THE DIPLOMATIC SCHOOL OF THE MINISTRY OF FOREIGN AFFAIRS REPUBLIC OF ARMENIA

Lecture Series: **SCIENCE DIPLOMACY**

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COURSE OBJECTIVES AND CONTENT

This SCIENCE DIPLOMACY session relates to our shared sustainability with the 17 Sustainable Development Goals (SDG) from the United Nations (2015) as a practical pedagogical framework and scalable model with lifelong learning for trainees to contribute at local-global levels (Appendix - Fig. 1). This training in Armenia also has national relevance as reflected by the *SDG Implementation Voluntary National* Review (VNR) from Armenia (2018), which will be the core reading and source of activities for this training with science diplomacy. For example, how can science diplomacy and its engine of informed decision-making contribute to SDG No. 16 in view of the Nagorno-Karabakh conflict?

Describing what it is, how it operates and why it is important for our globally-interconnected civilization – **science diplomacy** is an *international, interdisciplinary and inclusive (holistic) process, involving informed decision-making to balance national interests and common interests for the benefit of all on Earth across generations.* The lessons of science diplomacy (Box 1) have been emerging largely after WWII, as revealed from Antarctica, where the United States and Soviet Union cooperated across the cold through the Antarctic Treaty (1959) *"with the interests of science and the progress of all mankind,"* as discussed in the first book on Science Diplomacy (Berkman et al. 2011).

BOX 1

SCIENCE DIPLOMACY AND INFORMED DECISION-MAKING FOR SUSTAINABILITY

TRAINING OBJECTIVES

HOLISTIC PROCESS – OBJECTIVE 1

Introduce the skills, methods and theory of informed decision-making with international, interdisciplinary and inclusive (holistic) integration.

HOLISTIC PROCESS – OBJECTIVE 2

Apply the Sustainable Development Goals (SDG) as a scalable pedagogical framework with local-global relevance, building on the *SDG Implementation Voluntary National* Review (VNR) from Armenia (2018).

HOLISTIC PROCESS – OBJECTIVE 3

Train 'common-interest building' in contrast to 'conflict resolution,' recognizing the starting point of the negotiation makes all the difference in the journey among allies and adversaries alike.

Acceleration in human population size over the last three centuries (Appendix – Fig. 2) has placed significant stresses on global natural resources, environment and jurisdictional systems. The increase in human population also tracks closely with planetary-scale changes in the Earth's atmosphere. In addition, this period also has seen rapid advances in science, technology, and innovation (STI), reflecting the increasing relevance of science diplomacy.

Since the Treaty of Westphalia and the emergent concept of the nation-state in the middle of the 17th century, humankind has increased its population size by more than 1000% (Appendix – Fig. 2). The emergence of "megacities" with populations over 10 million people further represents the rise of sub-national jurisdictions, whose capacities are rapidly accelerating with urbanization on a global scale (Appendix – Fig. 3). How do we manage our expanding human population on local-global scales with 8 billion people alive at the start of the next decade, highlighting there only were 1 billion alive when the industrial revolution began around 1800?

The overarching innovation with science diplomacy is its holistic process to address change in our world, promoting cooperation and preventing conflict. Tangible applications of science diplomacy are reflected by high-level dialogues, including the first formal dialogue between the North Atlantic Treaty Organization and Russian Federation regarding security in the Arctic Ocean (Berkman and Vylegzhanin 2012) as well as more recent international dialogues on science and technology advice in foreign ministries (Vienna Dialogue Team 2017, Talloires Dialogue Team 2018). For nations and our globally-interconnected civilization (Figs. 1-3), change is represented by 'continuum of urgencies' (Appendix – Fig. 4) that extends from security time scales (mitigating the risks of political, economic and cultural instabilities that are immediate) to sustainability time scales (balancing environmental protection, economic prosperity and societal well-being across generations).

Underlying science diplomacy are the theory, methods and skills of informed decision-making that have emerged along the way, evolving from policy as a product into diplomacy as a process with STI. This process of science diplomacy balances the interests of stakeholders, using evidence in view of governance mechanisms with holistic consideration superimposed throughout (Appendix – Fig. 4b). Moreover, the methods and skills of science diplomacy can be viewed across levels of research and actions from foundational questions to informed decisions at the apex (Appendix – Fig. 4b). The 'holistic integration' pedagogy for the science-diplomacy training with the Diplomatic School of Armenia will be to address Objectives 1-3 across the 'Pyramid of Informed Decision-Making' (Fig. 4b) in view of categories of questions (Table 1) to be addressed in view of a single SDG agreed by the trainees as the focus.

