USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

S4D4C EUROPEAN SCIENCE DIPLOMACY ONLINE COURSE

MODULE 5

Which thematic and regional approaches of science diplomacy exist?

Andreas P. Müller, Simon Schmitz, Maria Josten

German Aerospace Center | DLR Project Management Agency | European and International Cooperation

Mitchel Young

Charles University of Prague

Charlotte Rungius

German Centre for Higher Education and Science Research (DZHW)

Ewert Aukes

University of Twente, the Netherlands

Quality assurance

The following reviewers have undertaken quality assurance of this module:

Susanne Keppler-Schlesinger and **Maximilian Huck**, Vienna School of International Studies
Ewert Aukes and **Sanaz Honarmand Ebrahimi**, University of Twente, the Netherlands
Marta Bozina, Juraj Dobrila University of Pula, Croatia
Mario González-Jiménez, University of Glasgow, UK
Helen B Woods, University of Sheffield, UK

Practical information

This module takes a minimum of **3 hours**

Document version

This module has been updated with new content since its launch in June 2020. This new module version has been made publicly available in February 2021.

How to cite this module

If you want to cite this module for academic or other purposes, please use the format below.

Andreas Müller, Simon Schmitz, Maria Josten, Mitchel Young, Charlotte Rungius and Ewert Aukes. 2020. Which thematic and regional approaches of science diplomacy exist?. In: *S4D4C European Science Diplomacy Online Course*, Module 5, Vienna: S4D4C.

S4D4C USING SCIENCE FOR/IN DIPLOMACY FOR ADDRESSING GLOBAL CHALLENGES

S4D4C EUROPEAN SCIENCE DIPLOMACY ONLINE COURSE MODULE 5 – Which thematic and regional approaches of science diplomacy exist?

Table of Contents

5.1 Approaches to science diplomacy – introduction to the module 4
5.1.1 Learning Objectives and Preliminary Experts' Insights 4
5.1.2 Structure and content of the module 5
5.2 Regional and national science diplomacy strategies 5
5.2.1 Differences and similarities in national and regional approaches 6
5.2.2 China 9
5.2.3 USA 11
5.2.4 Germany 12
5.2.5 France 14
5.2.6 Japan 15
5.2.7 Spain 16
5.2.8 India 18
5.3 Science diplomacy strategies for global challenges 19
5.3.1 Food and nutrition security 20
5.3.2 Water 21
5.3.3 Oceans 22
5.3.4 Health 23
5.3.5 COVID-19 Crisis 26
5.4 How to Design a Science Diplomacy Approach 28
5.4.1 Procedural principles 29
5.4.2 Infrastructural principles 34
5.5 Question Time 36
5.5.1 Brainstorming Questions 36

5.1 Approaches to science diplomacy – introduction to the module

This module is a walk through the science diplomacy strategies in different countries and regions around the world.

Furthermore, we will explain how different countries and organisations face some of the biggest global challenges and delineate the science diplomacy (SD) strategies that are related to the corresponding national or regional initiatives (climate change, food sustainability, pandemics, etc.).

Finally, we draw some conclusions on how to identify, plan and facilitate SD actions.

5.1.1 Learning Objectives and Preliminary Experts' Insights

Learning objectives

After successful completion of this module, you will be able to:

- describe and differentiate a number of regional and national approaches to science diplomacy
- name and describe some important approaches to challenging global topics (e.g. water, health)
- design a basic approach towards building a strategy in science diplomacy

Please be aware that the examples that are given in this module are just a selection of what can be found in the real world. They are, therefore, illustrative, but not comprehensive and should be augmented by the experiences in the course of your own development.

What the experts think

We have invited a group of experts to give us some preliminary insights about the question "Which national, regional and thematic approaches of science diplomacy exist?" Their explanations will help to establish the foundations on which we will build up your knowledge.

<table>
<tr><td rowspan="2">  </td><td>Martina Hartl
Austrian Ministry of Education, Research and Science and rapporteur of the Science Diplomacy Force of the Strategic Forum on International Cooperation (SFIC).</td></tr>
<tr><td>How Europe collaborates with other regions in the world?
Video Link to YouTube
What are the "strategic", "operational" and "support" tools for EU science diplomacy?
Video Link to YouTube</td></tr>
</table>

	**Miguel García-Herráiz Roobaert** Deputy Directorate General for EU External Relations and Trade, Secretariat of State for EU Affairs, Spanish Ministry for Foreign Affairs, European Union, and Cooperation
	What is the Union for the Mediterranean? How does it relate to science diplomacy? Video Link to YouTube
	**Tiina Vihma-Purovaara** Senior Ministerial Adviser, Ministry of Education, Science and Culture, Finland
	How do you see the approach to science diplomacy (personally, in Finland, in Europe)? Video Link to YouTube
	**Pierre Bruno Ruffini** Professor, University of Le Havre
	How do member States of the European Union relate to science diplomacy? Video Link to YouTube

5.1.2 Structure and content of the module

The module is composed of **three major chapters**:

1. an introduction to regional and national approaches to science diplomacy based on some historical facts, national institutional frameworks and selected spotlights on current trends;
2. examples for the handling of global challenges, where both aspects of science diplomacy, science *and* diplomacy, are actually needed and can be combined in prolific ways;
3. summary – characteristics of science diplomacy action.

You may find it helpful to refer to module 4 "Science Diplomacy practices of the EU" as an example of a particular regional approach to science diplomacy. Reference to other modules might be useful as well, as they introduce the cultural dimension of science diplomacy.

5.2 Regional and national science diplomacy strategies

National, regional or thematic approaches to science diplomacy can be identified by scrutinizing documents from national and international diplomatic contexts in which diplomacy meets science and vice versa. You may find policy guidelines or even just short

sections that point to a specific understanding of science diplomacy. One may suppose that such an understanding has a **political underpinning**, which was set in a country's foreign policy deployment and which is now implemented by its diplomats. The following paragraphs will mainly focus on this approach, by interpreting science diplomacy strategies as representations of national – or regional – policy making.

However, a specific approach to science diplomacy is not only expressed in the official announcements of public diplomacy. It is also reflected in the **behaviour of diplomats and of scientists who interact with one another**. We could therefore base our political understanding of science diplomacy on a perspective that goes hand in hand with the attention we pay to the individual behaviour of statesmen and scientists. It quickly becomes clear that the communicative style of an individual is not only and necessarily based on a certain selected political strategy. In some situations, **personal and socio-cultural factors** may also have a considerable influence. However, the experience shows us, a need to respect such differences in fields of international relations, foreign policy, and diplomacy. For more information on this, please look again at the individual experiences of our experts (videos), and on chapter 6.3 Skills in practice, in which communication and negotiation skills are described.

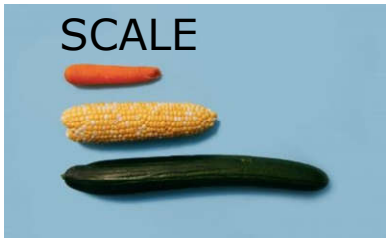
The national, regional, and thematic access to science diplomacy is marked by current political dynamics, interests, and sometimes, of course, by tensions. Against this background, it is important to look at current situations and to recognize and use the **strategic possibilities of science diplomacy**. In addition, historical and cultural contexts can play an extremely important role. The historical and cultural dynamics of global diplomatic relations and the role that science plays in them are complex. However, the better you understand it, the more useful science diplomacy can be.

Due to the different strategic approaches we have chosen three European (Germany, France and Spain) and three non-EU countries (China, Japan and USA). These countries are leading in science, technology and innovation, but they have different cultural identities and different political and scientific structures. As regards science diplomacy, all of them follow more or less explicit strategies, while China is following a more implicit line. Therefore and in sum, this selection gives us the chance to present a comprehensive overview. Please have a look at the specification of the similarities and differences that we describe in the following sections. For more detailed information, please feel free to check the information in the "Read more" boxes.

5.2.1 Differences and similarities in national and regional approaches

(Transversal analyses: geography, scale and instruments)

National and regional access to science diplomacy is marked by current **political dynamics, interests** and, sometimes, of course, by **tensions**. Against this background, it is important to look at current situations and to recognize and use the strategic possibilities of science diplomacy.

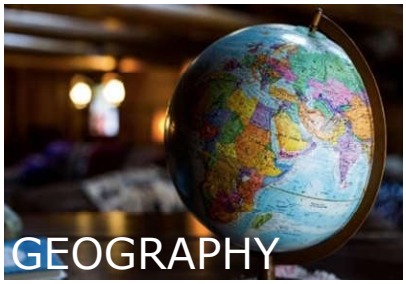


Furthermore, **scales** matter profoundly for the conceptualization of science diplomacy.

The following three dimensions are relevant for national and regional approaches:

Spatial scale ranges from the sub-national to the global level, and relates to geography (see below) and proximities of space. Science diplomacy targets global challenges but solutions could be designed at regional levels.	**Administrative scale** is usually referred to in terms of science diplomacy governance. It relates to different governance levels on which solutions can be framed, from the organizational, subnational, and national, to the supranational and the international level, including calls for improved governance frameworks to tackle globally scaled challenges.	**Epistemic scale** refers to different levels, networks and dispersions of knowledge: specialized epistemic communities, disciplinarily specialized, functionally/professionally specialised and unspecialized epistemic communities. Depending on the available communities different foci might be established in national and regional approaches.

Our S4D4C empirical case studies (see Module 7) argue that **geography** continues to be influential regarding how nation states approach diplomacy in general, and science diplomacy in particular.



Scientific, technology and innovative capacity of a country or a region determines its overall power, next to economic power, competitiveness or education.

