Isidor Wallimann *Editor*

# Environmental Policy is Social Policy – Social Policy is Environmental Policy

## Toward Sustainability Policy

Springer

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Isidor Wallimann
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# Chapter 1
# Environmental Policy is Social Policy – Social Policy is Environmental Policy

**Isidor Wallimann**

This book argues that social and environmental policy should be treated as one and the same field, that both are but two aspects of the same coin – if sustainability is the goal. This paradigm shift is indicated, important, and timely to effectively move toward sustainability.

In general, social problems are dealt with in one "policy corner" and environmental problems in another. Rarely is social policy (at large) concerned with its impact on the environment or its connection with and relevance to environmental policy. Equally, environmental problems are generally not seen in conjunction with social policy, even though much environmental policy directly relates to health, nutrition, migration, and other issues addressed by social policy. This book intends to correct the tendency to separate these very significant and large policy fields. Using examples from diverse academic and applied fields, it is shown how environmental policy can (and should) be thought of as social policy – and how social policy can (and should) simultaneously be seen as environmental policy. Tremendous benefits are to be expected.

The unity between environmental and social policy is significant, and to treat them as separate spheres is highly problematic. Any separation comes at the cost of policy efficiency and at the expense of perverse effects. One policy domain may explicitly or implicitly counteract – or even outright "sabotage" – the other. Furthermore, to maintain them as the separate and uncoordinated policy fields they are today stands in the way of attaining social and environmental sustainability. It is even counterproductive to that goal. Sustainability – an often and highly acclaimed goal – would under these circumstances remain but rhetoric. The case is made, then, that social and environmental problems and their policy fields should best be envisioned, conceived, and practiced in conjunction with each other. Thus, they become parts of one integrated policy field.

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How the two policy fields implicitly or explicitly counteract each other must be studied in ways that transcend disciplines. For instance, funds to deal with social problems – social policy funds – often are derivatives of economic growth. The more quantitative economic growth, the more funds are available. However, this mechanism may counteract efforts by environmental policy to contain negative effects on the environment caused by quantitative economic growth. The signals emitted by this funding mechanism are that social risks can only be tempered by sufficient economic growth – even though the resulting environmental risks to life may lead to social risks as a consequence. Therefore, new ways to fund social policy and to define economic well-being – or ways to prevent social problems – must be found. This will avoid perverse effects to environmental dimensions of sustainable living.

In other examples, inequality and poverty may lead (or even force) populations to interact with nature in such a way that, even though needs may be met in the short run, the depletion of nature resources will prohibit needs from being met in the long run. In other words, social justice and (in)equality – mediated by social policy – is strongly intertwined with environmental policy and foundations to sustainability.

In turn, also environmental policy should be analyzed for its consequences to social policy. Thus, the need to regulate human interaction with nature through environmental policy is in many instances directly connected to social risks, human survival, and social and economic change. All of them are salient to social policy. Yet few efforts are under way to discern the social policy implications of environmental policy and to think and practice the two policy fields jointly. Many more examples could serve to show how social and environmental policy are intricately interwoven in content, both in regard to particular problem cases and to the macro policy frames of which they are a part.

However, not only the two mentioned policy fields can greatly benefit from relating to each other in a transdisciplinary manner. Most academic fields and disciplines can (and should) ask how "their" knowledge relates to issues of social and environmental sustainability. In so doing, they must look over the fence of their "narrow" discipline to become part of a transdisciplinary effort among academic disciplines proper and in conjunction with environmental and social policy.

"Sustainability" can be thought of as a societal pattern of interaction with nature which assures a very long-term output and distribution mode sufficient for all to live in dignity and in accord with the average longevity potential. From this vantage point, it is evident that many academic disciplines and both environmental and social policy are strongly intertwined once "sustainability" becomes their focus. Therefore, this book takes the position that "sustainability" can only be discussed, researched, and planned for with a transdisciplinary perspective and practice be it in environmental and social policy or in specific disciplines.

No doubt, looking at sustainability in such ways will influence how we think and converse about it. Moreover, understanding that sustainability cannot be attained without coordinating environmental and social policy will certainly lead to more holistic approaches in politics and policies. Finally, thinking of environmental policy as social policy – and its inverse – will lead to visions on how the two policy fields can be merged to become two aspects of a single field.

The spirit of this book is proactive. Given the need to transform society toward sustainability, the question is not how additional damage to nature and society can be avoided or minimized. How to transform the status quo from its state of "sickness" to a state of "health" (i.e., sustainability) is the question. This calls for a paradigmatic shift. To further rely on techniques like Environmental or Social Impact Assessments is no longer adequate, since such measures only aim to avoid additional harm and not to transform the status quo. In addition, they tend to focus but on the local or regional cases, and social and environmental criteria usually are not synthetically applied. In contrast, the new paradigm suggests that environmental and social policy be synthetically combined and that this transdisciplinary act be complemented by other academic disciplines asking "what is our knowledge by which we contribute to moving (world) society toward sustainability?" Alternatively, academic disciplines can ask "what knowledge inhibits or obstructs attempts to move (world) society toward sustainability?" – "what knowledge contributes to environmental or social problems becoming an obstacle to reaching sustainability?"

The case studies presented in this book illustrate what needs to become a widespread and general approach in bringing disciplines and policy fields together around "sustainability" as a cross-sectional perspective. As an ensemble, the contributions included here show how this could be accomplished in academic and applied fields represented in this book.

Of course, this book is just a beginning, and we should ask where we could go from here to further embed the paradigm shift suggested. Certainly, the examples given here will trigger our imagination as to how disciplines can transcend their boundaries and cooperate with others around the vision that a "sustainable world" can be achieved – that interdisciplinary knowledge and synthetically practiced environmental and social policy can make it happen. However, these contributions should be complemented by other examples of "good practice." A multitude of problem settings should similarly be framed and analyzed from a transdisciplinary and synthetic policy perspective. Possibly, a book series could be launched or journals with an environmental or social problem and policy focus could publish special issues for this purpose.

It is generally recognized that moving toward "sustainability" is bound to call for a sizable environmental and social policy effort, the "like" of which we may never have seen except for times of war. Should this be so, present policy must be scrutinized in preparation for it. Entire policy frames and their segments (like health care or water management) must be studied for their internal consistency and for the contradictory incentives and effects one policy frame may have on another. This has already been alluded to above for the case of environmental and social policy. To do so, we might get some guidance from the analysis of tax policy which in some countries is now being scrutinized for its perverse incentives and effects in terms of environmental and social policy. Ideally, tax policy should be structured such that it neither "sabotages" environmental or social goals nor the policies to realize them. In this vein, social and environmental policy, too, must be revisited.

Some contributions show how social and environmental policy and their indicators can be jointly applied in planning or environmental management.

How such projects and processes are being monitored for their results over time does not get much attention. It seems obvious that such monitoring would also have to be conceived of and tested in practice. Finally, academic and movement professionals could make it their mission to insist that projects presently being planned do synthetically include environmental and social policy criteria.

The book starts with a section on agriculture, food production, and forestry. Its contributions show the importance of a synthetic, holistic approach to social and environmental policy from a more specific or from a general, more macro frame of analysis. Stu Shafer's work belongs to the latter and combines insights from political economy, agriculture, and nutrition. Using Marx's view of society as being in a metabolic exchange with nature for food and other production, he shows how a rift has been introduced into this cycle by industrial society and its capitalist version in particular. What is "by nature" a whole has in food production been divided up by various, dominantly linear processes. Grave consequences to nature and to the welfare of humans both as producers and consumers of food are the result. Shafer, then, reflects how social and environmental policy could symbiotically be thought and practiced to help repair the identified rift. In addition, he locates existing attempts in social movements, and elsewhere, that could launch the required paradigmatic shift to both repair the rift and enhance sustainability.

Also Geoffrey Evans and Chetana Mirle's address a macro issue – that of meat production, global warming, and social well-being. Their transdisciplinary investigation integrates environmental sciences, agriculture, and developmental economics. Where should meat be produced – and how much of it – in order to optimally reduce greenhouse gases, alleviate poverty, and conserve soil and vegetation is the question asked. Again, both environmental and social policy are synthetically combined and treated as two aspects of a single field. The same approach is followed by Kimberly E. Johnson in her more specific case analysis of trans fatty acids (TFAs) in foods. What, she asks, would be required to simultaneously eliminate detrimental health effects from TFAs in foods and to prevent environmental degradation and marginalized populations due to palm and seed oil production? Nutrition, food manufacturing, agriculture, ecology, and developmental economics are the disciplines she draws on to formulate her answer in which it becomes apparent that social and environmental policy are most usefully applied in conjunction with each other.

Forest management knows of numerous examples to show that social policy can promote or (in its inadequacy) inhibit and block the realization of environmentally important policy goals. Equally, deficient environmental policy in forest management will generate social problems (mostly in the form of poverty). As they, in turn, exert pressure back on the remaining forest resources, vicious cycles may result and perpetuate. Thus, it becomes obvious that social policy is intricately linked with and dependent on environmental policy and reverse. Such cycles can be broken by viewing social policy also as environmental policy and environmental policy as social policy. As a result, the contributions by Guy C. Robertson and that by Evisa Abolina and Valerie A. Luzadis critically focus on various forestry management systems that strive to integrate environmental and social policy dimensions. In so doing, they assess the quality of such management systems in view of their objectives to enhance or to assure forest sustainability.

Worldwide, the rapid trend to live in urban settings continues, while in industrialized countries some 80 % of the population already lives in urban agglomerations. As a result, any transformation to sustainability is bound to also focus on urban settings and their abusive and damaging use of resources. Urban planning and development has, therefore, been experimenting with building sustainable cities in which environmental and social criteria and goals have jointly been integrated into urban design, planning, and development. Both Gary J. Coates and Matthias Drilling focus on examples in which building such cities has been the goal. Coates' primarily looks at how social and environmental criteria have been synthetically used, at how they have been operationalized, and on the outcomes that could so be realized. Drilling's attention – using different examples – is also on the processes by which planners can successfully arrive at synthetically including environmental and social criteria.

Lee Liu investigates urban planning in China – the environmental Model Cities program. Whereas Coates and Drilling chose positive examples from Europe to show how social and environmental criteria were synthetically applied in sustainability-enhancing ways, Liu shows the opposite. What happens, he asks, when "sustainable cities" are built on but narrow territorial and environmental criteria and dimensions? The new Model Cities appear to have resolved many environmental issues by differentiating and dividing urban activity into a narrowly defined "environmentally clean" space and another space. In the latter, "old" and socially and environmentally unsustainable patterns are continued. A holistic environmental and social policy approach in planning urban spaces and functions is not given, though some spaces – new Model Cities – show improvement along environmental criteria.

The German sustainable city example studied by Coates explicitly includes urban food production as one criterion in urban design and planning. Coates does not elaborate in detail why this should be so. Monika Jäggi, however, does. Choosing Toronto's food policy as an example, she shows how both environmental and social policy objectives can synthetically be combined in and through urban agriculture. She elaborates on the various policy dimensions and on urban agriculture's potential in transforming urban spaces toward sustainability.

In his discussion Drilling explores how the process of planning can be decisive in the degree to which environmental and social policy are synthetically included when building sustainable cities. Jeremy Levine also adopted this perspective. He studied the role environmental and social justice movements played in ascertaining that both environmental and social policy criteria are synthetically included in a Boston urban transit development case. Finally, it is to be noted that the urban examples presented here benefit from knowledge anchored in disciplines such as architecture, geography, sociology, public administration, and planning,

None of the contributions in this book focuses on the very macro frame as does Lynn Duggan, who assumes that moving toward sustainability is a given and a formidable challenge. She investigates what must be done on a very general social and economic level to enhance the necessary transformation we face. Thereby, she draws on knowledge from political economy, sociology, and gender studies. For her, the sphere of consumption and work (paid work and unpaid care work) are in need of major corrections. Bringing about sustainability is for her not possible without

reducing levels of consumption and moving care work from back to center stage. In so doing she demonstrates the need and utility in simultaneously employing both environmental and social policy if only to avoid these policy fields to have perverse effects onto each other.

Unlike Duggan, the contributions of Ross Klein and that of Valerie Carroll and Rhonda Janke investigate the extent to which social and environmental policy find synthetic application in a given industry – cruise travel and higher education. Klein looks at the problem from the vantage point of cruise destinations and asks how such destinations have integrated social and environmental policy when deciding on whether or not they wish to become – or remain – a cruise destination. He finds that the cruise line industry tends to oppose the simultaneous application of environmental and social policy criteria. Cruise lines highlight the social policy benefits resulting from cruise dollars spent at destinations – understating or refusing to accept the need for environmental criteria. He further shows how the cruise line industry tends to respond when environmental movements become active at particular cruise destinations to emphasize that environmental problems need to be addressed. Often such articulation occurs when the local population realizes that environmental damage done by the cruise industry can also cause social problems. As a result, both policy fields are to be applied in conjunction with each other to foster sustainability.

