

Global Governance and the World Economy:  
Impressions from Complex Adaptive Systems Analysis

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January 2012

## **Abstract:**

Two features of the modern world economy have become abundantly clear. First, its component parts are now so densely interconnected that disturbances reverberate quickly, sometimes catastrophically, right around the globe. And second, the ever-bigger world economy is now bumping up against, and in some cases breaching constraints imposed by the finitude of the planetary bio-geosphere. Modeling human society on Earth as a complex adaptive system illuminates the role that global governance can play with respect to both of these issues. In the first case, complex adaptive systems analysis tells us that excessive connectivity in the economy, and in human society on Earth more generally, causes brittleness and reduced resilience. A loosening up of excessive connectivity and a shift toward decentralization and localized self-sufficiency will improve resilience, but will also promote fragmentation; thus the need for global governance will be amplified to ensure overall systemic coherence and ecological sustainability. In the second case, a close look at the property of ‘emergence’ in complex adaptive systems suggests that human society on Earth is endowed with an evolving ‘collective consciousness’ which, at this early stage of its development, is vulnerable to momentary impulses, unreflective behaviour, and simplistic ideas. One such idea—that growth is good and more is better—has been institutionalized as a non-negotiable political commitment to economic growth, forming the core principle of modern global governance. Given that this idea is untenable in the long run, it must be superseded in our emergent ideational domain. A new form of global governance, guided by new ideas and principles, can foster a more mature shared worldview not premised on the lethal illogic of perpetual economic growth.

## I Introduction

The push-pull world of Newtonian mechanics is familiar, predictable and useful. We build bridges, run factories and put satellites into orbit according to Newton's laws of force and motion. We can exploit and manage our material world because of our knowledge of these immutable laws of nature.

But there's another world out there that's much harder to quantify and manipulate. What laws govern how a forest works? How do the world economy and stock market work, and why are they so volatile? How are we to understand the world's communication networks? Forests, the stock market, the internet, among many other things, are all hugely complex systems with many interactive parts, and with synergies among those parts which often yield unpredictable consequences. And they're all constantly changing, constantly adapting to new circumstances, some generated from within, some imposed from without. They're all *complex adaptive systems* which function according to rules we can barely discern, let alone fully understand.

Earth's climate, heavily influenced by linkages between the atmosphere and the world ocean, may be the biggest complex adaptive system of all, but a close second is the planetary socio-ecological system. This big system also has two major components—the human population and Earth's bio-geosphere. The relationship between these components, that is, between people and planet, is deeply interactive, giving rise to a bewildering array of changes large and small, some instant, some glacial. As a result, the planetary socio-ecological system is forever adapting and moving. But moving where?

We know that complex adaptive systems vary and evolve over time, even if we often have difficulty precisely identifying the causes of change or the direction of evolution. In the case of the planetary socio-ecological system, however, we have a special interest in trying to understand the process of evolution because, for us, the stakes are nothing short of existential. The human population, our collective human society on Earth, is utterly dependent on the bio-geosphere for protection and sustenance. A proper understanding of the relationship between people and planet, therefore—how it changes and how it can be managed to preserve the integrity of the socio-ecological system—is of the utmost importance. In what follows, I highlight the problematic nature of the world economy as seen through the lens of complex adaptive systems analysis, and introduce a novel conception of global governance.

## II Managing Human Behaviour

The major source of uncertainty in the relationship between people and planet in the past was the changeability of nature, but today, because of growing stresses imposed on Earth's operating systems by human activity, the dominating cause of unpredictability is gross human behaviour. We're changing the composition of the atmosphere, the ocean, and our soils with little comprehension of the consequences. Fresh water systems, forest cover, species habitat and much more are all vulnerable to roughshod human intervention, interventions so massive that we are now entering what geologists call the Anthropocene epoch.

