

Complexity, Security and Civil Society in East Asia

Foreign Policies and the Korean Peninsula

Edited by
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Chapter 2

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2. Global Problems, Complexity, and Civil Society in East Asia

Peter Hayes and Richard Tanter

Introduction

This chapter presents an argument about the relationship between global problems, complexity, problem-solving, and East Asian civil society. In section 1, we begin by asking two fundamental questions: what is specifically “global” about a global problem, and what underlies an issue of global concern that makes it problematic? We outline three categories of global problems — those that affect the sharing of global commons, those that affect our shared humanity, and those that rely on our shared rule book for regulating human activity. We conclude there is no agreement as to which global problems are most urgent, let alone how each fits into these three categories. To demonstrate the need for a consistent approach with an explicit method and transparent values in developing a ranking of global problems, we describe the effort of the World Economic Forum to generate a map of global risks based on the perceptions of global leaders. In turn, we find this effort is limited by the privileged status of the participating experts, and we suggest that what constitutes a global problem must be negotiated across national borders and political cultures. Without convergence towards consensus on which of these issues are truly global, there is no basis for agreeing on which of these problems are common to all countries in East Asia and which are so important they justify joint action in the form of shared solutions.

In section 2, we enter the conceptual world of complex systems. We argue that international security and sustainability are dimensions of human existence that increasingly reveal the characteristics of complex systems at the start of the twenty-first century rather than the relatively simple state of affairs that pertained in the last half of the twentieth century. We suggest that one of the emergent patterns of human organization in the region — a continuous city corridor stretching from Beijing to Tokyo — presents an immense challenge to the leaders of China, South Korea, and Japan. Inherent in that development are contradictory aspects of energy insecurity, urban insecurity, and nuclear insecurity, cross cut by the challenges of climate change and the specific threat posed by an unstable, declining North Korea.

Drawing on the work of Ha Young Sun, an eminent South Korean political scientist, we suggest the basic approach to this increasingly complex set of global problems in the region is to draw on the networking capacities of civil society to organize transnationally across the region. We review the outcomes of such efforts in relation to cooperative environmental projects undertaken by inter-city, cross-border networks between Japan and China. Next, we suggest linking single-issue civil society networks to future networks of local governments will create resilience in the region and lend new capacity to framing and solving global problems in spite of their complexity.

We conclude this chapter by arguing that it is central to the role of civil society to provide a critical perspective as to what constitutes the most urgent global problems that originate in or affect the region as a whole, rather than mirroring the priority problems set by states. Otherwise, civil society networks risk being entrapped in “realpolitik” zero-sum games rather than moving to “idealpolitik” based on cooperative strategies.

What Are Global Problems?

What is a *global* problem? This might appear obvious, but in fact, it is a much more difficult question to answer than one might think at first glance. Are they just extra-large problems, otherwise similar to complex problems found at the local or regional level? If they are different, even if only in scale, what do we have to do to solve them and how does that differ from what we do now? Is there an emerging field of “global problem-solving” with its own methods and tools? Are conceptual innovations needed to undertake

global problem-solving? What comprehensive approaches already exist for this purpose?

The list of questions goes on. What are the implications for policy if global problems have special characteristics, and, if so, what are these? To what extent do global problems originate in this region? How are they manifest in this region even if they don't originate here? And how does the region contribute to the solution of these problems both in the region itself and beyond?

By their very nature, global problems are complex, intractable, and interrelated. Global problems cannot be solved sequentially, one at a time. Often, our best efforts to solve global problems fail or even make them worse. Multiple, interrelated global problems demand multiple, shared global solutions; they require more complex strategies and differentiated organizational responses. Global problems often stress our decision-making processes and institutional capacities beyond their limits. Consequently, such problems may spiral out of control, sometimes catastrophically, and often they persist whatever individuals and organizations do to resolve them.

Organizations tend to focus on one problem as their core mission, pushing aside secondary, linked problems as less important. Individual humans are hard-pressed to track more than four independent variables at once.¹ Yet we live in a seamless web of interrelated global problems, each of which may feed into and shape other problems. Partly because of this tunnel vision, we do not agree on which global problems are the most important, let alone on global solutions. Consequently, humanity searches for global solutions at cross-purposes and even in conflict. The result is often "global gridlock." Meanwhile, this dissensus immobilizes the search for partial, multiple solutions that can be implemented at the local and regional level.

In fact, global problems are not just important problems, or problems that affect many people. Rather, they are those problems that affect the whole planet, and potentially all of the people who live on it. In this

1 "Processing loads required for the 2 x 3-way and 4-way problems differed because two 3-way problems can be processed independently, and a solution can be stored for each, whereas the two halves of a 4-way problem must be processed relative to each other, and cannot be decomposed into separate problems. Therefore, the increase in working memory load from the 2 x 3-way to the 4-way problems was not simply due to the amount of information that was stored, but was due to the number of variables that had to be related in the representations of the problems..." Halford, G.S., *et al.*, "How Many Variables Can Humans Process?," *Psychological Science*, 16(1) (2005), doi: <http://dx.doi.org/10.1111/j.0956-7976.2005.00782.x>

sense, all global problems are local (although the reverse is not true, see below). Climate change is an obvious example of a truly global problem. The consequences of humanly-generated changes in the atmosphere will, albeit in different ways according to region, affect everyone on the planet. In other words, the consequences are universal. Moreover, unless we profoundly change our collective behavior, climate change may well result in irreversible changes in the climatic conditions of life — a measure of the deep vulnerability of human society in the face of this problem.

There is no easy solution to the climate problem — it is truly intractable. There are many causes of climate change rooted in our economic system, our attitudes to nature, our political organization, our technological capacities and preferences, and our uses of resources. Solutions will involve all communities and every country; they must be collective, not just individual. In other words, the example of climate change suggests that global problems are complex, intractable, and make human society as a whole increasingly vulnerable. The solutions to climate change are inherently global, but in their archetypical form, the mitigation of greenhouse gases and adaptation to climate impacts will always be manifested locally and usually in ways tailored to local circumstances.

What, in contrast, is a strictly *local* problem? These are problems that are local in origin and solution and do not require global governance for resolution. Since the mid-sixties, for example, environmental organizations have existed almost everywhere. They work on local ecological problems such as habitat loss, land and forest rights, or environmental pollution.² Many of these groups are now networked transnationally across borders, some of them globally, to address “glocal” problems — problems that are universal but are regulated locally, not globally — in contrast to truly global problems, such as restoration and preservation of the ozone layer.³

Such problems for the most part are truly local, not global problems, no matter how widespread the issue. Usually, the cause is local (that is, national or smaller in scale and sub-national in terms of the governance level). Unless the problem arises from some international connection, such as foreign

2 Hayes, P., *The Potential for Environmental Action: Report to the UNEP* (Geneva: NGO Environment Liaison Board, 1976).

3 Lopez, G., A., et al., “The Global Tide,” *The Bulletin of the Atomic Scientists*, 51(4) (1995).

investment in a polluting factory (as at Bhopal) or a transnational criminal gang dumping toxic wastes (as in Somalia), the solution is primarily local. By the widely accepted principle of subsidiarity, the responsibility for solving a problem should be pushed to the lowest level possible in the institutional context where the problem demands resolution. Of course, at some point, the local problem becomes so internationalized that it becomes truly global in scope and scale—and today at least seven types of international environmental crimes exist.⁴ Thus, the status of a problem is dynamic. With time, local problems may become global, both quantitatively and qualitatively and, typically, will exist on a local-global spectrum rather than at one or the other end of the scale.

Rischarde's Top Twenty Taxonomy

One way to define and categorize “inherently global” problems is shown in Table 2.1. As Jean-Francois Rischarde explains in *High Noon: Twenty Global Problems, Twenty Years to Solve Them*:

Roughly a third of these have to do with how we share our planet (burning environmental issues); another third of which relate to how we share our humanity (urgent economic and social issues requiring a worldwide coalition for their effective solution); with a final third having to do with how we share our rulebook (important regulatory challenges urgently requiring a minimum critical mass of global rules to prevent free-riding and other negative consequences).⁵

We believe this taxonomy of global problems is powerful, although as we will see below, Rischarde's “top twenty” list of global problems may be too narrow or inadequate. For example, not listed is a truly global and intractable global problem that originates in and affects East Asia in profound ways (see chapter 5 of this book): the risk of next-use and proliferation of weapons of mass destruction (WMD).

4 “They include: illegal trade in wildlife; smuggling of ozone depleting substances (ODS); illicit trade in hazardous waste; illegal, unregulated, and unreported fishing; and illegal logging and the associated trade in stolen timber,” in Banks, D., et al., *Environmental Crime, a Threat to Our Future* (London: Environmental Investigation Agency, 2008).

5 Rischarde, J.F., *High Noon: Twenty Global Problems, Twenty Years to Solve Them* (New York: Basic Books, 2002).

Table 2.1: Taxonomy of Twenty Global Issues

Global Commons

“Sharing the Planet: Issues involving the global commons”

1. Global warming
2. Biodiversity and ecosystem losses
3. Fisheries depletion
4. Deforestation
5. Water deficits
6. Maritime safety and pollution

Global Commitments

“Sharing our Humanity: Issues whose size and urgency requires a global commitment”

7. Massive step-up in fight against poverty
8. Peacekeeping, conflict prevention, combating terrorism
9. Education for all
10. Global infectious diseases
11. Digital divide
12. Natural disaster prevention and mitigation

Global Regulatory Approach

“Sharing our Rulebook: Issues needing a global regulatory approach”

13. Reinventing taxation
14. Biotechnology rules
15. Global financial architecture
16. Illegal drugs
17. Trade, investment, competition rules
18. Intellectual property rights
19. E-commerce rules
20. International labor and migration rules

The Nature of Global Problems

In addition to falling into one of these three categories, global problems exhibit a number of characteristics that make them global rather than national or local in nature. Global problems may exhibit linkage between cause and effect across societal levels from global to local. Global problems also separate cause and effect when the driving forces are highly centralized and concentrated both institutionally and spatially and, therefore, are distant or even invisible to most of humanity who nonetheless experience the effects. Other global problems are the result of highly distributed and decentralized driving forces so diffuse yet cumulatively powerful that the resulting overall impact is qualitatively transformative even though it passes unnoticed except at the local level. The global financial collapse is an example of the former; the ozone hole is an example of the latter.

Often, global problems are multi-dimensional and drive pervasive change propelled by interrelationships across superficially segmented problems or disparate issues or levels of governance. Global problems may be the result of multi-directional causes that erupt suddenly from below or without warning from above a specific level or location in the global hierarchy of place (extra-national, national, subnational, local, individual) and organization (UN Security Council, regional government unions, nation states, provincial and state governments, local governments, cities and villages, associations). Sometimes, events in one society arc around the planet to jolt another, thereby dramatically changing both their trajectories — a phenomenon that James Rosenau calls “distant proximities.”⁶ Acts of mass terror by non-state actors exemplify this kind of global problem. Political scientists have observed such turbulence for decades,⁷ but have not contributed significantly to our understanding of the origins or outcomes of such sudden, discontinuous, and often non-linear changes in world affairs.

The impact of some global problems may not be felt for years or decades, whereas decision-making time horizons for actions that contribute to or resolve these problems are relatively short. Such enduring

6 Rosenau, J.N., *Turbulence in World Politics: A Theory of Change and Continuity* (Princeton: Princeton University Press, 1990).

7 Ernst Haas was an exception, with his early contribution: Haas, E.B., “Turbulent Fields and the Theory of Regional Integration,” *International Organization*, 30(02) (1976), doi: <http://dx.doi.org/10.1017/S0020818300018245>

global problems may set severe limits on solving interrelated, medium-term global problems. Some solutions may turn out to generate further problems. These attributes and perceptions of global problems are an enormous challenge to traditional organizations, especially those that are state-based, which typically are slow to recognize problems and even slower to respond.

Disaggregating a Global Problem

Complex global problems often appear to be rigid, opaque, and immune to human agency. At the risk of losing sight of the whole, therefore, it is useful to decompose such mega-problems into constituent problems.

As a global problem, the weapons-of-mass-destruction or “WMD” issue is enormously complex. Solving it entails a great deal of regulation of human behavior. Failure to control it could result in crimes against humanity on a massive scale, to the point where it threatens human existence as well as global ecological integrity. In Rischard’s framework, it is a global problem that falls into all three categories. Thus, many distinct, linked, global problems are tied together in this instance into a rigid “mega-problem.”

In the case of nuclear weapons, researchers at the Carnegie Endowment for International Peace unpackaged the global nuclear weapons problem into its constituent problem drivers and possible “solution strategies” (see chapter 5). They identified four key drivers — terrorism, new states, existing arsenals, and regime breakdown — each of which had four distinct sub-problems, generating no fewer than sixteen distinct possible ways in which East Asia might contribute to the global problem — including North Korea, nuclear threats, nuclear black markets, and the collapse of the Nuclear Non-Proliferation Treaty (NPT).

On the solution-strategy side of the nuclear weapons problem, they outlined six obligations (no easy exit, devalue weapons, secure materials, stop transfers, resolve conflicts, deal with the four nuclear-armed states outside of the NPT), each of which contains multiple possible strategies for a total of twenty possible ways that regional action in East Asia could contribute to the solution of the global problem.⁸ Overall, the drivers and solutions present no fewer than thirty-six possible links between the global

8 Perkovich, G., *et al.*, *Universal Compliance, a Strategy for Nuclear Security* (Washington, DC: Carnegie Endowment for International Peace, 2007).

and regional dimensions of the nuclear weapons problem. Of these, at least fifteen of the sixteen nuclear weapons threats and at least fourteen of the solution strategies pertain to East Asia. Thus, the regional dimension of the global nuclear weapons problem is only marginally less complex (twenty-eight out of thirty-six) than the full-blown global WMD problem. Whether global or regional, the overall level of complexity in either case far exceeds human comprehension.

In this book, we will use a similar process of disaggregation into constituent, separate, but linked problems to approach and comprehend the daunting complexity of climate change, urban insecurity, energy insecurity, and weapons of mass destruction.

Contested Nature of Global Problems

If there is no definitive, authoritative list and priority ranking of global problems, how does civil society determine which global problems are most important in East Asia, and which of these are in turn amenable to solutions, in what combinations and sequencing?

One approach to setting this agenda was taken by the United Nations (UN) in 2000 when it adopted the Millennium Development Goals (MDGs). These eight anti-poverty goals were to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability; and develop a global partnership for development.⁹ More than a decade later, significant progress has been made to fulfill some of these goals, but we are lagging behind several of them. And while these goals are challenging, they do not capture the full range of obstacles and threats that obstruct them, let alone the full array of security and sustainability problems that are truly global in scope, many of which afflict this region.

Is it true, as the United Nations appears to assume, that overcoming global poverty entails solving all the other critical global problems that could lead humanity over a cliff of unsustainable insecurity and disorder? Although overcoming global poverty is central to fulfilling our shared

9 *The Millennium Development Goals* (New York: United Nations Development Programme), http://www.undp.org/content/undp/en/home/mdgoverview/mdg_goals.html

humanity, it is not clear that doing so would suffice to resolve all the problems afflicting the global commons, nor to complete the agenda of problems related to achieving equitable, just development of all humans, let alone to regulate all behaviors that could lead to global problems. Other global problems would still be universal, have global impact, and would be inescapable, for example, energy use leading to irreversible climate change that reduces food security. Nor would overcoming global poverty suffice to instigate all the behaviors needed to create global public goods (such as open, transparent government processes at every level).

At the other end of the spectrum of specificity we find that the Union of International Associations (UIA) empirically documents at least 170 *basic universal* problems (such as danger, lack of information, social injustice, war, environmental degradation).¹⁰ These high-level problems are defined by the UIA as difficulties

of such proportions and complexity that no single organization or discipline can claim to encompass any one of them in all its aspects. The scope and implications of such problems tends to be a matter of continuing debate. They are not sufficiently well defined to respond to well-defined solutions. The nature of an appropriate solution to such problems is also a matter of continuing debate.¹¹

Another source for determining the possible priority of problems would be global civil society. Many international think-tanks offer their own laundry lists of priority global problems that form the foci of their research. The Brookings Institution, for example, offers a list of seventeen global issues, only nine of which wholly or partly overlap with Rischard's list and only three of which partly or wholly overlap with the eight MDGs.¹² Similarly,

10 In addition, UIA 1994 update identified a further set of 575 cross-sectoral problems (such as animal suffering, irresponsible nationalism, soil degradation), 2,162 detailed problems (such as epidemics, white-collar crime), 3,857 emanations of other problems (such as terrorism targeted against tourists, injustice of mass trials), 3,072 fuzzy exceptional problems (such as blaming victims, pacifism, unconstrained free trade), 2,153 very specific problems (such as blue baby), 214 problems under consideration for inclusion (such as feminist backlash, mudslide), for a total of 9,832 world problems. See Union of International Associations, *Encyclopedia of World Problems and Human Potential*. 3 vols (Munich: K.G. Saur, 1994). *Encyclopedia of World Problems and Human Potential* (Wikipedia), http://en.wikipedia.org/wiki/Encyclopedia_of_World_Problems_and_Human_Potential

11 *Basic Universal Problems* (Brussels: Union of International Associations), <http://www.uia.be/node/328165>

12 Namely, communications, corruption, crime, development assistance, economics (global finance international trade), environment (nature conservation, environment:

Rischarð's list contains partial or complete overlap with the MDGs (7/8), but these constitute only a third (7/20) of his top twenty global problems. Thus, there is simply no consensus in global civil society as to what constitutes the core set of global problems.

Shifting levels, one could seek instead to identify a set of shared priority economic and security concerns from the agendas of the leading Asian-Pacific regional organizations, assuming these reflect the priorities of the participating states, and further assuming that regional and national civil society follows suit. For example, Asia Pacific Economic Cooperation (APEC), the members of which are "economies," not states, promotes free trade and economic cooperation throughout the Asia-Pacific region. Its convening and dialogic activities encompass a wide range of topics on competition policy, commercial law, trade, and investment issues (such as market access and business mobility). It also holds senior official meetings on sectoral-level economic and technical cooperation with specific attention to terrorism, gender issues, mining points of contention, and an array of ad hoc themes such as sustainable development, free trade agreements, and bio-technology.¹³

The ASEAN Regional Forum (ARF) addresses a range of regional security issues and promotes dialogue at an official level.¹⁴ The Council for Security Cooperation in the Asia Pacific (CSCAP) convenes "Track 2" study groups¹⁵

pollution), global commons (oceans, Antarctica, atmosphere and outer space), health, human rights, labor rights, refugee protection and assistance, violence: intrastate conflict, warfare (conventional weapons, nuclear, biological, chemical weapons). See Simmons, P.J. and de Jonge Oudraat, C., *Managing Global Issues: Lessons Learned* (Washington, DC: Carnegie Endowment for International Peace, 2001).

