

# *The Political Economy of the Capital System: Food, Climate Change, and Violence*

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**F**or those concerned with both human and ecological well-being in the world today, it is essential to grasp the dynamics of the global political economy. In particular, the system of capital should be viewed as a system using a thermodynamic (entropic) perspective. In this article I focus on the interrelationship among violence, climate change, and food production. Because the global system of capital is a high-input system, requiring massive amounts of matter, energy, and information to reproduce itself, it generates specific types of crisis, internal to its own dynamics. However, low-input solutions to such crises are here possible, if the theoretical and ideological blind spots of neoliberalism can be overcome.

Scholars at the New England Complex Systems Institute (NECSI) have put together impressive studies showing relationships between food shortages and “social unrest,” defined as a condition “[reflecting] a variety of factors such as poverty, unemployment, and social injustice.”<sup>1</sup> Their research suggests a provocative conclusion:

Despite the many possible contributing factors, the timing of violent protests in North Africa and the Middle East in 2011 as well as earlier riots in 2008 coincides with large peaks in global food prices. We identify a specific food price threshold above which protests become likely. These observations suggest that

protests may reflect not only long-standing political failings of governments, but also the sudden desperate straits of vulnerable populations. If food prices remain high, there is likely to be persistent and increasing global social disruption. Underlying the food price peaks we also find an ongoing trend of increasing prices. We extrapolate these trends and identify a crossing point to the domain of high impacts, even without price peaks, in 2012–2013. This implies that avoiding global food crises and associated social unrest requires rapid and concerted action.<sup>2</sup>

NECSI researchers point to the dangers of a buffer-less global system. Without any buffers, many destitute regions of the world will experience a loss of food security and large scale social violence and upheaval; but widespread instability has become a global issue as food supplies have become interdependent on trade and other global markets. A reform-oriented solution to these growing problems emerges for NECSI, namely: solutions to problems in the international political economy include a re-regulation and restriction of commodity markets as well as a reduction in ethanol production.<sup>3</sup> Considering systemic instability, however, will the implementation of structure-preserving buffers be adequate to the daunting realities?

This important question should be set in the

larger context of the global political economy and within conditions of climate change. Food crises and climate change in various ways are both linked to strategies of high-output industrial agricultural production. Neoliberal policy and factory farming, for instance, promote such high-output strategies. In this article I will suggest an alternative to current high-output global food production: low-input agriculture methods, which may offer insightful models for the future of food production and its management.

#### POLITICAL ECONOMY: A SYSTEMS VIEW

Why is there poverty and hunger alongside the rise of global temperatures while polar ice caps melt at unprecedented rates? Why are there, at the same time, violent revolutions throughout the Middle East and unidirectional tendencies toward militarization? Surely today's crises are not isolated or random, but flow out in patterned forms from the deepest structures of our society and may be conceived on the rationale for the political economy upon which this society is based.<sup>4</sup>

From the systems point of view, the current international political economy is a precise result of the conditions by which structured forms of energy, materials, and information flow through, and are reproduced in, our social system with its overarching logic of capital. Societies, in order to exist as systems, must continuously reproduce specific structures, over time, in order to maintain their integrity against

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of fidelity between these social groups. Ultimately, when these structural inputs were removed, the feudal system experienced multiple crises and collapsed (in the language of systems, the feudal system underwent a bifurcating phase change, opening the space for the system of capital to emerge). Thus, the idea is that the political economy of the system of capital can be understood by looking at the way it transforms inputs of energy, materials, and information in the service of

reproducing its structurally necessary components as outputs.

With respect to the reproduction of capital, the capital system must continuously convert the bulk of its energy, materials, and information into structural components that must be reproduced for the system to perpetuate itself over time, including:

- a structurally enforced inequality between capital and labor;
- constant accumulation of capital with expanding profit motive;
- a property system with private ownership of means of production;
- an uncontrollable world market with requisite production objectives of capital;
- a nation-state system as framework of international relations.