Carroll and Janke investigate ways by which institutions of higher education are motivated and committed to becoming sustainable units. In doing so, various instruments as well as their measuring and reporting tools are compared and assessed for things such as the indicators used, transparency, and quality and comparability of data. Aside from locating the strengths and weaknesses of such instruments, they also conclude that social policy indicators are rarely employed and that institutions of higher learning do not synthetically combine social and environmental policy criteria in their attempt to transform themselves toward sustainability.

The contributions in this book are of interest to a broad range of scholars, researchers, teachers, and students from many disciplines. In addition, professionals engaged in environmental or social movements will find this book relevant to their work. The readings show how each discipline can look over its own fence. Their accessible style invites readers to inquire and become knowledgeable about issues of sustainability. Thus, the book serves as a communication catalyst for bridging disciplines and introducing readers to various fields as they focus on sustainability in a transdisciplinary and policy-connecting way. In this sense, it can be useful as a text in interdisciplinary seminars concerned with sustainability and to acculturate students and teachers to thinking of "sustainability" as integrated component in all teaching and learning. Done successfully, it would become a cross-sectional perspective throughout curricula – similar to what has been suggested for "gender." There, too, the need to reflect on dimensions of "gender" in all we think and do has been seen as a necessary component in transforming gender relation patterns. The same holds true for "sustainability" in transforming society to a sustainable state.

Some scholars in this book are themselves engaged in sustainability-related social movements. Some fill academic positions at universities, while others hold

positions as academic professionals in nonuniversity research or NGO settings. Some have an educational background in two or more academic disciplines, and some have been trained both for academic careers and for trades. As academics they are part of the natural and/or social sciences and represent disciplines such as geography, sociology, general social science, social work, American studies, architecture, urban planning, forestry, agronomy, horticulture, general agriculture, nutrition, environmental studies, economics, international studies, and philosophy.

# Part I
# Agriculture, Food and Forestry

# Chapter 2
# Where Environmental Policy Is Social Policy: Nature, Food, Society, and Metabolic Processes

**Stuart Shafer**

Most people are familiar with the physiological concept of metabolism.[1] We eat food, and our bodies utilize biochemical processes to first break down the food into its chemical constituents, then to reassemble these constituents into the building blocks of our cellular structure. In the process, energy is captured and utilized to carry out the assembly of and reproduction of cells and to fuel the other necessary activities of the organism. One of the functions of the metabolic process is to build compounds such as lipids (fats), which serve as energy storage mechanisms to be called upon as needed.

Metabolism (together with its dialectical precursor photosynthesis) is the fundamental productive process of life, serving as a counterpoint to entropy. While the overall tendency toward chaos governed by the second law of thermodynamics (in which energy is converted from a more "usable" to a less usable or simpler state) cannot be negated by metabolism, it is still the case that metabolism entails the use of stored energy and matter ("food") to reconfigure the molecules into more complex forms in order to produce and reproduce living cells. Of course, metabolism is also governed by the first law of thermodynamics—the conservation of matter and energy—and cannot create new energy from nothing. But since Earth is not entirely a closed system with respect to energy—receiving daily inputs in the form of solar radiation—the sequences of photosynthesis and metabolism provide the means by which solar energy is captured and utilized to transform minerals, gases, and water into organic matter—living organisms. The ability of those living organisms to sustain and reproduce themselves depends, of course, on metabolism.[2]

In this light, Karl Marx's employment of the concept (*Stoffwechsel* in German) to describe the human interaction with nature through the labor process is telling and no mere metaphor. As John Bellamy Foster points out,

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I. Wallimann (ed.), *Environmental Policy is Social Policy – Social Policy is Environmental Policy: Toward Sustainability Policy*, DOI 10.1007/978-1-4614-6723-6_2,

> It was in *Capital* that Marx's materialist conception of nature became fully integrated with his materialist conception of history. In his developed political economy, as presented in *Capital*, Marx employed the concept of "metabolism" (*Stoffwechsel*) to define the labor process as "a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature." (Foster 2000, 141)

Foster (2000) gives us a comprehensive and extremely useful explanation of the historical development of the concept and its significance not only in Marx's work but also in science generally, most particularly in human nutrition and soil science (following Liebig), physiology, and systems ecology.[3]

Ultimately, as Foster explains, Marx concluded that capitalist development creates a "metabolic rift" by interrupting the cycles of nature in order to maximize the production of exchange value, necessary for the ever-expanding accumulation of surplus value—the *raison d'être* of Capital. In concrete historical terms, this meant the concentration of labor power in urban areas, where the waste products of their own physiological metabolism (human manure, if you will) were removed from the soil, leading simultaneously to the depletion of essential soil "nutrients" as well as the pollution of the urban environment by these same products, which, as concentrated wastes removed from an ecological process of decay and recycling, become toxic.

It is no mere coincidence that a nineteenth-century scientist such as Liebig was concerned not only with the processes of organic chemistry in the soil but also with the similar role of "nutrients" in the physiology of the human organism.[4] The development of a science of metabolic processes in the soil was stimulated by a concern with widespread depletion of soils that was occurring globally with the development of capitalism and that was linked with struggles in the realm of theory between those such as Malthus, on the one hand, who postulated overpopulation and catastrophic outcomes as the result of uncontrolled reproduction and natural limits on agricultural productivity, and Marx, Liebig, and others who were conceiving the problem in entirely different terms while still recognizing the negative social consequences.

Thanks in large part to Liebig, the frameworks and even the terminology for modern scientific explanations of the mechanisms of metabolism in the soil and in the human body are parallel: essential nutrients are needed (in the soil for plants and in the diet for humans) in the proper amounts and balance as raw materials for the organism to metabolize in order to survive and thrive. These interestingly mechanical conceptual frameworks find their application in the practices of agriculturalists and nutritionists. The former utilize soil science to calculate the proper amounts of soil "nutrients"—primarily the key macronutrients, nitrogen, potassium, and phosphorus (in organic or manufactured form)—to be applied as inputs to allow the healthy growth of plants. The latter utilize the science of nutrition to calculate the daily inputs of nutrients in food (or manufactured supplements) needed for the human body to sustain itself.

Popular food journalist and author Michael Pollan has recently published "An Eater's Manifesto" (*In Defense of Food*), in which he offers a critique of the

scientific reductionism inherent in "nutritionism." The idea that food and its functions can be analytically decomposed into their essential parts, the most vital of which can be identified, isolated, and even manufactured, has devolved to little more than an ideology supporting the practices of modern industrial food processing corporations, Pollan argues. It follows, then, in an argument similarly made by nutritionist, Marion Nestle, that many of today's diet-related health problems result from this simplistic, distorted view of how food works, how it should be produced (i.e., processed), and how it is consumed.

There is, of course, a great deal more to Pollan's argument, but his critique of nutritionism is particularly relevant to an exploration of disruptions in metabolism in human society and nature. If, as Pollan implies, metabolism is a more complex process than the industrial model, then he might be on to something. The industrial model proceeds in a linear fashion (mined inputs → processing → energy and product → consumption and waste → disposal) and is entirely compatible with a reductionist approach, as long as raw materials and energy sources are abundant and waste disposal does not create intolerable side effects. Capitalism thrives under such conditions, again so long as the metabolic rift can be ignored or accounted for as "externalities," costs of production that can be dumped on nature and society.

By the late twentieth century, however, these costs became so widespread and pernicious that they could no longer be downplayed or ignored. Social movements developed responding to both the ecological crisis and a decline in health attributed to problems with the industrialized food system. While most of these movements remained separate and somewhat narrowly focused, gradually perspectives emerged which perceived the link between the effects on nature and human health of the metabolic rift. Simultaneously, some scientists working with an ecological perspective in agriculture as well as others working within a more ecological perspective on human biology developed research and theory that transcended the reductionism characteristic of earlier periods.[5] The understanding, for example, that the human digestive system contains coevolved species of microorganisms (bacteria) that are in fact necessary for proper digestion, has become widespread in recent years (if only because the organisms themselves have become commodified and available via normal market purchases of yogurt and other "active" dairy products).

Significantly, research is now proceeding to investigate human metabolism through a more holistic lens taking into account what is essentially an ecosystem within the human organism. A recent study in the Proceedings of the National Academy of Sciences, for example, describes our digestive "system" in terms that are much more descriptive of an ecosystem than a factory:

> The human gut "metagenome" is a complex consortium of trillions of microbes, whose collective genomes contain at least 100 times as many genes as our own eukaryote genome. This essential "organ," the microbiome, provides the host with enhanced metabolic capabilities, protection against pathogens, education of the immune system, and modulation of gastrointestinal (GI) development. (De Filippo et al. 2010)

The study demonstrates that children in Europe eating diets higher in fructose than their counterparts in rural Africa eating diets rich in fresh, fiber-dense foods have different microbial balances in their digestive system, rendering the European children more vulnerable to diabetes and obesity. That the incidence of these two maladies has grown to epidemic proportions in wealthy First World nations is but one indication of the extent to which human metabolism has been disrupted by a modern, industrialized diet heavy with products such as high-fructose corn syrup (HFCS). That those diets are heavily infused with HFCS is itself a product of farm policy that subsidizes and encourages the overproduction of commodity crops, including corn.

Just as sophisticated nutritional analyses such as this are taking an ecological approach toward a richer comprehension of human metabolism, some soil scientists are overcoming the reductionist tendencies that developed after Liebig's discovery of essential nutrients in both soil and diet. This is especially true where soil scientists have engaged an ecological approach, both informed by and testing hypotheses stimulated by the development of "organic" agriculture.

Organic farming traces its roots to the work of Sir Albert Howard in Great Britain in the early twentieth century. Sir Albert's concern with the connection between the health of the soil and health of humans is summarized in the aphorism often attributed to him: "the health of soil, plant, animal and man is one and indivisible."[6] Although concern about the preservation of soil has been advocated by soil conservation movements and although soil conservation has often—especially in the United States—been seen primarily in terms of the prevention of soil erosion, the organic agriculture movement that Sir Albert helped found has looked at soil more in terms of its ecological processes and the need to preserve and encourage them as a way to ensure the health of plants and the health of those who eat them.

In the simplest sense, soil conservation and organic farming are concerned with returning nutrients to the soil through the use of composts and mineral sources. Restoring "nutrient cycles" is clearly key to repairing the "metabolic rift" created by capitalist industrial societies, as Foster, Magdoff, and others note (2000, 48–51). But the organic agriculture movement went well beyond reductionist understandings of essential nutrients, coming quickly to see soil (and the human organism) as more than a collection of chemical and physical properties, but rather as a living ecosystem—as reflected in the title Howard's colleague, Lady Balfour, used in her iconic book, *The Living Soil*. And although some proponents of organic and natural agriculture have flirted with metaphysical explanations of these processes (notable, e.g., in Biodynamic agriculture inspired by the philosophy of Rudolph Steiner), more recent scientific research has revealed intricate and complex webs of interaction at the microscopic level of soil ecology.[7]

Not surprisingly, just as exposure to drugs such as antibiotics (or even, as we have seen, an imbalance of fructose) can destroy the "good" microorganisms in the human gut that are needed for healthy metabolism, similarly exposure of the soil to chemical pesticides and herbicides can disrupt the natural ecology of soil microorganisms. Increasingly, soil scientists taking an ecological, rather than a reductionist, approach to soil nutrition are finding that these microorganisms are vital to processes which make essential nutrients available to plants and even often provide protection

against pests for healthy plants—again, findings that have parallels in human metabolic process involving symbiotic organisms.

The same metabolic rift that has disrupted the soil nutrient cycle has had an even deeper effect on the soil and its products. In their attempt to mitigate the depletion of macronutrients—the iconic "NPK" (nitrogen, phosphorus, and potassium) discovered by Liebig—the agricultural industrialists have accomplished a temporary boost in quantity of production while creating hidden effects on the quality of the product.[8] Recent research in both the UK and the United States has found that the nutritional value of fruits and vegetables grown in those countries today is lower than it was prior to the widespread use of chemical fertilizers and pesticides (Davis et al. 2004). It is likely, according to these researchers, that changes in the choices of cultivars to emphasize yield rather than nutrition account for much of this deterioration. But Davis et al. recognize other research that suggests the focus on productivity in terms of bigger and faster growing fruits and vegetables has resulted in the production of plants that simply have not had the chance to synthesize, incorporate, or metabolize the minerals and micronutrients that are as essential to plant and human health as the macronutrients are, or that depletion of soil can also be a contributing factor. Use of chemical agents to provide NPK or to eradicate pests is also implicated in changes in soil microecology (Steenworth et al. 2002). In short, the agricultural practices driven by the need to produce profits from food have significantly affected both soil and human metabolism.

Increasingly, researchers looking for clues in food and metabolism to the prevalence of chronic diseases characteristic of modern societies are focusing on the presence or absence of micronutrients such as antioxidants, substances that counteract the mutagenic effects of free radicals at the cellular level. Mutations caused by free radicals are known to contribute to the formation of cancerous cells. Antioxidants, such as the phytonutrients produced by plants as part of their own natural defense against stress, attack, and disease, counteract the effects of these free radicals. Thus, research is focusing on the possibility that food grown organically has higher levels of phytonutrients. But food grown under the hyperproductive conditions of chemical-fed commodity production is less likely to produce such phytochemicals.