13 See Wesley, M., *The Regional Organizations of the Asia Pacific: Exploring Institutional Change* (Basingstoke: Palgrave Macmillan, 2003).

14 ASEAN Regional Forum official activities cover confidence building measures; peacekeeping; search, rescue and disaster relief; defense; counter-terrorism; non-traditional security; maritime security; WMD proliferation; preventive diplomacy; small arms and light weapons; energy security; shipboard waste disposal; economic security; and eminent persons. See *List of Track II Activities 1994-2012* (Jakarta: ASEAN Regional Forum), <http://aseanregionalforum.asean.org/library/arf-activities/list-of-arf-track-i-activities-by-inter-sessional-year.html>

15 As of May 2011, CSCAP working groups were (with Asia-Pacific wide scope): Cybersecurity, Water Resources Security, Responsibility to Protect, Naval Enhancement, Safety and Security of Offshore Oil and Gas Installations, Regional Transnational Organised Crime Hubs, Countering the Proliferation of Weapons of Mass Destruction, Export Controls; and sub-regionally, Multilateral Security Governance in Northeast Asia/North Pacific. Already concluded working group topics covered: Capacity Building for Maritime Security Cooperation, Facilitating Maritime Security Cooperation in the Asia Pacific (specifically, Safety and Security in the Malacca and Singapore Straits, and a Legal experts group), Future Prospects for Multilateral

that often mirror the foci of the ARF.¹⁶ The ASEAN Plus 3 (China, South Korea, and Japan) is an extension of the ARF process that began in 1997 and tries to develop cooperation between the member states that spans cultural, economic, functional, political, security, and social areas.¹⁷ Likewise, CSCAP has also convened a sub-regional working group on Multilateral Security Governance in Northeast Asia and the North Pacific.

These regional concerns are listed at a high level of generality, however, and there is no more than a loose convergence of views represented in these fora. Although they show what issues national elites in the whole Asia-Pacific want to talk about, none of these regional organizations entail substantive commitments. No state in the region relies on them to preserve their vital national security and sustainability interests.

At the sub-regional level of “low politics” a set of Northeast Asian environmental inter-ministerial¹⁸ and senior official meetings¹⁹ have focused on critical environmental oceanic and land-based issues, but none of these dialogues have led to any concrete cooperation or collaboration.²⁰ At the level of high politics, the Six Party Talks addressed the specific issue of North Korea’s nuclear weapons program. Again, to date the Talks have achieved nothing but acrimony, nuclear tests, and the isolation of North Korea.

Scholars have also tackled interrelated global problems in East Asia under the rubric of “human security.” For example, Tsuneo Akaha examines three global insecurities arising from the extent to which the

Security Frameworks in Northeast Asia; Human Trafficking; Regional Peacekeeping and Peacebuilding; Enhancing the Effectiveness of the Campaign against International Terrorism with Specific Reference to the Asia Pacific Region; Preventive Diplomacy; Oceania; Energy Security; and Security Implications for Climate Change. See *Study Groups* (Kuala Lumpur: Council for Security Cooperation in the Asia Pacific), <http://www.cscap.org/index.php?page=study-groups>; *Concluded Working and Study Groups* (Kuala Lumpur: Council for Security Cooperation in the Asia Pacific), <http://www.cscap.org/index.php?page=concluded-working-and-study-grups>

16 *List of Track II Activities 1994-2012* ; *ibid.*; *ibid.*

17 See *ASEAN Plus Three Cooperation* (Jakarta: Association of Southeast Asian Nations, 2012), <http://www.asean.org/asean/external-relations/asean-3/item/asean-plus-three-cooperation>

18 The 13th Tripartite Environment Ministers Meeting among Korea, China and Japan since they began in 1999 was held April 29, 2011 in Korea. See *The 13th Tripartite Environment Ministers Meeting (TEMM13)* (Tripartite Environment Ministers Meeting), <http://www.temm.org/sub05/view.jsp?id=20>

19 The 14th Senior Officials Meeting since they began in 1993 was held on April 8-9, 2009, in Russia. See *Key Outcomes of Soms: Som-14 (8-9 April 2009; Moscow, Russian Federation)* (Incheon: North-East Asian Subregional Programme for Environmental Cooperation), <http://www.neaspec.org/key-outcomes-soms>

20 Jho, W. and Lee, H., “The Structure and Political Dynamics of Regulating ‘Yellow Sand’ in Northeast Asia,” *Asian Perspective*, 33(2) (2009).

countries of the region have failed to embrace global norms regarding the rights of groups of individuals, namely humans trafficked for exploitation, migrant workers, and persons living with HIV and AIDS patients. He and other scholars conclude that a common obstacle to addressing these global problems as manifested in East Asia is the lack of common principles and regulations concerning the treatment of border-crossing mobile individuals who embody each of these pressing issues.²¹ Others have tackled further human security issues in the region such as the role and status of women and the realization of human rights.²² Yet another, more critical angle of approach investigates the existential sources of insecurity experienced by the peoples living within this region: demographic pressures, resource limitations, ecological degradation, food politics, identity challenges, health threats, and political change.²³

Identifying Linkages

We argued above that civil society networks are particularly good at identifying links between global problems and solutions. However, doing so is not easy. As Jared Diamond points out, they are linked in complex and often unrecognized ways. He lists twelve problems that lead to “unsustainability” and notes that while these problems appear to be separate,

[T]hey are linked: one problem exacerbates another or makes its solution more difficult. For example, population growth affects all eleven other problems; more people means more deforestation, more toxic chemicals, more demand for wild fish, etc. The energy problem is linked to other problems because use of fossil fuels for energy contributes heavily to greenhouse gases, the combating of soil fertility losses by using synthetic fertilizers requires energy to make the fertilizers, fossil fuel scarcity increases our interest in nuclear energy which poses potentially the biggest “toxic” problem of all in case of an accident, and fossil fuel scarcity also makes it more expensive to

21 Akaha, T., “Human Security in East Asia: Embracing Global Norms through Regional Cooperation in Human Trafficking, Labour Migration, and HIV/AIDS,” *Journal of Human Security*, 5(2) (2009), doi: <http://dx.doi.org/10.3316/JHS0502011>. See also Vassilieva, A. and Akaha, T., *Crossing National Borders Human Migration Issues in Northeast Asia* (Tokyo: United Nations University Press, 2005), <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=148044>

22 See, for example, UNESCO, “Human Security in East Asia,” in *International Conference on Human Security in East Asia* (Seoul: Korean National Commission for UNESCO, 2003).

23 Renwick, N., *Northeast Asian Critical Security: Exploring Democratic Freedoms and Social Justice* (Basingstoke: Palgrave Macmillan, 2004).

solve our freshwater problems by using energy to desalinate ocean water. Depletion of fisheries and other wild food sources puts more pressure on livestock, crops, and aquaculture to replace them, thereby leading to more topsoil losses and more eutrophication from agriculture and aquaculture. Problems of deforestation, water shortage, and soil degradation in the Third World foster wars there and drive legal asylum seekers and illegal emigrants to the First World from the Third World.²⁴

This interlinking of issues, or complex interdependency of problems, has implications for both the way we think about these issues — our forms of knowledge — and the way we might start to solve them. Diamond remarks:

People often ask, “What is the single most important environmental problem facing the world today?” A flip answer would be, “The single most important problem is our misguided focus on identifying the single most important problem!” That flip answer is essentially correct, because any of the dozen problems, if unsolved, would do us grave harm, and because they all interact with each other. If we solved eleven of the problems, but not the 12th, we would still be in trouble, whichever was the problem that remained unsolved. We have to solve them all.²⁵

Some international agencies have attempted to map the specific links between the global problems that they tackle. In 2004, for example, the Global Environment Facility (GEF) recognized it was missing opportunities to exploit synergies and complementarities between their different projects on biodiversity, climate change, international waters, persistent organic particulates, integrated ecosystem management, and land degradation. It was ignoring the negative impacts arising from duplicated and incomplete work because linkages were not taken into account in project design and implementation.²⁶ In an important study for the emerging field of global problem-solving, undertaken for the GEF by its Scientific and Technical Advisory Panel (STAP), the GEF called attention to four distinct types of linkages that were identified in its funded projects. These were:

Key Linkages (blue), for example:

- Climate change and biodiversity, land and water degradation
- Land degradation and biodiversity
- Water degradation and biodiversity

24 Diamond, J.M., *Collapse : How Societies Choose to Fail or Succeed* (New York: Viking, 2005).

25 *Ibid.*, p. 498.

26 Anderson, D., *et al.*, *A Conceptual Design Tool for Exploiting Interlinkages between the Focal Areas of the GEF*, GEF working paper (Washington, DC: Global Environment Facility, 2004).

Intermediate Linkages (light blue), for example:

- Effect of land degradation on water bodies and vice versa, disrupting the hydrological cycle and leading to declining productivity and food insecurity, accentuated poverty, and social instability
- Effect of Persistent Organic Pollutants on biodiversity due to major impact on species and ecosystems

Weak Linkages (green), for example:

- Effect of land degradation and biodiversity on climate change via changes in albedo and decreasing carbon sequestration

Multiple (3-4 way) Interactions, for example:

- Climate change and variability affect biodiversity (at genetic, species and ecosystem levels), land degradation, hydrological cycles, thus also influencing surface, ground, and international waters — possibly all at the same time²⁷

Of the 119 GEF projects reviewed by the STAP, only one-fifth of the project documents revealed any recognition by GEF of the existence of these links in the underlying problems and their causal factors, and only nine tried to exploit these links in project design.²⁸ On the solution side, that is, the intended outcome of projects in the GEF focal areas, the STAP identified ways in which the projects could have positive or negative impacts on projects in other focal areas. In the case of establishing and managing protected areas, for example, the projects were found to have positive effects on climate change by increased carbon storage when previously overexploited habitats are restored, but negative effects on climate change if the protected areas displace human populations and/or brings tourists to the area, which can further degrade it.

The GEF recommended each project identify these links between causal factors and the positive and negative linkages in their strategies. In addition, each project was told to take specific measures to reduce vulnerability to neglecting these links. In the case of protected areas, this approach means ensuring that protected areas include buffer zones and corridors to link separated areas, for example. GEF is one of the few international agencies to explicitly address the issue of linkages between problems and solutions in their project design — although effective implementation is another question. (The UN Environment Programme has also addressed this issue

²⁷ *Ibid.*, pp. 14-19.

²⁸ *Ibid.*, p. 22.

by creating an “Interlinkages Unit” that attempts to strengthen interlinkages and promote synergies across multilateral environmental conventions.²⁹ We are not aware of a similar study of inter-linkages applicable to the work of civil society organizations and networks, although some metrics exist to determine the performance of networks independent of their contribution to the resolution of global problems). Some of the GEF’s framework is usable in a civil society context — the notions of key, intermediate, and weak linkages, cross-problem impacts of solution strategies, etc. But the lack of scholarly work in this field is striking, given the scale of international civil society activity and interventions on specific problems. It appears that practitioners responding to real-world crises in intergovernmental organizations may be the most important source of knowledge in the field of global problem-solving. Although not reviewed here in detail, the Nexus Network, established in the UK in 2014, attempts to distil lessons learned about such linkages among problems — in this case water, food, energy, environment, and in some cases climate. These interlinkages were perceived by development agencies to be critically important in 2009 after the food and energy crises of 2007 and 2008.³⁰

World Economic Forum Global Risk Taxonomy

In 2005, the World Economic Forum (WEF) developed a new taxonomy of global problems under the rubric of “global” risk. In its first of a series of annual reports, the WEF listed thirty-six global risks, which it classified into four categories: economic, geopolitical, societal, and environmental. From this list, the WEF focused on ten risks most likely to have a “major or extreme impact on business.” These were instability in Iraq, terrorism, emerging fiscal crises, disruption in oil supplies, radical Islam, sudden decline in China’s growth, pandemics and infectious diseases, climate change, weapons of mass destruction, and unrestrained migration and related tensions.³¹

29 Gitay, H., *et al.*, “Interlinkages: Governance for Sustainability, Section D: Human Dimensions of Environmental Change” in *Global Environmental Outlook GEO 4* (Kenya: United Nations Environment Programme, 2007).

30 See *The Nexus Network* (Brighton: The Nexus Network), <http://thenexusnetwork.org/> Allouche, J., “Does the Nexus Mask a Bigger Debate? Rethinking the Food-Energy-Water Nexus and a Low Water Economy,” *Knowledge, Technology and Society*, 21 March 2014, http://www.water-energy-food.org/en/news/view__1607/does-the-nexus-mask-a-bigger-debate.html?rethinking-the-food-energy-water-nexus-and-a-low-water-economy

31 World Economic Forum in collaboration and Merrill Lynch, *Global Risks to the Business*

In 2006, the WEF reduced the list to twenty-five global risks, but added technological risks to the taxonomy. At this point, the dangers were identified by commissioned individual, scholarly, and corporate risk analysts.³² In 2007, the WEF increased the number of “core” risks to twenty-seven, a precursor of what was called “clusters” and then “Centres of Gravity,” that is, global risks that are highly interconnected with other risks of great consequence. The WEF also introduced a “risk barometer” that year to measure the probability, impact, and trend of each risk (measured in potential economic damage, growth loss as per cent of global GDP, and mortalities) and a measure of the degree of correlation between them.³³

In the 2008 report, the WEF made the concept of global risk more granular and explicit. The WEF explained that it separated identifiable trends (“observable facts in the contemporary world”), issues of concern (“potential challenges which arise from those trends”), and risks (“specific realizations of those challenges in a format which is sufficiently specific to be open to a level of assessment in terms of relative severity and likelihood, without being so specific as to preclude them as a basis for decision-making”). In some domains, the WEF noted that the *trends-issues of concern-risks* pathway is clear. “In others, notably geopolitical risk,” the WEF observed, “the pathway from trend to risk is less clear, contingency is greater and common issues can manifest in many different ways.”³⁴ Thus, whereas for economic global risks, there were six trends, six issues of concern, and six risks, for geopolitics, there were seven trends, nine issues of concern, and twelve risks to track.

In the 2008 report, the assessments were still based on expert groups. Some of the thirty-one risks listed such as natural catastrophe were assessed using actuarial data. Others, geopolitical risks in particular, required additional, disaggregated assessment by specialists. Consequently, the WEF allowed for a wider range of possible outcomes on the latter types of global risk and correspondingly higher levels of uncertainty.³⁵

In 2009, the WEF added new depth to their evolving taxonomy. This time, as the global financial crisis took grip, they listed thirty-six global risks.

Environment, 2005 (Geneva: World Economic Forum, 2005).

32 World Economic Forum, *et al.*, *Global Risks 2006* (Geneva: World Economic Forum, 2006).

33 World Economic Forum, *et al.*, *Global Risks 2007, a Global Risk Network Report* (Geneva: World Economic Forum, 2007).

34 World Economic Forum, *et al.*, *Global Risks 2008, a Global Risk Network Report* (Geneva: World Economic Forum, 2008).

35 *Ibid.*, p. 45.

For the first time, the WEF defined global risk (see Table 2.2). To qualify, the WEF stated, a global risk must have the following attributes at a global or supra-regional level: pervasive economic impacts, high uncertainty as to its general impact, a risk of no less than \$10 billion, and a multi-stakeholder approach to risk mitigation given the complex linkages with other risks.³⁶

Table 2.2: WEF Definition of Global Risk

Global Scope: To be considered global, a risk should have the potential to affect (including both primary and secondary impact) at least three world regions on at least two different continents. While these risks may have regional or even local origin, their impact can potentially be felt globally.

Cross-Industry Relevance: The risk has to affect three or more industries (including both primary and secondary impact).

Uncertainty: There is uncertainty about how the risk manifests itself within 10 years combined with uncertainty about the magnitude of its impact (assessed in terms of likelihood and severity).

Economic Impact: The risk has the potential to cause economic damage of around US\$ 10 billion.

Public Impact: The risk has the potential to cause major human suffering and to trigger considerable public pressure and global policy responses.

Multi-stakeholder Approach: The complexity of the risk, both in terms of its effects and its drivers as well as its inter-linkages with other risks, requires a multi-stakeholder approach for its mitigation.

Source: World Economic Forum, *et al.*, *Global Risks 2009, a Global Risk Network Report* (Geneva: World Economic Forum, 2009), p. 32.

Unlike previous catalogues of global problems, the WEF's definition can be used to determine if a specific problem qualifies as "global" based on the qualitative and quantitative characteristics of the risk it presents. There is still a substantial overlap with older taxonomies and catalogues, however, especially with regard to the "mega-problems" or "core problems" identified by earlier studies.

The WEF also began to map the interconnections between risks, drawing on a survey initially limited to experts. By 2012, it had surveyed more than 1,000 participants in the WEF from all regions and cultures of the world

36 World Economic Forum, *et al.*, *Global Risks 2009, a Global Risk Network Report* (Geneva: World Economic Forum, 2009).

for estimates of the degree of correlation and level of risk associated with a trend. Of course, this is not a representative sample in any respect. Those surveyed were mostly privileged, wealthy transnational leaders from market and public sectors (with a sprinkling from the “social” sector). But they surely constitute a relatively well-informed group alert to trends that might affect business or the exercise of power and, therefore, a priori more likely to be scanning the global risk horizon than most people on the planet.

The empirical basis of the risk assessment and linkage also allowed the WEF to break down their results on a regional basis. They found that Asian countries “are much more diverse with respect to their exposures to economic risks, but comparatively tightly clustered — however at a higher median risk level — when it comes to the geopolitical and environmental risk dimensions.”³⁷ Moreover, most Asian economies “are heavily exposed to a hard landing in China. Asia is also subject to risks related to the price of oil, dollar fluctuations, and a retrenchment from globalization.”³⁸

In 2011, the WEF introduced three new elements. These were “cross-cutting global risks,” “the nexus between risks,” and “risks to watch.” Cross-cutting risks “are especially significant given their high degrees of impact and interconnectedness [that] influence the evolution of many other global risks and inhibit our capacity to respond effectively to them” (in 2009, economic disparity and the failure of global governance were highlighted).³⁹ These nexuses are clusters of emerging risks (in 2009, the WEF identified three such emergent nexuses, “macroeconomic imbalances,” “illegal economy,” and the “water-food-energy” nexus). A separate set of “risks to watch” were also identified in 2009 through the combination of survey responses with expert opinion indicating that these risks may have “severe, unexpected or underappreciated consequences” (such as cybersecurity issues ranging from cyber theft to all-out cyber warfare).⁴⁰

The 2012 report added another characterization to its mapping of the linkages between risks. Previously, the WEF identified five “centers of gravity” in each of the categories of problems, these being “the risks of greatest systemic importance, or the most influential and consequential in relation to others” (in 2012, they were chronic fiscal imbalances, greenhouse gas emissions, global governance failure, unsustainable population growth,

37 *Ibid.*, p. 8.