Therefore, geography plays a role in two main directions:

Physical geography defines the access to natural resources, such as water, food or fish, among others. Countries or regions have developed certain expertise to address their access to these resources or be part of related negotiations, which ultimately leads to technological innovation and economic growth. Physical geography can be harnessed as a soft-power element of a country (in the international system), to position itself as the leading country in the field, promote its own industry worldwide and foster global alliances with countries with the same needs.	**Human geography** matters because the extent of cultural, scientific, historical or bilateral relationships either facilitate or hamper collaborations, influence mobility patterns, and shape institutional arrangements. It brings together different countries and cultures beyond physical geography, e.g. the Commonwealth, or Spain and Portugal with Latin American. Human geography may increase or decrease interdependence, the need for negotiations and the likelihood of shared challenges between regions/countries, which influence general diplomatic approaches and the scope of science diplomacy.

Science diplomacy also relies on a set of instruments to achieve national and regional objectives.

For Van Langenhove (2017), science diplomacy instruments may be classified into three types:

Strategic instruments are policies which set objectives, describe how something is going to be done and who is responsible for it. They often set the scope and strategic goals for the policy realm (e.g. governmental strategies and action plans).	**Operational instruments** enable concrete action in a field and enact strategic objectives. They organise mechanisms of action and resource management. (e.g. bilateral and multilateral agreements, science attachés, research programmes and funding schemes)	**Support instruments** aim to promote or facilitate science diplomacy activities. Those comprise any form of dialogue and training. They may take the shape of meetings and conferences, trade fairs, personal meetings between scientists and policymakers, briefings and explanatory meetings and roundtables.

Regarding the used instruments, two types of bottlenecks have been generally identified (see the Instruments matter):

1. Ruptures occur when there is a gap or missing type of instrument within a science diplomacy practice or process. These occur when the mix of instruments is disjointed, shows a rupture or is insufficiently coordinated.
2. Frictions arise during the development of instruments due to a lack of consistency between the objectives of different actors and institutions. This results in sub-optimal outcomes.

In the next country-related chapters, the scales, the geography as well as the setting of the instruments used, play an important role for the strategic development of their science diplomacy approaches.

What the experts think

Mitchell Young

Assistant Professor, Department of European Studies, Charles University in Prague

What are the key similarities that transcend national and regional approaches in the case studies that your S4D4C team has observed?

Video Link to YouTube

Charlotte Rungius

Senior Scientific Officer, German Centre for Higher Education and Science Research (DZHW)

What are the main differences between regional approaches?

Video Link to YouTube

5.2.2 China

Historically, the export of Chinese scientific knowledge to the rest of the world is a fundamental part of Chinese cultural identity. After the time of European enlightenment and the emergence of modern science, however, the roles changed. In recent times, China participated in the scientific innovations of the western world in particular by exchanging knowledge among scientists and by sending visiting students to western universities. In the **course of economic liberalization**, the Confucius Institutes were founded in 2004 with the aim of promoting cultural and scientific exchange. Interestingly enough, they are often situated at a university campus (unlike, for example, the German Goethe-Institute or the Institut Français). Although their main purpose is to promote and teach the Chinese language and culture, an ideological undertone is regularly attributed to them and skepticism is growing with regard to the political backdrops of their work.

On March 28, 2015, President Xi Jingping outlined China's ambitious "**One Belt, One Road**" vision during his remarks at the Boao Forum for Asia. This project "covers over half of the global population and involves more than 60 countries along the routes, the economic aggregates of which account for about one-third of the world" (Zheng and Zhang Chi, 2018). According to the head of the scientific component of the project, "Science, technology and innovation are the core driving force for the BRI (Belt and Road Initiative) development" (Masood, 2019). In the framework of the president's project, the University Alliance of the Silk Road (UASR) was founded as a non-governmental and non-profit organization. The self-declared goal is to "advance institutional exchanges and partnerships on the Silk Road routes in regards to talent education, scientific research, cultural dissemination, policy studies, and medical service etc." (UASR, n.d.). The Chinese investment in the construction of modern infrastructure along the road, e.g. at the frontier to Kazakhstan, may be interpreted as an example of technological export and an argument for diplomatic interchange. The medium- and long-term impact of China's "One Belt, One Road" vision remains unclear. The degree, however, to which the BRI incorporates science diplomacy may be taken as an indicator of how far it has become a coherent policy framework and actually incorporated into policy practice (Freeman 2019). Recently the Chinese ambassador to the U.S., Quin Gang, pointed out that "China has partnered with thirty countries in the Initiative for Belt and Road Partnership on COVID-19 Vaccines Cooperation to promote the fair international distribution of vaccines" (S&D Conversation 2021).

Ingrid d'Hooghe

Lecturer, Leiden University

Senior Research Fellow, LeidenAsiaCentre

China's BRI Education and Science Diplomacy

Video Link to YouTube

Over the past two decades, China's importance for the **development of modern sciences and future technologies** has increased significantly. Chinese scientific publications have caught up with the number of publications by the industrialized countries and even outperformed some of them. Science is thus readily available as a tool for soft power in diplomacy. Chinese Science & Technology diplomats are working in embassies and consulates of the PRC in more than 50 countries (Fedasiuk et al. 2021). Chinese diplomacy demands communication on equal terms with leading industrial nations. Europe and China are indispensable partners in higher education and research, but European policymakers increasingly face the question of how to develop safe cooperation, as well as how to best minimize strategic, security, and ethical risks (d'Hooghe and Lammertink 2020). Here, the negotiation of a feasible roadmap may be needed. At the same time, Chinese government makes use of its new scientific-technological position and the growing economic power in its interaction with trusted partners (such as the BRICS states).

Science diplomacy is seen by the Chinese as an important instrument: "Promoting science diplomacy is a **major part of the nation's overall diplomatic work**, and makes a contribution to major power diplomacy with Chinese characteristics" (MoST 2017, cited by Freeman 2019, 7). But science diplomacy, as Freeman (2019) shows in an analysis of Chinese basic political texts from the MoST among others, does not play a clear and consistent role in the orientation of the Chinese strategy. Rather, it is an instrument alongside others, especially economic ones, and is used selectively and sporadically. At least it appears that Chinese science diplomacy is not based on a fixed framework.

Read more about China´s development in the reference below:

- Elsevier (n.d.), The One Belt, One Road Initiative's Potential Impact on Global Research Collaboration, (Link) (accessed, 25 March 2020)
- Freeman, D. (2019): China and Science Diplomacy: An Emerging or a Marginal Policy? In: European Leadership in Cultural, Science and Innovation Diplomacy (EL-CSID) 2019/17, pp. 1-11. (Link) (19.12.2019)
- Ingrid d'Hooghe, Annemarie Montulet, Marijn de Wolff and Frank N. Pieke (2018): Assessing Europe-China Collaboration in Higher Education and Research (Link)
- Ingrid d'Hooghe, Jonas Lammertink (2020): Towards Sustainable Europe-China Collaboration in Higher Education and Research, https://leidenasiacentre.nl/wp-content/uploads/2020/10/Towards-Sustainable-Europe-China-Collaboration-in-Higher-Education-and-Research.pdf
- Masood, E. (2019), How China is redrawing the map of world science (Link) (accessed 25 March 2020, published 1 May 2019).
- Ryan Fedasiuk, Emily Weinstein and Anna Puglisi (2021), China's Foreign Technology Wish List (CSET Issue Brief), Washington D.C. (Link)
- S&D Conversation (2021): The Global Nature of Science, Technology and Innovation: An interview with Ambassador Qin Gang, China's Ambassador to the U.S. In: Science & Diplomacy, December 17, 2021 (Link)
- Zheng Yongnian and Zhang Chi (2018), The Belt and Road Initiative and China's Grand Diplomacy, China and the WorldVol. 01, No. 03, 1850015 (2018) Part One: Journal Articles (Link)

5.2.3 USA

"On science and technology, we will launch a new fund to support technological development in Muslim-majority countries, and to help transfer ideas to the marketplace so they can create more jobs. We'll open centers of scientific excellence in Africa, the Middle East and Southeast Asia, and appoint new science envoys to collaborate on programs that develop new sources of energy, create green jobs, digitize records, clean water, grow new crops."

Remarks by President Obama, "On a new beginning", Cairo University, Cairo, Egypt, June 4, 2009, https://obamawhitehouse.archives.gov/the-press-office/remarks-president-cairo-university-6-04-09 (19.12.2019)

The US-American understanding of science was and is an important orientation for many states and societies worldwide. An advanced educational model, highly developed science and technology, and liberal traditions of public diplomacy are the essential elements of America's national style in science diplomacy. For a long time there was **broad consensus on the US dominance** in this area. Krasnyak (2018) points out that American science diplomacy was well suited to weakening the very assertive communicative style of US diplomats under certain circumstances. For instance, during the Cold War, the foreign policy goals of the two superpowers required diplomatic multitasking. Both America and the Soviet Union practiced science diplomacy to achieve the goal of spreading influence in the Third World. Such was the case for vaccine diplomacy. Reinforcing bilateral relations with each other, both adversaries went through at least a decade-long project of space diplomacy. Today, the International Space Station (ISS) is considered a flagship of science diplomacy.

The USA played a **leading role** in the development of science diplomacy. Many of today's standards that apply to the intermeshing of science and diplomacy can be traced back to US initiatives. Since the 1950s, there has been a Science Adviser's Office at the Department of State. Particularly President Obama contributed to the significance of science diplomacy in international politics, when he announced in 2009 a bundle of actions in science and technology cooperation with the Middle East and other regions of the world. Among others, a science attaché's program was initiated in order to establish long-term partnerships built on scientific cooperation and trust.

Science diplomacy is led by several US institutions and is located close to the highest decision making powers in the White House Office of Science and Technology Policy (OSTP). The **American Association for the Advancement of Science (AAAS)** is an important forum where the role of science in international relations and scientific cooperation in foreign policy is enhanced and strengthened. However, critics of President Trump accuse him of neglecting facts that are widely accepted by the scientific community, such as the origins of climate change, in his decision making (NY Times, 2018).