Again, if a significant portion of these structurally necessary components of the system of capital are removed, the system demonstrates signs of a crisis and undergoes a radical change in its structure; it is threatened by collapse. Not just food, then, but the following range of crisis-provoking conditions within our society can be linked to the political economy of capital:

- cyclical problems with over-accumulation and underproduction (boom and bust cycles);
- the appropriation of labor by capital (including the separation of the majority of the population from access to the inputs defining the means of subsistence)
- the structure of the ownership of means of production and the productive resources and technologies used to extract surplus labor;
- over-dependency on hydrocarbon resources;
- the politics of nation-states and national identities within the various international relations frameworks as problems of political representation;
- the problem of poverty vis-à-vis global governance institutions like the International Monetary Fund and the World Bank (and, for instance, their control of agricultural surplus through tariffs and trade organizations).

Specifying the *structural* make-up of the system of capital, then, as well as the relations that this system maintains with other, pertinent systems (ecological systems and systems of human labor) provides insights into the management and resolution of a variety of current crises. The system of capital generates the

structural crises defining our world in virtue of its own structure and the necessity it, like all systems, has to dissipate or funnel entropy—a variety of waste products and unusable forms of energy—into its environment in order to reproduce itself. The process is not dissimilar to the ways in which biological organisms must take in food and also expel harmful waste products just in order to be.

Perhaps no one has gone further in this type of analysis than Robert Biel in his study, *The Entropy of Capitalism*.<sup>5</sup> Following his lead, we might apply a general framework of systems-analysis that allows us to make the following assumptions—assumptions that inform, in turn, our view of the political economy, its dynamics, and thus, the kinds of solutions we propose to systemic crises:

1. Capital, in order to exist as a system, must continuously reproduce specific structures, over time, in order to maintain its integrity against perturbations from the environment. It allows for a range of accumulation regimes (whether mercantilist, Taylorist, etc.) to dominate this continual reproduction of input-output transfer. Simplifying things a bit, the system of capital is in all likelihood undergoing a neoliberal policy-dominated accumulation regime, which acts, to a degree, as a form of (attempted) control or agency over the dissipative dynamics of the system.<sup>6</sup>
2. When these structural components of a system are no longer reproducible, the system in question experiences an inter-linked set of crises and becomes highly susceptible to collapse.<sup>7</sup> As the system confronts such crises it breaks down and is flooded with entropy, energy that it can no longer convert into useful inputs and outputs required for its maintenance and functioning.
3. The political economy of the system of capital, including solutions to the crises it generates, can be understood by looking at the way the system of capital transforms inputs of energy, materials, and information in the service of reproducing its structurally necessary components as outputs.<sup>8</sup> The point is to attain more concrete analytical results by examining long-term historical cycles and trends. Again, these mechanisms, dictated by structure, ought to be situated within the various accumulation regimes that attempt to force controls over the

dissipative dynamics of the capital system.

In light of the core structural features outlined above, the system of capital appears to be a high-input system. That is, the system's reproduction, the sustaining of its structure, requires very high quantities, tons of inputs of energy, materials, and information and a corresponding high-input-oriented accumulation regime aimed at regulating the input-output flows. The system of capital—and certainly not the current accumulation regime—is not sustainable, even on its own terms. Moreover, any functioning accumulation regime (along with the notion of political economy that theorizes the system) configured on such high-input parameters, must be configured in such a way that sustainability requirements demand high-input suppression of emerging crises.

How can such a complex system be analyzed? One must give up the attempt to derive effects from causes in any linear progression; one must give up the notion that forms of agent-based control can, in fact, steer a system precisely designed to be uncontrollable as part of its very structure. As the entropy of the system of capital increases, these points become all the more significant. We are at a bifurcating moment in the system's trajectory where increases in its entropy mean increases in its fragility, and these in turn mean increases in its future non-predictability.

#### FEEDING PEOPLE AND SUSTAINABLE SYSTEM FEEDBACK LOOPS

I want now to consider and pursue Robert Biel's thermodynamic system perspective more fully. Food shortages and their links with violence must be analyzed by examining the entropy of capitalism, viewed as a system, holistically. Historically, the capital system has drawn its energy from two main sources—labor, especially in the global south, and environments, for example rainforests, from which capital has extracted timber for construction projects. Today the capital system is in danger of being unable to reproduce itself—its reliance on natural environments has become threatened. Thus, problems with the environment become problems within the system, compounded by the fact that capital's other essential source of inputs, labor, is only getting hungrier. As the system confronts such crises it breaks down and is flooded with entropy, energy that it can no longer convert into useful inputs required for its maintenance and functioning.