While advocates of organic farming have been organizing, researching, and working to build a sustainable model of food production that repairs the metabolic rift in terms of ecological soil processes, advocates of social justice have been concerned with the effects of poverty on access to an adequate diet, in other words on "food security" (Allen 2004). Lack of access to the most basic necessities of life such as food is recognized as poverty in its "absolute" form.

Poverty in the "postmodern" world has had serious effects on health even when public policy is designed to provide access to sufficient caloric intake to prevent starvation. But given the premises and design of food assistance and antipoverty programs in general, at least in the United States, the results appear to be paradoxical. While poor Americans may not suffer from the type of severe and widespread malnutrition resulting in such conditions as *kwashiorkor* witnessed in Third World countries experiencing extreme hunger events, that does not mean that Americans do not

suffer from food insecurity and its negative effects on their health. Most serious among these may be the higher prevalence of obesity and diabetes associated with low-income (and low-education) status. In fact, research shows a fairly straightforward reason for higher rates of obesity (and by implication, diabetes) among this population. The kind of food that is highest in "energy density" and lowest in cost, and thus most attractive to people with limited buying power, is exactly the kind that is "energy dense"—higher in sugar and fat—and thus most likely to lead to obesity and diabetes (Drewnowski and Specter 2004).[9]

The connection between these types of foods and agricultural policy brings us back to the metabolic rift in the production of food. Under pressure from concentrated blocs of capital in agribusiness, farm policy in developed countries, particularly the USA, has focused on support for production of commodity crops which lend themselves to extensive cultivation stimulated by heavy infusion of petrochemicals (which are also subsidized). Ultimately, overproduction of crops like corn (maize) and soybeans encouraged employment of new methods of utilizing them, thus resulting in the proliferation of products like HFCS, fast food, and cheap meats—all of which contribute to the rising epidemic of obesity and diabetes.[10] Thus, conventional social policy geared toward support of agricultural elites and maintenance of existing production relations has contributed to the exacerbation of health problems correlated with lower class position.

There are similar issues with the production of livestock for meat consumption. The same agricultural policies subsidizing the production of commodity grains facilitate the feeding of these grains to ruminants, particularly cattle, which are not biologically adapted to long-term consumption of such carbohydrate-dense foods. As a result, cattle suffer from digestive and metabolic problems, which lead to at least two negative outcomes: increased emission of greenhouse gases from the animals[11] and increased likelihood of disease in the animals. The latter result, in turn, has two major effects: the development and potential contamination of food products with highly infectious agents such as E. coli O157:H7 and increased routine use of antibiotics (which also have an outcome favorable to the quantitative increase of exchange value in this industry by stimulating weight gain in the animals). And again, in turn, the routine use of antibiotics in feed and treatment of livestock stimulates the evolution of antibiotic-resistant strains of the infectious organisms.

Such destructive chains of causality are further indications of a metabolic rift. The cascade of effects that are destructive of health is an entropic, rather than metabolic, process. Similar processes are endemic in the modern and postmodern systems of industrial food production, from the tendency toward increasing concentration of animal feeding processes (pigs, poultry, and eggs, as well as beef and dairy cattle) to the increasingly frequent outbreaks of acute health effects from food contaminated with disease agents such as E. coli and Salmonella. And these are the acute symptoms resulting from the same systemic processes we have already shown to impact chronic unhealthy conditions such as obesity and diabetes. The metabolic rift in agriculture is reflected in a metabolic rift in the human organism resulting from the production of unhealthy food.[12]

## Environmental Policy and Social Policy Means to Address the Metabolic Rift

Similar arguments regarding the alienating environmental effects of modern market systems can be made, but are not the focus of this chapter. We have focused on the production and consumption of food as one of the most fundamental interstices of the processes of a species' life. Marx described a metabolic relationship between human society and the nonhuman world—"nature." That Marx was able to draw upon an understanding of the human/nature relation as a dialectical unity, rather than a dichotomy, was, I think, an indication of both a high point in Western philosophical development as well as a link to ancient and profound human cultural insights.[13] That he saw the most profound violation of that unity in the form of the metabolic rift is an indication of the depth of the crisis he understood modern capitalism to have generated.

Marx, it probably goes without saying, was not particularly optimistic about the prospect of capitalist societies developing the capacity to rationally manage economic relations to the extent necessary to repair this metabolic rift. The type of revolutionary society he saw as necessary to bring about such rational development is well known as "socialism." History, however, has in its fashion managed to muddy the concept significantly, so that a group of 10 "socialists" will inevitably have the proverbial 40 opinions about how to implement it. Ultimately, those who embark on this sort of deep critique of social relations and the human/nature relation at their base will agree that *some* form of rational, cooperative society is necessary to avoid the ultimate demise of human culture. But how to get there is rife with at least as many uncertainties and pitfalls as there are visions of its ideal shape, again complicated by an often tragic history of attempts.

In the short run, steps must be taken to mitigate the extreme effects of the real existing metabolic rift, and such is the potential role that environmental and social policy can perform. Fred Magdoff and John Bellamy Foster, in arguing for "ecological revolution," point to Marx's pessimism regarding capitalism's ability to overcome the crisis Capital itself has generated:

> *Après moi le deluge*!is the watchword of every capitalist nation. Capital therefore takes no account of the health and length of life of the worker [or the human-nature metabolism], unless society forces it to do so.[14]

Further, as Magdoff and Foster (2010) relate, Marx sees socialism/communism as the social form in which "the associated producers" rationally govern the human metabolism with nature.

But these are clearly long-term goals, and Magdoff and Foster also recognize the need for short-term strategies that can be implemented under current conditions. For example, a short-term strategy dealing with carbon emissions advocated by climate scientist James Hansen (2009) calls for environmental policies including cessation of coal burning, progressive taxation of fossil fuel consumption, and a global campaign against deforestation and for reforestation. In other words, short of the long-term rationalization of production through an ecological form of socialism, current

environmental policies can be implemented which can mitigate the most extreme effects of the metabolic rift with respect to climate. Hansen's proposed environmental policy is concomitantly social policy, specifically in the provision that the progressive fossil fuel tax would be used to redistribute revenues to the population (thus presumably reducing differential economic impacts on the less privileged sectors of the working class).

Similar policies can be conceived in the metabolic relations entailed in the nature-food-society nexus. Enrique Leff has argued for an analysis of "ecotechnological productivity" as an essential component of planning for sustainable development in developing societies. The process would assess ecological structures and potential sustainable productivity of crops that would optimize the ecological potential of a region or country while adhering to two other basic principles: meeting social needs and sustaining cultural values (1995). While Leff's focus is on strategies for developing societies, it suggests a framework that could also be applied to shape policies and planning for the transition of developed countries toward greater rationality, environmental sustainability, and social justice.

A similar approach should be taken to food policy. Just as parts of the environmental movement have moved toward a recognition that working class and minority communities suffer disproportionately the externalized toxic environmental costs of industrial capitalism (as witnessed in concerns about environmental justice and the development of "blue-green alliances"), two trends in social movements concerned with the production and consumption of food have begun to converge. As Patricia Allen (2004) terms it, movements addressing sustainable agricultural production and those concerned with food security have come "together at the table" in the common cause of addressing the basic need for human sustenance.

Both of these movements have been influential in shaping policies at local, regional, and national levels regarding their respective concerns, and their convergence results in the recognition that farm policy and food policy are inevitably entwined. The placement of food assistance programs within the US Department of Agriculture facilitates this convergence of concerns, as does the efforts of movement organizations and sympathetic politicians to reframe agricultural policy as farm *and food* policy, as reflected in the short title of the 2008 farm bill, the "Food, Conservation, and Energy Act of 2008."

While the 2008 farm and food bill still maintains many of the commodity programs that contribute significantly to the metabolic rift in agriculture and human nutrition, there is clear movement (small though it may be) in the direction of a more rational transitional program. While Food Policy Councils and ongoing local food, farm-to-school, community-supported agriculture, and urban agriculture movements can incrementally affect policies and practices at the local and regional level, what is also needed is a set of broader and longer-term strategies that can begin to repair the metabolic rift in the nature-food-society nexus.

Such a strategy could be built on an approach similar to the ecotechnological rationality outlined by Leff. The process would require (1) a scientific calculation of the level of *sustainable ecological productive capacity* for each particular region (based on the potential optimal production of biomass through photosynthesis);

(2) the types of *technological systems* that are sustainable; and (3) an assessment of *cultural needs*, including preservation and enhancement of cultural diversity by ensuring healthy levels of sustenance for all as well as opportunities for levels of cultural development and expression that contribute to a satisfying quality of life.

The current state of research suggests the promotion of organic production methods and the reconstruction of local and regional food system infrastructures would be components of an ecofood system, as these help restore and enhance both the metabolic capacity of the soil as well as the metabolic quality of our food. An increased emphasis on a research agenda that is guided by the three principles of ecological productivity, technological sustainability, and cultural advancement should inform an agricultural and food policy that is ecologically, economically, and socially sustainable.

Too often under the constraints of market economics (and their accompanying ideological and practical compulsions), social sustainability is given a low or no priority (Shreck et al. 2006). The notion of social sustainability implies that the prerequisite for long-term social stability and development is social justice, a condition of equity and fairness conducive to an optimal quality of life for the diverse range of social categories. While it is possible, for example, for large corporate entities to produce a higher quality of food using organic practices and for those corporations to persist as long as political-economic conditions permit (attaining a certain level of economic "sustainability"), if such concentrated business enterprises depend for their economic success on a tenuous labor supply such as undocumented migrant workers, their social sustainability is in grave doubt. To be sure, even moderately scaled family farms in labor-intensive sectors succumb to the temptation to hire migrant workers under the compulsion of market imperatives and labor market limitations. Ultimately, given Marx's insight into the fundamental role of labor in the metabolic relation between society and nature, the metabolic rift cannot be repaired until agricultural labor is no longer characterized by the exploitation embedded in the production of commodities for capitalist markets. Clearly, the "labor question" is an unresolved issue for a socially sustainable agrifood system, albeit beyond the scope of this chapter.

Further, as long as organic food maintains itself via a niche market—a kind of moral economy in which affluent customers are able to choose to pay premium prices to support the higher costs of production—the social sustainability of such a food system is in doubt, as lower-income people are relegated to diets that reproduce the metabolic rift, threatening their personal health and sustenance. At each of these ends of the nature-food-society nexus, the metabolic rift produces "alienation" and the inevitability of social conflict.

A rational agrifood policy therefore needs to embrace both environmental and social needs. Here, if nowhere else, environmental policy *should be* social policy, and social policy should be environmental policy. In fact, even given our current state of knowledge, the ideal food policy is simultaneously ecologically and socially sustainable. A policy that promotes the (re-)construction of a local and regional system of organic food production will necessarily require a redeployment of labor, as organic production methods require the substitution of more labor-intensive for

fossil-fuel-intensive technologies. But a socially sustainable labor force would require greater equity than the current wage system and would imply some combination of independent and cooperative, as well as urban and rural organizational and settlement patterns.

An ecofood policy designed on the principles of ecological productive capacity, sustainable technology, and cultural needs will also likely require a redeployment of animal resources, in some cases as ecologically sustainable sources of traction power (in which animal power complements human labor power and is sustained by the biomass productivity of the local ecology), and in other cases in more dispersed feeding systems (as opposed to the current concentration of animals in CAFO's—concentrated animal feeding operations). Such changes in both the distribution of human labor and the reemployment of animal power (as well as increased use of organic techniques and urban agriculture) were necessitated in Cuba as the result of a sudden collapse in energy and other resource supplies following the collapse of the Soviet Union. Because Cuba's social system was already geared toward social equity, in addressing its resource crisis it devised a policy that was simultaneously socially just as well as environmentally sustainable. This was, indeed, the only rational course to follow under the circumstances.

It is possible—perhaps even likely—that a similar collapse on a global scale will be required for human societies to finally move in a more rational and sustainable direction. But that prospect is fraught with unimaginable suffering, and the probability of a rational and sustainable outcome of such a collapse is, perhaps, low. Social movements that are working on ecological, food, and social justice issues would do well to take a strategic approach to sustainability by recognizing the fundamental significance of metabolic processes in the nature-food-society nexus and promoting the reparation of the severe metabolic rift created by the development of global capitalist industrial society. Movement in that direction is only possible by recognizing that environmental policy and social policy should be one and the same.