As in other countries, development cooperation and foreign aid play a crucial part in science diplomacy. Critics have lamented the supposedly politicised role of the **US Agency for International Development (USAID)** in the country's foreign policy. Due to its generous funding, American non-governmental institutions, such as the Carnegie Foundation or the

Bill Gates Foundation, have a significant impact in the beneficiary countries. They enhance frugal innovation in Africa, for example, and provide funds for scientists who work in international cooperation. Some places in the USA itself have become an important breeding ground for science diplomacy, where other countries establish and maintain diplomatic representations (Ittelson & Mauduit 2019).

The **Trump administration** has changed the framework conditions for the appearance of diplomats as well as the role that science plays in diplomacy. The National Security Strategy of the United States of America (December 2017) has focused on the task of making diplomacy more competitive.

On 1 January 2019, the **United States withdrawal from the United Nations Educational, Scientific and Cultural Organization (UNESCO)** took effect. The withdrawal of the USA, together with Israel, was seen as a major setback to one of the most important forums for science diplomacy and has challenged the funding of the majority of the agencies' projects.

President Joe Biden has already used the opportunity to regain a perspective for policies that are evidence-based and make use of the results of science and research. His "Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking" (January 27, 2021) reaffirms and builds on the Presidential Memorandum of March 9, 2009 (Scientific Integrity), and the Director of the Office of Science and Technology Policy's Memorandum of December 17, 2010 (Scientific Integrity).

Read more about the USA in the references below:

- The National Security Strategy of the United States of America (2017) (Link)
- A contribution by Olga Krasnyak to the blog of the Centre of Public Diplomacy at the University of Southern California on the science diplomacy strategy of the USA (Link)
- FAO, IFAD, UNICEF, WFP and WHO. 2018. The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition. Rome, FAO (Link)
- Ittelson, Pavlina and Mauduit, Jean-Christophe (2019): Science & Diplomacy. How countries interact with the Boston innovation ecosystem. Msida: DiploFoundation. (Link) (19.12.2019)
- Krasnyak, Olga (2018): National Styles in Science, Diplomacy, and Science Diplomacy. A Case Study of the United Nations Security Council P5 Countries. Leiden/Boston: Brill. (Link) (19.12.2019)
- Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking" (Link) (27.01.2021)
- NY Times (2018), In the Trump Administration, Science Is Unwelcome. So Is Advice. (Link) (accessed 25 March 2020, published 9 June 2018).
- Jeff Tollefson (2020): Scientists relieved as Joe Biden wins tight US presidential election, Nature (Link)

Links to institutions:

- White House Office of Science and Technology Policy (OSTP) (Link)
- American Association for the Advancement of Science (AAAS), sometimes called the "Triple A-S" (Link)

5.2.4 Germany

For several decades, science diplomacy has been an important strategic tool in the context of German international engagements. German science diplomacy is **closely linked with institutions** that have initiated and maintained a particularly high degree of scientific and diplomatic interlocking. Probably you have heard of the DAAD, the German organisation for academic exchange. After the war, for example, there was already a DAAD office in

London before the UK established diplomatic relations with Germany. The German Max-Planck Society (MPG) and the Israeli Weizman Institute (WIS) also signed their first "Minerva Agreement" on scientific cooperation in 1964, one year before diplomatic relations between the two states began. Another institution, the Alexander von Humboldt Foundation, had already been founded in the 19th century. The foundation is an important advocate for strengthening global science diplomatic networks and explicitly focuses on science diplomacy. Leopoldina, a scientific academy that was founded in the 17th century, is considered the oldest continuously existing science academy in the world. In 2008, Leopoldina was named the first German National Academy of Sciences. It represents the German scientific community abroad and advises the German government.

Scientific institutions are increasingly embracing the concept of science diplomacy. The German Research Foundation (DFG) adopted the concept in their **guidelines for international action**. The German Helmholtz Association of German Research Centres acknowledges the importance of science diplomacy and named it as one of the central four strategic goals of their internationalisation strategy 2017-2022.

A further structure abroad are "The German Houses for Science and Innovation" (Deutsches Wissenschafts und Innovationshaus – DWIH) in selected cities such as New York, Sao Paulo, Moscow, New Delhi and Tokyo. They aim at gathering the offices of different German research institutions under one roof. The Houses are considered to showcase the German research landscape. The staff of these Houses are responsible for organising networking events as well as the communication with politicians and scientists: This is the way science diplomacy works. The German government puts increasing emphasis on the role of science in foreign policy. In the 2010s, the first strategic documents that clearly pointed in that direction were published by the German Federal Ministry of Education and Research (BMBF) and the German Federal Foreign Office (AA). In 2017, the Federal Cabinet published the new **Strategy of the Federal Government for the Internationalization of Education, Science and Research**. The strategy includes, among other measures, the enhancement and strengthening of international cooperation, the facilitation of knowledge and competencies, and the support of German industries in the markets of future technologies. Science diplomacy is part of the Internationalisation Strategy. In this context, the BMBF has defined three main pillars of education and science diplomacy:

1. It creates lasting partnerships based on trust with a country or region. These kinds of activities help to secure international stability (pillar: **connect**);
2. It helps to solve global, regional and national challenges. Central elements include providing support for innovations that create greater prosperity and societal benefits, and providing evidence-based advice to policy-makers (pillar: **inform**);
3. It supports the establishment of suitable conditions for international education and science collaborations ranging from basic scientific research to applied research. In this context, the BMBF actively pursues its commitment to the freedom of science, research and teaching (pillar: **enable**).

In December 2020, the AA published a new strategy for foreign policy dedicated on Science Diplomacy.

Additionally, there are more than **50 German science diplomats** at German Embassies in the world in order to support scientific collaboration. The system of Science Counsellors is a shared responsibility of the AA and the BMBF.

Read more about Germany´s approaches in the reference below:

- BMBF Website on Education and Science Diplomacy (Link)
- German Houses for Science and Innovation (Link)Flink, T. & Schreiterer, U. (2010), Science diplomacy at the intersection of S&T policies and foreign affairs: Toward a typology of national approaches, 37, DO -10.3152/030234210X12778118264530,
- Science and Public Policy (Link)
- Schütte, G. (2020), „Science Diplomacy – zwischen Anspruch und Wirklichkeit", DAAD (Link)
- Science Diplomacy Strategie of the German Federal Foreign Office (AA) (2020, in German only) (Link)

5.2.5 France

French foreign policy and diplomacy are strongly linked to **France's role in global history, in colonial contexts**, but also to a large extent through **cultural diplomatic initiatives**. The posting of science counsellors and attachés at embassies is part of the long historical tradition of French cultural action abroad, starting at the end of the 19th century by the creation of French cultural centers and schools and the birth of the network of *Alliances françaises* (Ruffini, 2020). France's reputation in the world goes hand in hand with a fundamental consensus on the importance of the "Francophonie". After all, French is one of the official languages spoken in various political institutions worldwide and was considered the "language of diplomacy" as of the 17th century until it was increasingly replaced by English.

In this respect, French foreign policy speaks of cultural diplomacy, to which it has recently placed scientific diplomacy on an equal footing. The report of the Ministry of Europe and Foreign Affairs (MEAE) on "***Une diplomatie scientifique pour la France***" of 2013 deals with science diplomacy in detail. Politics can and should serve science; science is an advantage for foreign policy in order to pursue France's interests in a soft way. Science diplomacy is seen as an important tool to stimulate development, maintain France's leadership, drive innovation and mobilise the global network for French (and European) interests. In this context, the government aims to increase interaction between **France's scientific community and its diplomatic network** in order to:

- support the status of researchers and companies in international competition,
- involve the science world more closely with foreign policy objectives, and in particular,
- raise researchers' awareness in development issues, by building and leveraging the Global South's scientific capabilities.

Since 2010, France has had an **Ambassador delegate for science, technology, and innovation**, whose mission is to promote French scientific and technological excellence and to highlight the national research strategy at the international level (Ruffini, 2020).

Furthermore, France adopted a **National Strategy for Research and Innovation** in 2009. The implementation of this strategy has been led by the Ministry of Higher Education, Research, and Innovation (MESR), in charge of the development and conduct of research

policy. Currently, a law on **multi-year research programming** is being prepared.

The **French Académie des Sciences** is a leading actor in policy advice with relation to these matters.

France's policy vis-à-vis **large-scale research infrastructures** is also an essential component of the effort to enhance the country's influence abroad and a good example for science diplomacy. For over fifty years, the country invested in developing major physics and astronomy research facilities and, very recently, databases, libraries and shared scientific computing networks, like GANIL (National Large Heavy Ion Accelerator) at the national level. Other multilateral examples include the European Organisation for Nuclear Research (CERN) and European Southern Observatory (ESO) at the European level, or the International Thermonuclear Experimental Reactor (ITER) and Atacama Large Millimetre Array (ALMA) at the global level. The hosting of major research instruments in France contributes to establishing itself as a hub for international scientific elites and provides opportunities to boost academic but also diplomatic cooperation.

What the experts think

Minh-Hà Pham

Vice-President for International Relations, Université Paris Sciences et Lettres – PSL (PSL)

Could you explain briefly the science diplomacy approach in France?

Video Link to YouTube

Read more about France´s science diplomacy in the reference below:

- Ministry for Europe and Foreign Affairs (n.d.), Scientific Diplomacy (Link)
- Report "Science Diplomacy for France" (2013) (Link)
- Pierre-Bruno Ruffini (2020): France's Science Diplomacy, AAAS Science & Diplomacy Publications (Link)

5.2.6 Japan

Since Japan has been **one of the leading countries in science, technology and innovation** for many decades, a closer look at its science diplomacy strategy is worthwhile. The Prime Minister's Cabinet Office's Council for Science and Technology Policy (CSTP) published the report "Toward the reinforcement of Science and Technology Diplomacy" in 2008 that described a clear link between science and technology and foreign policy and pleaded for mutual development. It insists that Japan's science diplomacy place importance on strengthening (Atsushi Sunami, Tomoko Hamachi, and Shigeru Kitaba, 2013):

1. S&T cooperation with developing countries for resolving global issues,
2. S&T cooperation using Japan's advanced S&T, and
3. the basis for promoting S&T diplomacy.

