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(doi: 10.2383/38274)

Sociologica (ISSN 1971-8853)

Fascicolo 2, maggio-agosto 2012

Ente di afferenza:

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Sustainability: A Wicked Problem

by Raymond Murphy

doi: 10.2383/38274

Introduction

Many years ago, one of the founders of sociology, Max Weber [1958, 147], argued that “the various value spheres of the world stand in irreconcilable conflict with each other”. Perhaps he overstated his argument with the word “irreconcilable”, but he nevertheless drew attention to the difficulty of reconciling various value spheres. This is certainly the case with the complex concept “sustainability”, where there is tension between sustainability and development, between environmental requirements and sociocultural needs and desires, between needs of the present generation and those of future generations.

The sustainability issue consists of how humans will use the resources constructed by nature and use its dynamics, whether our unique species will be good stewards of the environment that it depends on or destroy its capacity to render us services and unleash dangerous dynamics of nature. The threats of modern human activities to sustainability are numerous and interconnected: habitat destruction and biodiversity loss, deforestation, degradation of the oceans, scarcity of fresh water for a growing population, depletion of resources, toxic synthetic chemicals accumulating in the environment, anthropogenic climate change, etc.¹ Books have been written warning

¹ Nuclear warfare and resulting nuclear winter was another threat to sustainability much discussed during the cold war, and could re-emerge, but it will not be examined here.

about the unsustainability of present practices, entitled *Limits to Growth* [Meadows *et al.* 1972; 2004], *Overshoot* [Catton 1980], *Enough: Breaking free from the world of more* [Naish 2008], *Collapse* [Diamond 2005], *Now or Never* [Flannery 2009], *Climate Wars* [Dyer 2008], and even *Requiem for a Species* [Hamilton 2010]. Collapse of society is the opposite to sustainability. Opponents reply that human reason is the ultimate resource [Simon 1981; Simon 1996] that will make prosperity permanently sustainable: “within a century or two, all nations and most of humanity will be at or above today’s Western living standards” [Simon 1995b, 642]. They advise those who give advance warnings to *Cool it* [Lomborg 2001; Lomborg 2007]. Both apocalyptic and *Pollyanna* discourses are prominent, but behind them lie the dynamics of the material world which are either safe or threatening. The crucial issue is whether the discourse is appropriate for the material world of nature’s dynamics that constructed the human species and habitats propitious for our species, and continues its constructions, including unwanted ones unintentionally unleashed by human constructions.

Sustainability or collapse of human societies is a social issue calling out for understanding by the social sciences because the threats are being caused by human activities and practices, not by asteroids. Unfortunately the discipline of sociology is ill-equipped to contribute to that understanding because of its long history of suspending the dynamics of nature rather than investigating the interaction between social constructions and those of nature [Murphy 2011]. This bracketing is strange because recently studies [Rosa and Richter 2008; Foster and Holleman 2012] have shown that the founders of sociology analysed social practices in their biophysical context. The issue of sustainability of societies combines sociology’s traditional focus on inequality with two new foci, namely nature’s dynamics and time.

1. What is Sustainability?

The most influential and persistent conception of sustainability integrated it with development: “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [World Commission on Environment and Development 1987, 43]. The Commission emphasized needs, future generations on a par with present generations, and development constrained by the state of technology, of organization, and of a finite planet. It implied going beyond short-term time series projections that are presently popular in economics to projected consequences for generations in the distant future. It shifted from a perspective limited to socioeconomic constructions to one that takes into account their interaction with the dynamics of nature.

Sustainability depends not only on social constructions but also on nature's constructions, that is on services that nature's dynamics provide human societies. Nature provides humans with the means of sustainability because of its ongoing constructions that over a geological time period have created resources for human use - such as fossil fuels, fresh water, forests, and waste sinks - or continue to provide services to humans, such as pollination by bees. Some of these services have to be maintained by humans, such as renewing a forest if it is cut, and some have to be protected from dangerous human activities, such as the Montreal Protocol protecting the ozone layer.

Sustainability is a systemic issue, whereby an improvement in one part of the system can result in a deterioration of another part. For example, Germany can shut down its nuclear reactors, but this doesn't decrease the risks of nuclear energy when Germany imports more nuclear energy from its neighbor France. If Japan increases its use of fossil fuels to compensate a decrease in nuclear energy, then that would worsen Japan's greenhouse-gas emissions. Thus it is important to recognize that the apparent reduction of risk may only be a displacement of danger.

Processes such as policies and discourse are significant for sustainability only to the extent that they affect material practices and outcomes. For example, since the atmosphere is affected by the absolute level of fossil-fuel emissions and of black and brown carbon, as well as by the absolute level of deforestation and other land use manipulations, it is outcomes that are important. The Canadian state and its industries have been world leaders in constructing policies and making environmental pronouncements, but a world laggard in implementing those policies, so much so that Canada has been characterized as a leader not only in carbon emissions but also in emissions of "hot air" [Simpson *et al.* 2009].