## Notes

1. "the sum of the processes in the buildup and destruction of protoplasm; specifically: the chemical changes in living cells by which energy is provided for vital processes and activities and new material is assimilated." (Merriam-Webster, http://www.merriam-webster.com/dictionary/metabolism, accessed August 14, 2010). Interestingly, the Greek root of the word *metabolē*—change—corresponds with the dialectical use of the term.
2. The first and second laws of thermodynamics are best understood as universal laws of physics, considered to apply within the presumed closed system of the universe as a whole (notwithstanding theoretical speculation about quantum physics, the potential existence of multiple universes, black holes, worm holes, etc.). But since the second law is widely cited in environmental discourse to raise concerns about the chaotic consequences of rapid and rapacious consumption, especially of fossil fuels, I think it is justified to consider the contrary tendencies of organic processes. The connection of metabolism to the first law was made by one of the discoverers of that law, Julius Robert Mayer (Foster 2000, 160).

3. See especially Chap. 5.
4. Liebig's 1840 pathbreaking work in soil science, widely known as *Agricultural Chemistry*, bore the full title *Organic Chemistry in its Application to Agriculture and Physiology*.
5. See, for example, Altieri (2000). For a particularly visionary approach toward a sustainable "perennial polyculture" form of food production, see Jackson (1980).
6. See, for example, http://www.ifoam.org/growing_organic/definitions/pioneers/sir_albert_howard.php
7. For a layman's introduction to this approach, see, for example, Lowenfels and Lewis (2010).
8. Although it is common among those unfamiliar with Marx's *Capital* to attribute these effects to the "industrial" model of production, it is worth considering that in Marx's analysis the dominance of the quantitative measure of value—exchange value—over the qualitative character of products—their use value—is the fundamental contradiction of capitalism.
9. Of course the attractiveness of these foods is no doubt enhanced by their satisfaction of natural cravings (which themselves get more intense as a result of the unbalanced diet) as well as the amount of money devoting to marketing and stimulating demand for these products. See Pollan (2008), 59, on the "carbohydrate hypothesis" and Nestle (2007) on the extent and effects of marketing.
10. See Pollan (2008), 117–118 and 121–122.
11. There is debate about this issue, with at least one study finding greater overall GHG emissions from grass-fed operations (Nemeth 2010). Other studies are focusing on adding such plants as alfalfa and flax to cut such emissions (Kaufman 2009).
12. And, as Marx argued a century and a half ago, this is all a product of a profoundly alienating set of social relations of production, in which exchange value prevails over use value, and capital accumulation prevails over the meeting of human needs.
13. Daniel Wildcat and his mentor, Vine Deloria, Jr., have both argued strongly and consistently for the lessons to be learned from indigenous knowledge of this fundamental place-based connection of human peoples with Mother Earth. See, for example, Wildcat (2009).
14. Marx (1976). *Capital*, vol. 1, 381; in Foster and Magdoff, 2010: 11.

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# Chapter 3
# Protecting Food Security, the Rural Poor, and the Environment: The Case of Climate Change Mitigation in Animal Agriculture

**Geoffrey Orme-Evans and Chetana Mirle**

## Introduction

Climate change, like most environmental and social challenges, transects poverty, human health, and animal welfare. Promising avenues for mitigating the climate crisis lie in a focus on rapid near-term reductions in short-lived greenhouse gases (GHGs), including methane. While this lifetime-leveraging approach considers differential responsibilities based on historic emissions and equitable finance, not all avenues for its implementation adequately account for parallel social justice and environmental objectives.

Animal agriculture is a key target for reductions because it is a leading anthropogenic methane source and one of the largest GHG sources overall. However, policies that seek to increase industrial animal production to make the sector more GHG efficient must be evaluated for their other societal impacts, which are overwhelmingly negative and threaten food security, rural livelihoods, the environment, public health, and animal welfare.

## Trends in Animal Agriculture

Humans raised 67.5 billion land animals for consumption globally in 2008 (Food and Agriculture Organization of the United Nations 2010). By 2050, meat and dairy production is projected to approximately double from 1999–2001 levels, with most of that growth occurring in developing countries (Steinfeld et al. 2006, p. 112).

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Along with increasing production, the way farm animals are raised has been changing. More and more producers around the world are turning to intensive, industrial farm animal production (IFAP) systems (Food and Agriculture Organization of the United Nations, Commission on Genetic Resources for Food and Agriculture 2007; Verge et al. 2007), which now account for about two-thirds of egg and poultry production and over half of pig meat production (Food and Agriculture Organization of the United Nations 2009). Industrial facilities concentrate thousands of farmed animals along with their waste on a small land area, frequently in welfare-depriving cages, crates, and pens, to grow them as quickly as possible to send to market (Pew Commission on Industrial Farm Animal Production 2008, p. 17). By the end of the twentieth century, IFAP was increasing "at twice the rate of more traditional mixed farming systems and at more than six times the rate of production based on grazing" (Verge et al. 2007).

Industrial facilities import the majority of feed grain from outside the farm (Food and Agriculture Organization of the United Nations 2009). Globally, more than 60 % of corn and barley, and over 97 % of soymeal, are fed to farm animals (Steinfeld et al. 2006, p. 113, Table 3.12). The shift from extensive animal agriculture towards intensive, IFAP, has profound implications for climate change, as well as food security, rural communities, and animal welfare.

## Climate Change

Human activity is causing a climate crisis (Hegerl et al. 2007, p. 704 § 9.4.5, pp. 729–732 Table 9.4). Between 1906 and 2005, global surface temperatures rose $0.74 \pm 0.18$ °C. These global averages are coupled with increasing temperature extremes (Trenberth et al. 2007, p. 237).

Droughts became more prevalent beginning in the 1970s, and there have been more frequent heavy precipitation events (Trenberth et al. 2007, p. 238). Snow cover is decreasing, and glaciers are melting (Lemke et al. 2007). Melting sea ice threatens polar bear habitat and may place the species at a high risk for extinction (Fischlin et al. 2007, p. 231, Box 4.3). The melting of the Greenland and Antarctic ice sheets has contributed to sea-level rise (Lemke et al. 2007). The world's oceans have been getting warmer, rising, and, due to increasing carbon content, becoming more acidic (Bindoff et al. 2007, p. 387).

According to the Intergovernmental Panel on Climate Change (IPCC), if humanity continues business as usual, temperatures will be 1.8–4.0 °C greater in 2090–2099 compared to 1980–1999 (Meehl et al. 2007; Intergovernmental Panel on Climate Change 2007, p. 13 Table SPM.3). This would put humans and animals at increased risk of disease, heat stress, and death (Confalonieri et al. 2007, pp. 393, 405; Easterling et al. 2007, pp. 283 § 5.4.1.4, 287 § 5.4.3.1). The combined impacts of flooding, drought, and high temperatures may stress crops and farm animals, jeopardizing food production. Additionally, agriculture will be at increased risk from pests, fire, and disease (Easterling et al. 2007, p. 275).

Developing countries, while projected to become larger contributors to the global climate crisis, are also expected to bear the brunt of its impacts (United Nations Development Program. Environment and Energy 2010; Confalonieri et al. 2007, p. 393). The poor in these countries will suffer the most from hunger and homelessness brought on by climate-change-induced drought and rising sea levels (African Development Bank et al. 2002).

The animal agriculture sector is one of the largest contributors to global emissions of carbon dioxide, methane, and nitrous oxide—three key GHGs (Unger et al. 2010, pp. 3382–3383, 3384 Fig. 1, 3386, Supplementary information p. 2 Table S1; Steinfeld et al. 2006, p. 114). According to the Food and Agricultural Organization of the United Nations (FAO) 2006 report, *Livestock's Long Shadow: Environmental Issues and Options*, animal agriculture is responsible for approximately 18 % of global, anthropogenic GHG emissions (Steinfeld et al. 2006, p. 275). Indeed, almost every step in farm animal production exacerbates climate change (Steinfeld et al. 2006, p. 82). In 2010, the FAO released a follow-up report showing that the dairy sector independently accounts for approximately 4 % of human-induced GHGs (Food and Agriculture Organization of the United Nations, Animal Production and Health Division 2010).

Carbon dioxide ($CO_2$) is the most important anthropogenic GHG (Steinfeld et al. 2006, p. 86; Forster et al. 2007, pp. 135–136), and remains in the atmosphere for hundreds to thousands of years (Moore and MacCracken 2009, pp. 43, 55). The FAO concluded that about 9 % of global, human-induced $CO_2$ emissions are due to animal agriculture (Steinfeld et al. 2006, p. 88).

A large proportion of emissions arise from the cultivation of crops, and associated inputs, for the production of animal feed. For example, producing fertilizer for feed production emits about 41 million tonnes[1] of $CO_2$ annually (Steinfeld et al. 2006, p. xxi). Burning fossil fuels on farms, mainly for feed production, emits about 90 million tonnes of $CO_2$ each year. These fuels are used for heating, irrigation pumps, and other machinery (Steinfeld et al. 2006, pp. 112–114). Additional $CO_2$ emissions result from desertification induced by overgrazing and trampling (≈100 million tonnes) (Steinfeld et al. 2006, pp. 39, 43) and from soil cultivation for the production of animal feed (≈28 million tonnes) (Steinfeld et al. 2006, pp. 66, 93).

However, the largest global contributor to $CO_2$ emissions from animal agriculture is deforestation due to pasture expansion and feed production. This contributes about 2.4 billion tonnes of $CO_2$ per year, according to the FAO (Steinfeld et al. 2006, pp. 79, 113, Table 3.12).

Methane and nitrous oxide are even more powerful greenhouse gases than carbon dioxide. A convenient way to compare long-lived GHGs' abilities to influence the climate is by their global warming potential (GWP) (Solomon et al. 2007, § TS2.5). By this metric, methane ($CH_4$) is 72 times more potent than $CO_2$ over a 20-year period (Forster et al. 2007, p. 212, Table 2.14). More significantly, methane only remains in the atmosphere for about 10 years (Boucher et al. 2009, p. 1; Unger et al. 2010, p. 3382), in contrast to $CO_2$ which can remain for more than 100 years (Moore and MacCracken 2009, pp. 46, 47).

[1]One tonne is one metric ton, or 1,000 kg.

Because of its large warming impact, and because of methane's short life span in the atmosphere relative to carbon dioxide, methane is a GHG of specific policy interest. Reducing methane emissions would have a greater impact, in a much shorter time frame, than reducing carbon dioxide emissions alone (Moore and MacCracken 2009, p. 46, Table I). Methane reductions would also reduce ozone heating because methane creates ozone in the atmosphere and is responsible for approximately half of ozone's warming impact (Ramanathan and Xu 2010).

The FAO found that emissions from animal digestion and manure account for approximately 35–40 % of global, human-induced methane emissions (Steinfeld et al. 2006, pp. 90, 91). Enteric fermentation, a digestive process that takes place in ruminant animals like cows and sheep (Steinfeld et al. 2006, pp. 92, 93), accounts for 25 % of animal agriculture's total GHG emissions globally (Steinfeld et al. 2006, pp. 95, 96).

Methane emissions from farm animal manure account for more than 5 % of animal agriculture's global GHG emissions (Steinfeld et al. 2006, pp. 95, 96). The US Environmental Protection Agency attributes, at least in part, the 54 % increase in methane emissions from US manure management between 1990 and 2008 to a "shift toward larger facilities" and "an increasing use of liquid manure management systems" (U.S. Environmental Protection Agency 2010).

Nitrous oxide emissions from the animal agriculture sector are also partially a result of manure. Animal agriculture is responsible for about 65 % of global, human-induced nitrous oxide ($N_2O$) emissions (Steinfeld et al. 2006, pp. xxi, 112). Nitrous oxide is incredibly more potent than $CO_2$—it lives in the atmosphere for more than 100 years (Forster et al. 2007, p. 212, Table 2.14; Steinfeld et al. 2006, p. 86), and has a GWP of around 300 (Forster et al. 2007, p. 212 Table 2.14). Emissions from manure account for over 25 % of animal agriculture's GHG emissions. Nitrous oxide from artificial fertilizers and leguminous feed crops are each responsible for approximately 2.8 % of animal agriculture's GHG emissions (Steinfeld et al. 2006, pp. 95, 96).

## Climate Change Policy as Social Policy

Climate change mitigation choices in the animal agriculture sector will impact multiple spheres of life, from air and water quality to food security and social stability. Therefore, it is crucial to place mitigation alternatives in the context of other societal objectives, such as global economic development, hunger alleviation, and environmental objectives.

Further, it is important to recognize differing responsibilities and burdens associated with climate change (Chandler et al. 2002). A key component of international climate change negotiations is the differential responsibilities of high-, low-, and middle-income nations in reducing greenhouse gas emissions. High levels of economic development and wealth in developed nations was powered by the unchecked burning of inexpensive fossil fuels (Moore and MacCracken 2009). Developing

nations are demanding the right to grow their economies in a similar manner and argue that developed nations should take the lead in reducing GHG emissions (Moore and MacCracken 2009; Government of India, Prime Minister's Council on Climate Change 2009).

However, even if OECD[2] countries ceased emissions in 2013, a dangerous level of GHG concentrations would still be reached by 2050 (Moore and MacCracken 2009). One model predicts that, by 2100, in the absence of internationally agreed caps on developing country emissions, the developing world "will emit four to five times the amount of carbon dioxide emitted by the developed economies over the last century and half" (Moore and MacCracken 2009).

