplomacy involving the region is the InterAcademy Partnership (IAP), a global network of national science academies that includes Egypt, Morocco, Sudan, and Jordan and aims both to build capacity in the sciences and to provide scientific evidence to inform national and international policymaking. Other examples include the Eastern Mediterranean Public Health Network, which connects public health workers in seven Arab countries and provides epidemiological training; the Israeli-Palestinian Science Organization, which was formed in 2004 to support research and education cooperation between Israeli and Palestinian scientists; and the Middle East Desalination Research Center, which supports research and training on desalination and water-related issues. While these projects are encouraging, they are the exception and not the rule for Arab countries. Science diplomacy, whether for the purpose of informing policy or engaging stakeholders to address regional or global challenges, has not yet become standard practice in Arab countries. Some indications, however, suggest this is beginning to change.

We, the coauthors, helped organize two recent efforts in Jordan to help foster science diplomacy in the Arab world. The first, the Regional Forum on Science & Technology Diplomacy: Towards Transformative and Inclusive Partnerships for a Sustainable Future, was hosted by the Royal Scientific Society of Jordan in partnership with the UN Economic and Social Commission for Western Asia (ESCWA) and CRDF Global in December 2015. The following year, the same three organizations, in partnership with the International Network for Government Science Advice (INGSA), organized the 1st Arab Leadership Dialogue on Science Advice to Governments. In this article, we provide a current picture of science in Arab countries, describe the outcomes of these recent events, and highlight the future potential for science diplomacy in the region.

Science in Arab Countries

Until recently, and with few exceptions, science has not been a priority for Arab governments. Unsurprisingly, indicators show that Arab countries are underperforming in science. According to UNESCO, Arab countries constituted just 1 percent of global expenditures on research and development in 2013.⁵ A comparison of national R&D expenditures as a percentage of gross domestic product shows that Arab countries (0.30% in 2013) fall short of the world level (1.70 % in 2013).⁶ The expense ratios vary across Arab countries, but according to UNESCO, those with the greatest R&D intensity (gross domestic expenditure on R&D as a percentage of GDP) among Arab countries are Libya (0.86% in 2014) and Morocco (0.73% in 2010).⁷

Various systemic shortcomings impede the advancement of science in Arab countries. For example, the education system—with its emphasis on rote learning, and its overcrowded classes, heavy teaching loads, inadequately equipped labs, and lack of academic freedom—does not encourage independent thinking or provide incentives for research and innovation. Other deficiencies include the absence of high-quality local scientific periodicals; the lack of scientific societies to promote regional and international collaboration; and visa restrictions limiting travel by Arab scientists even within the Arab region.^{8,9}

Because science policy is typically implemented at national levels, scientific progress is best measured on a country-by-country basis. Recent science indicators show mixed results in the region since 2006. For example, R&D intensity improved slightly in Morocco (.64% in 2007 to .73% in 2010), Jordan (.34% in 2007 to .43% in 2008), and Qatar (.33% in 2007 to .47% in 2012).¹⁰ The UNESCO Science Report: Towards 2030 relates that in 2012 Tunisia had 1,394 researchers per million inhabitants—the highest among Arab countries, yet lower than Tunisia's own 2006 level of 1,588 researchers per million inhabitants. The numbers in Egypt also declined, from 617 in 2007 to 581 in 2013, a result largely attributable to brain drain linked to various factors, including political instability. By contrast, the number of researchers per million residents in Morocco increased from 647 in 2006 to 864 in 2011.¹¹

Much more needs to be done to raise the influence of science and scientists within Arab countries. One important area is to link science and policymaking. The declaration of the 2015 World Science Forum, a biennial international conference on global science policy, underscored that “sound, independent scientific advice largely improves the quality of policymaking.” The declaration thus called on scientists and policymakers to work together “to develop and communicate science to inform and evaluate policy based on responsibility, integrity, independence, and accountability.” Further, it urged all scientists to be proactive and provide scientific advice to policymakers.¹² So many of the challenges facing Arab countries—water shortages, the imperative to feed growing populations, disease—require

science-based solutions. Without the active involvement of all stakeholders and experts from the relevant disciplines, the prospects of finding genuine solutions will be poor. Each discipline offers a unique range of perspectives, insights, and deep knowledge that, when combined, can offer both a rich diagnosis regarding systemic shortcomings and lasting solutions.

Additionally, Arab countries are part of the global community of nations and therefore must help reach negotiated solutions to complex issues such as climate change, security, migration, and energy, all of which require science advice. Here, countries need mechanisms and science advisory ecosystems to ensure that political leaders, including the diplomats representing them in international negotiations, have access to the science advice they need. Achieving such a framework in Arab countries will require a seismic shift in the traditional view and mind-set of Arab governments toward science and its potential role in international relations.