2. Sustainability of What?

When examining the issue of sustainability, it is important to make the analysis more precise by asking the question: sustainability of what? Some social practices are not worth sustaining, such as fascism. Would we want to sustain the horse-and-buggy society? The Amish would, along with its patriarchy. Would we want the monarchy to be sustained as the system of governance rather than democracy? Or apartheid? Should the arms race be sustained? Sustainability is a value-laden concept. Development involves change and not sustaining certain practices when they can be improved. There is likely a strong consensus in most societies that life is better today because the societies that existed 500 years ago were not sustained, with their authoritarian power

structures, widespread poverty, and vulnerabilities to diseases and forces of nature. Life has improved because pre-democratic, pre-scientific societies were transformed rather than sustained. An overall indicator is the great leap in life expectancy. Are the high rates of material consumption by wealthy societies and rich individuals to be sustained, and all other societies brought up to that level of consumption? That would be extremely challenging in the long run for a human population of seven billion growing to at least nine billion, and likely impossible because of its effect on the human-sustaining dynamics of nature on a finite planet. The improvements have brought danger. Sustainability is a complex concept that consists of values and material conditions, and refers to the interaction of social constructions and nature's constructions over short and long periods of time.

3. Sustainability Successes

It is important not to fall into pessimism and despair. There have been notable successes in solving some problems caused by social constructions interacting with constructions of nature. Ozone-layer depletion by CFCs and by aerosols constructed and used by market-driven modern technology, which threatened to increase rates of skin cancer among humans and animals and have detrimental consequences for agriculture, has been in large part solved through international agreements among nations such as the Montreal Protocol. This Protocol had a significant environmental justice component: wealthy nations that developed the dangerous technologies were obliged to be the first to phase them out and innovate new technologies, whereas poorer nations would be allowed a grace period and the new technology transferred to them. Leaded petrol was similarly phased out by state regulations. Sulphur dioxide emissions and resulting acid rain were solved by a government set cap within which market based trading of pollution occurred. Air and water pollution in metropolitan areas were diminished by state regulations. Asbestos was eliminated from insulation. Germany and the social democratic societies of Scandinavia are world leaders in the development of renewable energy and implementing carbon taxes, in promoting binding international commitments to control carbon emissions, and in decreasing emissions since 1990. Norway is the only oil producing country to send significant funds to developing countries to offset its carbon emissions. All these could be called the successes of sustainable development. In these cases, the environmental problem was recognized as a real threat by scientists, the public, and political leaders, regulations were imposed on the market, and the threat diminished.

These modifications of potentially harmful practices can also be correctly viewed as the successes of top-down initiatives, but it must be recognized that they have a strong bottom-up component as well, albeit in different forms that varies according to the particular issue. For example, the state in Northern Europe only succeeded in reducing emissions because it had strong popular support to do so. This is lacking in North America, so emissions rise despite the good intentions of American President Obama. Rather than merely labeling some initiatives as 'top-down' (Kyoto Protocol) and others as 'bottom-up' (local solar communities), it is more significant to analyse the interaction between the top and the bottom that promotes either sustainable practices or unsustainable ones.

4. Theories of Sustainability or Collapse

In the debate about whether modern societies are sustainable or are headed for collapse, there are very different assumptions, explanations, perspectives, and forecasts. The following are some of the main perspectives, but they should be seen as ideal types, with many shades existing between them.

4.1 Non-Ecological Economic Modernisation

Simon [1981] argued that the ultimate resource is human reason, particularly in the form of market dynamics and technological development. If a resource in demand becomes scarce, its price increases, which triggers a search for better technologies to augment its supply or to develop substitutes, the search succeeds, and its price decreases. To illustrate his hypothesis, he offered a bet with Ehrlich that the price (in constant dollars) of a basket of resources of Ehrlich's choice would go down over the next period, and he won his wager [Ehrlich and Ehrlich 1998, 100-104]. He concluded that resources are not being depleted by the market and technological development; instead they are becoming more abundant because lower price indicates greater supply. The same logic is applied to waste sinks: when an environmental problem arises, the ultimate resource – human reason used in the market and technology – finds a solution. Sustainability is foreseeable on condition that backward ideologies not stifle market dynamics of supply and demand and technological development. Lomborg [2001; Lomborg 2007] is a more recent proponent of this theory. This perspective assumes that human reason is sufficiently strong to master nature and socially reconstruct it. Their counsel is to give free rein to market dynamics and technological development, then adapt and be resilient. Since wealthy societies have

more capacity to adapt and be resilient than poor societies, the advice is to become wealthy. Although this perspective typically discounts future threats, it does not necessarily deny environmental problems and threats to sustainability, rather it claims that they can be managed by the market and technology. Recent evidence to support this theory comes from the apparent demise of peak oil: when the price of oil rose, additional supplies were created by new market-generated technologies of deepwater drilling, hydraulic fracturing, and extraction of oil from tar sands, the Amazon, and the Arctic. So now despite greater world demand, the supply of oil and fossil fuels appears to be sustainable for the foreseeable future.