Internationally, the United Nations Framework Convention on Climate Change (UNFCCC) preamble recognizes nations' differential responsibilities and challenges related to the climate crisis and calls for an equitable response (United Nations Framework Convention on Climate Change 1992). The Convention has produced the Copenhagen Accord, which sets a 2 °C ceiling on temperature rise (Conference of the Parties 2010). Nearing this temperature ceiling would put marine life in the Southern Ocean in peril (McNeil and Matear 2008; Ramanathan and Xu 2010). Further, warming of 2–4 °C would cause widespread glacial melting, lowered agricultural productivity, and extensive biodiversity loss (Schneider et al. 2007). Strategies for staying within the 2 °C limit must be evaluated in light of their effects on poverty, overall environmental sustainability, and nonhuman animals. Thus, climate change policy is as much a social policy as an environmental policy.

With the threats of climate change looming, the international community is searching for an equitable and sufficient policy response that meets multiple environmental and social goals (United Nations Development Programme 2010). A reduction in $CO_2$ emissions alone will not allow nations to keep the temperature rise below 2 °C (Ramanathan and Xu 2010), and numerous scientists call for methane reductions to be a part of the solution (Ramanathan and Xu 2010; Moore and MacCracken 2009, p. 46, Table I).

One possibility for a more equitable solution may be Moore and MacCracken's lifetime-leveraging model, named for its focus on the ability of reductions in short-lived GHGs to mitigate climate change in a short time frame (Moore and MacCracken 2009, p. 46, Table I). They estimate that by 2050, $CH_4$-induced warming could be halted if tight $CH_4$ emissions controls are implemented from 2000 to 2050. By contrast, equivalent controls on $CO_2$ would only eliminate about 40 % of $CO_2$'s warming effect in the same time period (Moore and MacCracken 2009, p. 46, Table I).

[2]The Organisation for Economic Co-operation and Development currently includes Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Organisation for Economic Co-operation and Development. Ratification of the convention on the OECD. http://www.oecd.org/document/58/0,3343,en_2649_201185_1889402_1_1_1_1,00.html. Accessed 31 Aug 2010.

A focus on methane reduction as a climate change mitigation strategy could also be more equitable from a developing country perspective. Equity issues in climate negotiations extend to distribution of costs for mitigation. In this regard, the lifetime-leveraging model may be more equitable than other solutions by being cost effective and by distributing mitigation burdens based on nations' incomes, with lesser requirements for low-income nations (Moore and MacCracken 2009, p. 46, Table I). Moore and MacCracken's model requires high-income nations to assume responsibility for the largest emission reductions in the near term by committing to reduce net emissions of all GHGs by 80 % below year 2000 emissions by 2050 (Moore and MacCracken 2009, p. 46, Table I). Middle-income nations would have a two-part commitment (Moore and MacCracken 2009, p. 46, Table I). The first part would require binding commitments to an 80 % reduction in emissions of methane and other pollutants with short-term climate impacts (Moore and MacCracken 2009). The second part of the commitment would be to gradually intensify targets for reductions in fossil fuel emissions but would not set caps on these emissions (Moore and MacCracken 2009, p. 46, Table I). Low-income nations would not have any caps on emissions (Moore and MacCracken 2009, p. 46, Table I). With this framework, the lifetime-leveraging model can help to avoid "dangerous and irreversible climate change" (Moore and MacCracken 2009). However, regardless of the model, it is clear that reductions of short-lived GHGs would cause significant reductions in projected warming (Moore and MacCracken 2009).

Animal agriculture—contributing about 18 % of global anthropogenic GHG emissions (Steinfeld et al. 2006, p. 275) and as the leading anthropogenic methane source (Ramanathan and Xu 2010; Steinfeld et al. 2006, pp. xxi, 82),—clearly warrants substantial consideration in negotiations. A 2010 study by scientists at NASA's Goddard Institute for Space Studies showed that, even discounting supply chain $CO_2$ emissions, animal agriculture was one of the most important economic sectors for near-term emission reductions (Unger et al. 2010, pp. 3382–3383, 3384, Fig. 1, 3386, Supplementary Information, p. 2, Table S1).

The IPCC and others have looked at mitigation opportunities in this sector (Smith et al. 2007, p. 507, Table 8.3; Ramanathan and Xu 2010; Verge et al. 2007). Proposed measures include improved grazing management, dietary additives, and manure management practices such as anaerobic digestion (Smith et al. 2007, pp. 508–511), which uses manure to produce biogas, a renewable energy source that is mainly composed of methane (Environmental Protection Agency, Office of Air and Radiation 2002). The problem with many proposed solutions is that, while they may offer some climate benefit, they may also be detrimental to long-term sustainability and food security.

For example, while animal manure has long been used as a fuel source in rural India (Harris 1978), anaerobic digesters (ADs) are now being used on the largest industrial animal agricultural operations to turn manure into electricity. Industrial animal agribusiness corporations in several developing countries have already initiated projects under the Kyoto Protocol's Clean Development Mechanism (CDM). One of Brazil's largest confined pig production operations developed a project under the CDM to install anaerobic digesters and generate electricity from manure

(United Nations Framework Convention on Climate Change 2004). However, IFAP facilities, whether they install digesters or not, still produce large amounts of manure and other wastes that pose threats to air and water quality (Pew Commission on Industrial Farm Animal Production 2008, pp. 1, 5, 23, 31, 33, 38, 42, 55, 85).

While technical solutions may hold some promise for mitigating climate change, plans to reduce greenhouse gases from the animal agriculture sector must ultimately include a reduction in overall farm animal populations. As the United States Department of Agriculture notes: "GHG emissions from livestock are inherently tied to livestock population sizes because the livestock are either directly or indirectly the source for the emissions" (U.S. Department of Agriculture 2004).

Further, it is not clear which production practices, conventional or extensive/organic, hold a climate change advantage over others. Given varying results from studies on emissions from different systems for beef and milk production (Casey and Holden 2005; Haas et al. 2001; Thomassen et al. 2008; Hörtenhuber et al. 2010; Subak 1999; Pelletier et al. 2010; Peters et al. 2010), and the difficulty of comparing these studies due to differing methodologies (De Boer 2003), it is difficult to conclude that one type of production system is better than the others based on GHG emissions criteria alone. However, it is clear that intensifying animal production systems has a significant negative impact on local air and water quality, while diminishing animal welfare (Pew Commission on Industrial Farm Animal Production 2008, pp. 23, 25, 27; Krohn and Munksgaard 1993). Organic systems, by contrast, are adapted to local ecosystems and promote ecosystem, human, and soil health (International Federation of Organic Agriculture Movements 2010).

Concrete efforts to reduce methane emissions from the animal agriculture sector must play a critical role in international solutions. A variety of policy tools to support small-scale farmers and the rural poor over industrial animal agribusiness could reduce the overall number of animals and encourage proper grazing management practices, thereby mitigating climate change while improving food security, sustainability, and community health.

## Impacts of Industrial Farm Animal Production on Livelihoods, Environment, Human Health, and Animal Welfare

Different climate change mitigation options support different types of farm animal production systems and therefore have disparate impacts on the farmers and communities. Mitigation options that support small-scale, traditional systems are better for food security and the rural poor.

Small farmers, pastoralists, and landless peoples in developing countries have a multifunctional view of farm animals. Farm animals contribute to the well-being of at least 70 % of the world's rural poor (Anderson 2003). To these households, the value of farm animals extends beyond measures of efficiency and quantity of meat, egg, and milk production. Around the world, the rural poor use farm animals to acquire cash income, to save and accumulate assets, to provide food, and to insure

against health or other financial crises (Anderson 2003; Holmann et al. 2005; Millar and Photakoun 2007). Integrated into a mixed farming system, animals provide inputs and services for crop production (Anderson 2003; Holmann et al. 2005; Millar and Photakoun 2007),

This multipurpose view of farm animals is well adapted to low-input, free-range systems managed by the rural people who account for 70 % of the world's poor (Pinstrup-Andersen and Herforth 2008) and whose strategies for acquiring food and other resources lie largely outside of the market system.

Food security is defined as the ability of a household to acquire the food needed by all its members to support a healthy and productive life (United Nations Administrative Committee on Coordination, Subcommittee on Nutrition 1990). A household's acquirement strategies might include homestead production, farming, and income-earning opportunities on other farms—all mechanisms that are better served and fostered through small-scale agriculture but impeded by IFAP. Industrial farm animal production may limit poor households' abilities to acquire food by disadvantaging small farmers, decreasing on-farm employment opportunities (Ponette-González and Fry 2010, p. 1109), and degrading the environment. Small farmers who try to directly compete with large animal agribusiness are at risk of being pushed out of the market, as they lack the political and economic power of the larger companies, or the ability to exploit economies of scale (McLeod et al. 2009). In the Amazon, cattle ranching and soy production for animal feed are replacing native forests, displacing smallholder farmers' diversified farming systems, and harming the indigenous communities that rely on the forest (Nepstad et al. 2006). The same trend is apparent in Mexico, where the industrialization of animal agriculture has forced small farmers out of the market (Ponette-González and Fry 2010).

The few small or midsize farmers who do stay in farming will likely do so by leaving mixed farming to focus exclusively on livestock and by becoming contract farmers to large corporations—dependent on distant markets and a remote corporate governance body for their income (McMichael 2001). The power structure in such contractual relationships favors the agribusiness firms over the individual farmer and results in a greater share of risks and costs of production, including waste management, being borne by the individual (Marks 2001; Kennedy and Schaeffer 2003).

As evidenced, the rural poor in developing countries are best served by extensive animal production systems that support smaller numbers of animals but provide greater amounts and types of support to their households and communities. These extensive systems can also support greater environmental sustainability.

When considering which types of animal agriculture systems to support, a wide variety of environmental considerations, outside of climate change, also come into play. Traditional farming systems combine animal agriculture with crop agriculture, thereby balancing the number of animals with the crops' ability to absorb the animals' manure. However, the massive amounts of manure produced by IFAP facilities, where thousands of animals are confined indoors, typically exceeds the ability of the surrounding soil and crops to assimilate the manure's nutrients. The animal waste is over applied to land, potentially contaminating water supplies and emitting

harmful gases into the atmosphere (U.S. Department of Agriculture – Economic Research Service 2007). Further, industrial animal agriculture results in a drain on water and other natural resources. A 2009 article by Méndez and Timoteo attributes declining water levels in the Perote-Zalayeta aquifer to pig factory farming in this region of Mexico (Méndez and Timoteo 2009; Ponette-González and Fry 2010). Industrial animal agriculture is also a large user of land, given its dependence on outside feed sources—33 % of the Earth's arable land is used for feed crop production (Steinfeld et al. 2006, p. 275). Approximately 70 % of previously forested land in the Latin American Amazon is used as grazing pastures, with the remainder being used largely for feed crop production (Steinfeld et al. 2006, p. 275).

In addition to draining environmental resources, IFAP poses significant risks to human health. Workers, as well as those living near IFAP facilities, are prone to a wide range of respiratory and other health problems related to airborne pollutants from these facilities (Earth Tech Inc 2001, p. 1; Pew Commission on Industrial Farm Animal Production 2008, pp. 29, 33). Manure contamination of food and water supplies can also transmit disease-causing pathogens. (Earth Tech Inc 2001, p. 31) Animal manure has been found to be the source of more than 100 zoonotic pathogens that may directly contaminate the food supply (Greger 2007, p. 254).

In addition, the crowded, stressful, and unsanitary conditions in IFAP facilities are also ripe for the emergence of new infectious diseases, including highly pathogenic strains of avian influenza that can potentially impact humans (Nierenberg 2005; Greger 2006). The excessive, nontherapeutic use of antibiotics in IFAP facilities, largely to facilitate weight gain and prevent disease in these stressful conditions, is a potential contributor to the emergence and spread of *Salmonella* and *E. coli* strains resistant to antibiotics (Greger 2007, p. 259 (salmonella) and p. 256 (e-coli); Barrett 2005, p. A117; Gibbs et al. 2004, abstract).

The wealth of information linking industrial farm animal production with illness led the American Public Health Association to issue a policy statement in 2003 urging US federal, state, and local governments and public health agencies to impose a moratorium on the construction of new IFAP operations in the US (American Public Health Association 2003). However, throughout the world, these facilities continue to replace extensive farm animal production systems that do not pose the same environmental and health hazards and that maintain higher standards for animal welfare.