In 2011, the Japanese government released the 24th five-year national strategy on science, technology and innovation. Here, science diplomacy is mentioned as a task of strategic national significance. The strategy clearly points at using science diplomacy as a tool for strengthening Japan's international competitiveness.

In 2015, the first **science adviser** to the minister of foreign affairs was appointed. This advisory system is expected to further strengthen Japan's Science and Technology Diplomacy. In the same year, the Japanese government published various policies with direct connection to science diplomacy. On 16 October 2015, Japan's Prime Minister, Shinzo Abe, adopted a national Arctic policy with unanimous support from his cabinet ministers. It declared Japan´s intention to address the negative impacts of environmental change by leveraging its strengths to enhance cross-border scientific and technological cooperation (i.e., science and technology diplomacy) and to incorporate the outcomes into design and implementation of national policy and international rule making. Moreover, to support the e adviser in his advisory activities, a Science and Technology Co-Advisor to the Minister for Foreign Affairs was commissioned in April 2019. On 1 April 2020, Prof. MATSUMOTO Yoichiro, the President of Tokyo University of Science, was appointed as the new Science and Technology Advisor to the Minister for Foreign Affairs.

Apart from the contribution that science diplomacy makes to international relations and agreements, particularly with neighbours in the Asian region, but as well with partners in the whole world, science diplomacy is planned with a clear differentiation of potential partners. Science diplomacy is intended to support research with developing countries to find solutions for global challenges. In this context, Japan has been increasingly demonstrating its willingness to open up its scientific programs to foreign partners and to sponsor genuinely collaborative partnerships with developing countries. Furthermore, science diplomacy serves research cooperation with technologically advanced countries for joint efforts in developing future technologies. In line with this government policy, the Japan Science and Technology Agency (JST) has implemented a research exchange program known as the Strategic International Cooperative Program (SICP) since 2003. The main policy lines in science diplomacy of the Japanese government had an effect on other ministries, which have each published their own science diplomacy strategies.

Read more about Japan´s science diplomacy here:

- Sunami, A. (2016), Japan's Science and Technology Diplomacy (Link) (accessed 25 March 2020, published 10 February 2016)
- Ministry of Foreign Affairs of Japan (n.d.), Global Issues & ODA- Science and Technology (Link)
- Atsushi Sunami, Tomoko Hamachi, and Shigeru Kitaba, "The Rise of Science and Technology Diplomacy in Japan," Science & Diplomacy, Vol. 2, No. 1 (March 2013) (Link)
- Yoko Kamikawa and Tomoko Hamachi, Japan's Evolving Efforts toward Sustainable Development of the Arctic (Link) (September 2016)

5.2.7 Spain

In its **Report on Science, Technology and Innovation Diplomacy (STID)** of 2016, the Spanish government emphasizes that science, technology, and innovation plays an important role in the development of fruitful and sustainable cooperation between countries. Accordingly, the capacity to produce scientific and technological innovation is a necessary and preliminary condition to achieve the goals of the Agenda 2030 of the UN.

Moreover, the government states that science, technology, and innovation is an important means to attract talent to the country, promote collaboration, and create the framework for competitive industries. Against this background, STID becomes an important soft power to build international relations and – an aspect that the Spanish government frequently mentions in this report – an instrument to create a positive image of the country as a whole.

The approach of the Spanish government towards science diplomacy relies to a high degree on the institutions that are involved. The governmental report refers to both the diplomatic and scientific organisations, associations, agencies, among others. Elorza et al. (2017), who give an overview of last years' developments of science diplomacy in Spain, offer an analysis of the layout and the results of the approach and its efforts, calling it a "**bottom-up, multi-stakeholder approach**". The Spanish science diplomacy network (comprising different departments of Spanish Embassies abroad, scientific and innovation representatives of the Ministry of Science and Innovation abroad, among others) has established a fluid dialogue with civil society and researchers associations as it aims to become open and receptive to the needs of society and the research community.

The Ministry of Science and Innovation, through the Spanish Foundation for Science and Technology (FECYT), and in coordination with the Ministry of Foreign Affairs, European Union and Cooperation has run a pioneering pilot in which three scientific coordinators were deployed to the Embassies of Spain in Washington DC, London and Berlin. The pilot, completed in 2018, helped dynamize the Spanish science diplomacy network. As for today, the network meets in Madrid on a yearly basis and keeps communication fluid among countries, institutions and different stakeholders.

During the last 5 years, there has been a notable rise in the importance S&T issues in the portfolio of cultural counselors at Spain's embassies and the Ministry of Foreign Affairs, European Union and Cooperation endorsed science diplomacy in its 2021-2024 strategy.

What the experts think

Cristina Fraile

Deputy Chief of Mission at the Embassy of Spain in Washington

How do you think science diplomacy can contribute to reinforce Spanish diplomacy?

Video Link to YouTube

Read more about Spain´s science diplomacy in the reference below:

- Elorza Moreno, Ana/Melchor, Lorenzo/Orts-Gil, Guillermo/Gracia, Cristina/Lacunza, Izaskun/Izquierdo, Borja/Fernández-Vera, José Ignacio (2017): Spanish Science Diplomacy: A Global and Collaborative Bottom-Up Approach. In: Science & Diplomacy 6(1) (Link) (02.01.2020)
- Government of Spain (2016): Report on Science, Technology and Innovation Diplomacy (Link) (02.01.2020)

5.2.8 India

Historically, India's international role in science diplomacy has been characterised on the one hand by the participation in the Western-influenced legacy of the former colonial power. On the other hand, India was already an important pole in a multipolar Asia in the mid-20th century and it still is (cf. Uddin Ahmed et al., 2021). India's aspiration to play a leading role on the continent has only become less prominent in recent years due to the emergence of China. Nevertheless, **India is very well networked through numerous agreements** with the leading industrialised nations, e.g. Germany, Japan, the U.S., and enjoys a high standing (Jaishankar, 2019).

The current system of higher education and research institutions in India is one of the largest and most complex in the world. Besides very renowned institutions such as the Indian Institutes of Technology (IITs) or the Indian Space Research Organization (ISRO), it also includes a large number of modern universities. With less than one percent of GDP, India still allocates less money to research than the industrialised countries. However, experts in many international research fields work very closely with colleagues in India, which is also reflected in a **remarkable Indian diaspora in the fields of research and science** and in the related diplomatic fields of action (Balakrishnan, 2018). Moreover, **India itself gives home to a number of international initiatives in high-tech sciences**. One of these is the cooperation in space technologies where India is on echelon 2 together with Japan, France, and Germany (behind U.S., Russia, and recently China; Cf. Giri, 2021). The India-led International Solar Alliance (ISA), with more than 100 sunshine countries as members, is another excellent example of modern-day science diplomacy. It was founded in 2015, the headquarter is in Gurgaon, India. In pharmaceutical industry, India reaches far more than 100 countries worldwide providing generic drugs and is the "mainstay of the global supply chain for Covax vaccine distribution" (Bhutta et al., 2021).

India disposes of well-established institutions for the promotion of science diplomacy activities. The Forum for Indian Science Diplomacy (FISD), for example, which is hosted at the Research and Information System (RIS) for developing countries is a program that was especially designed to link stakeholders in Indian science diplomacy. The program has come out with a series of activities, including a journal on science diplomacy and a training program (FISD, 2022; Cf. NISCAIR, 2022). In the moment, **India is preparing a draft Science Technology and Innovation Policy**. Science attaches, science diplomats and representatives of foreign missions in India from about 20 countries have recently been involved in round table discussions (Ministry of S&T, 2021).

EU and India work closely together, e.g. in the framework of the Asia-Europe Meeting (ASEM), the Association of Southeast Asian Nations (ASEAN) and in international ocean governance (cf. the Indian Ocean Rim Association IORA). The EU-India Think Tanks Twinning Initiative (EU-India, 2021) aims to foster the joint work of Indian and European think tanks communities. Their strategic partnership will be strengthened through cooperation in various fields, e.g. foreign and security policy, global governance and international affairs. Šime (2021) argues that a more "targeted diffusion of scientific and technological solutions" might be needed here (Šime, 2021).

Read more about India´s development in the reference below:

- Balakrishnan, Bhaskar (2018), Indian Science Diplomacy: A Forward Looking Agenda, in: Science Diplomacy Review (Link) (accessed 31 January 2022)
- Bhutta, Zulfiqar A. et al. (2021), Conflict, extremism, resilience and peace in South Asia; can covid-19 provide a bridge for peace and rapprochement? In: The BMJ (Link) (accessed 31 January 2022)
- EU-India (2021), The EU-India Think Tanks Twinning Initiative, ed. by the Delegation of the European Union to India (Link) (accessed 31 January 2022)
- FISD (2022), Forum for Indian Science Diplomacy: Science Diplomacy Review (Link) (accessed 31 January 2022)
- Giri, Chaitanya (2021), The Widening Panorama of India's Space Diplomacy (Link) (accessed 31 January 2022)
- Jaishankar, Dhruva (2019), What the world thinks. A brief analysis of the Pew Research Center's study and findings on India (Link) (accessed 31 January 2022)
- Ministry of S&T (2021), Science attaches, science diplomats & representatives of foreign missions in India discussed shaping of STIP, News by the Indian Ministry of Science and Technology (Link) (accessed 31 January 2022)
- NISCAIR (2022), Science Diplomacy, India's Global Digest of Multidisciplinary Science, journal ed. by India's National Institute of Science Communication and Information Resources (Link) (accessed 31 January 2022)
- Šime, Zane (2021), Science Diplomacy in the Context of the EU-India Strategic Partnership: Looking Beyond the European Sandbagging Contest (Link) (accessed 31 January 2022)
- Treacy, Sean (2015), Science diplomacy: a view from the South, in: TWAS News, 4 May 2015 (Link) (accessed 31 January 2022)
- Uddin Ahmed, Monir et al. (2021), An Overview of Science Diplomacy in South Asia, in: Science & Diplomacy (Link) (accessed 31 January 2022)

5.3 Science diplomacy strategies for global challenges

When the Summit of the United Nations adopted the **Agenda 2030** in 2015, the international community clearly expressed the conviction that the major global challenges can only be solved with joint actions. Many of our contemporary global problems need scientific analysis through the dedicated work of experts; solutions can only be found by border-crossing and coordinated cooperation. Science diplomacy is crucial for policy making that opens doors to these joint efforts.

