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“The Sustainable Development Goals (SDGs) and Scientific Advice: A Science-Policy Interface”, Tateo Arimoto, GRIPS and JST,

1. The importance of Science-Policy Interface for achieving the SDGs

2015 became a milestone for the 21st-century science, technology, innovation (STI), and humankind. At the United Nations (UN) General Assembly in September, it unanimously adopted “The 2030 Agenda for Sustainable Development”, whose subtitle is “Transforming our world”. In the resolution, article 70 gives a full framework and the roles expected of STI communities in the world. That same year, the UN Economic and Social Council published “Global Sustainable Development Report (GSDR) 2015”<sup>1</sup>, in which possible contributions that STI can make to each of 17 SDGs are stated. A review of progress towards each goal is expected to be published each year. The first chapter of GSDR2015, “Science and Policy Interface”, clearly explains the importance of collaboration between science and policy to achieve the SDGs, providing many examples. It is a strong request for the two world communities, between science and politics, where values and behavioral patterns differ.

2. Global development of the scientific advisory system and the need of institutionalization for the SDGs

A science-policy interface, namely “scientific advice”, is a new concept that has attracted growing attention these years. It is defined as “scientists, engineers and their groups providing their knowledge, expertise and experience regarding a specific policy challenges in order that governments, companies, or citizens can achieve reasonable policy formation and decision-making”<sup>2</sup>. Since during the 1970s, the mechanisms of risk assessment and management at regulatory authorities in the fields of environment, medicine, and food safety around the world have been practically formed, reflecting the characteristics of political administration and STI system in each countries. At the turn of the century, the need to reframe the relationship between science and policy was recognized following certain challenges, including the BSE crisis in Europe, the political interference in science under the USA Bush administration, and the conviction of Italian scientists for failing to give an adequate warning of the earthquake in L’Aquila, Italy. In Japan as well, following the Great East Japan Earthquake and the Fukushima Nuclear Power accident,

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<sup>1</sup> “Global Sustainable Development Report (GSDR 2015)”, The Economic and Social Council, United Nations, 2015. “Supporting the Sustainable Development Goals: A Guide for Merit-based Academies”, IAP-InterAcademy Partnership, 6 December 2017.

<sup>2</sup> Scientific Advice - Science, Technology, and Policy-Making in the Twenty-First Century, Tateo Arimoto et al. University of Tokyo Press, 2016, English Summary (original in Japanese).

distrust of science and technology increased among the general public and politicians, and some science-related advice garnered attention. In response, the Science Council of Japan revised its “Code of Conduct for Scientists” in 2013 to include ethical principles to which scientists must adhere when they give scientific advice. Furthermore, in 2015, the first Science and Technology Advisor to Japan’s Minister of Foreign Affairs was officially appointed.

### OECD Project on Scientific Advice

What accelerated this worldwide movement was the launch of the “Project to Examine Scientific Advice” by OECD in 2013. The project, of which I am Co-Chairperson, includes 22 participant countries, publishing a primary report in 2015 after gathering information about each national system, conducting interviews with many stakeholders, and holding international workshops in Tokyo and Berlin<sup>3</sup>. The project compared the systems of each nation to extract and propose common frameworks. These frameworks concern the following: interactive mechanisms between the STI community and society & administration; the Code of Conduct that guides both sides and the building of trust between them; mechanisms for relations between both sides (councils, science academies, advisors, think-tanks, etc.); and an advisory process (framing questions, selecting advisors, producing advice independently, maintaining transparency & quality, and communicating, using, and assessing advice). The 2015 report has become an international standard in this field. For the second stage, OECD is working on international data sharing and advisory systems related to natural disasters across borders (e.g. earthquakes, tsunamis, volcanos, and infectious diseases). The output of the second stage is expected to be published in the spring of 2018.