Although this perspective is rarely accepted in sociology, I would hypothesize that social practices in most societies occur as if it were the predominant one and that the premises behind it are very widespread among economists and the general population. This faith in the market and market-driven technological innovation to solve sustainability problems will, however, likely turn out to be wishful thinking in the long run because the planet is finite despite being big [Murphy 2006]. Promised innovations often fail, such as the fuel cell, nuclear fusion, and cures for cancer. Even if they eventually succeed, they are often not timely, and a great deal of suffering occurs in the meantime. Moreover sustainability threatened by the very successes of science and the market is a new issue that the market and science have never had to deal with. These successes could tip the human-supporting natural environment into a new steady state less beneficial for humans, and the tipping could be irreversible, thereby making resilience and adaptation impossible. Many climate scientists are concerned that this is precisely what is taking place with anthropogenic climate change. Most important is that market-driven technological development is causing the threats to sustainability. The pursuit of fossil-fuel market opportunities has been exacerbating greenhouse-gas emissions and threatening climate stability, yet the market shows little sign of being self-correcting [Murphy and Murphy 2012]. Relying on the institutions that cause the problem to solve it would be like depending on cigarette companies to solve lung cancer. Without powerful institutions to push companies toward societal goals like long-term sustainability, the danger is that they will act in terms of short-term profitability. The state is the only institution with the resources necessary to regulate and steer powerful corporations. Sustainability is too important to leave it to profit-seeking companies.

4.2 Ecological Modernisation

This perspective [Mol 2001; Mol *et al.* 2009; Jänicke 2008] is based on the assumption that the market is so embedded in all societies and that sustainability problems are so urgent that it is quixotic and counterproductive to propose the replacement of the market. It is better to redirect market mechanisms to decouple economic growth from the use of natural resources and waste sinks. The perspective has two versions. In the earlier version, the market solves resource depletion and environmental degradation automatically by innovating substitute resources and replacing waste sinks in a timely fashion as needed because it is in the financial interest of companies to do so. For example, using energy more efficiently conserves resources, reduces pollution and emissions, and increases profits. This version is similar to the previous theory, hence it shares its weaknesses.

The more recent version recognizes that society's needs, in particular for sustainability, are not always met by the market and that the pursuit of profit has caused and continues to cause environmental problems. So the state has to purposively steer the market to develop both technological and social solutions for environmental problems and to ensure that risk is well managed. Giddens' analysis of the politics of climate change is an example of this version, where he proposes that the state implement carbon taxes, assurance bonds, cap-and-trade systems, etc. [Giddens 2009]. He contends that the state needs to ensure the convergence of economic development with the mitigation of anthropogenic climate change and of other threats to sustainability.

The main evidence for ecological modernization is by association: the countries where it developed as a perspective, namely Northern Europe, are the countries that are leaders in developing practical measures like energy efficiencies, renewable energy, etc., which enhance sustainability whereas countries more resistant to ecological modernization theory are also those whose economies emphasize economic modernization and fossil fuels, for example the United States, Canada, and Australia. However the direction of causality is not necessarily from theory to practice. The practical measures encouraging energy security and efficiencies, renewable energy, carbon taxes, etc., were developed by Northern European states, green movements, etc., and then attempts were made to codify this into ecological modernization theory. It is likely that the spread of sustainability practices from Northern European states to other countries would require not just ecological modernization but also the underlying social democratic values of those states.²

² See Murphy and Murphy 2012 for a critique of Giddens and a development of this argument.

A particularly important weakness of the ecological modernization approach is its use of relative indicators of success, for example carbon dioxide emissions per unit of GDP. The atmosphere is affected by the absolute cumulative amount of emissions, the oceans by the absolute amount of toxins and acid, land by the absolute amount of deforestation and other land use changes. Hence absolute indicators of success or failure of sustainability are needed because this is the way human practices affect the environment. Relative indicators can give the misleading impression that the problem is being solved when it is getting worse, for example, reduced emissions per unit of GDP in China when GDP is increasing even faster, or reduced emissions per barrel of Alberta's tar sands oil when the number of barrels extracted is increasing more rapidly. In absolute terms, dematerialization – that is, economic growth while decreasing raw materials like energy – has not occurred at the global level.