Apart from the effects that can be observed on the level of international cooperation, one can assume that national policies will be affected by joint actions, too. Science diplomacy strategies can have a **positive impact on the internationalisation** of institutions in the area of science and technology. Additionally, the way countries pursue their own national interests will impact the shape and characteristics of the joint initiatives that are undertaken in order to face global challenges. For example, the effects of rising global temperatures due to climate change will be felt by us all. In this context, efforts on the level of international policy already date back decades with varying degrees of success. And we are convinced that effects on (sub-)national levels will become more and more visible in the future.

Science cooperation is a **powerful instrument to build trust and to pursue common goals in diplomacy**:

"Diplomats need practices that enable them to bring together and reconcile the increasing variety of interests, which they can achieve, for example through

science advisors or science advice mechanisms. This is a precondition if they want to realise collective action that addresses grand societal challenges."

(Policy brief: Towards effective science diplomacy practice, Premise #3, Page: 8)

The provision of safe nutrition and health, the reduction of poverty, the preservation of our environment, and the exploration of space can only be achieved by joint action. In some cases, science cooperation leads to beneficial effects for entire regions. A remarkable example can be seen in the development of the Tsunami Warning System in the Pacific. The coordination of its installation was done by an international group. The UNESCO established an Intergovernmental Oceanographic Commission to this end. The UN will provide a framework for more international cooperation in this area of disaster risk reduction by proclaiming the Decade of Ocean Science for Sustainable Development (2021-2030).

5.3.1 Food and nutrition security

One of the **UN Sustainable Development Goals**, SDG 2, addresses the urgent need to achieve food and nutrition security ("Zero Hunger"). Although some progress in this regard has been reported by international agencies in recent years, there is no reason to believe that the challenge has been overcome. In its report of 2018, "The State of Food Security and Nutrition in the World", the Food and Agriculture Organization of the United Nations (UN FAO) indicated that international food security has decreased and that the proportion of people suffering from malnutrition has increased.

There are a number of influencing factors in the processes that decide whether nutritional safety and improved nutrition can be achieved in the short or long term. These include climate change, water scarcity, poverty, and even oil and gas prices, since the production of fertilizers, for example, is oil dependent. However, there are also great economic differences in the conditions prevailing in agriculture worldwide. In less developed regions, for example, such as the sub-Saharan and some Asian areas, food is mainly produced by small farms. In industrialized countries such as the USA or Canada it is rather large farms that generate food. The challenges that these food production systems are facing differ significantly. The **Network of African Science Academics (NASAC)** has recently pointed out that virtually all components of the nutritional system depend on innovation. Planting material should be affordable and accessible, soil and water have to be controlled in terms of quantity and quality, waste should be avoided. For African food systems, innovations, i.e. R&D of products/services specifically developed for local circumstances, seem to be a key element of success.

Science has to guide these processes and science diplomacy can provide pathways for international cooperation with regard to these matters. NASAC, for example, is the African regional network of the InterAcademy Partnership (IAP), a global **network of science and medical academies**. The IAP includes over 140 scientific academies that work together in four such networks. The IAP helps to find adequate policies, improve public health and enhance education. Food and nutrition security and agriculture are some of its focuses. From the identifying of needs and knowledge gaps, the IAP project moves to the formulation of an effective agenda and on actions. With a working group in each of the four regions, further evidence at the regional and the national level is collected, existing priorities and initiatives are consulted. The results lead to the preparation of regional

reports that are presented to key policymaking bodies.

On various occasions, the EU expressed its **strong commitment** to enhancing food security in Africa. The cooperation of the EU with representatives of the African Union and its member states has led to a number of bilateral agreements, where related matters are addressed. In the current work programme of Horizon 2020, you can find a section that is dedicated to "Support to the Implementation of the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture". Here, the linkage between a foreign policy objective and a scientific approach becomes explicit.

Read more about food and nutrition security in the reference below:

- The 2018 Report of the FAO on the state of food security and nutrition in the world (Link)
- An article on new models for science diplomacy transcending boundaries, by Claudia Canales Holzeis and others (Link)
- The growing importance of science diplomacy in the world of diplomacy, by Nikhil Seth (Link)
- IAP Project 'Food and Nutrition Security and Agriculture' (Link)

5.3.2 Water

Water diplomacy is a relatively new field of interest in international relations and foreign policy strategy building. The significance of water, however, is increasing rapidly. Water is a resource that is related to multifaceted issues. When we discuss the challenges that are related to food and nutrition, actually, water (water quality, irrigation, scarcity of water, etc.) is **one of the biggest influential factors**. The water/climate-change nexus is also critical to the many people living in low-lying areas around the world. In view of the variety of aspects that are linked to water, it is no surprise that water diplomacy is far from being a homogeneous field.

Since water is a **critically important resource**, humankind has always organised access to water in some way. Due to ongoing industrialisation and its impact on the environment, different scientific disciplines, such as hydrology, physics, ecology, and the social sciences, have more and more become interested in water systems. Interdisciplinary approaches to water management, for example, in the case of water dam construction, polder landscapes, river basin and coastal zone management, have increased in number. Although some segments of water management are prone to be privatised, water is a public good and policy bodies are busy with its maintenance and care. Since water is a topic for border-crossing concerns, it is a diplomatic issue.

In the 1960s, for example, it was the support of the Americans in the person of President L. B. Johnson who gave his support to the Israeli planning of drinking water through desalination. In a speech on 1 June 1964, during the visit of the then Israeli Prime Minister Eshkol to Washington, President Johnson declared:

"Mr. Prime Minister, you told me only this morning that water was blood for Israel. So we shall make a joint attack on Israel's water shortage through the highly promising technique of desalting. Indeed, let us hope that this technique will bring benefit to all of the peoples of the parched Middle East."

President Johnson showed his willingness to cooperate in the development of the

desalination technology, and, later, approved funding for the project. It was linked, however, to the hope that a benefit to all people in the Middle East would be generated. Nowadays, the supply of water in the Middle East remains an issue of political tensions.

On 19 November 2018, the European Council adopted **conclusions on water diplomacy** which lay out the strategic framework and the policy objectives and priorities of the EU on water diplomacy (Cf. European Council 2018). The conclusions are divided into five chapters that give us a neat idea of the priorities that are set by the Council of the European Union with regard to water diplomacy

1) Principles (Introduction),
2) Water and security, stability and conflict prevention,
3) Transboundary water cooperation, institutions and governance,
4) Leaving no one behind – water in the 2030 agenda, the Paris agreement on climate change: working multilaterally,
5) Moving to enhanced action.

The conclusions put emphasis on the role that water plays in crises and of the interplay between water scarcity and peace in specific regions. The Council also emphasizes the expertise available in the EU on the issue and its full commitment to ensure that it remains a common good. To this end, a multilateral approach is considered necessary.

Read more!

- European Council (2018): Water diplomacy: Council adopts conclusions. Press release. (Link)
- Foreign Relations, 1964–1968, Volume VolumeXXXIV, Energy Diplomacy and Global Issues (Link)

5.3.3 Oceans

At the latest since the middle of the 20th century the oceans have been a tangible subject of international diplomacy and scientific endeavour. Even before, they were the scene of a multitude of disputes between the seafaring and trading powers. However, it was only after the foundation of the United Nations and the concomitant beginning of seabed policy, that very specific fields of action become interesting. Since then the oceans are touched by a diverse range of interests: "the ocean as military space (to stage weapons), as science (to expand knowledge), as resource (to be procured), and as environment (needing protection)" (Robinson, 2020, p. 151). This development led to promising scientific perspectives on the one hand and to potential conflict on the other, allowing – and urgently demanding in some case – the development of interfaces between science and diplomacy.

Over time, it became clear that an international legal framework and agreement was required. After a series of different treaties, the United Nations Convention on the Law of the Sea (UNCLOS) came into force, being "one of the most important pieces of international law drafted in the 20th century" (Robinson, 2018, p. 1; UN, 1982/1994). Since the oceans are a crucial factor for some of the most urging global challenges, e.g. climate change, migration, and secure nutrition, the negotiation still has to go on: "By now ocean governance in the face of ocean change requires urgent actions which should not be weak political statements of goodwill but legally binding norms within the hard law

mechanisms and rightfully enforceable acts on international entities" (Sikiera, 2021, p. 8).

Multilateral science diplomacy is driving research cooperation on oceans and polar areas, and opens up ways to combat the threats posed by pollution, micro-plastics, overfishing and rising sea levels (Cf. Hatje et al., 2021; Su and Mayer, 2018). The United Nations presented an ambitious research agenda with the UN Decade of Ocean Research for Sustainable Development (2021-2030). Under the slogan "The Science We Need for The Ocean We Want" (UN 2019), the goal is to make oceans and seas clean, healthy, productive, predictable, safe, accessible and inspiring by 2030. "Ocean science diplomacy" (Polejack, 2021) is the most important pillar for this endeavour and for many intergovernmental organizations such as the Intergovernmental Oceanographic Commission (IOC), the International Seabed Authority (ISA) and the Intergovernmental Panel on Climate Change (IPCC).