As meat, egg, and milk production are ultimately dependent on sentient animals, there should be a consideration of animal welfare on ethical grounds when evaluating climate change mitigation solutions in the sector. Industrial facilities fail to provide animals with environmental stimulation or adequate space for animals to engage in most natural behaviors. The majority of egg-laying hens are reared in barren, wire battery cages (United Egg Producers 2010) so restrictive that the birds cannot even spread their wings (Dawkins and Hardie 1989). With no opportunity to exercise or engage in many other natural behaviors, these caged birds suffer immensely. A large number of breeding sows are confined in gestation crates for the majority of their repeated pregnancies, denied sufficient space to walk or even turn around. Some facilities confine lactating dairy cattle in tie stalls (U.S. Department

of Agriculture 2007). Wide-ranging scientific evidence demonstrates that intensively confined animals are frustrated, distressed, and suffering (Duncan 1970; Špinka 2006; Baxter 1994; Dawkins 1990; Vestergaard 1984; Broom et al. 1995; European Commission 1995),

Greater levels of animal welfare are an aspect of organic production that cannot be discounted (Haas et al. 2001; Thomassen et al. 2008; Hörtenhuber et al. 2010). A life cycle assessment on dairy production concluded that organic systems were better for welfare than the conventional systems (Haas et al. 2001). In fact, many backyard egg and chicken meat production systems, nomadic pastoral systems or other traditional systems, and mixed cropping systems that incorporate farmed animals, and do not intensively confine the animals in cages or crates, allow them more space for movement and, in many cases, environmental stimulation and the freedom to express many natural behaviors.

## Conclusion

Meeting the environmental objectives of climate change mitigation policies is critical to achieving key social and economic development goals as well. As policymakers evaluate solutions to stem climate change and its effects, it is essential to consider these solutions in light of other pressing global issues. One promising policy solution focuses on quick, near-term reductions of short-lived GHGs as a way of mitigating atmospheric GHG concentrations while taking into account the differential responsibilities of developed and developing countries. Considering animal agriculture's leading contributions of methane and other GHGs, it is a key focus for such policy options. However, aside from questionable GHG efficiency improvements, policies that seek to further intensify and expand industrial animal agriculture in an attempt to lower GHGs have widespread, negative side effects. Industrial animal agriculture poses threats to food security, rural livelihoods, public health, the environment, and animal welfare. Climate change policies aimed towards GHG reductions in animal agriculture should therefore support traditional, extensive, and organic production which support a smaller number of animals. This would reduce GHG emissions while improving income and food security for a large number of small farmers and the rural poor.

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# Chapter 4
# Living Off the Fat of Another Land: Trans Fat Social Policy and Environmental Externalities

**Kimberly Elizabeth Johnson**

The removal of artificial *trans* fatty acids (TFAs) from the food supply is a public health measure that is predicted to have a profound positive impact on local and global human health, but may conversely have a negative impact on the global environment. Implicated in cardiovascular disease, artificial TFAs have been ubiquitous in the processed food supply and have become a target of removal by public health agents. But what happens when the bans and labeling laws go into effect? TFA restriction for public health purposes also reaches upstream into food processors and the agricultural sector as producers make efforts to find suitable replacements within given policy time frames (Eckel et al. 2007; Unnevehr and Jagmanaite 2008). Palm oil has become an industry alternative broadly adopted, though questionable in regards to both health and environmental repercussions. Significant increases in global demand for the oil and subsequent subsidized government clearing of lands for agricultural purposes have resulted in environmental consequences ranging from soil degradation, deforestation, and pollution to threatened and endangered wildlife (Brown and Jacobson 2005). Genetically modified (GMO or GM) oil seeds that can produce fats that are considered TFA-free have also been a part of the industry solution to TFA restrictions. Yet these also create environmental challenges regarding issues of genetic diversity, transparency in the food supply, and establishment of intellectual property rights of multinational corporations over large chunks of the world's food commodities through seed patents. This case study will explore efforts in replacing TFAs in the food supply while looking more broadly at the intersection of food, health, and environmental policy. In particular, the focus will be on the social and environmental challenges of the substitution of palm oil and the use of monocultured GMO oil seeds in contrast to the alternative of shifting to diets and products that decrease intake of concentrated food substances in processed foods.

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Public health policy that impacts other areas such as agriculture and environment calls for engagement by a broader group of interests in a manner that has yet to be adopted in a meaningful and prospective way. How might lessons learned from the case of *trans* fatty acids help us to create a shared space in research and future applied public policy that will benefit society and sustain the environment?

I started my exploration of artificial *trans* fatty acids (hereafter referred to as TFAs) quite incidentally and informally in 2003 as a consultant for a local restaurateur and farmer who wanted to explore ways to replace the fat in his restaurants—it seemed discreet and ending after a summer. I had no idea that I would later adopt TFA as a formal topic of study. What I discovered in my studies of TFA is that food is not abstracted and removed from our lives but rather intimately connects and attaches us to the earth and is somewhat determinative and reflective of our quality of life. We live that connection many times a day as we consume pieces of the earth to nourish, intoxicate, stimulate, or please us. This daily action and choice in what foods we consume and how we consume them sends waves from our persons and microenvironments out through humanity and the environment across the globe. Each bite we take is a personal political statement, an affirmation or contestation of our current paradigm in living and the social structures behind that paradigm. We often act habitually without conscious reflection on this, as our human environments sway us in subtle ways we may be blind to. TFAs, like other foods, have cut through our world with their presence and absence and have been the source of social policy blending into environmental policy and earthly concerns (and ultimately back to social concerns).

*Trans* fatty acids now haunt my daily existence somehow. Most recently, I went television shopping with a friend. I confess I become somewhat depressed in my role as consumer. Gazing at all the plastic and packaging, I experience anxiety as I remember reports of off-gassing toxins and the over 4,360 chemicals that a TV may be comprised of (McDonough and Braungart 2002). I recall the news piece on the trash dump in the Pacific Ocean that is reportedly twice the size of Texas (Handwerk 2009). I have a somewhat obsessive-compulsive reaction to plastic in general, trying desperately to consider my purchasing in light of this. I take long moments of grave consideration before I dispose of plastic in the garbage. I am an uncomfortable but semi-compliant (if contesting) Western World overconsumer. In this light, we shop for a TV. We balk at the service plans in recognition of the obsolescence built into products and technology which drive consumerism and unsustainable free market growth and make local repair of products a thing of the past. We, like so many others, navigate and balance our decisions based on perceived need and quality, availability, and accessibility (often financial).

We load up our purchase and on the way home I am asked to stop by the local Dunkin' Donuts. I am asked if I want some but I decline. It seems I also have mixed feelings about these donuts. On the one hand, I recall visits to my beloved extended family downstate as a child. We would have donuts as a rare treat on these occasions and I associate them with fond memories of familial closeness (along with lots of made-from-scratch Polish classics, like borscht). On the other hand, I lived a former life as a professionally trained chef and culinary purist, and this sort of food was never considered pure food—particularly when purchased in a convenience setting.

Add to this my current understanding of nutrition and the politics of food and you have a schizoid reaction to the food. What finalizes my decision though is what the long list of ingredients does to my palate, and I cannot say it is a good thing. I trust my sensory evaluation of the world in spite of all the past scientific literature that assures me all is well.

We add to this Western story by purchasing the donuts in a drive through, consuming much too much energy on all accounts. After paying for the donuts, we are handed a white box with pink and orange writing on it. It is shaped like a clothing gift box. In the left hand corner, the box exclaims, "0 g *trans* fat." I realized I needed to know more.

## TFA in Health and Diet: Food or Toxin?

*Trans* fatty acids (TFAs) in the diet are predominantly industrially produced (80 % of TFAs consumed), although they are also naturally occurring in small amounts in products from ruminant animals such as cattle (Mozaffarian et al. 2006). Artificial *trans* fatty acids are found in fried foods and baked goods. They are produced when vegetable oils (most vegetable oil in the USA is soy bean oil) are put under pressure in the presence of a catalyst such as nickel (Eckel et al. 2007). Chemically, this has the effect of creating saturated fatty acids (hydrogenated fats). Physically, the fats become solid and pliant or "plastic" at room temperature and are often called shortening in this state. The process also creates partially hydrogenated vegetable oil (PHVO) rich in *trans* fatty acid. How much *trans* fat is created is a result of the fatty acid composition of the oil and/or the process (Tarrago-Trani et al. 2010). Fats rich in *trans* fatty acids have been favored by food processors because of their plasticity which helps to create great textures in baked goods, increased shelf stability compared to liquid vegetable oils, and because they are cheap.

While TFAs are convenient and cheap for food processors, in 2002 an Institute of Medicine report essentially stated that there is no safe level of consumption of artificial *trans* fatty acids (New York City Department of Health and Mental Hygiene Board of Health 2006). Primarily targeted as an artificial food substance that contributes to cardiovascular disease (CVD) such as coronary heart disease, consumption of TFAs are also linked to increased risk for gallstones and prostate cancer in men, increased risk for colon cancer, increased risk for endometriosis, stroke and breast cancer in women, and may contribute to reduced fetal growth and low birth weight when consumed during pregnancy (Mozaffarian et al. 2006; Chung et al. 2005; Chavarro et al. 2008; Vinikoor et al. 2008; Missmer et al. 2010; Yaemsiri et al. 2010; Chajes et al. 2008; van Eijsden et al. 2008). In spite of the risk, consumers in the USA are largely ignorant of their intake of *trans* fatty acids. Although many have become increasingly aware of the danger of TFAs, few can name a food source they are found in and so cannot apply the information to their eating habits (Eckel et al. 2009; International Food Information Council Foundation 2008). This has led many public health authorities to turn to policy and political action on behalf of population health.

Since the FDA amendment of the Nutrition Labeling and Education Act, TFAs are slowly being weaned from both national and international food systems (Mozaffarian et al. 2006). Largely ubiquitous in the US processed food supply, and the FDA estimated that labeling of TFAs would effectively prevent 250–500 deaths (The United States Food and Drug Administration 2003). Less conservatively, a proposed TFA ban in Great Britain was projected to prevent 11,000 heart attacks and save 7,000 lives yearly (Campbell 2010). National and international strategies to remove TFAs have included requests for food industry voluntary replacement, such as in Tiburon, CA, and NYC in 2005 (Ban Trans Fat.com 2003; New York City Department of Health and Mental Hygiene Board of Health 2006). More forceful public health efforts and policy have included labeling of TFAs in packaged foods such as in the USA and Canada, regulated reduction and bans such as those found in Norway, Switzerland, NYC in 2006, Philadelphia and California (US Food and Drug Administration 2006; Ban Trans Fat.com 2003; Stender and Dyerburg 2004). Bans in the USA effectively closed the loophole of transparency and accessibility left by labeling TFAs which did not cover restaurant and convenience foods. The NYC Department of Health and Mental Hygiene, for instance, noted the increased intake of meals eaten away from home by Americans, and when positioned next to the high levels of TFAs particularly in fast foods, it became a viable public health move to improve cardiovascular health through policy (New York City Department of Health and Mental Hygiene Board of Health 2006; Stender and Dyerburg 2004). While Michael Jacobson of Center for Science in the Public Interest petitioned in 2004 to have TFAs removed from the GRAS (generally recognized as safe) list, others claim any food containing TFA should be considered adulterated (Jacobson 2010; Scott-Thomas 2010).

Shifting away from TFAs in the food supply is described as a complex process, but in general food industry response to TFA policy has been to try to find another cheap, accessible fat with similar properties that may be substituted for TFAs in food. The three routes followed by food processors are substitution of another fat, reformulation of the recipe altogether, or modification of the hydrogenation process (Eckel et al. 2007). Additionally, alternative blends of saturated fats with liquid oils are used in baked products as is interesterification of oils (Daniells 2009, 2010; Tarrago-Trani et al. 2010). The focus from this point on will be on substitution of TFAs with palm oil and GMO seed oils and the environmental impact of these two routes.

## Replacing TFAs with Palm Oil

In light of TFA policy, palm oil has become a substitute broadly adopted. Food processors have chose palm oil particularly for baked goods because it has high quality flavor, good plasticity, and low cost. While palm oil is high in saturated fats that are considered less heart healthy, it is still considered to be a better alternative to fats rich in TFA in terms of chronic disease and the health impact of tropical oils is now being revisited (New York City Department of Health and Mental Hygiene Board of Health 2006; Mukherjee and Mitra 2009). Shortly after the US FDA labeling

requirement for TFAs, US import of the oil increased by 50 % (Brown and Jacobson 2005). As a widely used vegetable oil, it is also the world's leading oil crop (RSPO 2009). Much of the demand is from China and India, and most of the production and new plantations are in Southeast Asia, predominantly Indonesia and Malaysia (Brown and Jacobson 2005; Sheil et al. 2009).