In essence, scientific and diplomatic communities must develop a clear, mutual, and comprehensive understanding of the enhanced value each community brings to advance the missions of the other. Science and technology can serve as a vehicle for addressing and understanding complex issues ranging from “soft” security, involving problems such as the environment, to conventional “hard” security, centering on areas such as arms control. All in all, better information makes for more effective diplomacy. In turn, the scientific community must also be awakened to the opportunities arising from such alliances, such as recognition and potential access to other pools of knowledge and cooperation through regional networks.

Regional Forum on Science & Technology Diplomacy

In December 2015, the Regional Forum on Science & Technology Diplomacy brought together leaders from scientific, diplomatic, and policymaking communities in West Asia and North Africa. The participants, representing eleven Arab countries, the United States, and Europe, discussed a range of issues, including various definitions of science diplomacy, national approaches to science diplomacy in other regions, mechanisms for implementation, and possible applications to key regional and global priorities, such as the UN-established Sustainable Development Goals.¹³

The Regional Forum produced ten recommendations for promoting science diplomacy in the Middle East:

1. Build an environment conducive to science-policy interaction, including cross-sensitization of scientists and politicians, and recruitment of science advisors to work with policymakers.
2. Foster a culture of science communications, including by grooming a new generation of competent science communicators.

3. Capitalize on youth and diaspora as potential champions of science diplomacy. Explore the feasibility of establishing programs for “brain circulation” and youth-focused academic mobility and exchanges in the region.
4. Develop a regional charter for best practices and ethics in research, technology transfer, and science diplomacy generally.
5. Organize science communications workshops or trainings on the communication of science and its impacts to policymakers.
6. Assess existing networks of scientists and take advantage of established or new networks or mechanisms. Create platforms, such as a database of scientists and research, for collaboration and information sharing in the region.
7. Articulate a vision for science diplomacy in the region that includes a clear definition of the discipline. Develop and begin implementing a road map.
8. Recognize the 2017 World Science Forum, to be held in November in Jordan, as an important channel for science diplomacy, and support cooperation before and during the forum.
9. Link existing diaspora networks and initiatives from the region with those outside the region.
10. Develop specific science diplomacy projects related to the water-food-energy nexus. Projects should involve multiple Arab countries and include an outreach strategy and plan for communicating the results to policymakers.

Forum participants suggested that Arab countries should invest more time, effort, and resources in creating programs to promote intra-Arab brain circulation and the mobility of youth across the region. The European Union’s “Scientific Visa Package,” which facilitates the admission of researchers from non-EU countries to conduct scientific research, was highlighted as a possible model effort.

Participants also suggested that the asymmetrical expertise and resources of countries within the region should be strategically leveraged for optimal impact. For example, while some countries such as the Arab Gulf states have financial wealth and science, technology, and innovation infrastructures including state-of-the-art laboratories and technology parks, other countries, such as Egypt, Jordan, and Lebanon, traditionally possess a higher number of trained scientists and engineers; together, they can both strengthen and staff the regional scientific enterprise, in turn informing regional policy. Water resources, as mentioned in the list, are one key area for collaboration, given that a large number of Arab countries face water challenges. Hence, developing pan-Arab research alliances and mentorship schemes in areas such as water management and technologies can provide a platform to exchange knowledge and expertise, with the potential to yield tractable solutions to these challenges and strengthen regional ties.

Science diplomacy must be founded on a strong culture of science among stakeholders. This can only be achieved in MENA by building infrastructure for and improving the capabilities of science communicators, media, scientists,

and S&T policy experts, among others. Several promising efforts are under way to celebrate individual scientists and improve science communications. For example, a scientific reality TV program, *Stars of Science*, was initiated by the Qatar Foundation to inspire young Arab scientists and entrepreneurs. As one jury member on the program noted, “*Stars of Science* is a catalyst of positive change for young people in the Arab world, prompting thousands to become interested in the limitless potential of science and technology.”¹⁴ Such platforms present an opportunity to encourage future generations of science leaders and role models. The success of *Stars of Science*, meanwhile, has included future appearances by program alumni in multiple venues, ranging from schools to TED Talks to the White House.¹⁵

Also noteworthy is the emergence of multiple media platforms—starting around 2009—aimed at fostering a culture of science communications. The Arabic edition of *SciDev.Net*, *Nature Middle East*, *National Geographic Al Arabiya*, and the Arabic edition of *Scientific American* are good examples of a trend that has begun to gain traction. Although the long-term impact is yet unknown, these efforts could become a powerful vehicle for channeling science communications across the region.

A final theme that appeared throughout the Regional Forum discussions is that science diplomacy among Arab countries will require cooperation. This is critically important: many of the problems that scientists in Arab countries are trying to solve—in water, energy, health, agriculture, and biodiversity (WEHAB)—are shared problems that can best, or only, be solved through cross-border collaboration. The similarities of culture and experience, coupled with a common language and history of scientific achievement, make collaboration an obvious strategy. Of course, collaboration will not be easy given geopolitical and economic factors, along with significantly varied levels of science capacity. But interest in Arab science communities working together to solve mutual challenges is gaining momentum, and such efforts should be strongly supported.