The IPCC (created in 1988) is an excellent example for well-established science diplomacy mechanisms. Many scientists contribute to its periodic assessments and provide the necessary data and knowledge for the public, political and scientific arenas and discourses that are related to climate and ocean change. But there is still a lot to do, as Sikiera (2021) points out: "There is an undeniably increased need for transboundary ocean cooperation at the institutional and governance level" (Sikiera, 2021, p. 9).

Read more about the development of Ocean Science Diplomacy in the reference below:

- Hatje, Vanessa et al. (2021), Pollutants in the South Atlantic Ocean: Sources, Knowledge Gaps and Perspectives for the Decade of Ocean Science, in: Frontiers in Marine Science, 8 (Link) (accessed 3 February 2022)
- Polejack, Andrei (2021), The Importance of Ocean Science Diplomacy for Ocean Affairs Global Sustainability and the UN Decade of Ocean Science, in: Frontiers in Marine Science, 8 (Link) (accessed 3 February 2022)
- Robinson, Sam (2018), Co-production of science and diplomacy in environmental monitoring: the case of the UN Convention on the Law of the Sea, Case Study n°7.2 of InsSciDE (EU Horizon 2020 Project) (Link) (accessed 3 February 2022)
- Robinson, Sam (2020), Scientific imaginaries and science diplomacy: The case of ocean exploitation, in: Centaurus, 63(1): 150–170 (Link) (accessed 3 February 2022)
- Sikiera, Joanna (2021), Ocean Diplomacy as a Promising Solution to Climate Change, in: Science Diplomacy, 4(4), 8-10 (Link) (accessed 3 February 2022)
- Su, Ping and Maximilian Mayer (2018), Science Diplomacy and Trust Building: 'Science China' in the Arctic, in: Global Policy, 9(3) (Link) (accessed 3 February 2022)
- UN (1982/1994), United Nations Convention on the Law of the Sea (UNCLOS), signed on 10 December 1982, in force since 1994 (Link) (accessed 3 February 2022)
- UN (2019), United Nations Decade of Ocean Science for Sustainable Development: "The Science We Need for the Ocean We Want" (Link) (accessed 3 February 2022)

5.3.4 Health

Health diplomacy has become more and more important in the last decades. Many countries and organisations share the idea of bringing together disciplines like public health, international affairs, management, law, and economics for a common goal for the good of the people. But this is not an easy task. National interests, medical patent rights, intellectual property protection, pharmaceutical industry groups, non-governmental organisations and various other stakeholders each play an important role in the development of global health diplomacy. Health diplomacy is needed for the negotiations

that shape and manage the global policy environment for health. The **relationship between health, foreign policy and trade** is at the cutting edge of global health diplomacy. Health diplomacy and science diplomacy are closely related and have overlapping fields of political and scientific work and interests.

The **World Health Organization (WHO)** has a special unit dealing with health diplomacy (cf. WHO 2019). The goals of this unit are:

1. To support the development of a more systematic and pro-active approach to identify and understand key current and future changes impacting global public health
2. To build capacity among Member States to support the necessary collective action to take advantage of opportunities and mitigate the risks for health (WHO 2019)

Many countries express the immediate political will to make a difference for the benefit of all people's health. In the **Oslo Declaration of 2006**, for example, the Ministers of Foreign Affairs of Brazil, France, Indonesia, Norway, Senegal, South Africa, and Thailand issued a statement, emphasizing that health is one of the most important, "still broadly neglected, long-term foreign policy issues of our time" (Oslo Declaration 2006). Similarly, many states express the immediate political will to make a difference for the good of all people's health. Health is described as a **global public good (GPG)** that needs to be achieved and maintained at a global level. Although there is progress in various fields, there is still a need to agree to the facilitating and the use of the necessary resources on one side and a lack of coordination and management of processes on the other side.

An international platform for the development of health diplomacy and for the enhancement of health as a GPG is helpful. In 2013, the **Swiss Academy of Medical Sciences** formulated some key points for the establishment of an international platform for health diplomacy. They call it the "5 C's" (Swiss Academy of Medical Sciences 2013):

1. Common norms and norms for investments
2. Communication mechanisms for information sharing and collaboration
3. Coordination mechanisms so that science, research and development investors have better information
4. Collaborating more efficiently
5. Collective decisions for big issues

Providing the necessary conditions to make these framework conditions possible and to implement an international initiative will certainly require a lot of effort. Nevertheless, there are also initial successes of international health diplomacy. One example is the fight against the **Zika virus** in a concerted initiative of several American states. The outbreak of Zika in Brazil and Colombia (2015-2016) led to an international epidemiological alert for infection issued by the WHO and the Pan American Health Organization (PAHO). Different institutions, e.g. the U.S. Center of Disease Control (CDC) and the *Instituto Nacional de Salud* of Colombia (INS), signed a memorandum of understanding to collaborate in an investigation on the long-term effects of Zika virus (CDC 2016). The need for a coordinated approach also became apparent during the **COVID-19 crisis**: The WHO convened a Global Research and Innovation Forum on the novel coronavirus, attended by more than 450 experts and funders. They came together in February 2020 to assess the level of knowledge, identify gaps and work together to accelerate and fund priority research, with equitable access as a fundamental principle underpinning this work. In summer 2020, the

COVAX Facility, a mechanism designed to guarantee rapid, fair and equitable access to COVID-19 vaccines worldwide, secured engagement from more than 150 countries, representing over 60% of the world's population. (Source: WHO)

Great hope for the longer-term achievement of the goals and sub-goals of SDG 3 currently also lies in the future development of the health-related science, technology, and innovation. **Digital technology** makes it possible to compensate for the insufficient doctor-patient relationship insofar technology allows us to reach out to people in inaccessible areas. E-health also facilitates the diagnosis, monitoring, and treatment of pandemic diseases. More recent research, in turn, is leading to the production of affordable medicines, including generics. Science will therefore be able to make an important contribution to the development of health diplomacy, as it already has, and help improve the GPG health.

The **COVID-19 crisis** offers a current example: It shows us how fragile and sensitive our living environments are. "All countries are turning to science. ", is stated in the UNESCO dialogue of 30 March 2020, because political decision-makers everywhere now seem to trust in scientific expertise more than ever. Science Diplomacy is best suited to support the international efforts for a transition towards Open Science:

- It began with the publication of the genetic sequence of COVID-19 by Chinese scientists in early January 2020 via GenBank – an open access DNA database operated by the US National Center for Biotechnology Information.
- Not yet peer-reviewed results are shared with the research community via bioRxiv and medRxiv and via COVID-19 SARS-CoV-2 preprints, which can immediately be reviewed and tested by the research community.
- Datasets such as CORD-19, literature trackers such as LitCovid or the Outbreak Science Rapid PREreview provide access to current activities.

In this context, the Coronavirus crisis has shown that we have:

- to recognise that the creation and transfer of scientific knowledge are critical to building and sustaining socio-economic welfare and integration in the global economy;
- to support the international scientific community to further demonstrate the spirit and principles of solidarity and knowledge sharing;
- to mobilise policy makers, civil society and private sector and patent holders to further collaborate with scientists to share scientific information.

The use of scientific collaborations among nations to address common problems and to build constructive international partnerships is the main definition of science diplomacy (see 2.2.2 The Royal Society and AAAS's Conceptual Framework: science for diplomacy).

What the experts think

Fernando Simón

Director of the Spanish Coordinating Centre for Health Alerts and Emergencies at the Ministry of Health, Social Services and Equality

Can science diplomacy help prevent and solve health emergencies?

Video Link to YouTube

How does the Spanish health system communicate with other national systems to work together on health issues?

Video Link to YouTube

Read more!

- U.S. Centers for Disease Control and Prevention (CDC) (2016): CDC and the Instituto Nacional de Salud of Colombia collaborate to understand long-term effects of Zika virus infection during pregnancy. Press Release (Link) (19.12.2019)
- Swiss Academy of Medical Sciences (2013): Health Diplomacy Meets Science Diplomacy. Symposium Report, Geneva, 12 November 2013 (Link) (19.12.2019)
- Health 2020: Foreign policy and health, WHO (Link) (19.12.2019)
- Katja Mayer, Open Science Diplomacy to tackle the COVID-19 pandemic (Link) (17.04.2020)
- Junaid Nabi, The Case for Global Health Diplomacy (Link) (14.02.2020)

5.3.5 COVID-19 Crisis

COVID-19 has highlighted shortcomings in the current interaction between international relations and scientific cooperation. The crisis demonstrates the **need for improving science diplomacy practices**.