4.3 *The Environmental Justice Perspective*

The environment is a medium through which the practices of wealthy nations and families adversely affect the most vulnerable. For example, the environmental justice perspective [Bullard 2000; Bullard 2005; Bullard 2007; Agyeman *et al.* 2003] investigates how waste dumps are located near the poor and minority groups and how waste is shipped from wealthy to poor countries. Although resource extraction is not very pretty in wealthy countries like Canada and Australia, it is done with even fewer safeguards in poor countries. Proponents of market-driven business-as-usual often use today's poor as an excuse for inaction towards sustainability issues that will have consequences in the future. For example, Lomborg [2001; Lomborg 2007] argues that the market should be allowed to operate to lift poor countries out of poverty rather than spending money to mitigate climate change. U.S Republican presidential candidate Romney mocked President Obama by claiming he cares more about the oceans rising than about unemployed American workers. But mitigating anthropogenic climate change is not opposed to social justice; rather it is an important component of it, namely inter-generational justice. Global warming is being disproportionately caused by today's wealthy societies and wealthy families but it will disproportionately cause harmful consequences for poor societies and poor individuals in the future because they are more vulnerable and lack the means to protect themselves, to adapt, and to be resilient. The same is true for other sustainability issues. If there is depletion of resources and a lack of waste sinks, it will be wealthy individuals and societies who will get more than their share of the former and less of the latter. Sustainability involves environmental justice for the future, rather than

only in the present. And this requires not only adaptation but also mitigating present practices that will cause harm to vulnerable groups in the future, such as fossil-fuel emissions that are causing changes which will impact poor countries like Bangladesh. If sustainability is framed as a competing issue to social justice, then it will make sustainability more of a wicked problem and even more difficult to attain.

4.4 Resilience and Adaptation Theory

These frameworks [Ostrom 1990; Folke 2006; Walker and Salt 2006] argue that change does not necessarily occur in a linear fashion. There are discontinuities and tipping points. Crises can promote innovation in complex systems. Rather than just sustaining what is, it is important to develop the capacity to bounce back after adversity (resilience) and to adapt to change. The ecologists among the proponents of this approach recognize nevertheless the danger of modern human activities tipping the planetary ecosystem into a strange attractor that is incapable of rendering the services for humans that it presently provides. Hence they see the strengthening of resilience and adaptation as complementary to necessary mitigation. The social science proponents of this approach typically emphasize bottom-up, participatory, democratic approaches. The participation of local populations is necessary for sustainability changes to occur, and this can be done more effectively from the bottom up than imposing changes decided at the top of the power structure. There is also concern that the need for urgent solutions to sustainability problems would encourage anti-democratic, authoritarian changes. It is sometimes also assumed that adaptation and building resilience are more politically palatable than mitigation, hence aiming for adaptation will lead to more awareness of the need for mitigation of environmental problems.

Adaptation and resilience are undoubtedly needed given the extent of the impact of human practices on the environment. So is robustness, which means the capacity to withstand perturbations. Democratic, participatory, bottom-up measures are clearly preferable to their opposites. But care has to be taken to avoid using adaptation and resilience as an excuse for not mitigating dangerous practices. It is also important to avoid overlooking the importance of organization for solving large-scale problems like sustainability. Bottom-up, local initiatives are to be encouraged, but the crucial issue is how to develop these on the massive scale required by a large and growing human population and at the urgent pace needed by many sustainability problems, like climate change. The problem of scale is particularly difficult, for example, at present local renewable energy initiatives are dwarfed by the big polluters of

the fossil-fuel industry. Localism has yet to deal adequately with the problem of scale. Moreover the habitus of the bottom that makes it resistant to change should not be ignored. Anyone harbouring romantic illusions about the participatory bottom seeking solutions to sustainability issues should visit the United States and observe the Tea Party blocking the sustainability initiatives of President Obama, lay local deniers of anthropogenic climate change having more devotees than the American Academy of Science, etc. (whereas 99% of climate scientists believe that anthropogenic climate change is occurring, only 34% of Americans do). Certainly Tea Party adherents are manipulated by wealthy Republicans in the American plutocracy, but research that seeks to probe beneath the surface must recognize that these lay folk are willingly gullible and manipulable. Although the transmitters of cultural capital are important to analyse, so too are the receptors, as Bourdieu [1966] demonstrated long ago. People can trust the convenient received culture they want to believe rather than inconvenient evidence-based assessments of risk for the future.

Worries about anti-democratic solutions to sustainability issues are largely unfounded since there is no evidence that countries leading in environmental sustainability [Yale University 2010] are less democratic than laggard societies. It should also be noted that science is not always allied with power, for example the warnings of the IPCC and of most scientists go against the interests of giant oil corporations. These scientific bodies warn of the possibility of tipping into irreversibility which could make bouncing back (resilience) and adaptation impossible. Adaptation and resilience are necessary conditions for sustainability, but are not sufficient. Mitigation of problems is also necessary, for example, turning off the tap rather than just cleaning up the mess, to use the climate change metaphor employed by National Geographic [Kunzig 2009].