Given this new source of unpredictability, and given that human survival depends on the stability and viability of the socio-ecological system over the long term, it follows that human activity—the disruptive element in this relationship—should be constrained. Newton's laws tell us nothing about how to accomplish this, but a better understanding of complex adaptive systems may be more helpful.

Ecosystems function quite nicely by themselves; they do not require our oversight. Damage done to ecosystems, however, and to the very structure of our material world, is being caused by us. Managing the relationship between people and planet, and consequently the evolution of the planetary socio-ecological system, is tantamount to managing human behaviour. How might this be accomplished?

A first conceptual step is to separate the socio-ecological system into its component parts, namely, Earth's natural materials and processes on one hand, and the human population on the other. This analytical starting point isolates 'human society' as a separate component of the larger socio-ecological complex, allowing it to be examined on its own terms. Having done this, it immediately becomes apparent that the human population on Earth is a complex adaptive system in its own right. It includes a huge number of component parts, dense linkages and dynamic synergies among those parts, and an inherent tendency to experience spontaneous non-linear behaviour—from the sudden outbreak of civilian unrest and war, to spasms of global giddiness created by the latest pop star craze.

It is by no means uncommon for large complex systems such as the global socio-ecological system to have smaller complex systems embedded within them; in fact the process of isolating ever-smaller component parts could be continued almost indefinitely. This applies both to Earth's

ecosystem and to human society. The latter comprises within itself a host of social and built systems any one of which could be further deconstructed into complex subcomponents; indeed, individual people are themselves complex adaptive systems. For present purposes, however, the system of interest is the human population as a whole. To begin to probe the idea of global governance, conceived as the management of human activity on Earth, I'll highlight two particular features of complex adaptive systems, namely, *resilience* and *emergence*.

### **III Complex Adaptive Systems: Resilience**

Complex adaptive systems are composed of many interactive parts, with a high degree of connectivity among those parts. They also have a propensity for fast and surprising changes in behaviour which may be disproportionate to perceived causes. These are good things because dense connectivity and the ability to change quickly make rapid adaptation to new situations easier. Complexity is a rich source of innovation, and it's also a source of stability. Diversity among its parts, distributed capabilities among its component sub-systems, and redundancy to protect against failure all combine to make complex adaptive systems highly dynamic, resilient and tenacious.

Too much complexity, however, can cause vulnerability. If connectivity is too dense, if component parts are too tightly coupled, if a breakdown here spontaneously creates a breakdown there, then overall system resilience decreases—the ability to adapt becomes brittle instead of flexible, and surprising changes in behaviour can be shocking and damaging instead of useful. The modern world economy now confronts exactly these problems. It has become too complex, too tightly coupled, too brittle, and therefore more likely to experience jarring change and cascading crises to which it cannot effectively respond. Many of these changes and crises will follow from misuse of the planetary resource base, but many more will follow from the mismanagement of our own population and social structure.

Any effective remedy for this problem will require an increase in resiliency. This means loosening up the tightly-coupled connectivity so characteristic of modern society—in our financial markets, in our energy and food production and delivery systems, in our transportation and communications networks, in our electrical power grids, and much more. All these sub-systems serve us well, but they're each poised on a knife-edge, each vulnerable to catastrophic failure. Increasing resilience means decentralizing the dense nodes which control these sub-systems,

distributing capabilities across a richer and more varied socio-industrial landscape. It means easing our locked-in dependence on far away suppliers of goods and services, and on irreplaceable technologies understood only by an elite few. Increasing resilience means, to a large extent, increasing self-sufficiency and autonomy. In terms of social organization, complex systems analysis calls us to envisage the democratic empowerment of local communities in order to increase diversity, redundancy and novelty, to gain greater control over basic services vital to our lives, to reduce our ecological footprint, and, in the general case, to increase adaptive resilience for the world economy and the human population as a whole.