The infographic below draws on three S4D4C policy briefs (see bleu box at the end of this topic), where more detailed information on each of the elements can be found:

1. "Towards effective science diplomacy practice"
2. "Calling for a Systemic change: towards an EU science diplomacy for addressing global challenges"
3. "Building better science diplomacy for global challenges: insights from the covid-19 crisis"

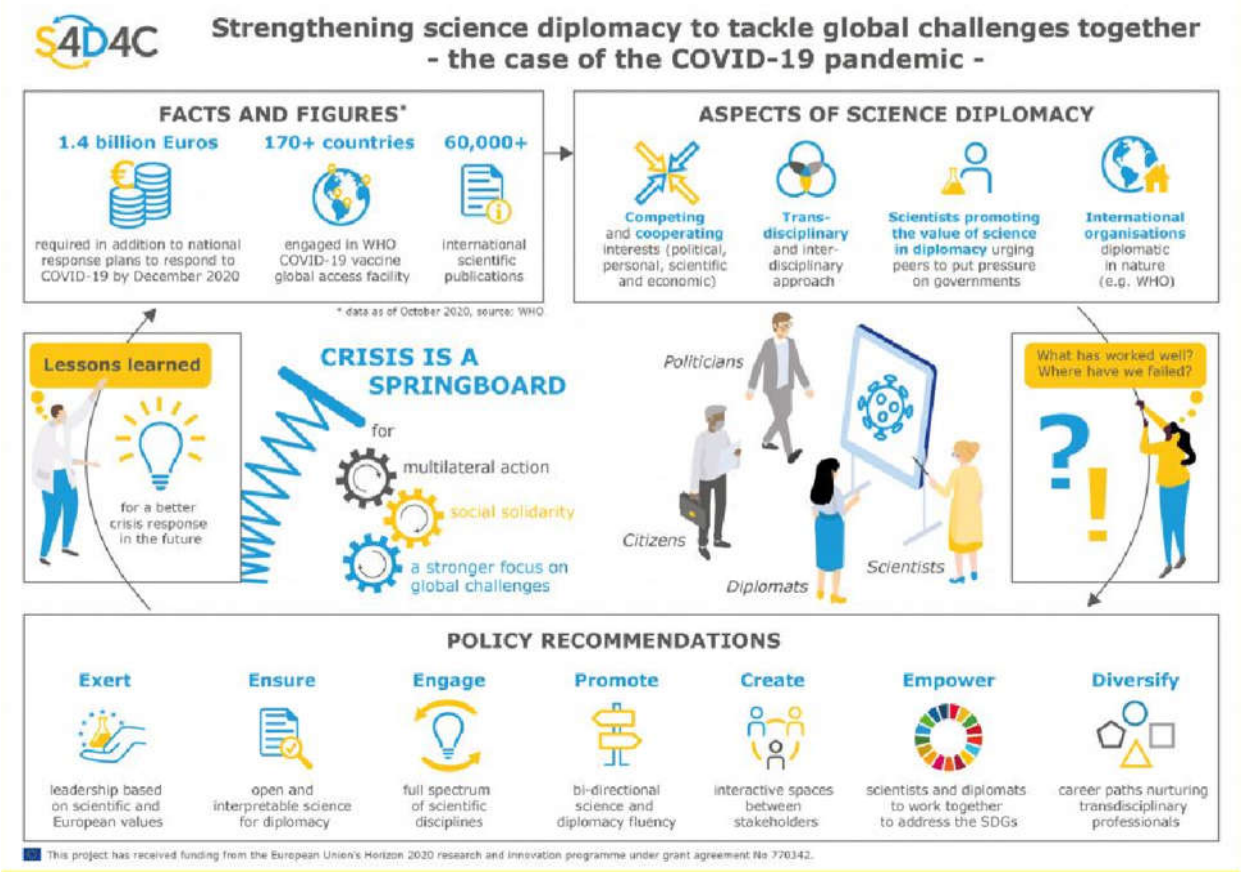


Figure: S4D4C Infographic

In the top left, in **facts and figures**, we see the various scales involved: geographical, administrative (here in terms of funding), and epistemic (here in terms of the extent of the science effort). It is important to recognise the incredible scale of scientific mobilisation that COVID-19 has generated. The number of publications is remarkable, not only in quantity, but also because these are nearly all open access. What should be noted, is that this was negotiated in advance, unlike many of the ad-hoc approaches to COVID, there was an '**Agreement on data sharing in public health emergencies**' already in place before the crisis.

On the top right, we find a number of key **aspects of science diplomacy** – the transdisciplinary character of the scientific efforts, the roles of scientists and international organisations as key actors and arenas, and the difficult interrelationship between cooperative and competitive forces.

On the bottom are seven **policy recommendations**. Connecting these are several themes. Diplomacy is rooted in interactions and relationships, and science diplomacy needs to consider the underlying ways to make these effective. **Ensuring** openness and interpretable science for diplomacy, means that diplomats (of all sorts) have access to science, but also access that they can use – it must be more than merely available, it must also make sense to them. Going back to the massive number of publications – this is both an opportunity and a threat – how does one sort through, much less absorb this massive amount of information? **Promoting** bi-directional fluency is critical for this – diplomats need to have a framework in order to make sense of scientific data, but it also goes the other way, scientists who are involved in diplomacy need to understand the politics involved in decision-making. Both sides have the tendency to simplify the context in which the other works. This is a mistake: scientists need to understand the multiplicity of interests and possible solutions on a diplomatic level, and diplomats need to understand

the contingency of scientific knowledge.

How can this happen? A number of the policy recommendations address this. **Creating** interactive spaces and **Empowering** scientists, diplomats, and other stakeholders to work together – directly on global challenges. **Diversifying** career paths and creating positions for transdisciplinary professionals, so that we have people who can effectively translate from and to the languages of science and power.

We also need to **Engage** the full spectrum of scientific disciplines. COVID-19 has established the importance of science for addressing global challenges. It has also shown the value of the Humanities and Social Sciences – which in the first phases of the crisis were crucial to establishing social distancing and models of flattening the curve. History as well tried to tell us that the 2018 Spanish Flu came back with a vengeance in the fall – regrettably, that lesson was not taken seriously enough.

Finally, it is important to **Exert** values-based leadership. This infographic was written with an EU policy focus and uses the words European Values – but these are not exclusively European, they are the values of a liberal, democratic, rule and good-governance based multilateral world order. We are optimistic that the **crisis can be a springboard** for both those values and for raising awareness of global challenges more broadly. But the stakes are high: science diplomacy efforts around COVID-19 will set the tone for our future ability to act resolutely (or flounder) when it comes to climate change, food and water security, and many other global challenges.

Read more!

- S4D4C Policy Brief "Towards effective science diplomacy practice" (Link)
- S4D4C Policy Brief "Calling for a Systemic change: towards an EU science diplomacy for addressing global challenges" (Link)
- S4D4C Policy Brief "Building better science diplomacy for global challenges: insights from the covid-19 crisis" (Link)

5.4 How to Design a Science Diplomacy Approach

In this module we have shown very different approaches, partly predetermined by the historical circumstances and by political currents in individual countries. In part it is also the regions in which the countries are located which determine the sense and purpose of individual science diplomacy measures. For African countries as well as for some countries in Southeast Asia, completely different approaches are needed to solve certain problems than we need in other highly industrialised countries. Science diplomacy must therefore adapt to the prevailing conditions in order to be effective and of long-term benefit.

Several S4D4C reports (see also Module 7) and scientific papers show that certain aspects of science diplomacy are always recurring. These include:

1. the **orientation towards global goals** that have been decided upon by many countries and on the basis of international agreements, such as the Agenda 2030 with the SDGs;
2. the cooperation of countries in **international institutions** that have been created specifically for this purpose, or the cooperation of national institutions in global or transnational contexts;
3. the **relevant institutions**, be it diplomatic or scientific, that are existing at the

level of the individual countries or are assigned science diplomacy tasks by political institutions or decision makers;

4. a number of countries send scientists to **diplomatic institutions**, form **advisory bodies**, link the work of **scientific think tanks** with the political work of decision-making institutions, etc.

All these approaches make a lot of sense, but they are by no means self-evident. The tenor is not yet that science diplomacy is a suitable means and medium for tackling problems in international policy. For the combination of science and politics, which can be very diverse, a certain conviction and spirit are needed.

The decision making process, which goes from an idea to a concrete approach, has many phases. At the beginning there is good will and a good concept, which is documented and institutionalised by the work of many experts and which has a clear and well thought-out objective.

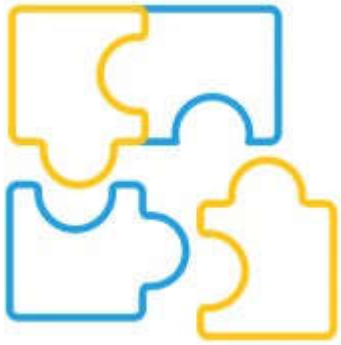
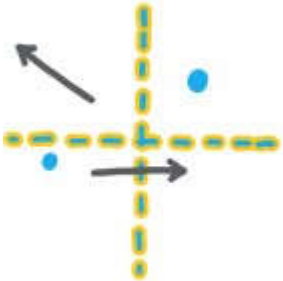
In the S4D4C report "Governance framework report, recommendations, process descriptions and chart" (2020) the authors outline a set of twelve procedural and infrastructural principles that need to be considered to create transformative science diplomacy interactions. Not all are applicable to every situation, but it will be useful to consider combinations of principles in most instances. Depending on the specific situation, it can be possible that several of the principles need to be balanced with each other and that sometimes trade-offs between them are inevitable. The next two topics present an overview of each principle, including their description, key questions and an example.

5.4.1 Procedural principles

The procedural principles explain how science diplomacy needs to be organised to get a chance to be successful, that is, productive and constructive. They are applicable in situations where the science diplomacy activity can be expected to be collaborative, i.e. in societal-challenge-oriented situations. It is built on the understanding that national, protectionist interests do not contribute to solving the challenges global society faces.