4.5 Consumerism and Economic Growth

Weber [1930] argued that Protestant asceticism was an important contributing factor in the rise of the spirit of modern capitalism and hence of its enormous increase in material consumption, a particularly ironic unintended consequence. Today many social scientists contend that such consumption, and its associated economic growth, are the drivers of unsustainability on a finite climate having a limited amount of resources and waste sinks and the drivers of the devastation of its dynamic ecosystem which renders essential services to humanity. They argue that sustainability requires dismantling the culture of consumerism by which modern humans define themselves, their happiness, and their friendships. Environmental sustainability can

be achieved only by ensuring the end of growth [Daly 1996; Heinberg 2011; Rubin 2012; Latouche 2006] because there are environmental limits to growth [Meadows *et al.* 1972]. However, not sustaining high consumption and economic growth could wreck the growth-oriented market economy, throw wealthy countries into recession, increase unemployment and inequalities, and stifle the capacity of developing nations to escape poverty. The solution they propose is to redefine prosperity: it would no longer be viewed in material terms but instead in terms of promoting voluntary simplicity, frugality, work sharing, and the like, which Jackson [2009, 196] refers to as “the Cinderella economy.”

Conservation and limiting consumption on the scale required for sustainability are, however, easier said than done now that the genie of mass consumption is out of the bottle. Consumption-restraint ethics have typically succeeded on a mass scale only if underpinned by a strict other-worldly ideology, such as the asceticism held by Weber’s Protestants or by modern day Amish. After all, consumption involves more than gadgets. A particularly significant item of consumption consists of energy to free people of labour and of the limits of space and of the climate. Hence consumption includes the automobile, tourism to see the world, air conditioning to achieve the perfect micro climate in the home, etc. All of these are dependent on cheap energy, with the cheapest being fossil fuels having externalities that threaten sustainability.

4.6 Treadmill of Production and Metabolic Rift Theory

Those who see consumption and growth as the source of unsustainability do not conclude that the solution is revolution and the elimination of capitalism. This is because of the historical record: the aftermath of the abolition of capitalism has been barbarism which promoted economic growth and decimated the environment even when the growth was not achieved [*ibidem*, 172-198]. They conclude that there are different forms of the capitalist market and one can be found that stresses ecological limits, restrains consumerism, and controls economic growth.

Neo-Marxists argue instead that the shift from surplus to scarcity in the environment is the result of monopoly capitalism [Schnaiberg 1980], which through its propaganda promotes consumption and economic growth to increase profits and mollify labour. This political capitalism allied with the state not only developed a treadmill of production, which underpinned the increase in consumption, but also accelerated this treadmill. Economic growth and increased consumption held potential conflicts between capital, labour, and the state in abeyance, but at the cost of environmental degradation. The capitalist treadmill is a self-reinforcing system that

is ecologically unsustainable and results in a metabolic rift between the social system and the non-human natural system [Foster 1999].

Marxists agree that it is urgent to heal the metabolic rift and decelerate the treadmill of production to arrest environmental degradation and to achieve sustainability. They seem to assume that the environmental degradation has the potential to provoke a breakdown of the capital-state-labour alliance leading to policies to shrink the economy and consumptive desires and decelerate the treadmill by inciting opposition from labour, much like disaster often incites change. But why will this happen when the adverse consequences are distant in time and space? How is the shrinkage and deceleration to be done without suffering? Where is there evidence that it is sufficient to meet the challenge of sustainability? The concepts of a treadmill of production and a metabolic rift are compelling, but the alternatives are vague. How can this be a solution for the urgent problem of sustainability?

4.7 Structural Human Ecology

Proponents of this perspective [York, Rosa, and Dietz 2003; York and Rosa 2003; York 2007] who study macro-level environmental impacts argue that population size and affluence are the main drivers of anthropogenic environmental stressors. They view technology as important, but the increases in efficiency that have occurred are not near enough to offset the impact on the environment of increases in population and affluence. Moreover improvements in efficiency are often nullified by the Jevons paradox or rebound [York *et al.* 2011]. For example, increased fuel efficiency for automobiles enables people to drive more with the same amount of petrol, which nullifies decreases in emissions. The differences in social organization these researchers investigated (urbanization, age distribution, economic structure) had little effect on environmental stress. The implication is that sustainability can only be achieved by reducing both population size and material affluence. This is a particularly demanding perspective since both of these are increasing globally at the present time.

I would suggest that this framework has overly pessimistic implications. The Jevons effect can be managed by appropriate policy decisions. For example, improved fuel efficiency standards can be coupled with a carbon tax such that the carbon tax reduces the incentive to drive more. Social organization does make a difference. For instance, environmental performance indices [Yale University 2010] have documented that Northern European countries, particularly social democratic ones, have out-

performed neo-liberal countries like the United States, Canada, and Australia. Such differences are suggestive of elements that could lead to sustainability.

5. Five Papers Suggesting Wickedness of the Sustainability Problem

I will not summarize the five interesting papers on sustainability in this issue because they are best read as written. They are excellent papers and I agree with much of their analyses, but I will focus on what they missed in order to push analysis further. In the above pages I have outlined the broader context of explanations of why modern practices are either sustainable or unsustainable so that the reader can situate these articles and discover what they overlooked. Next I will try to provoke further reflection on some of their premises. My overall conclusion is that by documenting the limitations of the attempts at sustainability that they studied, the papers provide an excellent demonstration of what a wicked problem sustainability is. Even their omissions suggest wickedness.