38 *Ibid.*, p. 10.

39 *Ibid.*, p. 6.

40 *Ibid.*

and critical systems failure).⁴¹ The WEF then pinpointed four global risks that were most connected across these global risk “centers of gravity.” (In 2012, all of these were economic in nature, namely, severe income disparity, major systemic financial failure, unforeseen negative consequences of regulation, and extreme volatility in energy and agriculture prices).⁴²

Arguably, these critical connectors are the most powerful leverage point in this “ecology” of risk-generating problems. The 2013 report supplemented this with an additional set of five “X Factors” or wild cards that look beyond the fifty known problems with potentially massive impact over the next decade to survey as yet almost unknown problems, issues that have the potential to emerge rapidly and “change the game.” (In 2013, the X Factors were runaway climate change, significant cognitive enhancement, rogue deployment of geo-engineering, costs of living longer, and discovery of alien life.)⁴³

In 2009, the WEF had already shifted from a quantitative definition of risk to a more qualitative one: “an occurrence that causes significant negative impact for several countries and industries.”⁴⁴ In 2014, the WEF used this definition to winnow down the list to thirty-one leading global threats.⁴⁵ It made this change because the quantitative valuations of risk inevitably involved many assumptions, could not account for a range of valuations for a specific risk, and could not be estimated at all for some risks such as loss of biodiversity or climate change.⁴⁶ Instead, the WEF relied primarily on surveys of perception of the leading risks in terms of possible impact and probability, with all the attendant problems of cognitive bias, etc. The 2014 report therefore identified the perceptual differences revealed by gender (women were found to be more sensitive to impact than men) and by age (the young were found to attribute higher impact to environmental and social risks such as the fiscal crisis than older respondents, for example).⁴⁷ It also showed that, in terms of probability and impact of risk, the WEF’s “top ten” evolves fast — faster, in fact, than the underlying real phenomena could possibly change. This is evidence, therefore, that the WEF risk indices

41 World Economic Forum, *et al.*, *Global Risks 2012* (Geneva: World Economic Forum, 2012).

42 *Ibid.*, p. 14.

43 World Economic Forum, *et al.*, *Global Risks 2013* (Geneva: World Economic Forum, 2013).

44 World Economic Forum, *Global Risks 2014, Insight Report* (Geneva: World Economic Forum).

45 *Ibid.*, p. 55.

46 *Ibid.*, p. 49.

47 *Ibid.*, p. 19.

are driven by factors that rapidly affect perception (such as “global events” that generate massive media and Internet exposure). In 2014, the WEF also distinguished between risks and vulnerabilities, which they suggest are really trends that portend the emergence of a risk.

In 2014, the WEF also introduced the notion of “systemic risks.” These are risks that transcend national boundaries, involve shared resources, and exhibit causality that is “indirect and time-delayed.” Such systemic risks resist technical fixes and require changes to the behavior of those involved.⁴⁸ The WEF examined three such systemic risks (instability in a multipolar world, the lost generation growing up with poor prospects, and digital disintegration) and argued that unless all stakeholders are engaged in joint problem-solving, each of these risks may overwhelm humanity.⁴⁹ They noted that failing global governance may be replaced by an “intricate lattice of multiple, interconnected government agreements related to relatively simple global goals,” leaving it to collaborative alliances, partnerships, and localities to figure out how to deliver solutions commensurate with the scale of the problem.⁵⁰

We focus on the WEF framework because it is the first detailed description of global problems and solutions (in their parlance, “global risks and mitigation strategies”) that describe the terrain of global problems (“risk landscape”) and populates it with empirical content, expert opinion, and survey data of risk perception. Admittedly, this approach is based primarily on the perceptions of a privileged community of corporate leaders and closely-related expert communities. Another global community — for example, ecological and climate specialists, or development and human rights practitioners — might generate a different top fifty list of global risks, centers of gravity of clustered risks, critical connecting risks, risks to watch, systemic risks, and wild card risks. Indeed, this is observable already in the problems that are highlighted in the United Nations’ Millennium Development Goals. Nonetheless, the WEF framework is a powerful navigation tool that can provide useful insight into interrelated global problems and shared solutions in a policy framework that can then be implemented in tangible, specific ways.

48 Ibid., p. 27. This section of the report drew on the conceptual work on “global systemic risk” advanced in Goldin, I. and Mariathan, M., *The Butterfly Defect, How Globalization Creates Systemic Risks, and What to Do About It* (Princeton: Princeton University Press, 2014).

49 World Economic Forum (2014).

50 Ibid., p. 22.

In 2008, the WEF suggested that nations create country risk officers to respond both to risks that are displaced across borders and over time onto vulnerable communities (a process of so-called “squeezing” in WEF parlance) and to risks that are becoming more homogenous across countries. Examples include the universality of “lifestyle” diseases formerly limited to OECD countries or exposure to pandemics that cross borders in hours and days due to the velocity and breadth of human mobility. The WEF proposed the creation of a forum of country risk officers or agencies to overcome fragmented accountability for managing these risks, and to devise coalitions for tackling collaborative mitigation of risk squeezing and risk homogeneity.⁵¹

In a multi-year process beginning in 2009 and involving nearly 200 young leaders, the World Economic Forum investigated how to craft practical interventions in twenty “issues” covering ten “areas of enquiry” such as education, energy, and health, issues which could also be termed complex global problems.⁵² They set out to identify positive feedback in the causal loop diagrams they visualized for each issue area. Such feedback could destabilize the entire issue area — or those linked to it — with runaway negative and positive feedback loops. Each group worked to identify interventions that would lend stability to their issue area, and in some cases, to multiple issue areas at a time. They recommended that not only the immediate effects of interventions should be considered, but also possible delayed second-order effects⁵³ They advised that intervention choices to induce constructive change should emerge through this mapping and testing process, stating “By exploring several levels of effects and influences, patterns emerged that indicated areas of leverage (many connections converging on one point) or root causes, which could spin a situation out of balance. By creating a broader, non-linear picture of your situation of interest, a more nuanced approach to intervention can be plotted.”⁵⁴

They then described case studies and interventions made by the young leaders such as proposed increases in transparency of governance, new uses of social media, and highly adapted and localized technological innovations. As Michael Drexler observed, all twenty loop diagrams generated by the

51 World Economic Forum, *et al.* (2008); World Economic Forum (2014).

52 World Economic Forum, “Young Global Leaders: Guide to Influencing Complex Systems,” in *The Forum of Young Global Leaders* (Nuevo Vallarta: World Economic Forum, 2012).

53 *Ibid.*, pp. 7-9.

54 *Ibid.*, p. 9.

groups contained potentially destabilizing feedback loops, endowing each system with the potential to “blow up.”⁵⁵ He noted how multiplier nodes often sit within each positive feedback loop, many of which are common to different complex systems and may be key to stabilizing the system once technical silos within each system are connected — for example, connecting popular mass media with specialist media in a given issue area. Drexler also noted that “meta-interventions” might work across different systems such as designing appropriate incentive schemes to overcome short versus long-term or local versus national versus global stabilizing outcomes. Finally, he concluded that as the systems are interconnected, interventions within each system will affect other systems. Thus, “An intervention to appropriately value natural resources, for example, will need at least collaboration, if not a reinforcing intervention, from financial services.”⁵⁶

It follows, Drexler asserts, that one must remove “the worst distortions first before the ‘softer’ measures can be given a chance to stabilize the system. One without the other will not work.”⁵⁷ Given the exercise began by recognizing that what appears at first to be a cause of one issue may, in a set of interdependencies, be a symptom of another,⁵⁸ Drexler leaves open the question of how the “worst distortions” are best identified for intervention before other distortions. Despite this lacuna, the WEF’s attempt to create an applied methodology to identify specific interventions — many of which have been implemented since 2009 — is an important methodological achievement in the field of global problem-solving.

In 2013, the WEF focused on how to build resilience at the national level to manage many disparate but linked risks in the form of action narratives. The WEF observed that it felt obliged to develop such narratives due to complexity: “The 50 global risks in this report are interdependent and correlated with each other. The permutations of two, three, four or more risks are too many for the human mind to comprehend. Therefore, an analysis of the network of connections has been undertaken to highlight some interesting constellations of global risks.”⁵⁹ A subset of these constellations was selected, and an “action narrative” around each of these cases was developed to help leaders understand the risk, make them aware of the true complexity of the

55 Drexler, M., *Influencing Complex Systems – a Systemic Overview*, Young Global Leaders: Guide to Influencing Complex Systems (Geneva: World Economic Forum, 2012).

56 Ibid.

57 Ibid.

58 World Economic Forum (2012).

59 World Economic Forum, *et al.* (2013).

interconnected risks, and help them to envision how they might contribute to possible solutions. In 2013, three such cases were presented: “Testing Economic and Environmental Resilience” on climate change mitigation and adaptation, “Digital Wildfires in a Hyper-connected World” on virally distributed misinformation, and “The Dangers of Hubris on Human Health” on the existential threat posed by antibiotic-resistant bacteria.⁶⁰

Dirk Helbing connects complexity with the WEF’s concept of “hyper-connected” global risks that can set off cascading and concatenating risks in his 2013 essay, “Globally Networked Risks and How to Respond.”⁶¹ He argues that systemic instability is the outcome of globalization processes, increasing network densities, sparse use of resources, greater complexity, and ever-faster decision-making processes, all of which interact to create “hyper-risks.” To increase resilience, Helbing suggests some general design principles for global systems. These include: fostering of diversity to ensure that at least one backup system exists in case of failure; imposition of limits on system scale to reduce the maximum damage from coupled failure; introduction of weak links within and between systems to reduce system density and, thereby, the rate of transmitted failure or “contagion”; deceleration of system processes to enable decision-makers to avoid and manage crises; devolution of sufficient authority to lower levels in command hierarchies, ensuring the top is not overwhelmed and cross-level decisions are not de-synchronized; and the design of certain critical systems to operate either partly or completely independently of other systems.⁶²

Global Asia

There is, as yet, no consensus in East Asia as to which problems are paramount, let alone which shared solutions should be adopted in the search for ways to engage in solving linked global problems at the same time. Indeed, it is not surprising that there are no ready-made catalogues of the most pressing problems in the region. In many respects, East Asia is more of an anti-region than a community, with only nascent convergence towards common norms, standards, and practices, let alone institutions of consultation, coordination, and collaboration.

⁶⁰ *Ibid.*, p. 15.

⁶¹ Helbing, D., “Globally Networked Risks and How to Respond,” *Nature*, 497 (2013), doi: <http://dx.doi.org/10.1038/nature12047>

⁶² *Ibid.*, pp. 55-56.

To recap, we have shown that some but not all problems are truly global in their impact. Those that are fall into one of three basic categories — they relate to a global commons, to our shared values as human beings, or to the need for regulating human behavior to create global public goods. But we have also seen that the “pool” of candidate global problems that meet these criteria is very large — upwards of hundreds of such problems compete for attention — and that many of these problems are nested within or linked to other problems, creating mega-problems.

Finally, we have noted that leaders from the region of concern to this book — East Asia — are yet to present clear statements of what they consider to be global problems. They have also yet to identify what global problems manifest in, or originating from, this region might be the subject of multilateral cooperation in the search for solutions at a regional or global level.

Thus, “Global Asia,” or the relationship between globalization and global issues and Asia, still needs to be defined.⁶³ The potential for this region to solve problems at a local, regional, and global level is immense and urgently required. As Thomas Risse-Kappen argues, the impact of transnational actors and coalitions on state policy is inversely related to the degree to which specific issue areas are regulated by international society or institutionalized, state-based relationships on the one hand, and by the capacity of these actors and coalitions to overcome the barriers set up by domestic political structures, on the other.⁶⁴ Nowhere is this clearer than in East Asia. One might also infer that the bigger the gap in institutional structure, the bigger the need and greater the role of networks of civil society. In this region, the security gap is bigger than the economic gap, and the cultural gap is greatest of all.

Before moving onto the task of specifying more precisely what is meant by complexity when discussing interrelated global problems and solution strategies in East Asia, and addressing the potential for civil society to contribute to the networked governance of these problems, we must first look more closely at the concept of “problem.”

63 “Global Asia” is the name of an important journal published in South Korea that tackles exactly this issue. The author is on the editorial board. See *Global Asia* (Seoul: East Asia Foundation), <http://www.globalasia.org/>

64 Risse-Kappen, T., *Bringing Transnational Relations Back In: Non-State Actors, Domestic Structures and International Institutions* (Cambridge: Cambridge University Press, 1995).

Negotiating Definitions of Common Problems and Shared Solutions

Earlier in this chapter, we outlined different approaches to ascertaining which problems are truly global and how these problems might be framed. Now we ask: what is a problem in the first place? At the most fundamental level, we may say that humans are goal-directed animals, and goals embody values. When a goal is not achieved, values are frustrated and a problem is born.

A problem, therefore, is an obstacle to the realization of one or more human goals, either individual or collective. By implication, once this obstacle is removed, the goal may be fulfilled and the value defining the goal may be realized — provided that no other limiting conditions or obstacles are in effect. Thus, a problem measures the deficit between actual or perceived reality and what humans desire to be the case. The deficit can be viewed pragmatically or with respect to some ideal state. The former measure is generally less demanding and is often the basis of pragmatic politics in search of marginal improvements to the status quo. The latter measure is often the motivating worldview of utopians who push radical, dramatic change that ruptures the continuity of past and present. Which one is more realistic or idealistic depends on context; whether a social agent adheres to incremental rather than radical change depends more often than not on the degree to which that agent — a person or an organization — is heavily vested in the status quo.

The core values of societies are only partly overlapping. They vary by culture, language, and history. Extensive cross-cultural communication, translation, and negotiation are required to establish the common core of values that may be threatened and which therefore constitute the basis for common problems across cultures and borders. Even when this has been achieved, the same “problem” may have different meanings in different social locations due to divergent cultural values, social rank, and socialization. In some contexts, one person’s problem may even be another person’s solution (exploitative workplaces, for example, render some people desperately poor and others fabulously rich). In another context, the leaders of one country (say North Korea) may find salvation in nuclear weapons whereas the leaders of another (say America) may view the same capacity to be a dire threat. And the leaders of yet another country (say South Korea) may view it as less of a threat and more of an irritant

— possibly even an achievement to be admired because as Koreans they share more values with North Koreans (for instance, the distrust of great powers) than Americans.

This analysis implies that only part of the total set of views as to what constitutes a big problem is held in common. This core of shared perceptions may be called common knowledge,⁶⁵ implying that each observer of the problem is convinced that another (especially an adversary) would agree that it is a problem. It does not, however, signify a consensus as to what constitutes the problem itself — a dimension of problems that constantly ambushes attempts to solve them. We hypothesize here that the problem “tails” — the aspects of the problem that are not captured in the overlapping, common view, which we call the core of the common problem, but are only perceived separately from distinct cultural angles of interpretation — constantly disturb and undermine the effort of one party to focus on the core.

Thus, we should not be surprised to find that even the definition of problems that afflict more than one society can be highly contentious. For example, China is the source of the bulk of the acid rain in East Asia, some of which is deposited in both Koreas and Japan as the winds blow it from west to east. On the surface, this might seem like a straightforward scientific issue. But in reality, China has been hesitant to concur with trans-boundary scientific research that suggests that it is the source of much of the acid rain in these countries. In fact, the primary concern of Chinese decision-makers is not the impact of the acid rain in Korea or Japan; it is the ghastly impact of acid rain on local communities and ecosystems in the immediate vicinity of the offending sources of sulfurous emissions. Roughly the same logic operates with respect to the yellow sand storm problem.⁶⁶

Given their true complexity, the only way to generate a common understanding across political cultures of interrelated global problems is to systematically decompose these problems into their constituent elements first at a global level, and then within each country to see where, if at all, the overlap is to be found. Inevitably, this exploration entails long and intensive dialogue and often uncovers deep assumptions and misconceptions about

65 Geanakoplos, J., “Common Knowledge,” *The Journal of Economic Perspectives*, 6(4) (1992); Vanderschraaf, P. and Sillari, G., *Common Knowledge* (Stanford: Stanford Encyclopedia of Philosophy, 2002), <http://plato.stanford.edu/entries/common-knowledge/>

66 Streets, D., *Energy and Acid Rain Projections for Northeast Asia*, NAPSNet Policy Forum (Berkeley: Nautilus Institute, 1997); Jho, W. and Lee, H. (2009), p. 62.

what parties in different countries believe to be problematic or even to constitute the factual situation.

For example, it took two years of meetings, mutual learning, joint exploration of issues and concepts, and finally, an extensive process of joint writing and word-by-word editing, translation, retranslation, and revision, for Nautilus experts from the United States and their Japanese counterparts to arrive at a shared, meaningful concept of energy security. The final statement of this concept, included in a long report, reads:

A nation state is energy secure to the degree that fuel and energy services are available to ensure: (a) survival of the nation (b) protection of national welfare, and (c) minimization of risks associated with supply and use of fuel and energy services. The six dimensions of energy security include energy supply, economic, technological, environmental, social and cultural, and military/security dimensions. Energy policies must address the domestic and international (regional and global) implications of each of these dimensions.⁶⁷

This concept explicitly included cultural dimensions normally ignored in Western thought. Conversely, the American side identified a key attribute of energy security not previously analyzed in Japan, namely technological diversity over time⁶⁸ — an issue that caused Japan's power sector to shut down reactors starting in 2000 and again in 2002 and that was highlighted by the catastrophic Fukushima reactor failures in 2012. Notably, the resulting concept was neither American nor Japanese, but rather a hybrid concept that truly was more than the sum of the parts. Consequently, its application in either culture required extensive explanation and further work by its authors, although this has proved productive in a number of applied policy contexts, including identifying the most resilient and rapid energy security response to the Fukushima disaster.⁶⁹

In two workshops held in Seoul in 2009 and 2010, researchers from South Korea, Japan, and China investigated energy-related and climate-related

⁶⁷ von Hippel, D., *et al.*, "Evaluating the Energy Security Impacts of Energy Policies," in *The Routledge Handbook of Energy Security*, ed. by Sovacool, B. K. (Abingdon: Taylor & Francis, 2010).

⁶⁸ Drawing on a diversity concept based on the Herfindahl index and advanced by Neff, T.L., *Improving Energy Security in Pacific Asia: Diversification and Risk Reduction for Fossil and Nuclear Fuels*, Pacific Asia Regional Energy Security (PARES) Project (Berkeley: Nautilus Institute, 1997).