### Expanding INGSA and FMSTAN global networks

In parallel with the OECD project, the International Council for Science (ICSU) proposed the establishment of an international network of institutions and individuals who actually and independently play advisory roles in science. This proposal resulted in the establishment of INGSA (International Network for Government Science Advice) in 2014<sup>4</sup>. The members of the network include Science and Technology Advisors for each nation’s leaders and Foreign Ministers, executives of scientific academies and scientific councils, and researchers. Under the leadership of Sir Peter Gluckman, Chief Science Advisor to the Prime Minister of New Zealand, the network has been expanding with new participants, including some members from developing nations. INGSA receives support from UNESCO and the Wellcome Trust and others in addition to ICSU. It organizes a world congress every two years, promotes scientific advice in each region, and provides educational training for young researchers, government officials and related institutions.

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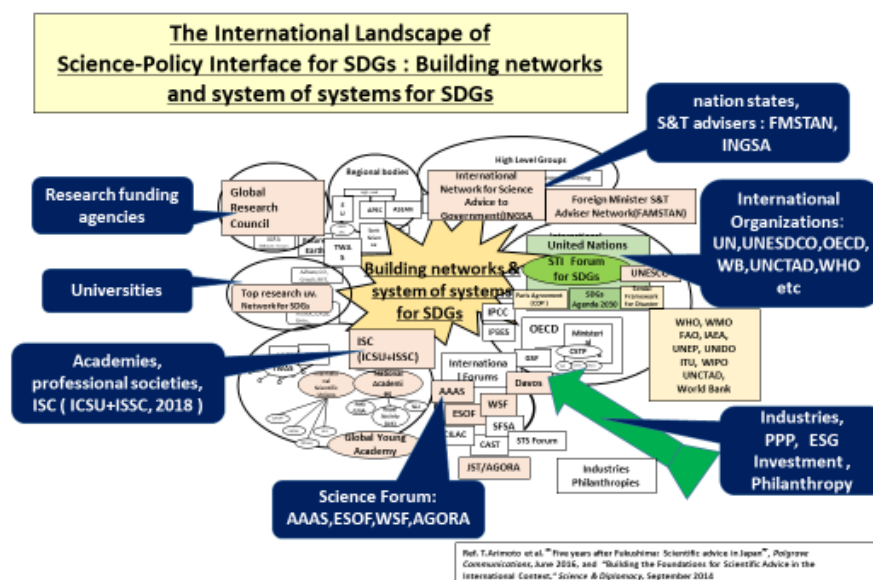
3. “Scientific Advice for Policy Making – The role and responsibility of expert bodies and individual scientists”, OECD, 20 April 2015.

4 “Science advice to governments: an international perspective”, Peter Gluckman, Nov 2016, Tokyo. “INGSA Manifesto for 2030: Scientific Advice for the Global Goals”, Draft for Consultation, INGSA, P. Gluckman et al. Nov. 2017.

Recently, it also functions as the secretariat for FMSTAN (Foreign Ministries Science and Technology Advisors Network). The world conference was held in Auckland in 2014 and in Brussels in 2016, and preparations for the 2018 conference, in November, in Tokyo are underway. I have participated conferences of FMSTAN and INGSA and recognized that many of recent discussions are related with the SDGs. At the 2018 INGSA Conference in Tokyo, in addition to the SDGs, important themes such as emerging technologies (AI and genome mappings) and society as well as big data and policy decisions are expected to be discussed. Since Dr. Teruo Kishi, Professor Emeritus of the University of Tokyo, was appointed for the first time as Science and Technology Advisor to the Minister of Foreign Affairs of Japan in 2015, scientific challenges have been discussed at diplomatic occasions among national leaders. These include the G-7 Summit and TICAD (Tokyo International Conference on African Development). Amid growing uncertainties in international affairs, there are rising expectations that Japan will lead the worldwide science advisory network.

### International landscape of Science-Policy Interface for SDGs

Various initiatives for SDGs are taken nationally and globally by different sectors. These sectors include the World Science Forum, the American Association for the Advancement of Science, the EuroScience Open Forum, the Global Young Academy, and other science academies and funding agencies worldwide, as well as universities, companies, the World Bank, and UNCTA. The greatest future task for the achievement of the SDGs is to institutionalize the various actions made by these groups.<sup>5</sup>



<sup>5</sup> "Five years after Fukushima : Scientific advice in Japan", Y. Sato and T. Arimoto, Palgrave Communications, June 2016. "Building the Foundations for Scientific Advice in the International Context", Y. Sato, H. Koi and T. Arimoto, Science and Diplomacy, AAAS, September 2014.