TABLE 1: Categories of Questions to Address with Informed Decision-Making as the Engine of Science Diplomacy (Figs. 3-4)

QUESTION CATEGORY FOR DECISION-MAKING[1-2]	HOLISTIC DIMENSIONS TO CONSIDER		
	International	Interdisciplinary	Inclusive
Science as *an essential gauge of changes over time and space.*	X	X	X
***Science* as** an *instrument for Earth system monitoring and assessment.*	X	X	X
***Science* as** *an early warning system.*	X	X	X
***Science* as** *a determinant of public policy agendas.*	X	X	X
Science as *an element of international legal institutions.*	X	X	X
***Science* as** *a source of invention and commercial enterprise.*	X	X	X
Science as *an element of continuity in our global society.*	X	X	X
***Science* as** *a tool of diplomacy to build common interests among allies and adversaries alike.*	X	X	X

[1] Decisions involve governance mechanisms and built infrastructure, coupled for sustainability.
[2] Elaborated from Berkman et al. (2011).

COURSE OUTLINE

DAY 1 (18 February 2019)

1. Introduction to Science Diplomacy
    - Terms
    - Concepts
    - History
    - Applications

2. Introduction to Informed Decision-Making
    - Skills
    - Methods
    - Theory

3. Skill Training #1 (Building Common Interests)
    - Negotiate agreement of the single SDG (Fig. 1) as the training focus
    - Considerations (Objectives 1-3):
        - International, interdisciplinary and inclusive (holistic) dimensions
        - Balance among environmental, economic and societal considerations
        - 'Common-Interest Building' versus 'Conflict Resolution'

Reading Assignment (Before the First Session):

- Review *SDG Implementation Voluntary National Review (VNR)* of Armenia (2018)
- Prioritize first, second and third SDG among the 17 (Fig. 1) to address through the training
- Justify SDG priorities in view of economic, environmental and societal considerations

Reading Assignment (Before Day 2):

- Vienna Dialogue Team. A Global Network of Science and Technology Advice in Foreign Ministries. *Science Diplomacy Action* Synthesis 1: 1-20.
- Review *SDG Implementation Voluntary National Review (VNR)* of Armenia (2018), focusing on "data" and "targets" for the selected SDG

DAY 2 (19 February 2019)

4. Introduction to Time and Space
    - Science as the 'study of change,' integrating the natural and social sciences inclusively
    - Patterns and trends that become the bases for decisions

5. Discussion about our Globally-Interconnected Civilization (Figs. 2-3 above)
    - Global human population size and growth
    - Planetary connections with Earth's climate

6. Skill Training #2 (Constructing Questions of Common Concern)

- Work through categories of questions (Table 1 – above) in relation to the selected SDG, using information provided in the *SDG Implementation Voluntary National Review (VNR)*
- Considerations (Objectives 1-3):
  - Interdisciplinary methodologies to answer questions of common concern
  - Synergies across the natural and social sciences, even indigenous knowledge, to address questions of common concern

Reading Assignment (Before Day 3):

- Berkman, P.A., Kullerud, L., Pope, A., Vylegzhanin, A.N. and Young, O.R. 2017. The Arctic Science Agreement Propels Science Diplomacy. *Science* 358:596-598 (with supplementary materials).
- Review *SDG Implementation Voluntary National Review (VNR)* of Armenia (2018), focusing on "governance" and "infrastructure" for the selected SDG

DAY 3 (20 February 2019)

7. Introduction to Systems
- Characterization of boundaries, geopolitical and natural
- Dynamics of system elements within, across and beyond sovereign jurisdictions

8. Discussion about Evidence and Options that Contribute to Informed Decisions
- Data and evidence are fundamentally different, with different origins and purposes
- Integration of data into evidence with consideration of decision-making institutions
- Options (without advocacy), which can be used or ignored explicitly

9. Skill Training #3 (Contributing to Informed Decision-Making)
- Identify 1 or 2 categories of questions (Table 1 – above) where tangible progress could be made with decisions about governance mechanisms and built infrastructure as well as their coupling to achieve progress with implementation of the selected SDG
- Use information in the *SDG Implementation Voluntary National Review (VNR)*
- Considerations (Objectives 1-3):
  - Diplomacy of options (without advocacy) to engage with decision makers
  - Development of dialogues to build common interests among allies and adversaries alike
  - Practical contributions to SDG implementation for the benefit of Armenia

APPENDIX

FIGURE 1: SUSTAINABLE DEVELOPMENT GOALS (SDG) established by the United Nations (2015) to transform our world for the benefit of all on Earth across generations.

