

# THREE CONSTRUCTS OF SYSTEMS THINKING FOR BETTER GOVERNING A GLOBALIZED WORLD IN THE ANTHROPOCENE

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## ABSTRACT

Living in a globalized society implies that political thinking necessarily extends beyond the national level to reach us in our roles as citizens of the world. Living in today's globalized society also requires a new level of political thinking commensurate with the complexity of its challenges. To overcome the many difficulties we, and the planet we live on, face in the Anthropocene era, it has become incumbent on human beings to practice systems thinking.

This paper will examine how general systemic thinking, critical systems thinking, and whole healing systems thinking can help us both comprehend and overcome these challenges.

**Keywords:** Global citizen, cosmopolitanism, globalization, Anthropocene, Earth System, systems theory

## I . Introduction

In Paul Crutzen's (2002) view, the Anthropocene era started in the latter part of the 18th century when global atmospheric concentrations of carbon dioxide and methane began to rise due to human fossil fuel use. Since this early phase of industrialization, human exploitation of the Earth's resources has increased dramatically and is now, according to the Anthropocene logic, so pervasive and profound in its consequences that it is influencing the very functioning of Earth itself (Lövbrand, Stripple, and Wiman 2009).

Crutzen and Will Steffen (2003) argue that the magnitude and rate of human activities currently are approaching or even exceeding some of the great forces in nature, creating a non-analogue state in the dynamics and functioning of the Earth System (Lövbrand, Stripple, and Wiman 2009). The Earth itself is a single system, within which the biosphere is an active essential component.

Human activities are now so pervasive and profound in their consequences that they affect the Earth at a global scale in complex, interactive and accelerating ways; humans now have the capacity to alter the Earth System in ways that threaten the very processes and components, both biotic and abiotic, upon which humans depend (Dalby 2004, 2).

As social and ecological systems around the world are becoming increasingly globalized, Anthropocene thinking requires that we merge the contemporary discussions of global change and globalization into one dialogue. The flows across boundaries, of people, materials, fuel and pollution that are sources of concern to many who study "globalization" are precisely the processes that are forcing the biospheric system in the new ways that so worry earth system scientists (Dalby 2009).

Even if in different disciplines the term globalization has nuanced meanings, with

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some scholars theorizing globalization as an ideology, some as a prevailing epoch, and others as a process, I would like to refer to the conceptualization of globalization by Chiu and Duit (2011) as the processes of global (i.e., worldwide) distribution of ideas and goods, most significantly with regard to scientific, technological, economic and cultural products and developments (cf. Gray and Colucci-Gray 2014, 18). Also, the humanities and social sciences should make essential contributions to issues such as understanding the drivers and barriers within societal organizations and human behavior, as well as the role of cultures in supporting the resilience capability of the Earth System.

Responding to disasters and cooperating where and when people are suffering have become the norm in international politics in the last couple of decades. While many states remain highly suspicious of humanitarian interventions and the principle of the responsibility to protect, nonetheless the habits of cooperation and the impulse to assist in the face of disaster offer promising pathways for further cooperation (Dalby 2009; Renner and Chafe 2007).

This future must now be based on the recognition that we are common inhabitants of a biosphere first, and citizens of particular states only secondarily. This rethinking of the implicit terms of geopolitics is gradually shifting the terms of international cooperation. We must view security not in the sense of preparing for war with rival states, but rather in terms of the ecological understanding of humanity as a presence in a biosphere that we are already changing quite drastically (Dalby 2009; Dalby 2013).

Human actions on so significant a scale and extent that we can be said to live in a new geological period, the Anthropocene, require us to rethink our assumptions of living within an external environment. Taken together these criticisms of the traditional categories of contemporary political life raise important questions about how geography is now understood and how we might teach it in the future. Such an analysis also suggests the continued importance of critique as an intellectual practice in the academy (Dalby 2007, 103).