This devolution to local empowerment is both necessary and important, but it misses a significant point. The resolution of any major problem—in this case a loss of resilience—is best handled with a two-pronged approach—bottom-up empowerment *and* top-down management. Local autonomy is direct and practical, but there must be some degree of cooperation and coherence among autonomous communities, and some overall sense of direction for their collective evolution as well. That sense of direction and coherence can only be provided by an overarching system of governance which facilitates and coordinates the work of local authorities. Recognizing the human population on Earth as a complex adaptive system interacting with its material environment leads to a new emphasis on decentralization, but by the same token it amplifies the need for supranational coordination.

As well as improving resilience, letting a thousand flowers bloom is surely an attractive philosophy which speaks to individual liberty and expression, but, given modern exigencies which are planet-wide in scope, the need for autonomous communities to share the same worldview with regard to long-term sustainability is of paramount importance. While ‘sharing the same worldview’ may carry the odour of totalitarianism, this need hardly be the case, as the next section will make clear.

#### **IV Complex Adaptive Systems: Emergence**

Understanding the human population on Earth as a complex adaptive system debilitated by a loss of resilience leads directly to a new recognition of the need for decentralization and global governance. A second characteristic of the human population also points to this same need. Not yet mentioned, another common feature of complex adaptive systems is *emergence*. Emergent properties are extra,

unanticipated properties which emanate from the synergistic interactions of the system's component parts. The familiar expression 'The whole is greater than the sum of its parts' loosely captures this idea. Perhaps the best example of it is individual human consciousness. The human body itself is a complex adaptive system, but no empirical evaluation of its parts or structure could predict the existence of the transcendent phenomenon of consciousness. The ability to perceive and engage with the domain of ideas is an emergent property of the human body and brain.

Can a similar property be ascribed to the human population as a whole? Is there such a thing as a collective consciousness? The idea seems fanciful at first blush. We're much more comfortable with the notion of individual sets of experiences and preferences which may be aggregated into sum totals, but which do not constitute an independent entity with unique characteristics. Jean-Jacques Rousseau called this sum total the 'will of all.' Interestingly, it is precisely this 'will of all,' this aggregation of personal experiences and preferences, now called 'utility functions,' which provide the rationale and raw data for our modern consumer-oriented economies.

And yet we do see odd phenomena washing across the human population which evoke a sense of a common consciousness. Usually these phenomena are emotional; waves of fear and panic, or sometimes elation and excitement, can spread rapidly across large sectors of society, sweeping up individual sentiments which otherwise are far removed from the immediate effects of the originating cause. The stock market roller-coaster offers an excellent example of institutionalized emotional mayhem wherein greed pushes stock values up and, just as quickly, fear pushes values down, often with no good reason other than the psychological twitchiness inherent in this undisciplined and disembodied 'mind.'

In contrast to the 'will of all,' Rousseau posited the existence of a 'general will,' a unified expression of social concern about the common good, a collective impulse to achieve the best interests of society as a whole. Rousseau's famous social contract was intended to create the political space in which this general will might flourish. To whatever extent this has actually occurred, the general will could plausibly be construed as a kind of collective consciousness, an emergent property associated with the human population as a whole. Of course, such speculations are impossible to prove. Collectively shared intentions arguably originate in and are propagated only by individual minds—but nonetheless it is tempting, in contrast to shopworn Enlightenment individualism, to posit the existence of an emergent phenomenon, a society-wide group consciousness akin to the more familiar and accessible consciousness enjoyed by the solitary

person.

Complex adaptive systems and their peculiar ability to spawn emergent properties sensitize us to the possibility that the human population, itself a complex adaptive system, may likewise generate such a phenomenon, however crude or unformed such a thing might be. The impression offered here is that this is indeed the case: a nascent collective consciousness does exist and, ideally, like Rousseau's general will, it could take the form of a collective intention to identify, protect and enhance the common good of the human population as a whole, vis à vis the ecosphere.