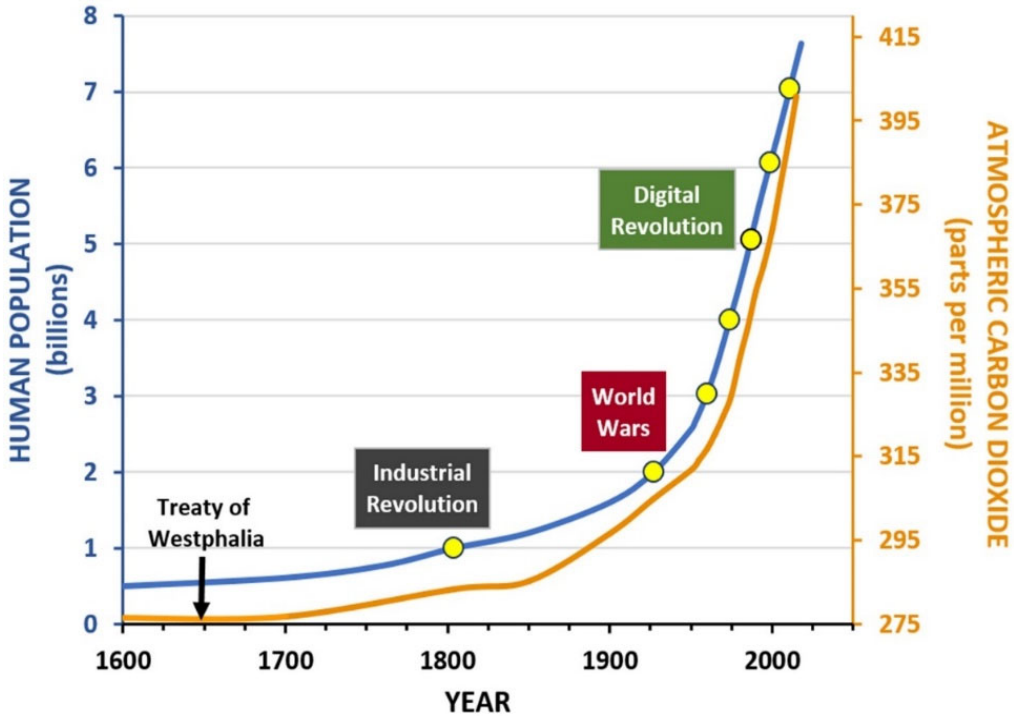

FIGURE 2: PLANETARY-SCALE CONNECTIONS with our human population multiplying by billions (yellow dots) also are reflected by increasing concentrations of carbon dioxide in the atmosphere around the Earth, recognizing that 'correlation alone does not mean causation.' Since the *Treaty of Westphalia* (1648), transformations from Science, Technology and Innovation (STI) include the industrial and digital revolution as well as capacity to wage "world wars," as happened in the 20th century for the first time since humans began recording time continuously on calendars over the past sixty centuries. From Berkman et al. (2019).