Sustainability cannot exist without justice, and justice cannot exist without equity (LeVasseur 2014). What is not yet clear in many discussions of climate change and security is that the Anthropocene should be understood as the physical manifestations of globalization, a phenomenon that is about using fossil fuels as energy to move huge quantities of material, quite as much as it is about moving money or changing identities.

Globalization reverberates throughout global society. It has, for example, also involved the expansion of urban spaces where the majority of humanity now live. Vulnerabilities and the possibilities of either cooperation or peace-building, or conflict and violence play out in these increasingly artificial landscapes. It is a physical process of environmental change that unavoidably shifts the focus from governments to people – it is their insecurity that becomes central to the analysis (Brauch et al. 2008; Dalby 2013).

Jürgen Habermas has differentiated the concepts of “system” and “lifeworld.” The most fundamental connection between the two realms relates to the process of “rationalization.” Lifeworlds are connected to systems via rationalization, a process that joins the two together (Lloyd-Jones 2004). As a corollary, in this paper I would like to explore the differences and interactions between system theory and the “real-life” world in creating the contemporary crisis and offering a way out of it.

My primary focus will be on how political life in the world should play out in the cosmopolitan era. In particular, due to climate change within the Anthropocene era, a

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new conceptualization of political citizenship is required. To achieve it, I want to explore how systems thinking can be applied to effectuate the needed changes. The main questions addressed in this paper are: a) How does the parametric paradigm of politics change in a globalized society? b) How can we manage to control the activities and interactions of what I will argue are the three levels of political life in a globalized society? c) What kind of thought and practice must we engage in to restore the only planet we live on? d) What is the proper management methodology to insure the sustainability of the Earth System?

### **II. The Paradigm Shift on the Politics of the Earth System in a Global Society**

The Earth System is a coupled human and ecological system, and has basic feedbacks between human society and the global environment. Biermann (2007, 4) defines Earth System Governance as "the sum of the formal and informal rule systems and actor-networks at all levels of human society (from local to global) that are set up in order to influence the co-evolution of human and natural systems in a way that secures the sustainable development of human society." Biermann (2007) notes that Earth System governance involves a myriad of public and non-state actors at all levels of decision-making, ranging from networks of experts, environmentalists and multinational corporations, to agencies set up by governments. Therefore we need not be surprised that Earth System dynamics are characterized by complex and multiple-scale feedbacks, critical thresholds, abrupt changes and large temporal and spatial variability. Earth System discourse is concerned with non-linearity, the existence of bifurcations, flips between multiple unstable equilibriums, and physically chaotic behavior (Wiman 1991).

The assumptions underlying three aspects of contemporary global politics on the grandest scale are subject to critique here: the War on Terror, globalization and the notion of what constitutes the environment. The global War on Terror can be treated briefly as it is not really global, and might well be better understood by using imperial analogies from the past. The definition of the environment, we find, shifts once we recognize that globalization manifests itself in the centrality of crowded metropolises in a process of "glurbanization."

But what exactly is globalization? With the increased scale and speed of worldwide flows of capital, goods, people, and ideas across national borders, "globalization" is understood as a process that erodes national boundaries, integrating national economies, cultures, technologies, and governance, producing complex relations of mutual interdependence.

The concepts of 'cosmopolitan' and 'national' identities are particularly complex. National identity is understood to mean the existence of communities with bonds of 'blood and belonging' arising from sharing a common homeland, cultural myths, symbols and historical memories, economic resources, and legal-political rights and duties. Therefore nationalism can take "civic" forms, meaning ties of soil based on citizenship within a shared territory and boundaries delineated by the nation-state, or it may take "ethnic" forms, drawing on more diffuse ties of blood based on territorial, religious, linguistic, or ethnic communities. But cosmopolitans can be understood as those who identify more broadly with their continent or with the world as a whole, and

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who have greater faith in the institutions of global governance.