⁶⁹ von Hippel, D. and Takase, K., *The Path from Fukushima: Short and Medium-Term Impacts of the Reactor Damage Caused by the Japan Earthquake and Tsunami on Japan's Electricity Systems*, NAPSNet Special Report (Berkeley: Nautilus Institute, 2011).

urban insecurity to explore how these three linked global problems were manifest in East Asia. As outlined below, they discovered they had very different views as to the nature of the problem and the required solutions both within and across countries.

South Korea: Climate and Energy Linkages with Urban Insecurity

Seung Jick Yoo advanced a traditional view of energy security and its linkage to climate change in South Korea. He argued the primary source of energy insecurity in South Korea is oil import dependency, a reliance that can be directly reduced by increasing energy end-use efficiency and the supply of renewable energy, which in turn mitigates greenhouse gas reductions. The other element of official strategy is to diversify geographic supply, in particular from the Russian Far East, via a regional cooperation framework advanced by the South Korean government since 2001, albeit without much success. He argued that solving the problems of import dependency and climate change simultaneously is very difficult and best achieved by regional cooperation. At the heart of these solutions is the joint development and deployment of new technologies, especially to reduce Chinese emissions from dirty coal.⁷⁰ This approach became the core of the South Korean government's "green growth" strategy.

In contrast, Sun-Jin Yun analyzed the linkage in South Korea between energy scarcity, prices, environmental stress, and equity in terms of energy access both across households with varying incomes and between regions in South Korea (for example, the concentration of reactors and related hazards on the southern and eastern coast to primarily power Seoul).⁷¹ She noted that South Korea essentially functions as an island because the Democratic People's Republic of Korea (DPRK) blocks the land bridge with respect to power and gas supplies from China and Russia.

She argued that technological change and regional diversification of fuel will not suffice to realize energy and climate security in urban areas. She

70 Yoo, S.J., "Issues in Climate Change and Energy Security in Northeast Asia," in *Interconnections of Global Problems in East Asia: Climate Change Adaptation and its Complexity in Perspective of Civil Society Initiative* (Paju: Nautilus Institute, 2008).

71 Yun, S.J., "Energy Security of Cities in Korea," in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

held that the standard energy paradigm leads to excessive energy use and overconsumption of resources, while concentrating the direct (pollution) and indirect (economic- and climate-related) impacts on the poorest and most vulnerable populations. The outcomes are energy poverty and needless suffering. The key to increasing energy equity and sustainability at the same time is not to maintain this paradigm but to provide decentralized, distributed, and renewable energy.

Lee Sang Gun approached the issue of linkage from a spatial perspective. He described the political-economic basis that allows ecological services and climate impacts to be distributed unequally across regions and income levels of South Korean society. The net result is the “apartment dominant” urban landscape of South Korean human settlements.⁷² This polarization leads to a vicious circle described by Lee as “Roads and roofs of building -> impervious cover -> hydrological circulation interruption -> vulnerability increase (serious damage from heavy rainfall) at Seoul in 2010.” We expand on this thesis in chapter 4.

Myungrae Cho explained that while green growth policies aim to ameliorate the negative impacts of climate and energy insecurity on urban populations in South Korea, a focus on technological solutions results in a paradoxical outcome. The benefits of green growth policies accrue mostly to the rich while the effects of environmental degradation fall disproportionately on the poor as was evident during the massive floods in Seoul in September 2010. A condition of “environmental injustice” is thereby created.⁷³

In this view, green growth is blind to the distributional outcomes of policies dedicated to the development and deployment of new technology. As Sun-Jin Yun argued, the urban poor in South Korea are most vulnerable to the effects of simultaneous resource depletion (higher prices) and increased energy consumption (leaving them relatively inefficient and under-served), as well as to many of the negative environmental externalities arising from energy supply and use. They are disproportionately susceptible to the local climate change impacts arising from increased greenhouse gas emissions.

Yun suggested that interdependent changes in lifestyle, land-use, energy democracy, and community participation are central to breaking this vicious cycle. She argued that these factors are directly linked and

72 Lee, S., “Climate Change and Green Cities in South Korea,” in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

73 Cho, M., “Is the Green Economy Secure in Korea? Dissecting Korea’s Green Growth Strategy,” in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

mutually reinforcing, and entail reshaping not just technology, but entire legal and institutional structures.⁷⁴ In her view, the official solution to the linked problems of energy and urban insecurity in South Korea, that is, green growth, boiled down to a stimulus, driven by the global financial crisis, that funded well-connected “construction and engineering” sectors to build nuclear reactors and huge water storage and flood control projects. These were primarily constructed to create jobs and to align voters with the ruling party. She noted the sharp turn away from an authentic solution in all aspects of the current Republic of Korea (ROK) government’s policies for green growth, implying that a political change at the top was a necessary enabling condition for the full realization of the local potential for sustainability.

According to these authors, policies intended to address the linkage between climate, energy, and urban insecurity have been captured by vested interests. Put slightly differently, the “meta-problem” (the WEF would call it the critical connecting problem) that connects these clustered problems is a failure of national and regional governance. This problem in turn represents a binding constraint on what can be done to resolve each aspect of the problems of climate- and energy-related urban insecurity.

China: Multi-level Critical Connections between Energy and Urban Insecurity

China presents a very different story to South Korea. According to Wen Bo, the mechanisms of social and political feedback from environmental and victims organizations to the central government, expressing the desire to curb environmental excesses created by local governments and companies, have already reached their limit. The scale of pollution and adverse impacts arising from local development projects and resource extraction threatens to overwhelm the capacity of local governments and political authorities to manage the consequent social displacement and political disruption. Wen observed that the environmental ministry lacks human and regulatory capacity, is particularly weak in local offices, and faces inconsistent legal frameworks, contradictory policies, and overlapping institutions. In this case, the problem is not so much the appropriation of institutional capacity by vested interests in green growth garb, as in South Korea. Rather, the lack of institutional capacity generates the social stress evident in Chinese urban development.⁷⁵

74 Yun, S.J. (2010).

75 Bo, W., “Urban Security in China,” in *Interconnections of Global Problems in East Asia*,

Conversely, top-down, central planning and allocation of production targets and resources have had limited efficacy in reducing energy intensity or improving environmental performance, two key indicators of sustainability. Yi Wang noted that the green stimulus and recovery package China adopted to counter the global financial crisis had alleviated much poverty. But it also led to the restoration of polluting, resource-intensive traditional industries on the one hand, and by increasing demand, drove an absolute increase in energy use and emissions due to the rebound effect on the other — even though it reduced energy intensity in various sectors.⁷⁶ Ironically, China makes more photovoltaics than any other country, but exports 90 percent of them because they are too costly for local use.

Wang argued that two elements are critical to achieving a successful sustainability transition whereby energy and climate-driven insecurity in China could be tackled at the same time as rapid urbanization and development. The first is extensive administrative, managerial, and technical-scientific capacity building at the local and provincial levels of government to manage environmental issues before they become massive and disruptive. The second is a market framework that sends the right, long-term price signals to investors, the consuming public, and to private corporate management. Due to the failure of the climate negotiations, a global market framework that sends such consistent signals and creates certainty in the market is missing. Without an informed and highly capable set of local actors, including government and community organizations of many types, no bottom-up participatory or democratic approach is feasible — as was evident in the controversies in Nanjing and Guangzhou over the incineration of waste. For civil society, the most important thing is local capacity building, including scientific, administrative, managerial, and financial capacities to enable civil society to challenge the state. A related problem is the market failure created by contradictory property rights regimes in the transition from “rural village”-based land ownership to “urban” collective land ownership. This inconsistency puts local government officials seeking to increase tax revenues and party cadres under pressure to evict local residents standing in the way of development projects, often leading to corrupt land deals followed by protests and social unrest.⁷⁷

Green Economy, Urban Security And Energy Security (Seoul: Nautilus Institute, 2010).

76 Wang, Y., “China’s Approach to Green Development and Transformation of Economic Development Pattern,” in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

77 Shin, H.B., “Development and Dissent in China’s ‘Urban Age,’” *openSecurity*, 25

At the level of the city, Wang noted that China has many demonstration projects and model cities. The latest project is a low carbon city led by the department of climate change. "We have invested a lot of money into these programs but have not coordinated between cities. We have a top-down approach and we do not have different regional policies. Many regions would like to set their own policies and plans, but they do not know how to realize their plans. There are a lot of conflicts between the various types of plans: low carbon, urban, etc."⁷⁸

"In China" he explained, "mayors dominate in urban planning and each mayor has their own plans. We change our plans depending on who is in office at the time, and they don't understand how to create a modern society. This is a big challenge. We need to integrate the top-down and bottom-up approaches in urban development."⁷⁹

Thus, in contrast to South Korea, one might say the primary problem in China is an outright institutional shortfall based on continued command-and-control planning, incomplete reform of property rights, and a deficit in local government capacity faced with these contradictory pressures. Whether this capacity can be built up without political democratization at the national level is a key issue. In China, there appear to be multiple, critical connecting problems that lead in turn to urban insecurity despite the gains in recent years to increase energy end-use efficiency and to supply renewable energy.

Japan: Social and Cultural Drivers of Energy and Urban Insecurity

Japan revealed a third picture, different from South Korea and China. In contrast to South Korea where institutional interests captured the "green solution space," and to China, where the primary problem is a lack of institutional capacity, the Japanese problem derives from rigid paradigms of growth combined with institutional gridlock. As Takayuki Minato explained, in Japan the process of innovation is driven by the feedback loop between individual consumers and producers as expressed in the

February 2013, <https://www.opendemocracy.net/opensecurity/hyun-bang-shin/development-and-dissent-in-chinas-urban-age>; O'Donnell, M.A., "Laying Siege to the Villages: Lessons from Shenzhen," *openSecurity*, 28 March 2013, <https://www.opendemocracy.net/opensecurity/mary-ann-o%E2%80%99donnell/laying-siege-to-villages-lessons-from-shenzhen>

78 Wang, Y. (2010).

79 Ibid.

highly regulated market system in Japan.⁸⁰ Thus, social factors that drive consumer behavior at the individual and household level in Japan, such as demographic aging, life style changes, and immigration levels, etc., are critical to system-level outcomes.

External factors such as Chinese competition for material resources and increasingly direct competition with South Korea for export markets necessitate government-driven technological innovation to reduce reliance on external resources. However, these state-led initiatives are often contradictory, slow, hazardous, and costly relative to the agile, rapid, and market-based technologies that are created to fulfill immediate social demands for goods and services and which have historically been Japan's competitive edge in global trade. Moreover, Japan's ability to implement high technology strategies that rely on imported materials such as rare earth minerals is potentially vulnerable to the loss of external suppliers (especially from China), which Minato noted is a "cross-national linkage" between energy, climate, and urban insecurity in Japan. Consequently, Japan and South Korea (which faces a similar constraint) may both need to develop new technologies that are not reliant on such minerals.

With regard to energy-driven urban insecurity, Kae Takase described the continuing difficulties faced by government and industry in making nuclear spent fuel reprocessing a viable energy strategy in Japan. She contrasted this with the adoption of a feed-in-tariff that could stimulate rapid growth in photovoltaic cell-distributed electricity production and achieve Japan's goals of reduced greenhouse gas emissions if combined with a "minimum" nuclear power pathway in Japan.⁸¹ She suggested a shift from conventional to "comprehensive" energy security policy that would capture the full complexity of the energy security issue in Japan, and by implication, in other countries.

In Japan, where the basic minimum needs of most people are already met, a key driver of policy is how people think: that is, the basic paradigms that drive behavior at all levels. Tetsunari Iida suggested that in the energy field, the basic shift is transforming renewable energy from a fractional wedge on the "carbon flatland" to 100 percent (when combined with stringent end use efficiency) of the energy supply in a "renewable revolution."⁸²

80 Takayuki, M., "Urban Security," in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

81 Takase, K., "Energy Security in Japan," in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

82 Iida, T., "Changing Climate Change & Energy Policy and Politics in Japan," in *Interconnections of Global Problems in East Asia, Green Economy, Urban Security And Energy Security* (Seoul: Nautilus Institute, 2010).

In his proposed “breakthrough” strategy, Iida relied primarily on local initiatives and market response to demand to drive change at the political and policy levels, but remained open not only to networking globally while acting locally, but also to cross-country, long-distance, and high-tech imports of renewable energy. Although the equity issues involved in one such project have yet to be analyzed, he referred to the “Gobitec” concept whereby solar, thermal, and other renewable sources of power generation could be undertaken in Mongolia and exported via long-distance, high-voltage, and direct-current transmission lines that would traverse China and/or Russia *en route* to the DPRK, ROK, and Japan.⁸³ This vision would stimulate development and local employment, create value where little currently exists in the Gobi desert, and build economic and energy interdependence between the countries of the region.

As with other regional energy networks that would traverse the DPRK (such as electric tie lines connecting the ROK and Russian Far East grids, or natural gas pipelines from Russia to the ROK), the Gobitec concept requires the resolution of the DPRK nuclear issue and the opening of the DPRK to be plausible. As a multi-billion-dollar, high-tech solution-strategy that would likely be championed by states and corporations, this top-down concept is the antithesis of the community-level strategies described by Sanghun Lee such as the bottom-up “green apartment” movement in Gwangju, South Korea, which aims to change community attitudes and consumption patterns in fundamental ways.

Many of the ideological and institutional barriers to implementing the strategies described by Takase and Iida were shattered by the March 2011 tsunami and the ensuing Fukushima catastrophe. The resulting networked strategies to realize post-Fukushima reconstruction and develop greater resilience are described in chapter 3. What is evident in Japan is that in a fully market-driven society, the linkages between climate, energy, and urban insecurity arise more from the devolved actions of very large numbers of individual, household, and corporate players and less from the policies and interventions of state-based agencies (as in South Korea or China). Ideational influences are important in all three countries, but are particularly potent in Japan, and in different ways than in China or South Korea, in part due to the different roles and institutional locations of scholars, mass media, and civil society organizations relative to state agencies and policy formation in each country.

83 The Gobitec Initiative led by the Hanns Seidel Foundation is described at: <http://www.gobitec.org/>

It is evident from the preceding section that it is not simple to determine the linkages between global problems such as energy, climate, or urban insecurity in East Asia, or even to create a common understanding of what constitutes these problems, let alone their linkages. A first step in each country to resolving shared global problems requires that the problem be decomposed into its separate drivers and constituent parts, with a focus on those elements that originate in or affect the East Asian region.

Separately, national researchers need to undertake substantial empirical research into the nature of the problem and solution in each country. Then they can attempt a joint mapping of the “complexity terrain” to see if a common core exists in the divergent views of these constituent elements of the problem and its solutions, and if this common core in turn provides a nexus that bridges the causes or the solutions between these problems across cultures. This distillation is necessary before a realistic appraisal of the potential for concerted action can even begin.

Before we commence this task (to which the bulk of this book is devoted), we must first drill deeper into the concept of complexity to ascertain whether civil society organizations and networks are able to provide unique insight into these linked problems. And, if so, we must ask what they are capable of doing to facilitate collaborative action to address these problems, within and across countries of the region.

Defining Complexity

When we say something is complex, we refer intuitively to the quality of a system’s interconnectedness, the relation between parts that makes it so complicated or intricate that it is difficult to comprehend. Although there is no authoritative definition, a “complex system” has acquired a conventional modern meaning in English as one in which:

- a. The interdependent elements of a system interact in a non-linear way (meaning that quantitative and qualitative change can occur very rapidly);
- b. The elements themselves are diverse rather than similar in nature;
- c. The system is self-organizing, and the constituent agents are autonomous and can make decisions on their own behalf rather than being controlled — that is, they have “agency;”
- d. The structures that emerge at different spatial, physical, and temporal scales within the system as a result of interacting, heterogeneous agents are unpredictable, but they are also very sensitive to small changes in the

initial conditions, changes that are amplified by the non-linear nature of interaction between constituent elements of the system resulting in chaotic outcomes over time, often called the “butterfly effect;” and

- e. The impacts of small changes at one scale of the system may affect another scale rapidly, unpredictably, and structurally — a moment sometimes called a tipping point.⁸⁴

These characteristics contrast with those observed in “simple systems” (see Table 2.3).

Table 2.3: Characteristics of Simple and Complex Systems

Simple Systems	Complex Systems
Few agents	Many agents
Few interactions	Many interactions
Controlled decision-making	Decentralized decision-making
Decomposable	Irreducible
Closed system	Open system
Static	Dynamic
Tend to equilibrium	Dissipative
Few feedback loops	Many feedback loops
Predictable outcomes	Surprising outcomes
Examples	Examples
Pendulum	Immune systems
Bicycle	Genes
Engine	Molecules in air
Boyle’s Law	Ecosystems
Gravitational system	Markets

Source: N.E. Harrison, “Thinking About the World We Make,” in *Complexity in World Politics: Concepts and Methods of a New Paradigm*, ed. by Harrison, N.E. (Albany: State University of New York Press, 2006), p. 3.

In ecological and human systems, such system-level transformations may be irreversible, and a system may become “stably unstable” and oscillate

⁸⁴ See Baranger, M., *Chaos, Complexity, and Entropy. A Physics Talk for Non-Physicists* (Cambridge: New England Complex Systems Institute, 2001).

around a point of equilibrium for a long time due to multiple negative feedbacks that discourage change. Sometimes, an apparently random small event perturbs the system so much, due to multiple positive feedback loops, that it transforms the system itself. Studies of complex systems have been undertaken in many disciplines including climate science, mathematics, ecology, biology, and even in fields as far from the natural sciences as the study of organizational behavior, markets, archaeology, interstate relations, land use management, diplomatic negotiations, and security dynamics.⁸⁵

Today, there are two basic methods for approaching complexity. One method made popular during and after the Cold War is to use models that attempt to simulate the whole system by defining state variables and the algorithms whereby these variables affect each other via defined pathways. A good example of this approach was the famous *Limits to Growth* report of the Club of Rome. These deterministic models often led to policy decisions that generated highly undesirable outcomes and a false sense of understanding and control.⁸⁶

A second approach, which emerged in the 1980s, is to model each agent that exists in a system rather than the system itself. One then uses computer models to allow the agents to interact based on rules of environmental perception, recognition, decision-making, and learning over time.⁸⁷ Based on multiple — sometimes thousands — of model runs, recognizable patterns emerge from the interactions of large numbers of agents. These outcomes can provide insight into the determining variables, the sensitivity of outcomes to initial conditions, and the counter-intuitive outcomes that can occur in aggregate outcomes. Agent-based models are attractive in that they highlight how the heterogeneity of the agents affects their interaction with each other and their environment. Moreover, there is no presumption as to the system-level outcomes. These just happen, deriving from the defining characteristics of the agent. Intuitively and appropriately, human behavior is treated as a complex system, especially if it involves some kind of spatial or social diffusion process including large numbers of people.