A Path for Science-Policy Collaboration in Arab Countries

The Royal Scientific Society of Jordan, the ESCWA Technology Center, and CRDF Global, in partnership with INGSA, collaborated again in December 2016 to organize the 1st Arab Leadership Dialogue on Science Advice to Governments. The meeting convened forty-six senior S&T stakeholders from eight Arab countries as well as from New Zealand, Malaysia, Europe, and the United States to discuss models and mechanisms for science advice.

Over two days of dialogue, participants explored ways to improve the interface between science and policy in the region. They examined lessons learned from six case studies from around the world, including the Fukushima nuclear disaster and national cases from Jordan and Lebanon, that demonstrated the opportunities

and challenges in effectively linking science with policy decision making. They concluded that while scientific advice occurs within the region in various forms—not necessarily following a systematic pattern—such as technical advice or advice in times of crises,¹⁶ Arab states would benefit from collaboration toward a more robust ecosystem of science advice that strengthens the science-policy interface for the benefit of their citizens.

The Arab Leadership Dialogue was an important medium in laying the grounds for this ecosystem. Participants identified possible next steps, including creating a regional chapter of INGSA; organizing national-level consultations that will feed into the set of principles and guidelines for science advice currently being developed by INGSA; and regularly exchanging information and experiences in science advice. The upcoming fall 2017 meeting of the World Science Forum in Jordan, under the banner “Science for Peace,” provides an important venue to advance the discussions and hopefully begin enacting some of the suggested actions.

Many countries in MENA face an array of challenges both complex and common that could threaten the region’s stability and security. Science diplomacy can play a crucial role in addressing these challenges by enabling the incorporation of science and scientific evidence into the decision-making process, and by mobilizing regional cooperation to address and solve these issues. For science diplomacy to be effective, Arab countries must pursue significant changes that effectively bring about a paradigm shift in their policymaking and scientific enterprise. Building and nurturing science communities, devising and strengthening mechanisms such as national science academies, and fostering science advisory ecosystems are some of the fundamental steps necessary to realize such a change. Above all, transforming the role of science in Arab countries requires a long-term vision that is characterized and supported by political commitment. In demonstrating this commitment, policymakers will have to adopt a mature mindset that recognizes the complexities of the development process and is open to challenging the status quo. Recent efforts to foster science diplomacy in the Arab world show it to be a promising avenue, but with immense work ahead. Only through the concerted actions of Arab nations can the region ensure effective and sustainable partnerships. **SD**

Endnotes

1. *Algeria, Bahrain, the Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen.*
2. “Population: Ages 0–14 (% of total),” data.worldbank.org/indicator/SP.POP.0014.TO.ZS.

3. *Approximately 33 percent of the population of Arab states is younger than fifteen, compared to 19 percent in North America and 18 percent in countries belonging to the Organisation for Economic Co-operation and Development (OECD).*
4. *Moneef R. Zou'bi, "The Arab States," UNESCO Science Report: Towards 2030 (Paris: UNESCO, 2015), 431–32, <http://unesdoc.unesco.org/images/0023/002354/235406e.pdf>.*
5. *Luc Soete et al., "A World in Search of an Effective Growth Strategy," UNESCO Science Report: Towards 2030 (Paris: UNESCO, 2015), 26, <http://unesdoc.unesco.org/images/0023/002354/235406e.pdf>.*
6. *Ibid., p. 27.*
7. *Zou'bi et al., 439.*
8. *"Report of Zakri Task Force on Science at Universities of the Muslim World," Muslim World Science Initiative, 2015.*
9. *A.B. Zahlan, Science Development and Sovereignty in the Arab World (New York: Palgrave Macmillan, 2012).*
10. *Ibid.; and Adnan Badran and Moneef R. Zou'bi, "Arab States," UNESCO Science Report 2010: The Current Status of Science around the World (Paris: UNESCO, 2010), 259, <http://unesdoc.unesco.org/images/0018/001899/189958e.pdf>.*
11. *Zou'bi et al., 440; Badran and Zou'bi, 261.*
12. *"Declaration of the 2015 Budapest World Science Forum on the Enabling Power of Science," adopted November 7, 2015,*
13. *See "Sustainable Development Goals: 17 Goals to Transform Our World," United Nations, <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.*
14. *"Public to Rank Stars of Science Finalists through Online Vote," Qatar Foundation, November 9, 2016, <http://www.multivu.com/players/uk/7975851-stars-of-science-finalists-online-vote/>.*
15. *Fida Chaaban, "Entrepreneur Ziad Sankari Distinguished at the White House," Entrepreneur Middle East, September 6, 2015, <https://www.entrepreneur.com/article/250359>.*
16. *See Peter D. Gluckman, "Science Advice to Governments: An Emerging Dimension of Science Diplomacy," Science & Diplomacy, June 2016, <http://www.sciencediplomacy.org/article/2016/science-advice-governments>.*