The nationalism-cosmopolitan dimension can be expected to crosscut traditional ideological cleavages, although there is some overlap. If leaning rightwards, cosmopolitans can be expected to support policies designed to dismantle protectionist economic barriers, while those on the left may favor other measures like stricter global environmental regulations and greater spending on overseas aid. Cosmopolitans can be expected to be comfortable living and working in different countries, familiar with travel well beyond their national boundaries, and fluent in languages, as well as well connected to international networks through global communications (Norris 2000).

Although scholars have suggested a range from two to six levels at which world politics can be analyzed, the most widely chosen scheme utilizes three levels based on Kenneth Waltz's use of three images in 1959 to analyze the causes of war (Rourke and Boyer 1996,18). This suggests that we can combine three kinds of level of activity and engagement with our global political lives.

- First, as global citizens we may act at the global system level, with our activities drawing attention at the system level by political analysts. This level presupposes that the world's social-economic-political structure and pattern of interaction (the international system) strongly influence the policies of states and other international actors (Rourke and Boyer 1996, 19). In other words, the political life in this level is strongly influenced by the powerful social-economic-political structure and its patterns of interaction.
- Second, we may act within the characteristic patterns of an individual country; the impact of those traits will affect the country's behavior in state-level politics among nations. Analysts can also elucidate the characteristics of political actors at this level. Because states are the key international actors at this level, we may act through the institutions sanctioned by the constitution of our sovereign state.
- Third, we can act and make decisions at a personal individual level. At this level, understanding how people make choices can help us understand how international politics operate (Rourke and Boyer 1996, 18).

We can conceptually differentiate these three levels from one another, but we also tend to mix them up in practice in global political activity.

The most familiar definition of politics was provided by David Easton in his identification of the political system with the "authoritative allocation of values for a society" (Easton 1971, 129-133). Extending the meaning of Easton's analysis on a wider scale, we can define global politics as the "authoritative allocation of values for a global society." There are as many forms of political competition in the international community as in an anarchic Hobbesian society. The actors of the international community are often left with limited resources, and must compete in accordance with ground rules set by their already successful rivals.

Now, we need to match the traditional conception of international politics with global politics as its reorganizes within a transformed nationalist-cosmopolitan dimension. Many of the time-honored traditional boundaries are frayed or missing entirely. To take one prominent political issue of the day, social inequality should be analyzed through the perspective of new cosmopolitan community societies because the world is becoming ever more networked and interconnected. Territorial, state, economic, social and cultural borders still exist, but they no longer coincide (Beck 2012, 302).

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Most textbooks about international politics have dealt with globalized politics as its plays out under the nationalism-cosmopolitan dimension. Scholars have suggested many approaches to the study of international politics since the Cold War, including realism, a society of states, the pluralist-interdependence model, the dependency model, and the world society model (Holsti 1995, 5-16). In this context we might return to a much earlier definition of globalization, William Shakespeare's in *As You Like It*: "All the world's a stage, and all the men and women merely players." But this means that the roles they play must change as the world stage changes. The interplay of contemporary international relations stems primarily from the world's political, economic, and social fragmentation (Rourke and Boyer 1996, 2).