Like the individual human mind, collective consciousness evolves through developmental stages, from a rudimentary awareness of the world around, through a kind of adolescent excitement and vulnerability, and finally to a more mature and stable form characterized by empathic care and responsibility. This latter form of consciousness, writ large, would be well suited to serve the public interest—to provide the noumenal foundation of global governance—by constraining or enabling the macro-behaviour of human society as circumstances require. It seems clear enough, however, that we are currently at the middle stage of development, easily tantalized by simplistic ideas and momentary impulses, easily stampeded into unreflective, emotion-driven behaviour, and easily diverted from serious consideration of the long-term health and vitality of the human condition.

This is not to say that grand and well-intentioned ideas about the long-term evolution of human society on Earth don't exist—they do—but they tend to be simplistic, idealized and panglossian, as is often the case with young, inexperienced adolescents. And this is certainly the case with the single idea which now dominates our collective consciousness, namely the idea that a rapidly, perpetually growing world economy will solve all our troubles and lead us inevitably to a prosperous future for all. It's not a bad idea, and it surely is intended to serve the common good by creating jobs, spurring innovation, reducing poverty, improving living standards, and so much more. But the idea is also shallow-minded. The prospect of unlimited economic growth on a finite planet flies in the face of the most elementary of ecological calculations. Worse, competitive over-exploitation driven by the pursuit of growth lies at the root of current processes of global ecological degradation, and is largely responsible for the precariousness of our current relationship with Earth's biosphere.

This has clear implications for the evolution of global governance. If humanity's collective consciousness is now at an intermediate phase of development and maturation; if, as such, that consciousness is vulnerable to cure-all ideas; and if, consequently, human society has embraced the

simplistic, ecologically unsustainable idea of perpetual growth, ostensibly to serve the common good; then what is called for is an act of leadership intended to countermand this juvenile agenda, to move the process of noumenal evolution forward, and to put in place a more responsible plan. This means creating a new form of global governance specifically designed to serve the better, nobler and more mature aspirations of people, to meet those aspirations with a certain sense of ecological modesty, and by doing so to preserve the integrity of the planet.

## **V Conclusion**

The practical mechanics of global governance are not addressed here; that will be the burden of other essays. The preliminary objective instead has been to show how framing the global governance problematic in terms of complex adaptive systems sheds new light on what such governance might entail. By viewing the human population on Earth as a complex adaptive system, we learn that improved resilience in the face of economic turbulence and environmental change will require a devolution of control over some elements of society's infrastructure and material processes, and that devolution must be accompanied by political oversight intended to maintain system-wide coherence, coordination and cooperative movement toward shared goals. And, by viewing the human population as a complex adaptive system with a nascent emergent property akin to individual consciousness, we learn that we must pay closer attention to the world of ideas, a world now dominated by the impossible expectations of youthful exuberance. The prospect of an improved system of global governance informed by these things can set the right tone for public debate by promoting a more sophisticated discourse among public officials and within civil society. And, instead of rushing after material prosperity on a wave of economic growth, such discourse may lead to a richer and more rewarding future.

As indicated earlier, many intransigent problems are best handled with a two-pronged approach—bottom-up empowerment and top-down management—and that is certainly the case with regard to the challenge of preserving the long-run viability of the socio-ecological system which we inhabit. The managerial issue, which I have framed as a problem of global governance, is especially interesting because the complex adaptive systems point of view recommends a decisive shift to the noumenal domain. The universalized commitment to economic growth as a policy priority is still bulletproof, seemingly invulnerable to reasoned argument or emotional appeals for a

sustainable world. One core, non-negotiable belief—the belief that growth is good—dominates the international political and economic agenda. The task at hand is to engage this belief directly, not with the intention of discarding its beneficial features but to subsume it, to move beyond it toward a more mature, more efficacious idea which serves the purposes of sustainability while simultaneously offering a clear sense of direction for the evolution of bottom-up socio-political activism. New ideas will emerge from synergies ignited in the noumenal domain of the collective human experience; they will hold the promise and the prospect of new adventures, opening wider our doors of perception without damaging the only home we will ever know.

Comments welcome  
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