Entropy registers the necessary conversion of inputs from the environment to some socially useful

product. The system of capital converts inputs of natural resources and labor into what is ultimately the capital necessary for the reproduction of the system of capital. Here, food crises go hand in hand with environmental depletion on a wide scale, and all the while such depletion is compounded by climate change and human economic policies. Economic policies may harmfully ramify entropy in a system. Of course, one must carefully consider the role of the dominant neoliberal agricultural policy that sustains industrial and factory farming methods as a cause of food crises, both at the level of methods of production and at the level of food price regulation. Naturally, bad policy may lead to a narrowing of the options available for the system of capital to dissipate its entropy into an environment. In his review of Biel's *The Entropy of Capitalism*, blogger Luigi Russi puts this point well:

Entropy, however, also refers to the ability to process information. In other words, as the system loses its ability to process diverse information and transform itself accordingly, it becomes responsive to only a narrow set of conditions and produces an even narrower set of responses that increase its fragility. So, for example, Biel looks at the progressive inability of the system of capitalism to process information that contradicts its basic core-periphery dynamics and becomes caught in a spiral of financial instability and militarisation. This occurs because, on the one hand, finance—by

reaping profits from risk—offers distorted feedback by promoting the multiplication of risk through speculation,

thereby muffling the stabilising feedback about the unsustainability of capitalist accumulation (which requires constant dissipation into an environment, which effectively becomes a “periphery”). Militarisation, on the other hand, is the response of late capitalist regimes to the increase in feedback which the system is unable to process and which is therefore bagged as chaos and subject to militaristic repression.<sup>9</sup>

In sum, the political economy of the system of capital deploys regimes of accumulation (modes of converting inputs to outputs) in order to sustain

itself, while the very logic of these regimes generates irresolvable contradictions, for example, when it comes to providing solutions to problems in food production. In this way, Biel's perspective differs from the NECSI view. The implementation of buffers and structural reforms will not suffice; what is needed is a radically different political economy, one capable of solving the food crises because it employs accumulation regimes based on low- rather than high-input production.

Instead, a main strategy of the present capital system has been to reverse or offset diminishing returns in food production by increasing the use of high-input accumulation regimes associated with industrial and factory methods in farming, even while such methods have reached the point of diminishing returns. The problem is one of positive feedback, wherein the presence of an element in a system causes an increase of that element, forming a loop. On this logic, for instance, toxins from chemicals used to increase agricultural output can only be reduced by the use of even more chemicals.

Biel proposes a transition to low-input accumulation regimes for food production in what he calls “urban agriculture.” He maintains that “surprisingly, small farms and gardens turn out to be more efficient than plantation agriculture.” Further, “this is the real significance of urban agriculture with sufficiently high productivity to make a serious contribution to feeding the people (this is the crucial condition), then we could afford to withdraw part of rural agriculture from the current, unsustainable system and still retain the total net food production while this part is being converted to organic, low-input methods.”<sup>10</sup> Biel also cites the aquaponic greenhouse system technologies as another example of his proposed low-input accumulation regimes.<sup>11</sup> Where the system of capital requires the high-input regimes just to reproduce itself, low-input regimes require a different set of structural supports premised on the logic of a different political economy—supports such as community-based food production divorced from all the trappings of agribusiness.<sup>12</sup> The virtue of Biel's proposal lies in the fact that low-input agriculture would provide a *systemic alternative* to capital's reproduction of its structurally embedded regimes of accumulation.