Principle	Description: "Science diplomatic activities should..."	Key questions	Example
SENSITIVITY 	Respect the specific political, socio-economic and environmental context they are designed for and be able to adapt to changes in them.	• Who are the main stakeholders? • What is the specific (geo-) political, scientific and natural-environmental context?	Dutch water diplomacy: The Netherlands benefit from their longstanding experience with and traditional expertise on all aspects of water management. (Tomalová et al. 2020; Geography)
INCLUSIVENESS 	Be aware of different degrees of inclusiveness vs. exclusiveness and that inclusion is a political choice and part of the diplomatic game, too. Where useful, involve a broadly representative portion of the relevant scientific and diplomatic communities.	• Who and what needs to be in/out of the envisioned activity? • How should inclusion and exclusion be balanced to ensure effectiveness of the activity?	SESAME Synchrotron: see Lesson 7.5

TRANSPARENCY 	Be appropriately visible to enable monitoring and accountability activities by observing communities, thereby increasing the legitimacy of the activity.	• Which aspects of the activity should be openly accessible? To whom?	Decisions by national ministries: They have their own decision making processes which can obstruct quick responses and transboundary activities. (Flink 2020a; Values, Interests)
DELIBERATION 	Encourage mutual understanding of actors' perspectives and needs as well as of the problem definition, the disciplinary and interdisciplinary knowledge required (incl. probing for other relevant scientific disciplines) and common narratives for the support of science diplomacy processes.	• Which different perspectives exist concerning the planned activity? • How can consensus be achieved about the problem definition, scope and acceptability of solutions?	Consensual problem narratives simplify cooperation: Framing of a water issue as a problem of water quality or of water as a scarce and contested resource makes a difference in how easily cooperation is achieved. (Tomalová et al. 2020)
RECIPROCITY 	Foster an attitude of understanding and cooperativeness leading stakeholders to trust that each actor participating in the activity contributes to addressing grand challenges in roughly equivalent ways according to their abilities, be it through knowledge or other resources.	• What are you willing to contribute and what do you expect your peers to contribute to the activity? • How do you achieve equivalent contributions?	The trade-off between competition and cooperation: Pursuing common interests is not always the objective of science diplomacy activities. (Degelsegger-Márquez 2020; Mayer 2020)
COMPLEMENTARITY &	Build on stakeholders' strengths to balance out others' weaknesses and embed them in governance arrangements that leave enough room to	• What are the relevant stakeholders for the planned activity? • What are they good at and	Soft power characteristics of Open Science: In the transition phase towards an Open Science system, restricting

MANOEUVRABILITY 	manoeuvre for these strengths to flourish.	which weaknesses can be complemented?	scientific publications in subscription journals can reduce scientists' room to manoeuvre. (Mayer 2020)
LEGITIMACY 	Strive for the mutual acceptance of shared "rules of the game" in the interaction space, respecting participating stakeholders' expertise and framings. Science Diplomacy activities should enable 'democratic quality' of proposed and implemented mechanisms, processes and solutions.	• How does the planned activity contribute to or threaten stakeholders' core values? • Through which processes can the planned activity increase its legitimacy?	'Science Diplomacy' as a label: Strategic avoidance of labelling activities as 'Science Diplomacy', can in some cases make more sense, e.g. health diplomacy, cyberdiplomacy or water diplomacy (Kadlecová et al. 2020; Šlosarčík, Meyer, and Chubb 2020; Tomalová et al. 2020)
ALIGNMENT 	Address problems on the lowest, i.e. most local and concrete, appropriate policy/instrumental level while coordinating all involved scales (temporal, spatial and administrative), governance dimensions (horizontal and vertical) and epistemic communities.	• On which level is the activity best suited to be implemented? • How can all influential stakeholders be aligned to maximize the activity's impact?	Crisis response time reduction: Response time to crises, e.g. cyber attacks or infectious disease outbreaks, can be reduced, if there are appropriate management systems in place (Kadlecová et al. 2020; Ravinet, Cos, and Young 2020; Šlosarčík, Meyer, and Chubb 2020))

EVALUATION 	Be reflective and facilitate learning throughout the process.	• What does the performance of the activity teach us? • Are we satisfied with the activity's performance?	Mutual Learning Exercise on Open Science: It was created specifically to learn from the way open science was being implemented, what went well and what could be improved or accelerated. (Mayer 2020)

Read more!

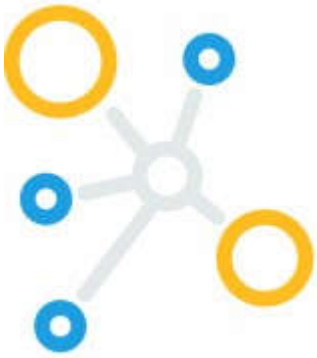
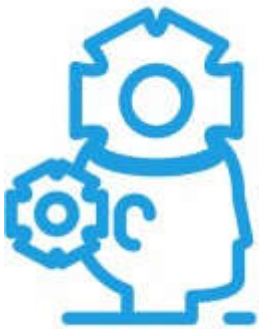
- The New Protocol for Science Diplomacy (Link)

In Science Diplomacy in the Making: Case-based insights from the S4D4C project, edited by Mitchell Young, Tim Flink and Elke Dall. Vienna: S4D4C (Link):

- Degelsegger-Márquez, Alexander (2020): "International dimensions of the EU's FET Flagships: Large-scale strategic research investments as a site of de-facto science diplomacy."
- Flink, Tim (2020a): "International Joint Research Programming."
- Kadlecová, Lucie, Nadia Meyer, Rafaël Cos, and Pauline Ravinet (2020): "Cyber Security: Mapping the Role of Science Diplomacy in the Cyber Field."
- Mayer, Katja (2020): "Open Science Diplomacy."
- Ravinet, Pauline, Rafaël Cos, and Mitchell Young (2020): "The science and diplomacy of global challenges: Food security in EU-Africa relations."
- Šlosarčík, Ivo, Nadia Meyer, and Jennifer Chubb. 2020. "Science diplomacy as a means to tackle infectious diseases: The case of Zika."
- Tomalová, Eliška, Eliška Černovská, Ewert J. Aukes, Jasper Montana, and Elke Dall (2020) "Water Diplomacy and its Future in the National, Regional, European and Global Environments."

5.4.2 Infrastructural principles

The infrastructural principles are related to what supportive resources and infrastructures in the broadest sense are required for preparing successful science diplomacy approaches. They include capacities, capabilities and trust.

Principle	Description: "Science diplomatic activities should…"	Key questions	Example
CAPACITIES 	Create, reinforce and/or draw on suitable and sufficient institutional and organisational resources, political will, reliable and inclusive knowledge resources, and gatekeeping proficiency.	• Which conditions does the activity require that are already in place? • Which conditions still need to be realised?	Accessibility of scientific knowledge and relevant stakeholders (networks): Knowledge infrastructures such as the S4D4C online knowledge resources platform (Link) can contribute to improving this accessibility.
CAPABILITIES 	Empower individuals to become trained 'translators', 'multilingual' in the sense of speaking the language of science and diplomacy and enable them to opportunistically or incidentally interact with communities beyond their daily circles both in the domain of science and/or diplomacy.	• Is the existing human capital, including skills and knowledge, appropriate for the planned activity?	Physicist negotiating for public funding: see SESAME, Lesson 7.5

TRUST 	Produce mutual recognition and credibility on an individual level as well as clear 'rules of the game' on the process level, thereby strengthening the process *and* increasing its legitimacy for the individuals involved.	• How well-developed are trust relationships between potential stakeholders of the envisioned activity? • What needs to be done to improve these relationships?	Role of large scale scientific knowledge infrastructures in international cooperation: see SESAME, Lesson 7.5

5.5 Question Time

5.5.1 Brainstorming Questions

These questions are posed for you to reflect individually about the main messages put by our experts in science diplomacy. Please, take some time to think about them.

- Science diplomacy is a practice that is understood in different ways by different professionals or countries. What is your definition? Do you think we require a common consensus for its definition among practitioners?

- How would you describe a specific science diplomacy action, such as the establishment of a large research infrastructure in a region traditionally in conflict, with the different conceptual frameworks here presented?

- Are all scientists and diplomats suited to undertake science diplomacy actions or do they require special training?

- There is no one size that fits all. Science diplomacy institutionalised positions vary between countries. Could you reflect on how your country structures its science diplomacy responsibilities between or within any of its scientific or foreign-affairs governmental departments?

Let's see how much you've learnt – Quiz Time: What Is Science Diplomacy?

Please, take this quiz to evaluate how much you have learnt. You need to get 8 questions right out of 10 in order to move to the next module. You can take the quiz as many times as needed.

We recommend you read the questions carefully to learn exactly what answer you need to select (true or false one, for example).

1. **Which statesman announced various actions in S&T cooperation with the Middle East and other regions of the world in 2009?**
    a. Nicolas Sarkozy
    b. Benjamin Netanyahu
    c. Donald Trump
    d. Barack Obama

2. ***True or false?* A good science diplomacy strategy can be set up disregarding historical, socio-cultural etc. backgrounds of the partner.**
    - True
    - False

3. **Which institution is closely working together with other countries and is thus considered a flagship initiative for Science Diplomacy?**

a. The International Space Station
b. The Confucius institute
c. The Goethe Institutes
d. The Institut Français

4. ***True or false?*** **Many of today's standards that apply to the intermeshing of science and diplomacy can be traced back to US initiatives.**
   - True
   - False

5. **Which country appointed its first Science Advisor to the Minister of Foreign Affairs in 2015?**
   a. Japan
   b. Germany
   c. France
   d. Spain

6. **What is most important to establish long-term food security in Africa?**
   a. Increase food imports
   b. Promote innovation
   c. Introduce referendums
   d. Enhance development aid

7. **Which state-run foundation started a Science Diplomatic Network in 2012 and strongly supports SD work?**
   a. Alexander von Humboldt Foundation
   b. Bill Gates Foundation
   c. Institut Français
   d. Spanish Foundation for Science and Technology

8. **Which purpose(s) do national science diplomacy strategies NOT serve explicitly?**
   a. Attract talent to the country
   b. Engage in innovation to tackle global challenges
   c. Build trust
   d. Increase a country's GDP

9. **Which of the following is a major challenge in protecting global health?**
   a. Lack of joint actions and international common agreement
   b. A global reluctance to vaccination
   c. Medication embargos
   d. All of them

10. **Which of the following is a flagship initiative for Science Diplomacy?**
    a. The introduction of the EU Stability and Growth Pact
    b. The initiation of the Marshall Plan
    c. The fight against the Zika Virus
    d. The creation of the North-Atlantic Treaty Organization

Quiz Solution

1D

2 False

3A

4 True

5A

6B

7D

8D

9D

10C