85 See, for example, Cumming, G.S. and Norberg, J., *Complexity Theory for a Sustainable Future*, Complexity in Ecological Systems (New York: Columbia University Press, 2008).

86 See, for example, Bracken, P.J., *The Command and Control of Nuclear Forces* (New Haven: Yale University Press, 1983).

87 Berry, B.J.L., et al., "Adaptive Agents, Intelligence, and Emergent Human Organization: Capturing Complexity through Agent-Based Modeling," *Proceedings of the National Academy of the Sciences*, 99(Suppl 3) (2002), doi: <http://dx.doi.org/10.1073/pnas.092078899>

The concept of complexity can be applied to any system, natural or artificial. As defined above, global problems result from the failure of natural and artificial systems to fulfil human goals. Today, the quantity, universality, and intensity of many human problems make them global and therefore common to all humanity. The increased rate and magnitude with which complex, interrelated global problems confront us demands a correspondingly increased social differentiation and specialization to manage and resolve multiple challenges at the same time. In short, as we will see below, complex problems demand complex solutions, and complex strategies required by complex solutions entail increasingly complex organizations, which often fail in spite of their extra effort.

Complexity in Urban Security and Sustainability

Complexity theory originated partly from efforts to understand ecological systems such as interdependent predator-prey dynamics; species and food webs; the relationship of diversity, especially biodiversity, to ecosystem resilience; and social-ecological interactions and system thresholds in the context of adaptive management.⁸⁸ Since the late 1960s, the understanding that humans affect the biosphere has increased dramatically, starting with the first United Nations Conference on the Human Environment in 1972 and leading to scores of multilateral environmental accords, as well as the attempt to preserve, conserve, and restore global environmental assets and services upon which humanity depends for its very existence. Arguably, the rising costs of damages to environmental services, which in turn lead to a non-sustainable economy, have derived from increasingly complex ecological dynamics in the biosphere.⁸⁹

Of these efforts, four “overarching” global environmental agreements have played prominent parts in East Asia sustainability agendas, both diplomatically and domestically. These are the conventions and protocols relating to ozone depletion, climate change, biodiversity, and regional

88 See Levin, S., “Ecosystems and the Biosphere as Complex Adaptive Systems,” *Ecosystems*, 1(5) (1998), doi: <http://dx.doi.org/10.1007/s100219900037>; Holling, C.S., “Resilience and Stability of Ecological Systems,” *Annual Review of Ecology and Systematics*, 4(1) (1973), doi: <http://dx.doi.org/10.1146/annurev.es.04.110173.000245>; Walker, B. and Meyeres, J., “Thresholds in Ecological and Social-Ecological Systems: A Developing Database,” *Ecology and Society*, 9(3) (2004).

89 Fisk, D.J. and Kerhervé, J., “Complexity as a Cause of Unsustainability,” *Ecological Complexity*, 3(4) (2006), doi: <http://dx.doi.org/10.1016/j.ecocom.2007.02.007>

oceans management. At regional and sub-regional levels, multilateral, government-funded dialogues and bilateral activities on acid rain, yellow sand, marine pollution, persistent organic pollutants, and biodiversity have also occurred.⁹⁰ By the first decade of the 21st century, environmental issues had become sufficiently “hot” in the region to be recognized by scholars as security concerns.⁹¹

These transboundary and global sustainability problems intersect with the emergent pattern of massive urban growth in this region. The developing urban corridor also poses an immense challenge for the preservation of biodiversity. As we shall see, local governments and civil society organizations have begun to tackle the issues arising from this rapidly evolving “sustainability complexity” in East Asia.

BeSeTo: An Emerging Northeast Asian Giga-City?

One of the most important patterns that emerged in the shift from a simple to a complex international system in Northeast Asia is the growth of urban corridors that now stretch across the region. This conurbation is neither planned nor controlled by any city or state. Yet it is the backbone of a tiger that cities and states will have to ride into the future. One obvious question is what new insecurities will arise from its proximity to the coastal zone, given climate change impacts?

Underlying these networked strategies, countervailing organizations and entrenched habits are uncontrolled, incremental expansion of cities and rapid connectivity (Internet and cell phones, fast trains, airplanes, etc.). This combination creates a set of linked, contiguous mega-cities, sometimes called mega-regions: organic entities that are more than the sum of their parts. This urban system includes horizontally-linked hinterlands (often called “rurbanization,”⁹² a hybrid rural-urban development also called

90 For the early period of these regional dialogues, see Hayes, P. and Zarsky, L., “Environmental Issues and Regimes in Northeast Asia,” *International Environmental Affairs*, 6(4) (1994).

91 See Schreurs, M.A. and Hyun, I., *The Environmental Dimension of Asian Security: Conflict and Cooperation over Energy, Resources, and Pollution* (Washington, DC: United States Institute of Peace Press, 2007).

92 This phrase is used partly to refer to reversal of net migration from rural to urban areas; and also widely in India to refer to the combination and infusion of traditional rural

“*desakota*” in poor countries,⁹³ referring to *in-situ* urbanization in rural areas driven by access to and demand from the globalized economy, on the one hand, and poverty-driven workforces desperate to generate income without moving to the city on the other — a process previously identified in Indonesia and now well underway in China)⁹⁴ and huge vertical, compact multi-function poleis that would serve aging populations in wealthy portions of the mega-region with super-efficient technology for healthcare, mobility, communications, schooling, and entertainment.

The emergence of this connected, contiguous, and interdependent set of mega-cities may accelerate if the DPRK opens up to trade and investment in the next decade, with huge impacts on energy and climate change risks in the region as a whole. Thus, urbanization and its underlying social, economic, and technological linkages reconnect in turn to the security and nuclear weapons issues posed by the conflict between the DPRK and the United States, on the one hand, and by unresolved inter-Korean issues on the other. The latter issues constitute a powerful mix of risks that is potent enough to register as a global risk in its own right in the WEF framework.

The BeSeTo (Beijing-Seoul-Tokyo) urban corridor concept came to international prominence in a 1996 United Nations University study by Sang-Chuel Choe.⁹⁵ In 1994, it already included 98 million urban dwellers living in 112 cities, each populated by 200,000 or more people, across 1,500 km. Today, this system has grown substantially. By 2050, it could become the world’s first giga-city: an agglomeration inhabited by a billion people and crossing four countries.

practices with urban amenities and facilities, in a hybrid and transformational manner in the rural landscape. See Modi, N., “Introduction to Rurban and Rurbanisation,” in *Panel Discussion on Rurbanisation* (Ahmedabad, 2011).

- 93 “The *desakota* phenomenon encompasses more than the term “peri-urban.” It refers to closely interlinked rural/urban livelihoods, communication, transport and economic systems. *Desakota* systems occupy, and radiate out from a spectrum of conditions that have purely urban and purely rural as the two extreme ends. In this emerging system, large sections of the population operate a mixed household economy that straddles the urban and the rural, as well as the formal and informal sectors.” Moench, M. and Gyawali, D., *Desakota: Reinterpreting the Urban-Rural Continuum* (Ecosystem Services for Poverty Alleviation, 2008).
- 94 Xie, Y., et al., *Simulating Emergent Urban Form: Desakota in China* (London: Centre for Advanced Spatial Analysis, University College London, 2005).
- 95 Choe, S.C., “The Evolving Urban System in North-East Asia,” in *Emerging World Cities in Pacific Asia*, ed. by Yeung, Y. and Lo, F. (Tokyo: United Nations University Press, 1996).

Although the core concept was already circulating,⁹⁶ Choe himself began to promote it as early as 1991.⁹⁷ Indeed, in 1995, Beijing, Seoul and Tokyo signed a memorandum of understanding which set the pace for inter-city cooperative relations, including all types of relations at both public and private levels. Hieyeon Keum explains that

In 1993, the Mayor of Seoul (Lee Won-Chong) proposed that city governments take concrete steps towards inter-city cooperation at a conference in Beijing. The mayors of Beijing (Li Qiyang) and Tokyo (Suzuki) agreed to the proposal. The expression of interest by the three capital cities' mayors in Beijing was followed up in April 1994 by an international conference in Seoul to explore the scope of and approaches to cooperation. In March 1995, the three mayors met in Seoul to sign the "Memorandum on BeSeTo Cooperation." The Memorandum stated a consensus among the three capital city administrations over the necessity of further three-way cooperation as well as a working principle of trust and faith in each other. In addition, the Memorandum pledged to involve the private and non-political sectors (such as cultural, academic, and athletic exchanges) in the cooperative framework as well. More specifically, the Second Memorandum identified four sectors for cooperation and exchange among the three mega-cities: economy, urban management, science and technology, and culture and the environment. The framework envisioned a three phase development trajectory of inter-capital-city cooperation. The first stage (1995-1997) was going to be one of further exchange of ideas and agenda setting. Indeed, a series of discussions on specific cooperation and exchanges were held. The second phase (1998-2000) would involve exchanges of scholars for more discussions; development of new tourist routes; formation of joint ventures; and frequent exchanges among city officials. However, except for several cultural exchanges and administrative meetings, there has not been discussion on specific areas and issues for cooperation and exchanges. The third phase (2000-2005) was going to be a period of consolidation, leading to an institutionalization of the envisioned cooperative scheme. With the help of their respective national governments, the three capital cities were supposed to coordinate the construction of an information highway to remove the obstacles to communication. The highest stage of the BeSeTo cooperative scheme was

96 See Seoul Development Institute and Seoul 21st Century Research Center, *Building the BESETO Cooperation System* (Seoul Development Institute and Seoul 21st Century Research Center, 1995); Han, Y.J., *The Necessity and Role of a Cooperative System among the Northeast Asian Mega-Cities; the Future of Northeast Asian Mega-Cities* (Seoul: Seoul Development Institute, 1994); Jung, H.Y., *Seoul-toward a Regional Hub City in the Northeast Asia* (Seoul: Seoul Development Institute, 2005); Choe, S.C., *Status and Role of Seoul for the 21st Century* (Seoul: Seoul Development Institute, 1994).

97 Keum, H., "Globalization and Inter-City Cooperation in Northeast Asia," *East Asia*, 18 (2) (2000), doi: <http://dx.doi.org/10.1007/s12140-000-0029-y>

going to be the establishment of a permanent organization to coordinate and facilitate the cooperation in the four areas listed in the Memorandum.⁹⁸

However, in the same year, the Seoul-led effort to stimulate collaboration between Beijing, Seoul, and Metro-Tokyo fell afoul of bureaucratic politics, and the new Mayor (elected in 1994) paid more attention to local issues with greater political payoff. Moreover, the private sector was not involved in these early dialogues.⁹⁹ Keum blames the lack of coordinated effort by the central and municipal governments to orchestrate the necessary private involvement to realize this vision.¹⁰⁰

Furthermore, the extent of economic complementarity as opposed to competitiveness between the three mega-cities was unclear. Without a champion, the BeSeTo concept could not overcome other powerful obstacles, namely the deepening power rivalry within the region and nuclear proliferation, especially in North Korea.¹⁰¹ Keum concludes, "At the present stage, the BeSeTo scheme remains more of a concept than a reality. In view of the political-economic complexities at the national and regional levels, the most practical step to follow is to build a BeSeTo urban information network."¹⁰²

However, the probabilities were always stacked against a scheme based on the collaborative strategies of three capital cities, given their different economic locations in national hierarchies and global networks of trade, finance, and investment. Regional urban corridors do not emerge through top-down planning. Rather, they emerge from the uneven processes of globalization that promote rapid urbanization and de-urbanization, shifts in production location due to relative factor endowment and comparative advantage, and changes in policy environment at the local and city level. Thus, the detailed study of the Shenyang-Yanbian section of the BeSeTo corridor, by Michael Wang and Guoping Lih, found that globalization had fragmented the corridor, causing shifts from Shenyang to Yanbian in competitive conditions, domestic reform of state-owned enterprises, and changing economic conditions in relation to international markets.¹⁰³

98 *Ibid.*, pp. 109-10.

99 *Ibid.*, p. 99.

100 *Ibid.*, p. 111.

101 *Ibid.*, p. 112.

102 *Ibid.*, p. 113.

103 Wang, M. and Li, G., "The Shenyang-Dalian Mega-Urban Region in Transition," *International Development Planning Review*, 30(1) (2008), doi: <http://liverpool.metapress.com/content/103530t8627u023t/?genre=article&id=doi%3a10.3828%2fidpr.30.1.1>

Overall, the authors concluded that the corridor is now characterized by “increasing divergence in the economic growth of the two urban poles of this corridor and a breakdown in rural-urban integration in the region.”¹⁰⁴ Much of the previous rural-industrial development had been driven by contracts by big urban state-owned enterprises entered into with town- or village-level enterprises. As the former shut down, the latter followed suit.

Nonetheless, some areas around Dalian have shot ahead, and the overall result is fragmentation of the corridor in some areas and rapid integration in others. A similar story can be told with respect to the Nampo-Pyongyang, Incheon-Seoul, and other major urban corridors that collectively constitute the network of cities in the BeSeTo space.

According to Chinese analysts, a major problem with the BeSeTo concept is that Liaoning Province and even Beijing itself are in many ways lagging far behind the coastal cities stretching south. In their view, a giga-city is far more likely to emerge in the area from Beijing to the Tianjin-Binhai zone, from Shanghai to Hong Kong and beyond, than merely from Beijing to Tokyo.¹⁰⁵

Interestingly, Professor Choe still suggests that the BeSeTo concept may be emerging as quickly as other regional corridors.¹⁰⁶ However, until the DPRK stops impeding the regional completion of dynamic networks currently blocked by its rejection of an open economy — which include road and rail transportation, telecom, pipelines, power grids, and, above all, labor mobility — the full potential vigor and likelihood that a completely interconnected BeSeTo corridor in China will emerge cannot be determined. Meanwhile, it will continue to evolve in stop-start, disconnected, and disjointed ways — exactly how most mega-urban corridors develop.

Moreover, the concept is still in motion at the policy level. In 2006, for example, three research institutes conducted a joint three-year review of the BeSeTo concept. It was led by Japan’s National Institute for Research Advancement (NIRA) — the Korean and Chinese partners were the Korean Research Institute for Human Settlements and the National Development

104 Ibid.

105 Chen, X. and Liu, C., “The Reluctant Powerful Participant: China on, in, and out of the Pan-Yellow Sea Rim,” in *2010 Presidential Committee on Regional Development International Conference* (Jeju, 2010).

106 Choe, S.C., “Incheon City-Region in Korea: Gateway to Northeast Asia — Aspiring to Be an Innovative and Learning Region,” in *2nd International Conference on the Process of Innovation and Learning in Dynamic City-Region* (Bangalore: United Nations Industrial Development Organization, 2005).

and Reform Commission/ISPRES — as part of a NIRA project on “Research on a Grand Design for Northeast Asia.” The project undertook:

In concrete terms, (1) detailed examination of the construction of networks of individual transportation modes, such as conceptualization of a high-speed rail system for Northeast Asia in the near future, an expressway network including the Asia Highway, and a daily roundtrip air shuttle system linking the three cities and related major cities; (2) examination of the concept of inter-modal networks; and (3) sketching an overview of the construction of an intergovernmental platform for economic relations in Northeast Asia.¹⁰⁷

In March 2007, this group published the joint *Proposal for Promotion of the Realization of the BeSeTo Corridor Vision — Toward sustained development in the Northeast Asia Region*.¹⁰⁸ Although they recognized the numerous impediments to the realization of this vision, including problems of energy, transport, logistics, and urban infrastructure, they argued that

The BeSeTo corridor is a linear representation of urban agglomerations in C-J-K [sic]. It contains major centers of talents and innovation, financial and industrial capital, and manufacturing and advanced services. The corridor, if equipped with less institutional barriers and a smoothly functioning transport system, would certainly contribute to building a more or less homogenized economic space wherein agglomeration benefits can be spread to enterprises and people.¹⁰⁹

“Three things,” they suggested, “are essential for building the BeSeTo corridor. They are transport corridors, information highways, and inter-city networks. Without doubt, these three elements are complementary to each other and thus constitute building blocks of the BeSeTo corridor.”¹¹⁰ Specifically, they argued that collaborative steps can be taken to circumvent the DPRK obstacle by implementing inter-modal roll-on, roll-off train and road freight systems that load onto and off ferries between Incheon and Yantai, alongside an improved Busan-Fukuoka train-ferry system.¹¹¹ Achieving this efficiency would entail standardizing rail gauges and freight sizes, adopting a common headless-chassis for containers, and

107 Gangzhe, L., *Research Trends: Research on a Grand Design for Northeast Asia* (Tokyo: National Institute for Research Advancement, 2006).

108 China Institute of Spatial Planning & Regional Economy, et al., *Proposal for Promotion of the Realization of the BESETO Corridor Vision-- toward Sustained Development in the Northeast Asia Region* (Tokyo: National Institute for Research Advancement, 2007).

109 Ibid., p. 24.

110 Ibid.

111 Ibid., p. 28.

harmonizing customs clearance procedures.¹¹² The group also suggested creating a “Northeast Asia Sky Corridor,” an inter-city shuttle service that would also entail issuing a fast-visa for passengers using this service.¹¹³

Finally, they promoted a variety of inter-city networking and mutual learning activities. These would involve not only the three capital cities, but would expand the sub-regional inter-city networks on the rims of the Yellow Sea and the East Sea/Sea of Japan, such as the Organization for the Northeast Asia Economic Development, the Association of Northeast Asia Regional Governments, and the Conference of Major Cities in the East Sea/Sea of Japan Rim Region.¹¹⁴ Along these lines, they also called for “active and positive participation” by the citizen sector. “The traditional exchange mode, which is regional government-centered with supports by local business groups and academics such as local universities and think-tanks, should be improved to the mode with participation of a broader civic sector. Getting this participation of the civic sector will widen and enhance the foundation of inter-city network.”¹¹⁵ Perhaps the most important single recommendation is the establishment of a virtual “BeSeTo Knowledge Corridor” whereby collaborative scholarly and policy research could be undertaken on both this concept and related issues by Chinese, Korean, and Japanese researchers.¹¹⁶ This would ultimately lead to a virtual transnational civil society, especially in areas of environmental and tourism cooperation.¹¹⁷

Sceptics may see this study as yet another example of Japanese “big think,” a product of a construction state in an endless search for taxpayer funds to finance massive public infrastructure markets. Indeed, behind the study lay NIRA’s previous work on a “Big Loop” vision that called for a circular high-speed railway to connect major cities in Northeast Asia plus a high-speed railway system to connect the “Big Loop” to the Shinkansen bullet train networks. Also in the background was NIRA’s “New Cross” vision to connect the existing main north-south transport artery in Northeast Asia with the emerging inner Mongolia-Northeast Asia, east-west traffic route, linked by sea and air to Japan.¹¹⁸

112 *Ibid.*, p. 29.