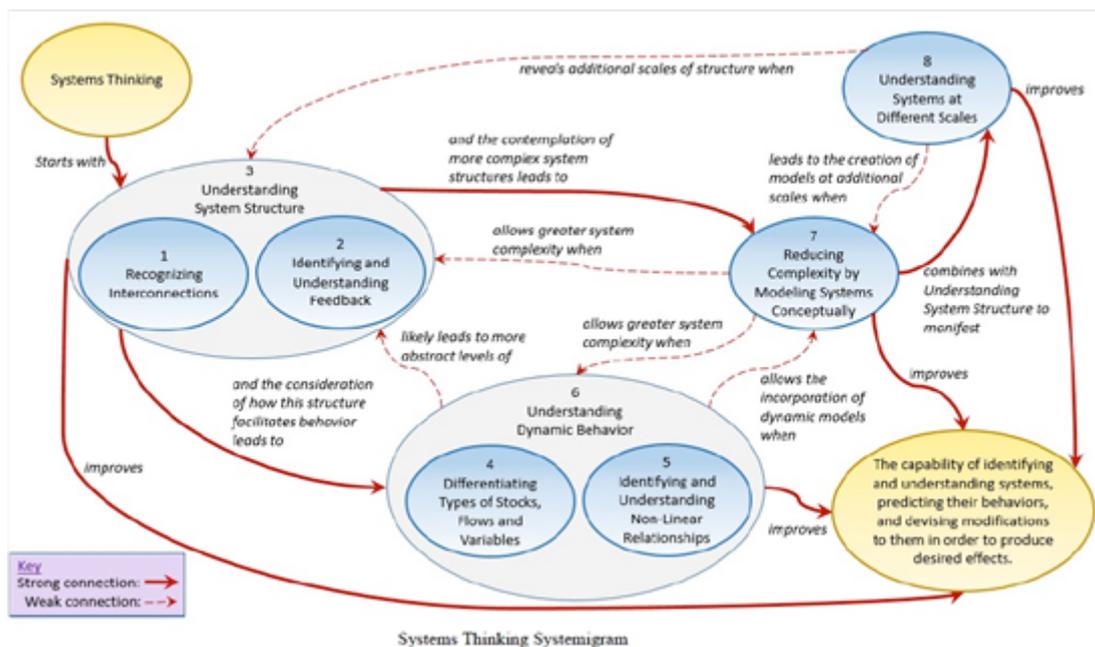
### **III. Three Constructs of Systems Thinking**

In confronting fragmentation and the interaction of rapidly changing roles, systems thinking provides tools for dealing with complexity. It allows us to track and take into account a myriad of nonlinear relationships, feedback loops, hierarchies, emergent properties and so on. In particular, critical systems thinking has problematized the issue of boundaries and analyzed their consequences for inclusion, exclusion and marginalization (Bammer 2003; Midgley 2000).

Peter B. Checkland (1985, 31) explains that system thinking is founded upon two pairs of ideas: those of emergence and hierarchy, and communication and control. Systems thinking utilizes modal elements to consider the componential, relational, contextual, and dynamic elements of the system of interest (Davidz and Nightingale 2008). Among the components of the system, there is a hierarchy, at the same time that there are mutual relationships across them. In this context we can present systems thinking as a pair of concepts: systematic and systemic. Systematic thinking means using a method, or following a plan or an explicit and rational procedure. Systemic thinking means using systems ideas, treating things as systems or from a systems view point and pertaining to a system or systems (Shim 2015).

Ross D. Arnold and Jon P. Wade proposed a definition of systems thinking for use in a wide variety of disciplines, with particular emphasis on the development and assessment of systems thinking within educational efforts. Their definition was derived from a review of the systems thinking literature combined with the application of systems thinking to itself (Arnold and Wade 2015, 676-677). They explain that in this systemigram, thick lines represent strong connections, while thin dotted lines represent weaker, but still important, connections. It is important to note that the system of Systems Thinking as depicted in this systemigram operates as a series of continuous feedback loops. They insist that the system does not cease to function at the final node; rather, as each of the elements improves and in turn improves connected elements, Systems Thinking itself continuously improves (676). After synthesizing definitions in the current literature, primarily those offered in Booth Sweeney and Sterman (2000), Hopper and Stave (2008), and Plate and Moore (2014), they suggest that their principal deviations consist of two elements: Reducing Complexity by Modeling Systems Conceptually, and Identifying and Understanding Non-Linear Relationships. Following are descriptions of each of the elements based on their presentation.

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First, Arnold and Wade assert that “Recognizing Interconnections” is the base level of systems thinking. The skill of “Recognizing Interconnections” involves the ability to identify key connections between parts of a system. Even highly educated adults without systems thinking training tend to lack this ability (Plate and Monroe 2014).

Second, Arnold and Wade note that some of the interconnections combine to form cause-effect feedback loops (Hopper and Stave 2008). Systems thinking requires identifying those feedback loops and understanding how they impact system behavior (Plate and Monroe 2014).