Beginning from an appreciation of this, climate change can be linked systemically—if not causally—to outbreaks of violence. In a system based on high-input dissipative dynamics, conditions are so complex as to require analysis of a multiplicity of causes and

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effects on any, apparently, single phenomenon. Here, multiple causes may play a role in outcomes while multiple effects may react back on their causes and multiply them in turn. Such a logic of multiplicity flies in the face of liberal politics, which relies on policymakers to manipulate human effects on the surrounding environment in the direction of rationally desirable, that is to say, sustainable, ends. As Biel sees it, a progressive liberalism of incremental precaution and sustainability measures is no longer capable of governing capitalism because the capital system of accumulation is now in a state where its dissipation of entropy is magnifying its uncontrollability, smashing the liberal logics of causation and progression. The social and environmental spin-offs of capital accumulation (climate, violence, prices, etc.) are experiencing the mechanisms of a series of positive feedback loops and are thus spiraling out of control (thus increasing the fragility of the system). For example, we live in a world where financial instability increases the necessity of militarization to control, say, consequent outbursts of violence linked to hunger on the streets; where the control centers of the financial system react—through structurally determined mechanisms—by tapping into markets *promoting* the militarization tendency generally as an ineffective means of control of violence or else of securing its own markets, thus influencing further rises in violence and financial instability.<sup>13</sup>

To comprehend the inter-linkages, the specific relations among climate change, violence, and food, a similar understanding of systemic inter-linkages must be cultivated. We should say that rising temperatures do not correlate with violence causally, but *systemically*, with corresponding notions of feedback, and circular or retroactive causality (notions generally rejected within any liberal political philosophy supporting the system of capital under its dominant neoliberal ideology). In an August 2, 2013 post at Firedoglake.com entitled, “Rises in Violence Linked to Climate Change,” D.S. Wright notes, “some of the effects of a changing climate on the planet are pretty obvious—crop damage, higher energy bills and lower standards of living. One consequence that might not be so obvious to many is the resulting violent conflicts. A bad situation will lead to worse situations.”<sup>14</sup> Wright cites a study, “Quantifying the Influence of Climate on Human Conflict,” noting that it reports “a substantial correlation between climate and violent conflict.” The study isolates what should be a surprising fact:

even small changes in earth’s temperature or rainfall correlated with a rise in assaults, rapes, and murders, as well as group conflicts and war. Wright also draws attention to the study’s prediction of what we have reported here, namely, that such increases in these phenomena are likely to lead to compounded violence.

Wright then cites a useful, concrete example of the genocide in Darfur where conflicts over access to water led to violence and notes that changes in climate may reinvigorate violent conflict between “historic adversaries that have remained dormant in less turbulent times.”<sup>15</sup> An article by Rebecca Morelle cites an increase in domestic violence in India during droughts as another example.

While the existence of climate change—even anthropogenic climate change—may be undeniable, it is less certain whether strong or direct correlations

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can be drawn between violence and climate change. This point was made by the researchers from the “Quantifying the Influence of Climate on Human Conflict” study. Might it not be

the case that economic factors play the key mediating role between the phenomena of violence and climate change such that the link between the two is frustrated, indirect, and specious? Can it be said with any degree of accuracy, as the researchers involved in the study do say, that a 2-degree Celsius (3.6-degrees Fahrenheit) rise in global temperature is enough to correlate with an increase by 15 percent in personal crimes, a more than 50 percent increase in these crimes in certain regions? Some scientists are skeptical of these conclusions. Morelle notes that work published in the *Proceedings of the National Academy of Sciences* suggests that “this environmental factor” was not to blame for civil war in Africa, but was “linked to other factors such as high infant mortality, proximity to international borders and high local population density.”<sup>16</sup>

Clearly there is a need for further questioning and debate on this problem. I would only note that those who are skeptical regarding the *cause* of violence by climate change may be making a mistake by not addressing such issues from a systems-theoretic point of view. The governance and ethical problems of the future may increasingly require this approach, rather than a perspective within which rational actors act out

causes and phenomena adhere to linear progressions of causes causing effects directly. I suggest that such simplistic expectations concerning systemically inter-linked phenomena are not only unsatisfactory, but they are a very part of the ideology upon which the system thrives. What are too often prescribed as policy changes within the current political economy, bent on maintaining the continued functioning of its accumulation regime, borrow from a similar rationale.