### 3. SDGs and role and responsibilities of science and technology in the 21<sup>st</sup> century

The International Council for Science (ICSU: est. 1931) and the International Social Science Council (ISSC: est. 1952)—the two councils focusing on natural science, engineering, social science—decided to merge in 2018 to address complex and interdisciplinary global challenges, such as tSDGs. Historically, the ICSU had emphasized the independence of science from politics and tried to ensure high standards for integrity and quality. It is therefore noteworthy in the context of modern scientific history that the ICSU shifted its direction towards collaborating with international political bodies to address global challenges such as SDGs. INGSA Chair, Sir Peter Gluckman, once wrote in journal “Science” about the difficulties of managing intricate dialogues and advisory processes between science and politics, as well as building trust between the two<sup>6</sup>. He once told me, “I am originally a scientist, but occasionally I become an artist as well”. INGSA is now preparing “INGSA Manifest for 2030 – Scientific Advice for the Global Goals”, which aims to provide a framework for discussion and action on the principles and guidelines that underpin effective science advice. Dr. Colglazier (Former Science and Technology Advisor to the U.S. Secretary of State), who is leading the UN STI for SDGs Forum, also describes the difficulty of providing scientific advice as the “art of science advice”<sup>7</sup>. American political scientist Roger Pielke Jr. explains these science advisors with the new concept of “honest broker of policy options” who are beyond “pure scientists”. This concept is widely accepted worldwide<sup>8</sup>. The guidelines created by the Berlin-Brandenburg Academy of Science and Humanities in Germany state that “the knowledge that scientific policy advice is based on and the knowledge that academic research is based on are not the same. The former exceeds the latter because scientific advice is based on knowledge that must meet scientific world standards and provide political impact”. The Science Council of Japan’s 2013 Revised Code of Conduct for Scientists states that “scientists shall offer fair advice based on objectives and scientific evidence. They shall make maximum efforts to ensure quality in their scientific advice, and at the same time clearly explain the uncertainties associated with scientific knowledge, as well as the diversity of opinions therein. Scientists shall recognize that while scientific knowledge is something to be duly respected in the process of policy decision in democracy, it is not the only basis on which policy is made”. While I was contributing to the revision of this code at that time, one country’s Science Advisor remarked that the biggest challenge is not writing the code itself, but practicing it thoroughly throughout the scientific community. Seven years have passed since the Big earthquake, tsunami and Fukushima nuclear accidents on March 11 of 2011. When Japan’s STI community’s efforts for the SDGs are in full swing, it is important to recall the experiences and memories of March 11 and after.

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<sup>6</sup> “The science-policy interface”, P. Gluckman, *Science*, 2 September 2016.

<sup>7</sup> “The Art of Science”, W. Colglazier, *Science and Diplomacy*, 6.30.2016.

<sup>8</sup> “The Honest Broker—Making Sense of Science in Policy and Politics”, Roger A. Pielke, Jr. Cambridge University Press, 2007.

## Conclusion

Dr. Colglazier once told me that “the SDGs are a great gift to the people of the 21st-century. At the same time, they provide a big opportunity to transform current STI eco-system”. The UN STI for SDGs Forum will mark its third anniversary in June 2018, shifting its focus from discussions to implementation. How would Japan’s STI community respond to this shift? “STI for SDGs” is also “SDGs for STI”. Implementing the SDGs will provide great opportunities to reexamine the significance of STI, and to reform the STI ecosystem through university management, funding systems, evaluation, question framing, multi-disciplinary collaboration, and new industry-university partnership including finance. For students, young researchers, and engineers, it indicates many new dream-inspiring challenges. 2019 will be a year of a series of STI-related political events at the prime-minister level from Japanese view point. These events include SDGs progress reviews by the global leaders’ level, as well as at the G-20 and TICAD hosted by Japan. We must also recall that it will be the 20-year anniversary of the “Declaration on Science and the Use of Scientific Knowledge in the 21<sup>st</sup> century (the “Budapest Declaration 1999 : Science for knowledge, for peace, for sustainable development and in society and for society”)), the keystone of the world’s STI policies in the changing world.