113 *Ibid.*, p. 30.

114 *Ibid.*, p. 35.

115 *Ibid.*, p. 36.

116 *Ibid.*, p. 37.

117 *Ibid.*, p. 38.

118 Mori, N., “A Grand Design for Northeast Asia,” in *15th Northeast Asia Economic Forum* (Khabarovsk, 2006).

Nonetheless, nearly two decades of conceptual work, extensive inter-city investigation, the uneven but inexorable process of massive urbanization and sprawl, *in-situ* rural industrialization and urbanization, integration of transportation systems, and above all, increasing movement of people within the region, suggest that, in one form or another, a BeSeTo corridor will emerge over the next fifty years. Indeed, some analysts have already added Shanghai to “BeSeTo” to make “BESHTOSHA”: the emerging mega-corridor along the east Chinese coast to the BeSeTo corridor.¹¹⁹ Whatever its final form — and remote sensing data already offers evidence of the emergence of this corridor¹²⁰ — when the world’s first giga-city emerges, it will present entirely new challenges of urban insecurity that, in turn, will require new forms of networked and trans-border urban governance.

Complexity and Port City Climate Adaptation

According to the United Nations Economic and Social Commission in Asia and the Pacific, the heads of ports from China, Japan, and South Korea have discussed the creation of a North-East Asian Transport Corridor. It would link East Asian ports with Europe by sea and land transport and enable the Northeast Asian countries to expand their international trade, especially Northeastern China. Major ports of call on the China-Japan route include Shanghai, Tianjin Qingdao, and Dalian in China and Tokyo, Yokohama, Nagoya, Osaka, Kobe, Moji, and Hakata in Japan. In part, these ports hope to avoid over-investment in facilities given the emerging level of need and competition for business while gaining from expanded regional flows of passengers and cargo that would be facilitated by trans-border technical standards on power supplies, rail gauges, and road safety.¹²¹

Almost by definition, port cities are greatly at risk from climate change, particularly from rising sea levels, increasingly frequent and intense storms and related storm surges, and degradation of physical infrastructure, such as accelerated carbonation and chloride-induced corrosion of concrete and

119 Lee, S.J. and Kim, W.B., “Recent Trends of Cross-Border Cooperation and Spatial Strategies of the Northeast Asian Countries,” in *Presidential Committee on Regional Development, 2010 International Conference* (Seoul, 2010).

120 Schneider, A., *et al.*, “A New Map of Global Urban Extent from MODIS Satellite Data,” *Environmental Research Letters*, 4(2009), doi:<http://dx.doi.org/10.1088/1748-9326/4/4/044003>

121 United Nations Economic and Social Commission for Asia and the Pacific, “Subregional Cooperation for Shipping and Port Development in North-East Asia,” in *Development of Shipping and Ports in North-East Asia* (New York: United Nations, 2005).

steel, due to increased atmospheric and oceanic carbon dioxide levels.¹²² These impacts will affect the operations of the already highly competitive port cities of East Asia, many of which have integrated into global shipping logistical and supply chains.¹²³

As a result, smart port cities are already addressing these direct impacts on the physical infrastructure of their port facilities, as well as focusing on reducing the carbon footprint of existing operations (largely arising from container traffic and docking facilities for ships) and substituting low or zero emission vehicles and equipment for the existing greenhouse-gas-emitting stock.¹²⁴ Los Angeles is one leader in this respect, but there are many others, including some East Asian ports, that participate in the C40 network of cities cooperating to respond to climate change.¹²⁵

Port cities contain vulnerable populations, especially those who live on the waterfront and who may gain little from the logistical operations by major production entities in the cities' manufacturing, mining, or agricultural hinterland. Worse, they may be displaced by port city expansion or heavily polluted by co-located industrial plants, especially petrochemical and energy generation facilities. Fishing communities also find their traditional homeport often dominated by major interests. Their coastal fishing operations may be further disrupted by a combination of runoff from watershed abuse and mismanagement, overfishing by industrial enterprises, and changes in fishing populations due to climate impacts on ocean temperature and circulation patterns.

In addition to these direct threats that undermine the physical and social resilience of port cities in the face of climate change, such cities are also subject to major geographic shifts of global competitive advantage in the production of globally traded and shipped fossil fuels, minerals, food, tourist cruise ships, and other bulk and high value goods that prove to be

122 Nicholls, R.J., et al., *Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes*, OECD Environment Directorate Working Paper (Organization for Economic Co-operation and Development).

123 Jacobs, W., et al., "Integrating World Cities into Production Networks: The Case of Port Cities," *Global Networks*, 10(1) (2010), doi: <http://dx.doi.org/10.1111/j.1471-0374.2010.00276.x> and Ducruet, C. and Notteboom, T., "The Worldwide Maritime Network of Container Shipping: Spatial Structure and Regional Dynamics," *Global Networks*, 12(3) (2012), doi: <http://dx.doi.org/10.1111/j.1471-0374.2011.00355.x>

124 Aerts, J., et al., *Connecting Delta Cities, Coastal Cities, Flood Risk Management and Adaptation to Climate Change* (Amsterdam: VU University Press, 2009).

125 C40 Large Cities Climate Leadership Group, "The World Ports Climate Declaration and Endorsement Ceremony: Declaration," in *C40 World Ports Climate Conference* (Rotterdam: C40 World Ports, 2008).

climate-sensitive. These factors in turn have multiple non-climate change drivers that are global, sectorial, and local. As Darryn McEvoy and Jane Mullett explain with reference to Australian port cities: “Volatility in markets, for example, increasing climate change impacts on agriculture both domestically and internationally, will also need to be factored into forward planning. Port planning needs to integrate land use, freight transport and environmental issues with consideration of multi-level governance perspectives at port, local, state and national levels.”¹²⁶

Thus, climate change amplifies the existing non-climate drivers of port city economic competitiveness or decline, and thereby superimposes new risks on top of the direct threats noted above. Some agile port cities will gain from this climate-driven shift in global production and trading patterns by adopting new, climate-friendly industries; they might become import-export centers for biofuels, as well as renewable energy generation from on-site or offshore, or possibly export hubs for captured carbon. Others, wedded to carbon-intensive processing, mechanical manufacturing, and logistical systems for bulky, carbon-intensive products such as fossil fuels, may lose market share whatever their locational advantage.¹²⁷

Some major ports and their affiliated global shipping networks have already identified this shift, one driven by indirect climate change and which may affect port cities much earlier than, for instance, slowly rising sea levels.¹²⁸ Thus, Rotterdam and affiliated global ports have created the global Rotterdam New World Alliance, redefining their primary role from industrial-era to climate-era port cities and creating integrated systems on common standards. The New World Alliance includes APL (Singapore), Mitsui OSK Lines (Japan), and Hyundai (South Korea). At a regional level, the European Union is developing new standards to promote climate-resilient best practices via ESPO, the European Sea Ports Organization. A first step is to compile a global index of clean shipping operations for carbon dioxide, nitrous oxide, and sulfur compounds emitted by ships on the ocean and in port.¹²⁹ A coalition of European port cities led by Antwerp,

126 McEvoy, D. and Mullett, J., *Enhancing the Resilience of Seaports to a Changing Climate: Research Synthesis and Implications for Policy and Practice* (Gold Coast: National Climate Change Adaptation Research Facility and RMIT University, 2013).

127 Stenek, V., et al., *Climate Risk and Business: Ports* (Washington, DC: International Finance Corporation, 2011).

128 Rynkiewicz, C., “European Port Cities as Gateways to a Green Economy?,” *Network Industries Quarterly*, 13(4) (2011).

129 *Environmental Ship Index ESI* (World Ports Climate Initiative), <http://esi.wpci.nl/Public/Home>.

Rotterdam, Le Havre, Bremen, and Hamburg has undertaken to create such an index.

With an eye on the horizon for the coming storm of climate change-generated shifts in energy use, cities such as Antwerp have begun to implement strategies for becoming distribution hubs for already globally-traded biofuels such as ethanol, biomass pellets, palm oil, and agricultural residues. As algal biofuels become economically viable and major producers of this new liquid fuel use existing refined oil product storage and distribution systems, port cities may turn into “energy ports.” Ports may also be well-situated for the direct transport of captured carbon for injection under the seabed or to other industrial and sequestration sites — a scheme that is already in pilot stage at Rotterdam and foreshadows its future as a “carbon hub.”¹³⁰

In East Asia, this dynamic is already in play via the global shipping networks and the alliances of port city authorities and corporate terminal operators. The direct and indirect impacts of climate change on East Asian port cities such as Dalian, Nampo, Inchon, and Niigata will shape urban mega-regions along the East and Northeast Asian coastlines, with the threats and opportunities challenging each port city. Because the climate system is all-pervasive, climate change will affect every aspect of human life in the region. The adaptive responses will differ, and no-one can predict the bottom-up, networked patterns of adaptation that will make some cities resilient and leave others more vulnerable to climate-induced decline.

Fortunately, many of the measures that cities should take to withstand the accumulating impacts of climate change are similar to those needed to anticipate other catastrophic events such as tsunamis, pandemics, earthquakes, and even wars and terrorist attacks. In this regard, not only the central state (including the military) and major corporate sectors (especially the financial, insurance, and legal industries) need to prepare for climate change.¹³¹ Local governments, city agencies, and communities represented by civil society organizations also need to act autonomously and with strategies tailored to local circumstances, not least because many

130 Rotterdam Climate Initiative, *Port of Rotterdam CO2 Hub: Crucial Stepping Stone Towards Sustainable Economic Growth* (Rotterdam Climate Initiative, 2012).

131 Prasad, N., et al., *Climate Resilient Cities: A Primer on Reducing Vulnerabilities to Disasters*, (Washington, DC: The World Bank, 2009).

of the large, centralized institutions are likely to either implement old, brittle strategies or deliver too little change, too late, and at the wrong location.¹³²

In this regard, complex networks, especially “live networks” using smart sensors and the latest social media communication devices, may enable first responders and communities to react in instantaneous swarms to catastrophic events far more efficiently than lumbering, slow, centralized agencies. In “cognitive cities,” citizens equipped with smart phones become the mobile, omnipresent sensor agent for smart systems integrated across sectors.¹³³ As Ali Mostashari *et al.* explain, citizens “become active data generators but also active consumers of urban information.” The result will be far greater accountability and efficiency in urban governance: “The transparency that a cognitive city provides will put the burden of performance on the shoulders of urban service providers, but it will also result in more efficient and effective resource allocation decisions. This is a fundamental cultural shift — thereby making urban governance far more transparent.”¹³⁴

The need to retreat in the face of climate-driven disasters, to adjust course mid-way in the midst of crisis response, and to generate a distributed, autonomous response puts the onus on networked civil society organizations and local governments to prepare for the worst while embracing climate change as the key to building multipurpose resilience in port cities.

Networked Inter-City Cooperation

Whatever its ultimate form, the sheer scale and complexity of the emerging giga-city in East Asia poses unprecedented challenges for regional security and sustainability. It will create new types of energy- and climate-related insecurity for urban areas along its corridor(s). It will require a new, cross-border form of urban governance that far surpasses the challenges of precursor “border cities” in this region.¹³⁵ Here, we address how networks

132 Matthias, R. and Coelho, D., “Understanding and Managing the Complexity of Urban Systems under Climate Change,” *Climate Policy*, 7(4) (2007), doi: <http://dx.doi.org/10.1080/14693062.2007.9685659>

133 Mostashari, A., *et al.*, “Cognitive Cities and Intelligent Urban Governance,” *Network Industries Quarterly*, 13(3) (2009).

134 *Ibid.*

135 See studies of Russian-China border towns in Billé, F., *et al.*, *Frontier Encounters: Knowledge and Practice at the Russian, Chinese and Mongolian Border* (Cambridge: Open Book Publishers, 2012).

of cities propagate best practice in the emerging giga-city. We also explore how civil society organizations accelerate the process of inter-urban and cross-border learning and innovation on an issue-by-issue approach — and how states may facilitate (or block) this process.

How these networked processes will be affected by the emergent patterns and logic of the emerging “giga-ntic” urban corridor is as yet unexamined.¹³⁶ That the corridor will superimpose its own properties, dynamics, and cellular structure on the component mega-cities, as well as on inter-urban cooperation and transnational civil society networks, is certain.

Kiho Yi suggests that inter-city networks in Northeast Asia already contribute to a nascent transnational “solution-strategy spiral.” These inter-urban networks, often connecting secondary and coastal cities, include the Niigata-Vladivostok-Wonsan triangle, the Kita-Kyushu-Pusan-Jeju triangle, and a Seoul-Dalian-Shanghai triangle. To these we might also add the Busan-Fukuoka bilateral network.¹³⁷

Yasuo Takao provides a set of documented case studies examining transnational inter-city networked cooperation on a range of economic, infrastructure, cultural exchange, human rights, and environmental projects between Japanese cities and their counterparts in China and the Russian Far East.¹³⁸ For example, the cities of Dalian (China) and Kitakyushu (Japan) cooperated closely through 1996-2010 on the creation of a Dalian Environmental Model Zone, transferring the requisite pollution control technology and management practices.¹³⁹ Takao explains:

The greatest potential for information dissemination lies in local government’s expertise transfer to overseas counterparts. The Dalian-Kitakyushu “friendly” relationship that had been officially established in 1979 built up a high level of information exchange between the two cities.

136 See Douglass, M., “Toward Participatory Governance of Transborder Intercity Regions in Asia,” in *Interventions in the Political Geography of Asia’s Transborder Urban Networks: Working Paper Series 193*, ed. by Miller, M. A. and Bunnell, T. (Singapore: Asia Research Institute, National University of Singapore, 2012).

137 Park, S.H., “Post-Cold War Trans-Border Networks in Northeast Asia: The Busan-Fukuoka Network,” in *Interventions in the Political Geography of Asia’s Transborder Urban Networks: Working Paper Series 193*, ed. by Miller, M. A. and Bunnell, T. (Singapore: Asia Research Institute, National University of Singapore, 2012).

138 Takao, Y., “Transnational Coalitions in Northeast Asia: Search for a New Pathway of Japanese Local Government,” *Ritsumeikan Annual Review of International Studies*, 2 (2003).

139 *Ibid.*, p. 82.

In the field of environmental issues, as early as 1981, Kitakyushu began to transfer the know-how of local planning and management to Dalian. From 1996 to 2000, Kitakyushu City in collaboration with the KITA conducted energy efficiency improvement projects. In 1998 environmental experts, engineers and city officials presented to Dalian through the KITA a set of 18 preventive environmental proposals including pickling/heat treatment process improvement in steel works, production conversion of sulfuric acid in a chemical plant, and nitration process improvement of chlorobenzene in a dye factory. In the same year, the KITA co-organized with the UN Centre for Regional Development a training seminar in Dalian to inform outcomes of the Model Zone project.¹⁴⁰

The cooperation was not merely formal or contractor-based, but involved extensive participation by local business and grassroots groups, as well as increased public awareness in both cities.¹⁴¹ At both ends, local government officials were able to compel their national governments to support the project, putting political pressure on the Japanese aid agency to provide the requisite resources, eventually amounting to over \$300 million of investment in the Model Zone.¹⁴² Importantly, city officials from Kitakyushu were able to deal directly with Chinese central government officials without having to pass via Tokyo. This transnational network enabled the project to proceed quickly and with state blessing, but unencumbered by the normal bureaucracy. As Takao concludes, "In so doing, they [the city level leaders] brought together otherwise unconnected domestic actors in a manner that produced a transnational interest that had not existed before."¹⁴³

Takao shows how the Niigata Prefecture played a similar role in establishing and hosting a regional acid rain training center in the city of Niigata:

In 1998 the Acid Deposition and Oxidant Research Center (ADORC) was established in Niigata. The ADORC started its activity as a branch of the nonprofit organization Japan Environmental Sanitation Center, which was located in Kawasaki. Since 1993, expert meetings on air pollution and acid deposition have been held by several East Asian countries, and in 1998 Niigata was designated as the interim network center for dissemination of monitoring data and other information to the participants.¹⁴⁴

140 *Ibid.*, p. 85.

141 *Ibid.*, p. 87.

142 *Ibid.*, pp. 98-99.

143 *Ibid.*, p. 104.

144 *Ibid.*, p. 84.

Having delved into the complex connections linking energy and urban insecurity and deriving from the bottom-up nature of urbanization in East Asia, we now turn to the relationship between complexity and geopolitical security issues in the region. In the course of doing so, we will discuss networked solution strategies that have been implemented by civil society networks to increase security and sustainability in East Asia.

Complexity and Security

Orthodox, *realpolitik* accounts of international security assume the unitary nature of the key actors (states), the nature of the game that they play (balance of power), the anarchic nature of the international system, and the key determinant of outcomes in the competition for power and influence (military capacity). In the Cold War period, a relatively simple bipolar model of the international system dominated, at least in the West: the nuclear balance-of-terror stabilized the system through fear of mutual annihilation by the American and Soviet blocs.

In reality, these are theories that overlap considerably. From a theoretical perspective, the concept of security propagated by all of them suggests that the state system is closed, determinate, and rests ultimately on the attempt to exert top-down control over unruly social and political phenomena. Fear is the fundamental basis of security in this realist world, dominated by the means of coercion and destruction, and the main way to understand the relative power of states or the structure of the region is to examine both these means and the elite's perceptions of threats.¹⁴⁵ The primary goal of the national security state is to maintain order. At the international level, the goal of great powers in a nuclear-armed world is to preserve the status quo, often termed "stability." Thus, one of the main security challenges in the region, the North Korean nuclear weapons program, is viewed as a threat to the existing balance of power. It threatens not only to rupture the regional order, a "punctuated equilibrium" in what was previously viewed to be a homeostatic system, but to herald the dawn of a new global nuclear era in which nuclear-armed rogue states and non-state actors disturb strategic stability.¹⁴⁶

145 See, for example, Hassig, K.O., *Northeast Asian Strategic Security Environment Study* (Alexandria: Institute for Defense Analyses, 2001).