CIFOR, the Center for International Forestry Research, published a paper detailing the agricultural constraints, challenges and repercussions of palm oil plantations in Southeast Asia (Sheil et al. 2009; Scott-Thomas 2010). Palm oil is primarily monocultured intensively in tropical forests, processed from both the fruit and kernel of the palm tree. The tree normally lives a life of 20–25 productive years. The oil is used in food substances like baked goods, personal care items such as soap, and more recently as biofuel. Indigenous to West and Central Africa, the palm oil tree was introduced to Southeast Asia in the mid-1800s, where its yield exceeds palm grown in Africa. The oil was first introduced to Europe in the late 1500s and was the source of the creation of Unilever (one of the world's largest consumer goods companies) from two parent companies in 1930. It is one of the cheapest oils to produce with highest yield—four times the yield of rapeseed (canola oil) and more than ten times the yield of soy beans (Sheil et al. 2009). The downside for a grower is the high initial investment and the long commitment for a tree that lives so long. However, it is a commodity of high demand, and like other seed crops, it has more recently become a target for biofuel production as an alternative to petrol. The USDA estimates though that 77 % of palm oil is for food (Sheil et al. 2009; Scott-Thomas 2010). The palm oil industry, employing over six million people, has simultaneously lifted communities to a higher standard of living and created extreme social conflict (RSPO 2009; Tauli-Corpuz and Tamang 2008). Along with the contentious social issues of palm oil production and the still questionable health options it offers, palm oil also brings with it devastating environmental effects. Among the environmental externalities of palm plantations are deforestation, fires, disruption of forest landscape, decreasing biodiversity, decrease in soil fertility, increased soil erosion, pollution, and contributions to greenhouse gas emissions (Brown and Jacobson 2005; Sheil et al. 2009; Scott-Thomas 2010).

Land, soil, air, and water continue to be assaulted in Southeast Asia, particularly Indonesia, as new palm plantations emerge to meet demand. Palm growers have financial incentive to both log natural forests for the wood and pulp, then burn the remainder as an inexpensive way to clear the land for palm production. While there is government policy in place to control clearing of new land and tropical forests, it is policy without teeth as both burning and deforestation continues (Agence France-Presse 2010). Increased media coverage highlighted palm oil and fires in 2010 due in part to a Greenpeace campaign to stop the destruction of rainforests in Southeast Asia for palm oil production by applying pressure on multinational companies that purchase palm oil through noncompliant suppliers—in particular through Sinar Mas, a pulp and paper company that also sells palm oil (Greenpeace 2007, 2010). The strategy worked as Burger King announced its decision to cancel its contract with Sinar Mas (Burger King to stop buying palm oil 2010). Destruction of peatlands throughout this region adds to global warming by releasing massive amounts of carbon stores (Greenpeace 2010). Logging and fires clear the land and exposed earth is

then subject to erosion of precious topsoil (Sheil et al. 2009; Brown and Jacobson 2005). When palm plantations are created (near a processing plant as the fruit has a short life once it is harvested), the effluent from the extraction process runs off into local water sources and is typically high in temperature, heavy metals, and acidity. While use of mulching to fertilize has increased, chemical fertilizers are often used, and these and pesticides also contaminate local rivers and water beds, impacting aquatic ecosystems (Sheil et al. 2009).

In a 2005 publication, Center for Science in the Public Interest exposed the impact of the palm industry on wildlife and endangered species. Fires kill animals and destroy rainforest homes of species such as the Sumatran tiger, Bornean and Sumatran orangutans, Asian elephants, and Sumatran rhinoceros—all on the endangered species list (Brown and Jacobson 2005). Palm plantations also threaten species through the fragmentation of their habitat and conflict with humans resulting in killing of species. Biodiversity of plant life is impacted with adoption of monocultured palm fruit trees, and with the creation of plantations, there is up to 60 % reduction in bird species (Sheil et al. 2009). Unfortunately, if plantation managers are relied upon to maintain the existence of species, it becomes a conflict of interest when short-term profit motive is on the line—even with species protective laws.

While RSPO (Round Table on Sustainable Palm Oil) was created to protect Southeast Asia and other tropical forests from devastation, Greenpeace and Fred Pearce, journalist for *The Guardian*, accuse the organization of being a front for the status quo (Greenpeace 2010; Pearce 2008). Additionally corruption in government, particularly in Indonesia, is reported to be common, making laws even less effectual and attempts at protection of resources close to impossible (Brown and Jacobson 2005). While the people of Southeast Asia cannot be expected to forego economic development that might be seen to improve their lives personally, destruction of important world resources is hardly acceptable. There is also resistance by indigenous people to this sort of globalized palm oil plantation development as detrimental to traditional subsistence farming that shapes their culture and worldview (Tauli-Corpuz and Tamang 2008). It is clear that there are local challenges to the control and conservation of rainforest treasures. These challenges are driven by globalized market demand such that local cultural and governmental forces may not be adequate to meet globalized forces head on and win. Greenpeace strategies to pressure multinational food giants to decrease demand for non-sustainable palm oil holds some promise in hedging the tide of destruction. The UN-REDD program (Reducing Emissions from Forest Deforestation and Forest Degradation in Developing Countries) that would provide potential funding to support sustainable policies has possibilities and promise (United Nations 2009). However, there is much to be lost here.

## Replacing TFAs with GMO Oil Seed Crops

Genetically modified soy beans, sunflower seeds, and canola oil that have fatty acid profiles that produce lower levels or no TFAs have been another viable alternative in replacing *trans* fat in the US food supply (Tarrago-Trani et al. 2010). With no

requirement for labeling in the USA, genetically modified foods were estimated to be in 60–70 % of our groceries in 2009, primarily processed foods (Schneider and Schneider 2009). Concerns and distrust by the public regarding the science of genetically modified organisms focus on the lack of long-term information regarding the science of genetic engineering and how it might impact human and environmental health. Other issues include the use of antibiotic resistant markers, transmigration of genetic material into the wild and its repercussions, and chance for cross contamination and expression of allergen-containing proteins (European Federation of Biotechnology 2001; Schneider and Schneider 2009; Neuman and Pollack 2010). In addition to this, there are environmental concerns regarding the mainstreamed agricultural techniques employed in growing GMOs. Current intensive agricultural practices that include monoculturing of crops, use of inorganic fertilizer (often based on non-sustainable petrol resources), and large machinery have devastating effects not only on biodiversity but also on soil including compaction and destruction of beneficial living organisms that nourish the earth (Altieri 2004; Pollan 2008). Current broadscale agricultural practices have whittled our mainstream food supply down to about 15 crops which provide us with the majority of our caloric needs (Food and Agriculture Organization 1995). Many scientists posit that biodiversity and preserving genetic diversity are essential to our future food security (Altieri 2004; Stokes 2010).

While GMO crops and animals have been a source of distrust of science by the public, they were not a broadscale contentious issue in past US politics. However, GMO salmon introduced in 2010 by AquaBounty Technologies renewed interest in the debate on labeling and transparency in our food supply, along with issues of public distrust of science—especially when science is combined with business interests in our food supply (Pollack 2010a, b; NPR 2010). This distrust of government ties to industry is understandable in light of the most recent report by the President's Cancer Panel which highlighted that cancer caused by exposure to chemicals in the environment (such as agricultural pesticides and herbicides) is more prevalent than previously thought. After decades of industry development where businesses and scientists collaborated to create and introduce products that were never really fully assessed for health and environmental impact, currently only 200 of the 80,000 chemicals have been assessed for safety (Martin 2011).

Unlike the USA, the EU has had a long-standing debate on GMO food. In a prospective report of food policy trends in EU, authors list consumer suspicion of GMO technology as a deterrent to GMO expansion in the EU market (akkanto et al. 2010). In 2010, the EU announced policy to loosen the approach to GMO cultivation in Europe as a state-decided issue has renewed contentious politics. Supporters of GMOs suggest that without a final decision by the EU to support GM cultivation, EU agriculture will no longer be able to compete with global agriculture given the purported edge in biotech's crop yield (Ford 2010). Those in opposition called it a victory, and by September 2010, 4,000 regions in the EU made declarations against GM cultivation (Anti-GM campaigners claim victories in UK and in Europe 2010).

Biotech companies make the case for GM crops to feed a growing world, and most patents issued address yield of crops through channels such as the herbicide

resistance of Monsanto's Roundup Ready soy beans (Monsanto 2010). Ninety-three percent of US soy planting in 2009 and 70 % of corn crop contained the patented Roundup Ready trait, which protects the soy beans from glyphosate, a potent weed killer used to decrease competitive weed growth (Bloomberg News 2010; Neuman and Pollack 2010). However, in the year 2000, superweeds with resistance to the weed-killer Roundup began to pop-up and have since spread throughout the East, Midwest, and South of the USA, making the weed killer less effectual and the patented, more highly priced Roundup Ready trait seeds less desirable. It also decreased trust in GMOs among farmers as an answer as they return to harsher chemicals and more labor intensive practices like plowing weeds (Neuman and Pollack 2010). Interestingly, just as the patent on the Roundup Ready trait is set to expire in 2014, Monsanto and others have arrived with a new patented seed trait for weed-killer resistance called glufosinate (Bloomberg News 2010; Neuman and Pollack 2010). For over a decade since the broad use of GM crops, seed prices have been increasing and drew the attention of the Obama administration and the Justice Department who began an antitrust investigation to assess competition and control in commodity crops (Neuman 2010). The investigation backs long-time anti-GMO activist Vandana Shiva, who had proposed that use of patented, genetically altered seeds not only destroys traditional agricultural practices globally, but concentrates power over our food supply into the hands of a few (2007). Further, gains experienced by farmers through use of GMO seeds may be lost through overuse and there may be limited access to non-engineered alternative crops for some farmers in the current market (Pollack 2010a, b).

Using the alternative GM oil seed crops with modified fatty acid designed and patented by large multinational seed development companies like Monsanto, DuPont, and Dow AgroSciences can decrease TFAs in our food supply. It would also bypass the environmental devastation and social conflict caused by replacing the forests of Malaysia and Indonesia with palm oil fruit plantations. However, it carries with it an array of equally concerning environmental consequences and negative possible outcomes as replacement with palm oil does. Environmentally, GM crops may speed the evolution of superweeds and continue intensive agricultural monoculturing as we see large proportions of some food commodities possessing similar gene traits and a concurrent decrease in diversity of food crops. This strategy carries the same burden of meeting intergenerational justice that palm oil does—are we robbing tomorrow's generations by excessive or unsafe and inequitable use of environmental resources today?

## Decreasing Concentrated Food

Continuation of TFA in our food supply or replacing it with palm oil or GMO-generated oil that is free of TFA are all poor solutions in the long run from environmental or human health perspectives. Concentrated food substances do not make sense on any level beyond short-term profit motives for discreet parties and interests. While substitution was the primary route chosen by most food producers who

used TFA, there is another solution. From a population and environmental perspective, a move away from concentrated food sources and a return to diverse and whole foods as the primary constituents of our food environment and diets would provide benefits to both human and environmental health. However, this is not seen as a viable business option for an industry that is incentivized to (and relies upon) deconstruction and reconstruction of food to create "value-added" products with acceptable profit margins.

There is little benefit to consumers or populations in maintaining concentrated food substances or production philosophies that support it. The food-based case of rapid expansion of the palm oil industry to meet increased demands in part created by replacement of TFAs illustrates this from a microlevel of individual health radiating out to the macro-level of environmental health. On an individual level, the higher intake of cheap, concentrated food substances such as processed foods rich in oils(including palm oil and TFA) and added sugars is associated with devastating chronic disease such as diabetes and cardiovascular disease and decreasing quality of life globally, often concentrating risks among the poor (Popkin 2006; Drewnoski 2004). Concentrated intensive agriculture in palm production has disproportionately concentrated benefits to some individuals and business interests but has simultaneously led to social conflict, environmental and species devastation, and decreasing biodiversity on an environmental level (Altieri 2004; Brown and Jacobson 2005; Sheil et al. 2009). Shifting away from concentrated processed food and production systems that support it would be beneficial to all levels of life. However, while agricultural giants continue to speak about feeding the world, government policy continues to support growing more food than the population requires through subsidies. Many link this government subsidy of overproduction to the worldwide obesity epidemic and increased availability of profitable, concentrated food substances (Elinder 2005). Popkin notes the selective reduction of research and promotion for development of healthier whole foods such as fruits and vegetables has resulted in higher prices for these healthier foods and less expensive subsidized, energy-dense crops such as sugar and corn (2006). Other studies demonstrate the inefficiency and poorer sustainability of seed oil as a concentrated food substance. A complete-diet model assessment of land requirements relative to food consumption for New York State found that both increased meat consumption (the Western diet) and higher-fat vegetarian diets (rich in concentrated vegetable oils) required more land per capita to feed the population (Peters et al. 2006). Just as a ban or restriction on TFAs has connections to environmental repercussions, agricultural policy based on an economy that supports concentrated foods and starts at the environmental and environmental level can be seen to lead to social repercussions such as obesity and CVD.