The first point to note involves the selection of topics and perspectives. Two of the five articles examine biofuels, a third deals with the green energy transition, the fourth compares cities that aspire to be green, and the fifth studies sustainable tourism. They all emphasize localism and participation as the key to sustainability. The previous section demonstrates that these subjects deal with only a small part of the problem of sustainability. The papers do what has been typical of most sociological inquiries into sustainability, namely they focus on underscoring failings of attempts at sustainability. This is important, but it would be even more significant to investigate unsustainable practices which are far more numerous, that is, to study the elephant as well as the flea on the elephant's back. The articles do not examine whether these attempts respond to the scale of the problems sustainability encounters nor do they critically analyse the sources of unsustainability. After all, biofuels and the green energy transition are presently dwarfed by fossil fuels and brown energy maintenance, sustainable tourism is tiny compared to tourism which is indifferent to sustainability, cities that aspire to be green are small in number compared to those that aspire to grow economically even if that means degrading their environment, etc. A more complete analysis would critically investigate the sources of unsustainability [McCright and Dunlap 2010; Dunlap and McCright 2011] and whether overall economic development is in transition to sustainability or instead on a path-dependent, unsustainable trajectory. Even if in transition, will the damage be done and development be tipped into unsustainability before the transition is accomplished?

The articles assume that local, participatory governance promotes sustainability best. They are correct in that the cooperation of the population is necessary for solutions to be accepted and implemented, otherwise proposals are resisted regardless of how logical they appear to planners and policy makers. For example, windmill installers need to be sensitive to local concerns, such as about the size and siting of wind farms. The local population should be consulted and their grievances dealt with as much as possible. The local population, not just property owners where windmills are located, should have access to the benefits of renewable energy, as Magnani [2012] argues. Of course, this standard should also be applied to fossil fuels. If this is what bottom-up means, then it is indisputable. But if local decision-making is carried to the extreme of stopping the installation of windmills where there is wind, then sustainability suffers.

Risk perceptions of local communities are not infallible: they may be either well founded or unfounded. This is an empirical question. Local populations can be anchored in the habitus of unsustainable practices and oppose changing those practices to sustainable ones. For example, often local criticism of sustainability improvements such as windmills decreases after installation when the feared adverse effects do not materialize, indicating that the resistance was the result of change of habitus, not of the windmills. Local practices that were sustainable when the planet had one billion people two hundred years ago may have become unsustainable now that there are seven billion growing toward nine billion. Care must be taken not to dismiss leadership and scientific evidence by labeling it top-down and authoritarian. Many environmental problems were solved in this way thereby improving sustainability, for example, the depletion of the ozone layer, leaded petrol, acid rain, etc. In these cases, the danger was precisely defined, leadership of scientists and enlightened politicians countered the assertions of corporations causing the problems, and the efforts were successful. Powerful corporations can pollute as they please unless they are confronted by other powerful organizations. Relying on bottom-up solutions for the global problem of unsustainability is likely wishful thinking that fails to take into account the power of top-down organizations whose practices threaten sustainability.

Participatory, bottom-up models have been promoted by adherents for a long time, for example those of Bookchin [1984], but have either not been implemented or are unwanted. The local participatory model has always been difficult to implement on a grand scale because participation can be a burden, and never more so than now in a world with a population growing upwards to nine billion living increasingly in a globally interconnected world. Building local sustainable communities [Carrosio 2012] will only be adequate to deal with global problems of sustainability if

every community does it in a timely manner, and only if they successfully cooperate to make their interconnections sustainable as well, such as transportation. That is a herculean task for local communities and flies in the face of knowledge of the need for organization to accomplish large-scale tasks and of the urgency of changing unsustainable practices. There is little evidence to suggest that localism will make the world more sustainable as defined in the usual way. After all, it is an empirical question whether the local sovereignty model or the national governance model is better at increasing global sustainability. Many environmental problems are of such high scale, broad scope, serious threat, urgency, and possible irreversibility that both top-down leadership approaches and bottom-up participatory approaches are needed for sustainability. It is important that the call for bottom-up participatory approaches not have as an unintended consequence, or perhaps intended in some quarters, the weakening of governance structures needed to develop sustainable practices thereby leaving the organizational vacuum to be filled by authoritarian corporate structures that have caused the pollution, the depletion of resources, and the threats to sustainability.