146 Wilson, P., "Does 'Strategic Stability' Have a Future in Northeast Asia?" in *Strategic Stability in a Turbulent World: SAIC Report of 5th Nuclear Stability Roundtable to Defense*

The constraints on independent behavior within this rigid, bipolar system became less effective with the reconstruction and rise of Japan and Europe. Consequently, new and less mechanistic theories emerged that reflected the shift in the underlying political-economy of American global hegemony. *Liberal institutionalism* proposed that states are able to cooperate even in a system without an overarching authority by concentrating on the norms, rules, and organizations that regulate and manage international affairs.¹⁴⁷ A variant, *Gramscian hegemonic theory*, suggests that less powerful states not only defer to great powers, but also consent to their subordination; they should therefore share the ideology of common political, economic, and security interests that legitimates the leadership of an external great power. And finally, *state formation theory* argues that nuclear weapons are one of the ways in which state elites not only project threat against external adversaries, but also employ it to reinforce domestic control.¹⁴⁸

Since the mid-nineties, a “complexity paradigm” has begun to challenge these traditional theories of the international system. In this view, there is no world or regional system of states, but only the macro-outcome aggregate results of the systematic interaction of large numbers of constituent agencies within and between states. The results of this interaction at any point in time are highly unpredictable. A further consequence of this view is that there is no homeostatic “balance-of-power” between states; rather, the power flux is always dynamic and never the same.¹⁴⁹ As James Rosenau explains:

Even the most complex system can maintain long equilibrium before undergoing new adaptive transformations, or what complexity theorists call “phase transitions.” Put differently, their progression through time can pass through periods of stasis or extremely slow, infinitesimal changes before lurching into a phase transition, thereby tracing a temporal path referred to as “punctuated equilibrium.”¹⁵⁰

Threat Reduction Agency, Advanced Systems Concepts Office (McLean: Science Applications International Corporation Strategies Group, 2003).

147 Mann, S.R., “Chaos Theory and Strategic Thought,” *Parameters* (1992).

148 Tanter, R. and Hayes, P., “Beyond the Nuclear Umbrella: Re-Thinking the Theory and Practice of Nuclear Extended Deterrence in East Asia and the Pacific,” *Pacific Focus*, 26 (1) (2011), doi: <http://dx.doi.org/10.1111/j.1976-5118.2011.01053.x>

149 Harrison, N.E., “Thinking About the World We Make,” in *Complexity in World Politics: Concepts and Methods of a New Paradigm*, ed. by Harrison, N. E. (Albany: State University of New York Press, 2006).

150 Rosenau, J.N., “Many Damn Things Simultaneously: Complexity Theory and World Affairs,” in *Complexity, Global Politics, and National Security*, ed. by Alberts, D. S. and Czerwinski, T. J. (Honolulu: University Press of the Pacific, 2002).

As a defining case in point for our purposes, the rigid boundaries and spheres of American and Soviet Cold War influence fractured, splintered, and flew apart in 1991, and then re-aggregated in ways that were inconceivable a mere decade before. In the two decades since 1990, new states were founded at the net rate of 1.6 per year,¹⁵¹ and international non-governmental organizations and transnationally active corporations were created at an astonishing rate. Today, there are some 27,000 internationally active non-governmental organizations,¹⁵² 63,000+ multinational corporations,¹⁵³ and about 3,000 cities with over 100,000 people, plus another ~19,000 human settlements with populations between 5,000 and 100,000. Overall, therefore, there are roughly 110,000 leaders with global reach. (Good data are hard to come by, but according to C. van Marrewijk *et al.*, there were about 2,957 cities with 100,000 or more people on Earth in the early 1990s.¹⁵⁴ J. Vernon Henderson and H.G. Wang estimate that there were 2,684 cities with populations of at least 100,000 or more people in 2000.¹⁵⁵ Yet another accounting states that there are currently about 21,905 urban areas each populated by more than 5,000 people, of which about 18,948 contain between 5,000 and 100,000 people).¹⁵⁶

The leadership of many of these non-state entities conduct their own international activities across state borders. Clearly, a theory that concentrates on the dynamics of only 190 interacting states does not capture the full complexity of the international system today. One of the tenets of complexity theory is that as the number of agents and the degree of their freedom in a system increase, so the outcomes become increasingly difficult to predict. This happens because the agents in a complex system have agency — they must make decisions based on available information,

151 Net because some states flew apart (Yugoslavia into five states) and others unified (Germany, Yemen).

152 For INGOs, see Union of International Associations, *Yearbook of International Organizations 2012-2013: Geographical Index: A Country Directory of Secretariats and Memberships* (Boston: Brill, 2012).

153 For multinational corporations, see Gabel, M. and Bruner, H., *Global Inc: An Atlas of the Multinational Corporation* (New York: New York Press, 2003).

154 C. van Marrewijk, *et al.*, *International Economics* (Oxford: Oxford University Press, 2006) (data tables at: <http://www2.econ.uu.nl/users/marrewijk/international/zipf.htm>).

155 Henderson, J.V. and Wang, H.G., "Urbanization and City Growth: The Role of Institutions," *Regional Science and Urban Economics*, 37(3) (2007), doi: <http://dx.doi.org/10.1016/j.regsciurbeco.2006.11.008>

156 *Data Sets, Global Rural-Urban Mapping Project* (New York: SocioEconomic and Applications Data Center, Colombia University), <http://sedac.ciesin.columbia.edu/data/collection/grump-v1/sets/browse>

and these decisions are undetermined in advance because of the stochastic way that different types of agents interact over time.

Thus, in the post-Cold War period, when rigid division between two essentially closed, relatively simple systems of states collapsed into an open flux across borders, new and powerful players entered the field of cross-border relations within the East Asian region. Indeed, some agents — corporations, unions, civil society organizations such as development agencies or religious movements, diasporas, and sometimes even individuals — may cross over and act simultaneously in more than one open, complex system at a time (a state, a market, and a church, for example). Some may cross state borders and operate simultaneously in multiple state systems or in international commons under the jurisdiction of no state (like pirates on the ocean). Others may be transnational actors working at the same time at different levels and locations through networks and influential webs such as the virtual diasporas supporting irredentist movements,¹⁵⁷ thus creating a kind of quantum politics. Neil Harrison calls such actors “meta-agents”¹⁵⁸ because they are both agents at a lower, domestic scale of the larger international complex system and acted upon at the same time by other states in the international system, itself a dynamic complex system that is not controlled centrally and constitutes an open-ended, evolving structure.¹⁵⁹

By this perspective, a state — a very large emergent system in its own right — adapts to other states, or constantly *co-evolves* with them to regenerate the international system of states. In this view, global or regional level interstate relations are not stable *per se* — an attribute that is often referred to as a positive value, the maintenance of which, by virtue of lending predictability to the outcomes of inter-state transactions, should guide the exercise of great power. Rather, the relationships between states are continuously reinvented and the “balance” between contending forces is always dynamic, a “fleeting embodiment” of the underlying deep organization of the domestic and international systems, never returning to the same equilibrium point.¹⁶⁰

157 *The Internet and International Systems: Information Technology and American Foreign Policy Decision-Making Workshop* (Berkeley: Nautilus Institute, 1999), <http://oldsite.nautilus.org/gps/info-policy/workshop/papers/>

158 Harrison, N.E. (2006), p. 8.

159 *Ibid.*, p. 27.

160 *Ibid.*

Complex Adaptive Systems and Networked Governance

The agents that constitute a complex state system — that is, individuals, civil society organizations, state bureaucracies, etc. — are all purposeful and able to learn and adjust their behavior in response to other agents and environmental factors. They may be able to change their behavior very quickly to adapt to external stress, and thereby lend resilience to the whole system — at least for a while. In doing so, they will often innovate and create new types of social agents, or differentiate those that exist to specialize in particular types of adjustment — as occurred, for example, when nuclear weapons were deployed, forcing whole new types of military organization and thinking to affect the traditional posture of military forces. Each of these kinds of innovation represents an increase in social complexity, or as Joseph Tainter puts it:

[Complexity] is a fundamental problem-solving tool. In its early phases, complexity can generate positive feedback and increasing returns. Confronted with challenges, we often respond by strategies such as developing more complex technologies, adding more elements to an institution (specialists, bureaucratic levels, controls, etc.), increasing organization or regulation of transactions, or gathering and processing more information. Each such action represents increasing complexity. Their effectiveness comes in part because changes in these dimensions can be enacted rapidly. While humans may be complexity-averse when we personally bear the cost, our problem-solving institutions can be powerful complexity generators. All that is needed for growth of complexity is a problem that requires it. Since problems always arise, complexity seems to grow inexorably. Since complexity is an adaptive problem-solving strategy that has costs, it can be viewed as an economic function. Societies invest in complexity.¹⁶¹

Unsurprisingly, complexity theory has been applied not only to the international system as a whole, as outlined above, but also to the realm of military security in the aftermath of the Cold War. Just as realist theories of the international system were mechanical in nature, so theories of war and military strategy in the industrial era were “Newtonian”: that is, they posited that war was linear in nature, that its effects could be observed and predicted, and that military organization and warfighting itself were

161 Tainter, J.A., “Problem Solving: Complexity, History, Sustainability,” *Population and Environment*, 22(1) (2000), doi: <http://dx.doi.org/10.1023/A:1006632214612>

subject to effective centralized command and control from above. Today, war is viewed dynamically. As John Schmitt states:

War is fundamentally a far-from equilibrium, open, distributed, nonlinear dynamical system highly sensitive to initial conditions and characterized by entropy production/dissipation and complex, continuous feedback. Rather than thinking of war as a structure at equilibrium, we should think of it as a standing wave pattern of continuously fluxing matter, energy, and information.¹⁶²

Like other social domains, Northeast Asia's militaries have faced a general shift from simple to complex environments, from simple to complex warfare. Instead of defined battlegrounds with distinct frontiers and dedicated forces, the military in each country faces diverse types of adversaries. (The exception is the Korean Demilitarized Zone, frozen in the 1950s on the northern side). Many possible adversaries for each military operate without central direction. They do not present fixed targets. Yaneer Bar-Yam argues that the military is particularly susceptible to the general law that an organization's repertoire of possible actions must be at least as complex as the challenge confronting it. As Bar-Yam argues, "In a high complexity environment, high complexity forces are more capable than low complexity ones. Thus, an effective analysis of warfighting capability must include both scale and complexity of the forces and the environment where the conflict occurs."¹⁶³

The scale at which the military applies force becomes a critical issue because its practices must match the level of complexity of the countervailing military. "A force that is organized, trained and otherwise prepared to apply large scale force," he writes, "is not well suited to high complexity conflicts."

Similarly, a force that is designed for high complexity conflicts is not well suited to large scale conflicts. More generally, the complexity of a force's capabilities at each scale of a possible encounter is a key property that describes the abilities of that force. This, then, is the central basis for

162 Schmitt, J.F., "Command and (out of) Control: The Military Implications of Complexity Theory," in *Complexity, Global Politics, and National Security*, ed. by Alberts, D. S. and Czerwinski, T. J. (Honolulu: University Press of the Pacific, 2002); Rosenau, J.N. (2002), p. 37.

163 Bar-Yam, Y., *Complexity of Military Conflict: Multiscale Complex Systems Analysis of Littoral Warfare* (Cambridge: New England Complex Systems Institute, 2003).

evaluating the effectiveness of force design in the face of a specific complex military mission or conflict.¹⁶⁴

As Trainter noted above, the argument that the complexity of organizations and problems must match to find solutions is a general proposition about the relationship between problem-solving organizations and the issues they tackle. As the number of complex global problems increases, so the level of social complexity must increase to solve these problems. This imperative creates a need for new forms of organization to fill the “complexity deficit,” as we shall see below.

Perhaps the most intractable and profound security problem in the region is the divided Korean Peninsula. The North Korean nuclear threat is the only geopolitical global risk originating in East Asia that can be found among the WEF’s top fifty global risks — in which the criterion is that a risk could impose a cost of more than \$10 billion dollars. Therefore, we will examine the evolution of the Korean Peninsula from a simple to complex security environment.

Korea’s Complex Regional Security Environment

The security environment of a small nation like Korea is especially complex, due in part to its division into North and South Korea, but also to the nature of great power relations. Five decades after the end of the Korean War, and two decades after the end of the Cold War, Korea remains trapped in a set of mutually reinforcing security dilemmas. These are partly driven by geopolitical circumstances in which great powers continue to exercise influence over the two Koreas. These external powers aim to realize their own interests in Korea by exercising diplomatic and military power in response to the DPRK’s nuclear breakout, on the one hand, and by attempting to pursue their divergent interests with respect to the future of the Peninsula regarding territorial disputes, resource management, military deployments, and crisis management, etc., on the other.

In this manner, classic geopolitical concerns such as the nuclear non-proliferation regime, the maintenance of the reputation of United States as nuclear and global hegemon, Sino-Japanese hostility, Sino-US distrust and the Taiwan Straits issue, and the desire of Russia to participate in regional security and development schemes are all super-imposed on and shape the

164 *Ibid.*, p. 4.

fundamental insecurity of Korea. This insecurity includes its division by war and the long standoff between its two halves. These external drivers over-determine inter-Korean relations and make it almost impossible to align the internal and external variables that influence progress or regress in those relations. When domestic Korean political and economic variables are added to the conflict equation, especially the isolated nature of the DPRK regime and the volatility of the ROK's democratic polity, it is almost certain that one or more of the critical external variables will be out of alignment at the brief moments when the two Koreas are able to accommodate each other. This makes periods of inter-Korean rapprochement short and virtually ensures their brutal, often abrupt termination and reversion to chronic conflict.

Thus, one could compare regional security problems to a classic six-sided Rubik's Cube with an additional layer of complexity arising from the domestic variables. As is well-known, the solution to the Rubik's Cube requires that each of the six faces — just as there are six states in East Asia — show only one color: each of these faces has nine cells, totaling fifty-four independent externally-oriented variables. The combination of cells by permutation is enormous, and solving the Cube takes practice, skill, and knowledge of solution algorithms that exceed the ability of most people.

As Changrok Soh has observed, since the Cold War ended, non-state actors have transformed what was a strict hierarchy of hegemonic state control into a "horizontal self-autonomous system" organized into networks composed of states and non-state actors. These diverse actors interact in transnational networks and contribute a new type of "networked governance" to the traditional, state-dominated system. This hybrid organizational innovation has been critical, for example, in developing a human rights regime in East Asia, and in creating a multilayered strategy to promote human security in the region.¹⁶⁵

Such networks have inaugurated a loose web of multilateral dialogues and concerted activities in the East Asia region that supplement rather than supplant the dominance of existing states.¹⁶⁶ Ha Young Sun has described this phase of international relations in East Asia as the "wolf spider"

165 Soh, C., "Enhancing Human Security in North Korea through Development of a Human Rights Regime in Asia," *Korea Review of International Studies*, 10(1) (2006).

166 Yeo, A., *Bilateralism, Multilateralism, and Institutional Change in Northeast Asia's Regional Security Architecture*, EAI Fellows Program Working Paper Series (Seoul: East Asia Institute, 2011).

stage, in which great powers still hunt for prey, but also form complex, multi-sectoral networks of diplomatic, economic, cultural, and ecological interdependence built on a foundation of information and knowledge.¹⁶⁷ Although it is small, South Korea is ahead of the pack in developing a networked strategy as a global actor, and may even lead China, still preoccupied with consolidating its economic development. North Korea lags far behind in this view, and to co-evolve with the other states without collapsing, to survive at all, it must introduce networked strategies.¹⁶⁸ Moreover, it must integrate with South Korea at the same time or fall apart. Along the way, leaders in each country must become cosmopolitan and adopt multiple identities as national and regional citizens.¹⁶⁹ Koreans face the extra challenge of adopting a triple identity as citizens of a divided nation, citizens of separate Korean states, and citizens of the East Asian region.¹⁷⁰

Thus, in Ha's view, South Korea should develop its thickest, stickiest webs with the United States and Japan, but over time, he suggests its web of relationships with China will be equally important. From this perspective, it is particularly important that South Korea do everything possible to ensure that China and the United States do not tear apart their web of increasing interdependence; South Korea can play the role of network mediator (sometimes called a border-spanning role in network theory), using its information power and knowledge to weave together the American and Chinese webs.

South Korea should also find ways to work around the "structural holes" that exist in the Japanese and American webs with respect to North Korea — a state almost bereft of networks in the sense used here.¹⁷¹ South Korea, he avers, can use its network power to overcome its relative scarcity of resources in terms of size and military power, but not, he implies, if it continues to be distracted by petty competition with North Korea rather than forging joint strategies.¹⁷² In short, as he suggests, "The complex time of the twenty-first century calls for complex networks."¹⁷³

167 Ha, Y.S., *Path to an Advanced North Korea by 2032: Building a Complex Networked State*, EAI Asia Security Initiative Working Paper (Seoul: East Asia Institute, 2011).

168 *Ibid.*, p. 13.

169 *Ibid.*

170 *Ibid.*, p. 14.

171 See Mansourov, A., *Bytes and Bullets: Information Technology Revolution and National Security on the Korean Peninsula* (Honolulu: Asia Pacific Center for Security Studies, 2005).

172 Ha, Y.S. (2011).

173 *Ibid.*

Ha Young-sun's concept is controversial in South Korea, not the least because the Lee Myung-bak government funded his South Korean-Japan project in 2009, to develop a joint concept of Korean-Japanese future relationships, as part of Lee's "Global Korea" strategy.¹⁷⁴ In support of this strategy, it proposes to maximize the soft power and public diplomacy of a middle-sized power by creating networks that promote national goals.¹⁷⁵ Others from the Ha study-group of complex diplomacy have suggested that South Korea implement a networked middle-power strategy to cope with the pressure placed on it by the US-China power transition in the region. Instead of having to choose between the United States and China, as Lee Sook-Jong states, South Korea should

pursue middle power diplomacy on global issues based on its United States support while staying away from some regional security issues that would invite US-China rivalry, such as the Taiwan issues and the South China Sea maritime disputes.¹⁷⁶

The September 2011 opening of the China-Japan-Korea Trilateral Cooperation Secretariat in Seoul was the epitome to date of the pursuit of this complex networked statecraft at a regional level, while the convening of the 2010 Seoul G20 summit exemplified it at a global level.¹⁷⁷

Ha and colleagues have not fully embraced the role of civil society in their concept of the "complex networked state," a polity in which civil society would not necessarily align with the goals of the nation state, but instead develop a cosmopolitan agenda that may counter rather than facilitate advances by the state. In part, Ha's state-focused concept reflects the relatively weak civil society sector in China, Japan, the two Koreas, and Russia. Nonetheless, civil society is in play in different and powerful ways within each society and across borders, even in North Korea. Civil society has already demonstrated its capacity to affect state agendas and to

174 "Korea-Japan Joint Research Project for New Era," *KBS World Radio*, 27 January 2009, http://world.kbs.co.kr/english/archive/program/news_zoom.htm?no=4709¤t_page=44

175 Sohn, Y., "Searching for a New Identity: Public Diplomacy Challenges of South Korea as a Middle Power" in *Opening New Horizons for Public Diplomacy and Culture in the 21st Century, 2012 Korean Association of International Studies-Korea Foundation International Conference* (Seoul: Korea Foundation, 2012); Sohn, Y., "Middle Powers' Like South Korea Can't Do without Soft Power and Network Power," *Global Asia*, 7(3) (2012).