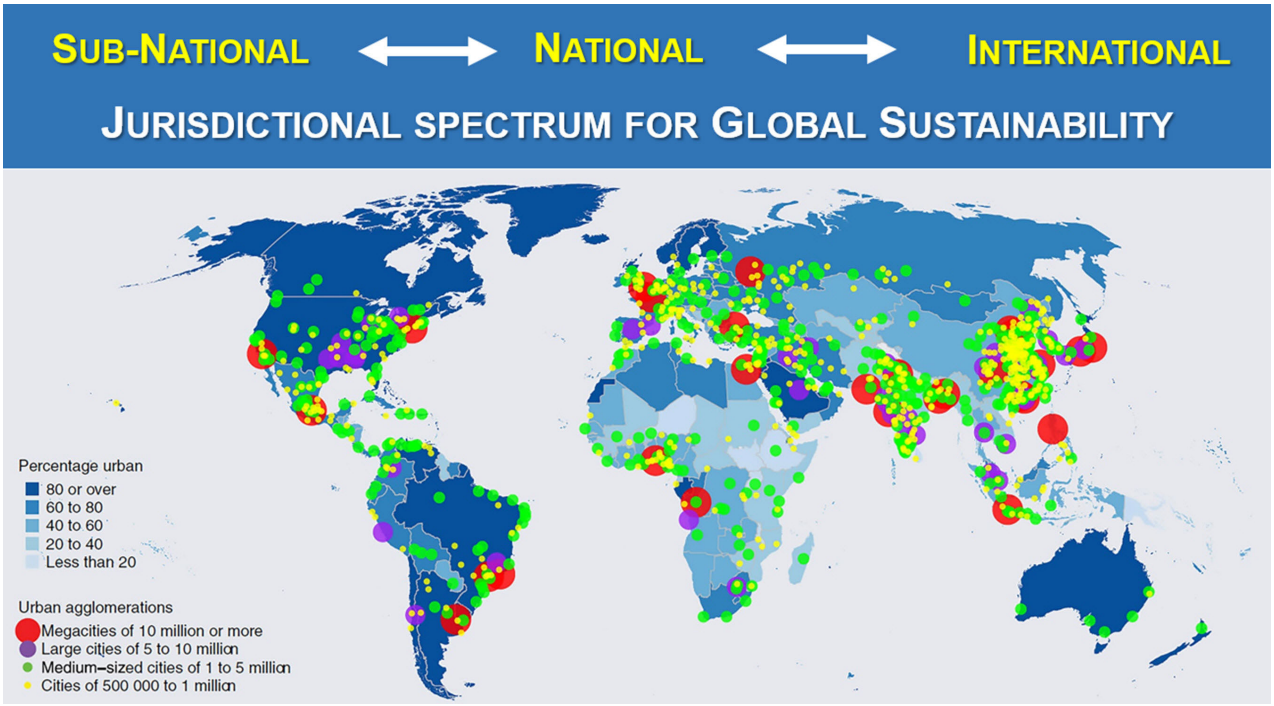

FIGURE 3: "MEGACITIES" (United Nations 2014) and other large human agglomerations across the Earth with "urban" defined by nations inclusively (United Nations 2018), reflecting the spectrum of jurisdictions from sub-national to international with nations as the central jurisdictional unit since the Treaty of Westphalia (1648), when global human population was less than 1/10 its current size (Fig. 1). From Berkman et al. (2019).

FIGURE 4: THEORY OF INFORMED DECISION-MAKING (as a testable proposition) recognizes that informed decisions operate across a *'continuum of urgencies'* – like safe driving on any road, constantly adjusting to the surrounding vehicles and circumstances while being alert to the red lights ahead and the traffic from behind. Adapted from the Vienna Dialogue Team (2017).

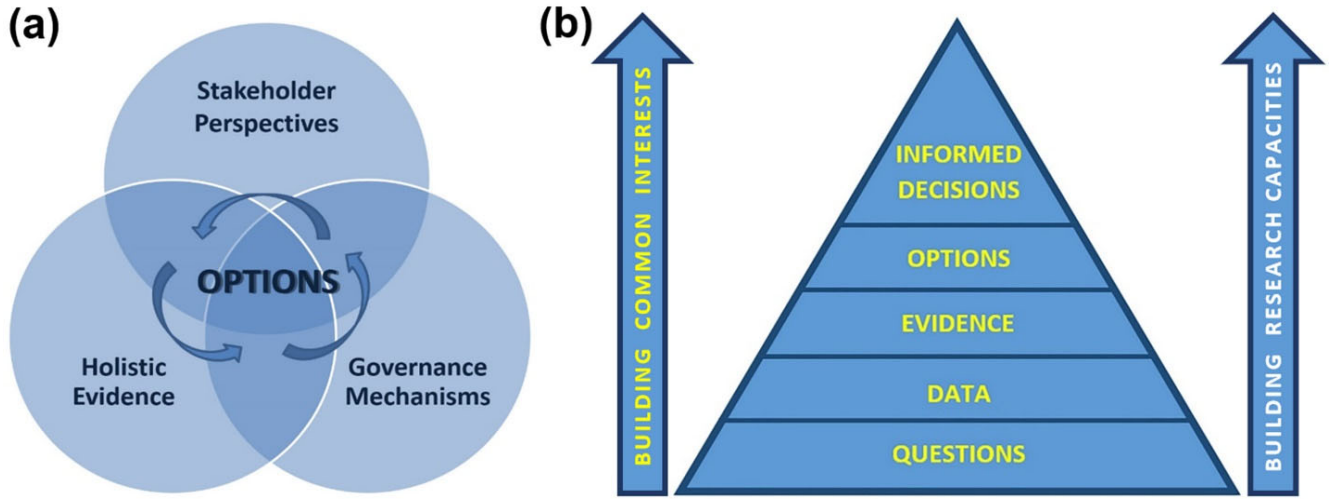

FIGURE 5: SCIENCE DIPLOMACY AND ITS ENGINE OF INFORMED DECISION-MAKING that operate with international, interdisciplinary and inclusive (holistic) integration**. (a) The Decision-Support Process** to reveal options for decisions that involve governance mechanisms as well as built infrastructure for sustainability. From Vienna Dialogue Team (2017). **(b) Pyramid of Informed Decision-Making** contributes to implementation of the 17 Sustainable Development Goals at local-global scales (Fig. 1). Research is framed traditionally in view of data and questions, whereas actions involve evidence and options. Contributing to informed decisions is the apex goal, which is a skill that can be applied, trained and refined with science diplomacy. Adapted from Berkman et al. (2017, 2019).