There is a large dose of naïveté in some of the assumptions, for example “the protection and reproduction of biodiversity are favoured by a local approach” [*ibidem*]. That wasn’t true for Easter Island where the locals cut down all the trees thereby undermining the sustainability of their local community. Nor did the local approach sustain communities documented by Diamond [2005] that collapsed. In Canada the local mining community called Asbestos pleaded for subsidies to mine asbestos and sell it to India, even though its use is banned in Canada. Coal mining communities push the use of coal, even though it is particularly polluting and emissions laden. Is the broader society to let local coal-mining communities dictate whether there will be sustainable practices or polluting ones that have adverse consequences well beyond the local community? Magnani [2012] quotes studies legitimating NIMBY reactions to wind energy as reflecting local risk assessments. Such assessments are however often based not on scientific evidence concerning the safety or danger of windmills but instead on the possibility of reduced property values. The most vociferous resistance often comes from well-to-do residents.

People complain about the health effects of windmills, but the pollution from coal-fired electricity generators is worse for their health and nuclear reactors carry more risk. Unless the public agrees to conserve energy, it will have to choose the least bad option to produce energy. How can global sustainability be achieved if sustainable practices are blocked by local vetoes, leaving unsustainable practices as the default option? Local vetoes of green initiatives would contrast with expropriations for highways, pipelines, and other fossil-fuel infrastructures. Mega-quarries succeed

in forcing their way in. Sociology is the discipline that claims to analyze phenomena in context, and it is important to study the local reaction to renewable energy in society's broader fossil-fuel context. Bozzini [2012] documents that farmers and rural communities lobby for biofuels for economic reasons even though their net effect toward combating climate change can be zero or negative. It is understandable that these local communities act in their immediate economic interest, but it is misleading to glorify localism and bottom-up approaches as a panacea for sustainability. This can only result in resistance to standardized rules to ban asbestos and to decrease the use of coal, in promoting ineffective approaches to mitigation, and in blocking effective ones. This too is part of the wickedness of the sustainability problem. Another part is the displacement of the goal of mitigation to other goals, such as energy independence and cheap fuel, also documented by Bozzini, which results in more use of fossil fuels [Murphy and Murphy 2012].

A contradiction in these articles concerning localism involves tourism. Salvatore and Maretti [2012] ignore one of the most significant threats of tourism for sustainability, namely, getting there. A large part of tourism is intercontinental, or at least long-distance tourism. Getting there depends almost entirely on the combustion of fossil fuels, whether by plane, cruise ship, or motorhome. In addition to its local environmental degradation, long-distance tourism is a significant environmental stressor in terms of greenhouse-gas emissions, of other forms of pollution, and of depletion of resources because it has become so large in scale. Following Carrosio, this could be called "boundless tourism." How would his concept of "bounded sustainability" apply to tourism? Should intercontinental tourism not be sustained, as could be deduced from the theory that sees consumption and growth as threats to sustainability? Restraining long-distance tourism would make it endogenous and bounded, as Salvatore and Maretti advocate. But would local communities whose economy depends on it agree with that? Local communities can be the promoters as well as the victims of unsustainable practices. Dependence on boundless tourism is found not only in developing countries, but also in large segments of wealthy economies, such as France, Italy, Spain, Portugal, and Greece. Even the United States has an important long-distance tourist industry. The difficulty of making boundless tourism sustainable as an item of consumption is an important dimension of the wickedness of the problem of sustainability.

A further aspect of wickedness is the displacement of blame onto attempts at sustainability for a host of social ills. Cucca [2012] is correct to note that there has been gentrification in Vancouver which has been associated with the erosion of the affordability of housing, displacement of the vulnerable, and other inequities. But she fails to present evidence showing that it was the result of attempts at sustainability. It

is more plausible to conclude that gentrification was the result of the other factors she mentions: reduction of investment in social housing by the federal, provincial, and local governments, massive investments in luxury housing by wealthy Hong Kong citizens when it was returned to China, etc. The “ecological” part had little if anything to do with these social problems, which would have been the result of nonecological gentrification as well, as occurred in other cities. Attempts at sustainability might not solve the problem of gentrification, but they didn’t cause it. This is shown indirectly by Cucca in her documentation that Vienna’s attempt at sustainability did not cause the same social problems as in Vancouver because it maintained funding for social housing. Spurious correlations can make it seem like attempts at sustainability are at fault for social ills when they are in fact caused by deeper underlying dynamics.

It is true, as Magnani argues, that ecological modernization does not emphasize environmental justice. But it is also true that the local, participatory approach has a weak relationship with the solving of environmental problems and sustainability. Despite some differences, the conceptual frameworks of sustainable development and ecological modernization are similar in that they promote the reform of market economies, probably because adherents see sustainability and ecological problems as too urgent to await the wholesale replacement of market economies and because alternatives to a market economy so attractive in theory have proven to be appalling in practice.