176 Lee, S.J., *South Korea as New Middle Power Seeking Complex Diplomacy*, EAI Asia Security Initiative Working Paper (Seoul: East Asia Institute, 2012).

177 The history of the Secretariat: *Politics* (Seoul: Trilateral Cooperation Secretariat), http://www.tcs-asia.org/dnb/board/list.php?board_name=3_1_1_politics

assert its own priorities in the region in different issue areas. We examine complex diplomacy in greater depth in chapter 6. We turn now to the role that networked civil society has already played in responding to global ecological problems in Northeast Asia, implementing its own foreign policies or “civic diplomacy” across national borders.

Civil Society’s Networked Search for Cooperative Solutions

In networked governance strategies, civil society actors have already contributed significantly to weaving the kinds of web espoused by Ha. They are particularly adept at creating networks that identify where global problems intersect, where solutions may jointly address more than one problem at a time, and where different linked problems might be tackled simultaneously to solve a common problem. In principle, civil society networks are also particularly suited for sensitive security tasks such as engaging North Korea, having the agility to forge relationships and deliver joint benefits quickly, without regard for the old “decision rules” adhered to by slow-moving, conservative bureaucracies.

Here we use networks to refer to structured patterns of communication and coordination originating with social actors who are not part of the state. As the degree to which the state encompasses social, economic, cultural, and even religious life varies in each society, so too does the relative autonomy and organizational capacity of civil society organizations originating in these spheres. Civil society organizations may reside primarily in the market or in the social sphere in all its diversity. The networks they spawn may incorporate actors from multiple sectors, including the state, provided the impetus is generated and maintained by civil society organizations. Their influence arises by virtue of their structural position. This is due either to their degree of connectedness, which enables them to increase the speed and quality of information flow across networks, thereby making the world smaller, or to their ability to fill structural “holes” between other networks by spanning borders or boundaries, thereby creating networks of networks enabling other organizations to communicate in ways otherwise thought impossible. The Nautilus Institute’s NAPSNet information service, with readers in every country in the region and, often, contributors from the

“community of readers,” is the former case in point.¹⁷⁸ “Track 2” dialogues such as the Northeast Asia Cooperation Dialogue are the classic instance of the latter.¹⁷⁹

Civil society actors are defined here not just with respect to the degree to which they are civilian, but also to the point to which they are committed to universally accepted values. John Keane argues that to the extent that civil society organizations realize the latter, they are truly part of “global civil society.”¹⁸⁰ Because many societies contest these values, what one society views as civilizing may be viewed negatively in another (gender-based rights, for example). Some “dark” non-state networks engage in activities that are arguably barbaric, such as human trafficking, drug or arms trading, or the propagation of international terrorism.

Thus, not all non-state networks are civil society networks as defined here, and some of these dark networks may contribute to the global problems that afflict the region.¹⁸¹ In this book, we have not sought out to illustrate this point, or to make a net assessment of the contribution of civil society and its diplomacy as described in subsequent chapters. There are plenty of failures to point to in which an uncivil society campaigned for socially and culturally regressive goals (historical revisionism and Japan’s textbooks are described in chapter 6); and there are also many instances in which single-issue civil society groups caused more chaos by mis-specifying their goals, seeking to bring about an ill-conceived or poorly understood solution, or failing to implement it in a competent, sensitive manner. In this book, we try to understand how civil society and its agencies may succeed, not fail, and we recognize that much research remains to be done in relation to the activities of uncivil society and its agents, as well as the performance metrics and record of civil society in this region.

178 See Hayes, P., et al., “The Impact of the Northeast Asian Peace and Security Network in US-DPRK Conflict Resolution,” in *Internet and International Systems: Information Technology and American Foreign Policy Decision-making Workshop* (Berkeley: Nautilus Institute, 1999).

179 See *The Northeast Asia Cooperation Dialogue* (La Jolla: University of California Institute on Global Conflict and Cooperation), <https://igcc.ucsd.edu/research-and-programs/programs/regional-issues/northeast-asia/northeast-asia-cooperation-dialogue.html>

180 Keane, J., *Global Civil Society?*, Contemporary Political Theory (Cambridge: Cambridge University Press, 2003).

181 Such as DPRK drug smuggling across the border to China. See Meng, L., “Study on Problem of Trans-Border Drugs Crimes on Sino-DPRK Border,” *The Journal of Chinese People’s Armed Police Force Academy*, 1 (2009).

To succeed, the leading agents in a networked complex adaptive system must have internal decision rules, the ability to learn from interaction with other agents and their environment, and thus the flexibility to adjust their decision rules and strategies. Most critical of all, civil society networks build enduring relationships that make trust possible, especially in conflict zones. Each of these engagements will change attitudes, build relationships, and make it possible to conceive of a world in which communication leads to cooperation and, in turn, to collaboration between warring parties. As Raul Lejano put it (in relation to establishing peace parks in conflict zones such as the Korean Demilitarized Zone), the process of creating such networks may lead to relationships “between actors, between groups of actors, between subsets of each group, etc. That is, we do not simply model cooperation as occurring between states, but between individuals, organizations, epistemic communities, and others. This follows from the fact that relationships are multiplex, unbounded, and dynamic.”¹⁸²

By *multiplexity*, Lejano means the “multiple contexts of a relationship whereby roles, exchanges, or affiliations overlap in a social relationship.” In addition to their structural attributes, networks are powerful because their social agents, especially individuals, live many lives at once, and each of these public and private lives intersects with other social networks, often not related directly to the primary concern of the issue-based network. Yet information will travel over any connected network, not just one that is designed around an issue. This is why taxi drivers, hairdressers, and other agents whose location leads them to connect with many people at the boundaries of their multiple identities are such good sources of rumor or hard information.

A good example of a regional multi-sectoral network is the Northeast Asian Forest Forum (NEAFF). Launched by South Korean foresters in 1998 and initiated by businessperson Moon Kook-Hyun, participants include forestry and paper companies, environmental organizations, forester associations, scholars, and individuals in China, Mongolia, and South Korea. It aims to “restore degraded forest lands, to combat desertification and deforestation, and to promote environmentally sound and sustainable management of forest ecosystems in the region.”¹⁸³ NEAFF worked in the DPRK to reforest 1.6 million hectares of land deforested for fuel wood and

182 Lejano, R.P., “Theorizing Peace Parks: Two Models of Collective Action,” *Journal of Peace Research*, 43(5) (2006), doi: <http://dx.doi.org/10.1177/0022343306066565>

183 *Keep Northeast Asia Green* (Seoul: Northeast Asia Forest Forum), <http://www.neaff.org/>

timber by establishing and upgrading forest nurseries. It also planted trees and fixed sand dunes in China's Inner Mongolia and the Gobi Desert of Mongolia.

A closely related civil society initiative was Forests for Peace (FFP), an inter-Korean reforestation project that aimed to restore degraded forestland and food production in North Korea. Begun in April 1999, FFP worked on a bilateral basis with the DPRK Asia Pacific Peace Committee and shipped pine tree seeds, spray machines, branching shears, plastic sheeting, and fertilizer on 22 May 1999 to the DPRK via the Inchon-Nampo sea route. Following that initial shipment, five more consignments containing various supplies and forestry equipment were dispatched by the end of 2000.¹⁸⁴

In the 1990s, a network of civil society organizations in Northeast Asia actively worked to address regional acid rain and yellow sand issues as well as to reduce greenhouse gas emissions. In 1995, the Atmospheric Action Network in East Asia (AANE) launched with members from South Korea, Japan, China, Hong Kong, Taiwan, Mongolia, and Russia. AANE's funding came from Japan and the secretariat was based in Seoul.¹⁸⁵ It aimed to reduce acid rain emissions, monitor the impact of acid rain by promoting citizen air quality measurement techniques, and address co-related greenhouse gas emissions.¹⁸⁶ However, the group faded away after achieving few concrete reductions in emissions. It suspended operations not long after 2000.¹⁸⁷ Another regional network, EnviroAsia, is sustained by a coalition of Japanese environmental groups. The project shares information about the environment between groups in South Korea, China, and Japan.¹⁸⁸

Esook Yoon argues that the failure of state-based environmental dialogues and meetings to reduce trans-boundary air pollution in East Asia opens a political space that may be filled by non-state civil society

184 Moon, K.H. and Park, D.K., "The Role and Activities of NGOs in Reforestation in the Northeast Asian Region," *Forest Ecology and Management*, 201(1) (2004), doi: <http://dx.doi.org/10.1016/j.foreco.2004.06.013>

185 Jho, W. and Lee, H. (2009), p. 55.

186 Yoon, E., *et al.*, "The State and Nongovernmental Organizations in Northeast Asia's Environmental Security," in *The Environmental Dimension of Asian Security: Conflict and Cooperation over Energy, Resources, and Pollution*, ed. by Schreurs, M. A. and Hyon, I.-T. (Washington, DC: United States Institute of Peace Press, 2007).

187 Jho, W. and Lee, H. (2009), p. 55.

188 For background in English, see *East Asia Environmental Information Center* (Tokyo: Asia 3R Citizen's Network), <http://www.asia3r.net/en/link/eden-j.html>. See also the sharing platform in three languages (Chinese, Japanese, and Korean) *Enviro Asia* (East Asia Environmental Information Centre), <http://www.enviroasia.info/>

networks. In spite of the severe and already-noted constraints on the ability of civil society organizations to affect state policy in East Asian countries, Yoon suggests:

Such informal social networks may facilitate official governmental level negotiation by opening dialogue on politically sensitive or ignored issues. NGOs also can play a role enhancing public awareness about the environment through information circulation, campaigns, and education programs. Grassroots actors may not be able to alter the fundamental distribution of power that explains the official and bureaucratic character of environmental politics in NEA today. Still, through the mobilization of social concern, civil society may achieve the goal of placing the environment higher on the NEA political agenda and slowly crack open a space for greater citizen participation in regional politics.¹⁸⁹

In this state-centered political culture, civil society networks may still play a critically important ideational role by convening and supporting the emergence of epistemic communities in each culture that share an understanding of sustainability problems. As Jho and Lee argue, the yellow sand issue was first raised at an expert forum in 1988, and in 1992 an information cooperation network called the Northeast Asian Conference on Environmental Cooperation (NEAC) was formed by experts, civil society organizations, scholars, and research institutes. NEAC held fourteen regional meetings from 1992-2006.¹⁹⁰ This group revealed facts about yellow sand and desertification that were previously unidentified and provided a rationale for a formal governmental investigation.¹⁹¹

Nonetheless, these early efforts by pioneering civil society environmental networks armed only with scientific information produced relatively few results. On yellow sand for example (whereby huge volumes of airborne dust laced with toxic materials are transported from inner Mongolia and the Mongolian desert across Korea and Japan, reaching all the way to North America), these networks succeeded in publicizing the issue and possible solutions. Yet they were unable to persuade governments to fund a proposed Northeast Asia Environment Cooperation Core Fund.¹⁹²

189 Yoon, E., "The Growth of Environmental Cooperation in Northeast Asia: The Potential Roles of Civil Society," *The Good Society*, 12(1) (2003), doi: <http://dx.doi.org/10.1353/gso.2003.0032>

190 See *Northeast Asian Conference on Environmental Cooperation* (Tokyo: Environmental Cooperation Office, Japan Ministry of Environment, 2005), https://www.env.go.jp/earth/coop/coop/neac_e.html

191 Jho, W. and Lee, H. (2009), p. 59.

192 Ibid.

This shortfall suggested to Yasuo Takao that environmental and other single-issue networks needed to make common cause with cities and local governments engaged in their own transnational, networked activities as described above. Cities can provide the resources and a degree of accountability to civil society organizations that increase their autonomy for the central state. He argues that local governments are located strategically between transnationally linked local civil society organizations and central state governments.¹⁹³ Exactly how this coordination would be achieved is not clear. Regional single-issue networks focused on air pollution, climate change, gender, etc., tend to emanate from the primary mega-city of each country, whereas many of the cross-border urban networks described by Takao are activated in second-tier cities, in part to compete with the primary capital city. We do not have a good picture of how these single-issue networks work between South Korea and China or how they interact with nascent Chinese non-governmental organizations.¹⁹⁴

In contrast, other civil society groups have managed to affect government policy. For example, at the center of the warzone — the Korean Demilitarized Zone — that forms the greatest barrier of all to the interlocking urban corridor stretching from Beijing to Tokyo, the DMZ Forum has set out to create a park. The goal of creating the park is to preserve biodiversity, restore Korean ecology and contribute to peacemaking, historical reconciliation, and cultural preservation by linking the Sorak, Keumkang, and Cheolwon regions north and south of the DMZ.¹⁹⁵

This proposed peace park is at the center of the very same biogeographical region where the BeSeTo giga-city is emerging, along with a multi-sectoral network of geographers, botanists, and ecologists from government and private sector conservation organizations in each country of Northeast Asia. In meetings convened by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in Bangkok, a regional inter-governmental organization proposed a set of trans-border biodiversity corridors through Mongolia, China, Russia, and North Korea. They want to ensure sufficient habitat remains for keystone and “flagship” species,¹⁹⁶ the successful conservation of which would ensure that a host

193 Takao, Y. (2003), pp. 78-79.

194 Xie, L., *China's Environmental Activism in the Age of Globalization* (London: City University London, Department of International Politics, 2009).

195 See the DMZ Forum's website for details: <http://www.d mzforum.org/>

196 See United Nations Economic and Social Commission for Asia and the Pacific, *Saving the Flagship Species of North-East Asia : Nature Conservation Strategy of NEASPEC* (New York:

of other species survive the emergence of the giga-city and its networked infrastructure, such as pipelines, roads, railways, and power lines.

In turn, a biodiversity corridor that would link the northern habitat preservation zones with the DMZ Peace Park, and stretch southward to Jeju and on to Japan, has also been proposed by this author.¹⁹⁷ As a result of the Forum's work, key government officials in the United States and South Korean militaries have indicated they support a DMZ Peace Park and biodiversity conservation, although they have not yet managed to elicit a response from the North Korean side.

Civil society networks have addressed other "hot" topics. These include the proposed Taiwan-North Korea nuclear waste deal¹⁹⁸ and the marine oil pollution clean-up networks in which civil society organizations played an effective role either in stopping governments outright (as in the case of the nuclear waste deal) or in mobilizing massive, bottom-up civilian efforts to achieve what governments could not (as when confronted by the massive 1997 oil spill off the western coast of Japan).¹⁹⁹

Conclusion

This chapter presented an argument about the relationship between global problems, complexity, problem-solving, and East Asian civil society. In section 1, we asked what is "global" about a global problem and what makes it "problematic" in the first place. We reviewed categories of global problems — those that affect the sharing of global commons, those that affect our shared humanity, and those that rely on our shared rule book

United Nations); *Meeting on Nature Conservation in Transboundary Areas in North East Asia Expert Group* (Incheon: North-East Asian Subregional Programme for Environmental Cooperation); Futrell, W.C., "Shallow Roots: Transnational Environmental Civil Society in Northeast Asia" in *American Sociological Association's 103rd Annual Convention* (Boston: American Sociological Association, 2008); Futrell, W.C., "Environmental Networks and Flows in Northeast Asia: NGOs and Institutes Working on Sandstorms and Migratory Birds" in *ISA's 49th Annual Convention, Bridging Multiple Divides* (San Francisco: International Studies Association, 2008).

197 See Hayes, P., "Sustainable Security in the Korean Peninsula: Envisioning a Northeast Asian Biodiversity Corridor," *The Korean Journal of International Studies*, 8(10) (2010).

198 See *TED Case Studies: Taiwan Nuclear Waste Exports (NKORNUKE)* (Washington, DC: American University), <http://www1.american.edu/ted/nkornuke.htm>

199 For the spill, see *Tanker NAKHODKA Oil Spill in the Sea of Japan* (Fukui: Environmental Research Centre, Fukui Prefectural Institute of Public Health and Environmental Science), <http://www.erc.pref.fukui.jp/news/Eoil.html>. For the citizen clean-up, see *TED Case Studies: Japan Oil Spill* (Washington, DC: American University), <http://www1.american.edu/ted/japanoil.htm>

for regulating human activity. We described the World Economic Forum's map of high-impact, most-probable global risks. And we suggested that only by cross-border and cross-cultural dialogue and negotiation could we determine the priority and strategy for solving global problems via coordination and collaboration at a regional level in the form of jointly implemented, shared solutions.

In section 2, we confronted complexity head-on. We suggested that the world is becoming not merely more complicated, but more complex in the sense that all realms of human existence are increasingly unpredictable, opaque and uncertain. We added that the possible emergence of the world's first giga-city — a continuous city corridor stretching from Beijing to Tokyo — would make worse the already contradictory aspects of energy insecurity, urban insecurity, and nuclear insecurity, cross-cut by the challenges of climate change and the specific threat posed by an unstable, declining North Korea.

Drawing on the work of Korean political scientists, we suggested that complex issues require a complex, networked response, organized transnationally across the region by states or by civil society. We examined cooperative environmental projects undertaken by inter-city, cross-border networks linking Japan, South Korea, and China, and suggested that integrating the single-issue environmental and security civil society networks in future networks of local governments will create a new type of resilience in the region and generate new capacity for framing and solving global problems in spite of their complexity.

We concluded this chapter by arguing that it is central to the role of civil society networks that they provide a critical perspective as to what constitutes the most urgent global problems that originate in or affect the region as a whole, rather than mirroring the priority problems set by states. Otherwise, civil society networks risk being entrapped in *realpolitik* zero-sum games, rather than moving towards *idealtolitik* based on cooperative strategies. To this end, we will present detailed case studies of energy, urban, and nuclear insecurity in the next three chapters of this book. In each case, the nature of the core problem, the "center of gravity" of urban insecurity, climate change, energy insecurity, or nuclear insecurity, differs. As a starting point in mapping the complexity landscape, each chapter considers the extent to which the authors can identify common causes and shared solutions in the problem area and country of primary concern, across problems, and across borders.

This mapping is similar to any exploration of uncharted terrain. What is important is to identify multiple pathways between problems and solutions, to identify the high ground that can serve as navigation points in the future, and to find ways around barriers without having to climb over the highest peaks. In reality, there is little terrain left on Earth that has not been lived in before. The same is true of conceptual territory and of the corpus of specialized insight into specific problems. Thus, the question is not to uncover but to identify the paths not taken, while learning from those with intimate knowledge of the local ground.