Third, Arnold and Wade note that system structure consists of elements and interconnections between these elements. Systems thinking requires understanding this structure and how it facilitates system behavior (Ossimitz 2000; Richmond 1994).

Fourth, Arnold and Wade establish the abilities to differentiate three concepts – stocks, flows, and variables – and to recognize how they operate as critical skills central to systems thinking. Stocks refer to any resource pools in a system, flows are the changes that occur in their levels, and variables are the changeable parts of the system that affect stocks and flows, such as a flow rate or the maximum quantity of a stock. Any of these conceptual components can be physical or emotional – for example, the amount of paint in a bucket, or the level of trust between two people.

Fifth, they separate non-linear relationships from other connections among stocks, flows, and variables. They note that the taxonomies created by Hopper and Stave (2008) and Plate and Monroe (2014) tend to imply for most readers linear flows, which could be confusing when we are forced to confront the complexity of non-linear flows.

Sixth, Arnold and Wade explain that interconnections, the way they combine into feedback loops, and the way these feedback loops influence and consist of stocks, flows and variables create dynamic behavior within a system. This behavior is difficult to grasp or understand without systems training (Plate and Monroe 2014). Emergent behavior, a term used to describe unanticipated system behavior, is one example of dynamic behavior. They suggest that differentiating types of stocks, flows, and

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variables, as well as identifying and understanding non-linear relationships, are keys to understanding dynamic behavior.

Seventh, Arnold and Wade focus on the element of “Reducing Complexity by Modeling Systems Conceptually,” which for them represents a deviation from the models of Hopper and Stave (2008) and Plate and Monroe (2014). Although it sounds similar to Hopper and Stave’s Using Conceptual Models, their element differs, they feel, in the ability to conceptually model different parts of a system and view a system in different ways. According to them, performing this activity extends beyond the scope of defined system models and enters the realm of intuitive simplification through various methods, such as reduction, transformation, abstraction, and homogenization (Wade 2011). They point out that research shows that perceptual wholes can reduce the conscious accessibility of their parts (Poljac, De-Wit, and Wagemans 2012). This skill could also be viewed as the ability to look at a system in different ways that strip out excess and reduce complexity.

Eighth, Arnold and Wade argue that the skill of “Understanding Systems at Different Scales” is similar to Barry Richmond’s forest thinking (Plate and Monroe 2014). It is said that this skill involves the ability to recognize different scales of systems, and systems of systems.

Ninth and finally, Arnold and Wade note that their proposed definition must be subjected to the System Test. According to them, it passes Item 1 of the tests, as it contains a clearly defined, understandable, and relatable goal. It also passes Item 2: its elements are described in detail. It also passes Item 3, as interconnections and dependencies between the elements are described in the systemigram. They therefore assert that their definition is the first that passes the System Test and successfully defines systems thinking as a system.

According to the Stanford Encyclopedia of Philosophy, a citizen is described as a member of a political community who enjoys the rights and assumes the duties of membership. Since the early 1990s, two broad challenges have led theorists to re-examine the concept of citizenship: first, the need to acknowledge the internal diversity of contemporary liberal democracies; second, the pressures wrought by globalization on the territorial, sovereign state (“Citizens, Resident Aliens, and Rights” 2011). The Encyclopedia notes that the main dimensions of citizenship (legal, political, and personal and group identity) can be instantiated in very different ways within the three dominant models shaping views of the concept: the republican, the liberal and cosmopolitanism (“Citizenship and Borders” 2011).

Global politicians should pursue the authoritative allocation of values for a global society, especially in the area most crucial for most global citizens, the principle of global justice. Global citizens need to cultivate their values and attitudes for living together with each other in a globalized society. Politically, global citizens need to learn liberal democratic values and attitudes for the better society, to place themselves as humans on "a frontier between the world, with its being and becoming, and a super world" (Voegelin 2003, 227).