Magnani [2012] quotes a study arguing that ecological modernization is a necessary but not a sufficient condition for sustainable development. There is an important point here. Sustainability is an issue of such seriousness, scope, and urgency that many of these approaches should not be seen as mutually destructive but as complementary. Sustainability efforts can be made simultaneously at different levels and in different ways: local and global, participatory and organizational, market-based and regulatory-based, efficiency improvements and consumption reduction, etc. Leaders in ecological modernization, such as the Scandinavian countries and Germany, are often leaders in sustainable development, whereas laggards in ecological modernisation, such as the United States, Canada, and Australia, are typically laggards in sustainable practices. Because of the scale and embeddedness of fossil-fuel use globally, sustainability requires increased efficiencies in its use [Jaccard 2005] as well as the deployment of more renewable energy.

Magnani claims that poorer countries and groups are unlikely to benefit either socially or environmentally from proposals to de-carbonize global energy supplies to combat global warming, but this is almost certainly wrong. The benefit of mitigation for vulnerable poor countries and groups consists of the reduction of the threat from hazards, which has to be taken into account in conclusions about the net benefit for

poor countries and groups. Furthermore global energy supplies are not being de-carbonized on the scale required by global warming. Erroneously criticizing attempts at de-carbonization contributes to legitimate the alternative: fossil fuels and the hyper-carbonization of the atmosphere. Moreover, unless it is predicated upon the reduced consumption of energy, a critique of renewables like biofuels also encourages the use of the existing alternative, which consists of fossil fuels. Stating this is not to reject criticism, but it is to view attempts at sustainability in context and to conclude that sustainability is indeed a wicked problem.

Conclusions

Three difficulties are particularly important in making sustainability a wicked problem. The first consists of the distant consequences of unsustainable practices in both time and in space. The experience of local well-being in the present seems to contradict scientific indications of threats for the future, hence it is easy for local groups to ignore the warnings and to continue the habitus. The second is the scale impasse, namely that successful local micro attempts at sustainability run into difficulty when tried on the mass scale necessary for sustainability. The third is the urgency dilemma. The threats to sustainability are embedded in cultural and social structures, habitus, and the built physical infrastructures such that it will take time to change them, but those threats require prompt change of those structures. For example, a tipping point into irreversible climate change could come soon even if adverse consequences only come later, much like smoking tips the body into lung cancer at a young age even if the cancer is only felt decades later.

With respect to the three pillars of sustainability, these articles run the risk of letting the social pillar trump the environmental pillar. Salvatore and Maretti admit as much when they state that the papers have redefined sustainability by diminishing the importance of the environmental component. This results in present intra-generational social justice trumping inter-generational social justice. In the cases of anthropogenic climate change, biodiversity loss, and other threats to sustainability, there exists the danger that if sustainability is defined so diffusely to include everything (reducing hierarchy, authoritarianism, and inequality, eliminating poverty, increasing participation and decentralized decision-making, etc.), then little or nothing will be accomplished. Most important, it should be recognized that non-ecological economic modernization, sometimes referred to as cornucopian market theory, is the default option. If paralysis results from disagreements among proponents of ecological modernization, local participatory approaches, environmental justice, Marxian theory,

anti-consumerism theory, human ecology, etc., then the result will be more non-ecological economic modernization in the form of fracking, deepwater drilling, Arctic drilling, deforestation of the Amazon, etc., with all the associated climate change, biodiversity loss, ocean degradation and their adverse unjust consequences for future generations. It is important to ensure that criticism leads to the strengthening of sustainable practices rather than the unintentional reinforcement of unsustainable practices by default.

There are many value spheres involved in the sustainability issue. As Weber indicated, the value spheres are indeed difficult to reconcile. If sustainability proponents do not succeed in reconciling the three pillars of sustainability and the different approaches to it, then non-ecological economic modernization will have free rein. Hence talented young sociologists like those who wrote the five articles in this volume should turn their critical analytic skills from the flea to the elephant, namely to studying sustainability attempts in context and to the investigation of ecologically indifferent and sustainability indifferent economic modernization, that is, to brown authoritarianism.

I wish to express my gratitude to the Social Sciences and Humanities Research Council of Canada for a grant that supported this research.

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Sustainability: A Wicked Problem

Abstract: This article outlines the theories of why modern practices are either sustainable or unsustainable, emphasizing that non-ecological economic modernization is the default option. If paralysis results from disagreements among proponents of ecological modernization, local participatory approaches, environmental justice, Marxian theory, anti-consumerism theory, human ecology, etc., then the result will be free rein for practices that threaten sustainability. This is an issue of such seriousness, scope, and urgency that these alternative approaches should not be seen as mutually destructive but as complementary. Sustainability efforts can be made at different levels and in different ways: local and global, participatory and organizational, market-based and regulatory-based, efficiency improvements and consumption reduction, etc. The five articles in this volume by talented young sociologists are excellent and I agree with much of their analyses. By documenting limitations of attempts at sustainability, those papers demonstrate what a wicked problem sustainability is. Even their omissions, which I have focused on to push analysis further, indicate wickedness. I conclude by suggesting that critical analytic skills should now be turned from the flea to the elephant, namely to the investigation of sustainability indifferent economic modernization.

Keywords: Sustainability theories, economic modernisation, localism, nature, future.

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