## CONCLUSION

The current accumulation regime of the system of capital is not sustainable, even on its own terms—the terms of its own continual reproduction. Moreover, any functioning accumulation regime (along with the notion of political economy that theorizes the system) configured on such high-input parameters, must be configured in such a way that sustainability requirements demand high-input suppression of emerging crises. This logic leads to increasing social turmoil and violence. Robert Biel's theorization of a low-input alternative to capital's high-input dynamics and his proposal for urban agriculture as a potential low-input solution to issues in food give us a starting point for a new systemic understanding of political economy.

Even incremental reforms that fall far short of altering the logic and feedback loops of the political economy are politically stymied in many of the key nations of the world. Should liberal governance somehow succeed in implementing them, such reforms would still be wholly inadequate to the task of resolving global crises. If climate crises are *a result* of the structure of the current political economy, then *no* reform measures will prove sufficient. Similarly, if the food crises are *a result* of the structure of the current political economy, then *no* reform measures such as those proposed by NECSI will prove sufficient. A revolution in the very structure of the political economy that produces crises in the first place may prove to be the only viable solution. What is required is a political economy based on entirely different structures of systemic reproduction and allied regimes of accumulation. The concepts and even frames of perception we use to analyze political economy also must become non-standard and unconventional.

## NOTES

1. M. Lagi, K.Z. Bertrand, and Y. Bar-Yam, "The Food Crises and Political Instability in North Africa and the Middle East," (Cambridge, MA: New England Complex Systems Institute, 2011), at <http://arxiv.org/pdf/1108.2455v1.pdf>. For a summary of this paper, also see B. Merchant, "We Are Now One Year Away from Global Riots, Complex Systems Theorists Say," Motherboard, September 10, 2012, at <http://motherboard.vice.com/blog/we-are-now-one-year-and-counting-from-global-riots-complex-systems-theorists-say--2>.
2. Lagi, Bertrand, and Yam, p. 1.
3. Ibid., p. 5.
4. For an excellent study of this view, see N.M. Ahmed, *A User's Guide to the Crisis of Civilization and How to Save It*. (London: Pluto Press, 2010). For a criticism of this work from the systems point of view, see R.D. King's review of this book at <http://marxandphilosophy.org.uk/reviewofbooks/reviews/2011/377>.
5. R. Biel, *The Entropy of Capitalism* (Leiden, the Netherlands: Brill, 2012).
6. Here, Istvan Meszaros's notion of second-order mediations of the system of capital is a strong influence on how these concepts are figured within our (but not Biel's) dissipative systems-theoretical readings of the capital system. See I. Meszaros, *Beyond Capital: Toward A Theory of Transition* (New York: Monthly Review Press, 2000).
7. Some criteria for social collapse have been established by Joseph Tainter in *The Collapse of Complex Societies* (Cambridge, U.K.: Cambridge University Press, 2013) and in another popular study by Thomas Homer-Dixon, *The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization* (Washington, DC: Island Press, 2008), among a variety of others.
8. For a more complete treatment and explanation of these points, see King, op. cit. note 4.
9. "Commoning Against Entropy: A Review of 'The Entropy of Capitalism,'" Commons Sense, at <http://www.commonssense.it/s1/?p=988>. Accessed 12-18-14.
10. Biel, *The Entropy of Capitalism*, p. 321.
11. Ibid, p. 322.
12. Ibid, p. 318.
13. No one has gone farther than Nafeez Mosaddeq Ahmed in writing on the inter-linked nature of global crises. See N.M. Ahmed, *A User's Guide to the Crisis of Civilization: And How to Save It* (London: Pluto Press, 2010).
14. D.S. Wright, "Rise in Violence Linked To Climate Change," Firedoglake, August 2, 2013, at <http://news.firedoglake.com/violence/2013/08/02/rise-in--linked-to-climate-change/>. Wright links to an article by Rebecca Morelle, science reporter for the BBC World Service. See R. Morelle, "Rise in Violence 'Leads to Climate Change,'" BBC News, August 2, 2013.
15. Such an insight would dovetail nicely with Kees Van Der Pijl's important and influential book *The Foreign Encounter in Myth and Religion: Modes of Foreign Relations and Political Economy* (London: Pluto Press, 2010).
16. Morelle, "Rise in Violence 'Linked to Climate Change.'"

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