And global citizens need to cultivate their own capacity of systems thinking for continuing the sustainability of the Earth System, in terms of general systems thinking, critical systems thinking, and whole healing systems thinking.

First, systems thinking is the process of understanding how things – physical, non-physical, or any mixture – that may be regarded as systems influence one another

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within a more complete entity, or larger system. In nature, systems thinking examples include ecosystems in which various elements such as air, water, movement, plants, and animals work together to survive or perish. In organizations, systems consist of people, structures, and processes that work together to make an organization "healthy" or "unhealthy".

Systems thinking has roots in the General Systems Theory that was advanced by Ludwig von Bertalanffy in the 1940s and furthered by Ross Ashby in the 1950s. In systems science, it is argued that the only way to fully understand why a problem or element occurs and persists is to understand the parts in relation to the whole. A holistic system is any set (group) of interdependent or temporally interacting parts. Parts are generally systems themselves and are composed of other parts, just as systems are generally parts or holons of other systems ("Systems Thinking" 2015).

Second, critical systems thinking is a systems thinking framework, that wants to bring unity to the diversity of different systems approaches and advises managers how best to use them (Ulrich 2003; "Critical Systems Thinking" 2015). Critical Systems Thinking, according to Gabriele Bammer (2003), "aims to combine systems thinking and participatory methods to address the challenges of problems characterized by large scale, complexity, uncertainty, impermanence, and imperfection. It allows nonlinear relationships, feedback loops, hierarchies, emergent properties and so on to be taken into account and critical systems thinking has particularly problematised the issue of boundaries and their consequences for inclusion, exclusion and marginalisation" (cf. "Critical Systems Thinking" 2015).

According to Crutzen (2002), sustainable management in the Anthropocene "will require appropriate human behaviour at all scales, and may well involve internationally accepted, large-scale geo-engineering projects, for instance to 'optimize' climate." Among a wide range of propositions, some of which date back several decades and are only now being revived, are schemes for curbing global (tropospheric) warming through injecting dust (aerosols) into the stratosphere (cf. Crutzen 2006; Wiman 1995). Earth System Governance is neither confined to states and governments as sole actors, nor to scientists as the only Earth System experts. As Frank Biermann argues (2007, 329), it rather involves a "myriad [of] public and non-state actors at all levels of decision-making, ranging from networks of experts, environmentalists and multinational corporations, to agencies set up by governments."

As Simon Dalby (2004, 2) has argued, the Anthropocene requires a new ethics because "ecology at the largest scale, that of the biosphere, is the required backdrop for considerations of our interconnected fates." Karen Litfin (2005) has made a similar argument by proposing that we need to align human purposes with the "function of Gaia." Her vision of "Gaian democracies" oriented towards sustainability and justice on a global scale implies a clear break with important modern institutions such as the sovereign state and the revolutionary mentality of the sovereign individual. "Hierarchical structures of domination would give way to participatory networks, and symbiosis would displace competition as the defining modality in economic exchange" (Litfin 2005, 514). If she is right, the current emphasis on the role of governments in the Earth System discourse may prove disproportionate.

The Anthropocene imagery, on the one hand, produces visions of expert-driven planetary monitoring, grand-scale technologies (geoengineering) and "global management" with some sort of World Environment Organization as coordinating

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institution. On the other hand, the complexity, risks and indeterminacy of “the coupled human and ecological system” also elicit a more deliberative, decentralized, heterogeneous language for exploring social and political organization for sustainability (Lövbrand, Stripple, and Wiman 2008, 13-14).

Third, “whole systems healing” is a way of thinking, leading, and healing that prepares us all to become active agents of individual growth, social change, and environmental restoration. By cultivating the health and wellbeing of individuals, communities, and the environment, we become more aware of the interconnectedness of all living systems. The Whole Systems Healing program operates within the framework of systems thinking, which emphasizes interdependence and the need to consider the whole system when seeking to effect change (Kreitzer 2014).

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