## Shifting our Philosophy Regarding Food and the Environment

This text has explored some externalities of what a market solution to a social health policy initiative in replacement of TFAs in the food supply was. Market solutions follow a competitive paradigm and with little cohesive long-term and cooperative

planning. This is evident in economic trade-offs for environmental losses in the case of TFAs, such as loss of priceless rainforest land and all it supports in the case of palm oil, and intensive monoculturing of a socially questionable food source in the case of GMO seed oils. Toward this end, social policy in health should take a new proactive and holistic approach to future policy in the area of food. Because food is a traded commodity, where powerful stake holders include profit-seeking business interests, policy needs to address concerns of the population and environment that may be invisible in the current market model and as such may go unaddressed. Social health policy needs to move beyond the immediate and proximal problem and view the streams of distal human action that are involved. In food policy that connects to health, it is clear that there are agricultural and environmental stakeholders and interests. Therefore, future policy that addresses health through nutrition and food should engage in a discourse that involves multiple stakeholders. It should steer toward policy that creates incentives that encourage holistic rather than fragmented solutions, on a structural rather than individual or interest group level. In our current production model, business and industry need to be part of the discussion. Yet any market solutions need to be played out beforehand to assess whether or not costs are simply shifted to yet another area of undesirable risk and burden. Additionally, new food substances need to go through more rigorous approval. In 1994, Michael Jacobson of the Center for Science in the Public Interest petitioned the FDA to require labeling of TFAs in foods. It took until 2006 for that to be implemented, yet the evidence for the toxicity of the food substance when consumed in larger amounts was clear in the early 1990s. The process of weaning the global food supply of toxic *trans* fatty acid is a slow one that is estimated to cost many lives and financial loss. More complete assessment of food substances should be done before they enter the market place. Finally, economic and cultural ideology that values mindless, unquestioning, and subjugated material consumption needs to be revisited (Pfol 1992). This involves reflection and revaluing of the material world and other facets of our human existence. What can we stand to lose or to gain? The economy is a dependent subsystem and construction of the human community, and the human community is a subsystem of the material earth we all exist on (Gowdy 1998). It can be transformed to meet our emerging needs and visions.

The case study of the removal of TFAs from the food supply as a health-related social policy that impacts the environment offers several directions to improve environment and human outcomes. In the immediate, when we need to make a broadscale change in our food system, we need to do so taking the long view to include environmental repercussions downstream. Also in the immediate, we need to be more rigorous in what we consider food and what passes for food in our food system through government oversight. Looking ahead, we need to make broad changes in our food supply through policy where agriculture and industry are incentivized to create a healthier food environment with fewer concentrated food substances. Also in the long run, we need to question our cultural ideology of over consumption that has devastating effects on ourbodies, the environment, and particularly marginalized populations.

After all this, I have to confess that while setting up the TV, I broke down and ate a Boston Kreme donut with 0 g *trans* fat. I am not sure if it was merely the presence

of the food in the next room or the increased need for glucose as I read TV assembly directions (which, by the way, were incredibly simple, clear, and easy—I guess human progress does exist). I suffered the post-ingestive consequences and guilt as my palate burned in the sweet aftermath of my culinary and nutritional breakdown. These are dire confessions for someone who teaches and makes claims to including sustainability and healthy eating in her life! I am guilty of Western lifestyle.

But my eyes are open. Though it takes a few weeks, I eventually search for nutrition facts on the web and find that of the 50 or so ingredients in a Dunkin' Donuts Boston Kreme, palm oil is listed twice for both the filling and the donut. I cringe and feel no better when I see that ONE donut was worth 310 cal and a quarter of my fat for the day according to the daily values (Dunkin' Donuts 2010). "Okay," I think, "maybe they use sustainable palm oil." I go on the web and with some digging found out that in July 2010, Greenpeace blasted multiple US companies for buying from Sinar Mas, a pulp and paper company accused of using unsustainable logging practices in Southeast Asia to make way for new palm oil plantations. The company also sells palm oil. Listed among customers of Sinar Mas were Walmart, Cargill, Campbell Soup, Burger King, Pizza Hut, and—yes—Dunkin' Donuts (Agence France-Presse 2010). I also found out that these clearing fires make Indonesia one of the largest contributors to greenhouse gases and global warming (Greenpeace 2007, 2010). I wonder sadly how many animals or even orangutans or Sumatran tigers were killed or displaced for my Boston Kreme. I imagine them running terrified with a fire burning close behind them, and I am so much more than simply uncomfortable. This is getting very personal. I recognize that we are attached to the story of TFAs through individual, social, political, and environmental space and time. When we consume palm oil in an irresponsible and excessive way, we are living off the fat of another land—not our own. My personal habits and commitments send waves across the planet—this is my part in globalization. Social policy helps determine and create our built, shared environment, and it can preserve or destroy the natural environment. However, personal decisions and choices are expressive of human agency. Along with social policy, individual acts reflect our vision of the world. How will I change my ideology and actions now that the veil has been lifted?

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# Chapter 5
# Forest Sustainability and the Social Context: Applying the Montreal Process Criteria and Indicators

**Guy C. Robertson**

## Introduction

Alongside agriculture, the science and practice of forestry represents humanity's most long-standing and explicit engagement with the issue of sustainability. While agriculture is perhaps older, forestry typically involves a longer time horizon, often extending well beyond the life spans of those responsible for making decisions and carrying out actions. It is usually, though not always, applied to systems that are less dominated by humans than in the case of agriculture, and it is thus more reliant on natural processes that are beyond direct human control. In this way, forestry combines two crucial aspects of sustainability: human interaction with nature and a concern for the future. Moreover, it is focused on balancing the constraints imposed by natural or seminatural ecosystems with the needs and desires of society. As a result, forestry and forest policy, whether it be public forest planning in the USA or community forestry efforts in India, must address social dimensions at the same time it does ecological ones. Social policy and environmental policy are inextricably joined.

Scarcity and depletion, and strategies to either regulate exploitation or enhance productivity to avoid them, have been the driving force for forest management since its inception. Aldo Leopold (1936) describes how first the decimation of wild game (including the extinction of several large mammals), and later the widespread clearing of forests and resulting timber famine, drove the evolution of forestry concepts in Germany through the last millennia. This evolution gave rise to the concept of the "normal forest," where individual stands are harvested on a fixed rotation across the landscape into perpetuity, an idea that remained a model for foresters in the West well into the last century (Wiersum 1995; Schlich 1895, 253). Likewise, in feudal

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Japan, the reliance on forests for fertilizer and animal fodder for intensifying agricultural practices, and latter for construction materials and charcoal for growing population centers, resulted in chronic shortages. In response, the Japanese developed forest-use regulations, coppice management, and intensive tree plantation systems (Totman 1989).

In comparison to today's concept of forest sustainability, these earlier approaches appear as rudimentary and incomplete, and it is difficult to argue that they achieved sustainability by current standards, even when fully implemented. But they did entail explicit requirements to maintain the integrity of forest resources (and flows of particular outputs) for the benefit of future generations. As such, they should be viewed as important efforts towards sustainability as defined in the terms and understandings of their times.

In recent decades, the demands we place on forests and the values we associate with them have grown exponentially (Brooks and Grant 1992). Moreover, the ways in which we impact natural ecosystems have extended well beyond direct use or geographically proximate externalities to include regional and even global interactions between humans and nature, climate change being the most prominent among them (Schellnhuber 1998). This has resulted in a rapid proliferation of different issues and dimensions that must be considered in our effort to manage forests sustainably and in the need for more systematic approaches to organize and assess information relevant to the problem. Sustainability criteria and indicators, where information specific to discreet indicators is organized under a broader framework of criteria, are one such approach.

This chapter describes the application of the Montreal Process Criteria and Indicators for Forest Sustainability (MPC&I) in the production of the US Forest Service's *National Report on Sustainable Forests—2010* (USDA Forest Service 2011). The second in a series,[1] the National Report incorporates the work of over 30 scientists and analysts addressing 64 different indicators spanning ecological, social, and economic dimensions. 20 of the indicators fall under Criterion 6, which treats the social and economic dimensions of forest sustainability, and these will be the primary focus of this chapter. At the same time, however, sustainability demands an interdisciplinary approach, and the results in Criterion 6 will be viewed in the context of the biophysical indicators found in the other criteria included in the report.

It is important to realize at the onset that the National Report and forest sustainability reporting processes in general are far from perfect. Data gaps are wide, results for individual indicators open to interpretation, and definitive conclusions relatively rare. Part of this arises from shortcomings in our information base and analysis techniques, but it also stems from a fundamental difficulty in conceptualizing sustainability in terms of concrete measures. This difficulty applies to all the criteria, but it is

[1]The *National Report on Sustainable Forests—2003* was published in early 2004 (USDA Forest Service 2004). Electronic versions of both the 2003 and 2010 editions of the report can be found on the project website at: http://www.fs.fed.us/research/sustain/

perhaps most apparent in the socioeconomic indicators in Criterion 6. In fact, the challenge in developing a concise definition of sustainability and implementing it in regard to C&I frameworks in general, and the indicators in Criterion 6 in particular, is an important subtext underlying this chapter and our forest sustainability reporting efforts as a whole. Accordingly, I now turn to the definition of forest sustainability and the question of how to operationalize it in the context of a C&I framework.

## Defining Forest Sustainability

Concise, formal definitions of sustainability as applied to forests and forestry generally follow the well-known lead established by the Brundtland Report, which defines sustainable development as "..development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, 24). While "sustainable development" is the focus, the definition is broad (some would say vague) enough to encompass all realms of sustainability, and this definition is a common touchstone in many studies addressing the sustainability of forests. Its popularity perhaps stems from the fact that, given its level of generalization, the definition can be agreed to by all and thus lacks the controversy and conceptual difficulties that would attend a more detailed definition. Since it is couched in terms of human needs, it is directly tied to socioeconomic dimensions, but the anthropocentrism that this wording would imply can be sidestepped simply by extending the concept of "needs" to encompass all aspects of human value, including the recognition of the inherent value of nature over and above the products and services it provides.[2]

Its popularity notwithstanding, the Brundtland definition (and others like it) provides little guidance on how to proceed in our attempts to ensure sustainability in a particular system; it exists more as an exhortation to do the right thing than as a practical guide for concrete action. It tells us nothing, for example, of the specific measures that should be considered nor of how we should balance the competing values and objectives that are implied in these measures. In this context, criteria and indicator frameworks exist as second-order definitions of sustainability, tiered to core definitions like Brundtland but containing vastly more detail and complexity related to the particular realms they are designed to address. Nevertheless, while they excel at identifying the various pieces of information to be considered, C&I frameworks generally remain challenged as to how to set parameters and thresholds for different measures or arbitrate between competing objectives (McDonald and Lane 2004). They do a good job of organizing and presenting relevant information, but they are less successful at telling us what to do with that information.

[2]This construction nonetheless maintains a fundamental anthropocentrism in that man remains the measure of all value, and it is conceptually incompatible with ecocentric approaches such as Deep Ecology (Devall and Sessions 1985). Whether this is true from a practical standpoint is another matter.

In their attempts to provide a comprehensive definition of sustainability and the tools to operationalize this definition, sustainability C&I frameworks are faced with the challenge of being inclusive of all relevant values while at the same time being quantitatively rigorous. The various approaches that have been suggested in response to this challenge can be arrayed along a spectrum with (what I will term) systems approaches at one extreme and public collaborative approaches at the other (Ramos and Caeiro 2010). The systems approach attempts to specify the various relationships governing the system to which sustainability is to be applied and then use these specifications to determine variables to be measured and the thresholds to be used in relation to them (Singh et al. 2009). The systems approach is generally favored in the scientific literature—at least that which focuses on the biological sciences—because it seeks to present a comprehensive and explicit description of the system in question and, to the extent that this description is accurate, it allows for the application of quantified thresholds to determine whether sustainability requirements have been met (Hodge 1997; Reynolds 2001). In practical application, however, the systems approach is perhaps less successful owing to its rigidity and complexity and, crucially, to the need of various stakeholders to understand and agree with the particular model of the world the system embodies.

At the other end of the spectrum lie collaborative approaches, where experts and stakeholders are brought together to determine the various types of information needed to assess sustainability independent of an a priori logical framework. This process can be quite formal, involving survey techniques (e.g., Parkins et al. 2001) or controlled collaborative processes (e.g., Hagan and Whitman 2006), but the resulting indicators need not be linked in an overarching system construct. Or it may be relatively informal, involving panels and committees that essentially muddle through. This latter process, in fact, is likely the most common since sustainability C&I, if they are effective, will have political ramifications, and the processes by which they are developed will thereby be subject to the more informal process through which societies make decisions affecting their constituents. The MPC&I is an example of this latter, more informal, approach. In actual application, most C&I processes include elements of both systems and collaborative approaches. Many of the more rigorous systems approaches, for example, include provisions for public participation, and the more informal approaches, the MPC&I among them, often seek to reflect linkages and underlying systems dynamics in their discussions and resulting frameworks.

Indentifying and gathering the necessary pieces of information is only the first step in ascertaining the sustainability of a given system, and some sort of additional assessment function is implied in any sustainability process. To accomplish this, a more explicit definition of sustainability is needed than that provided by the Brundtland Commission, and it is here that a great deal of theoretical work (e.g., Fox et al. 2009; Hodge 1997) and general discussion (e.g., Romm 1994; Gale and Cordray 1991) has occurred. I will not characterize this development in detail, but I do want to point out that the concept of depletion figures prominently in much of this work; indeed it is integral to our overall conception of sustainability. However, depletion may not aptly characterize the challenges to sustainability we face in

highly dynamic systems such as forest ecosystems. It is likewise problematic in regard to socioeconomic systems where dynamic change is the rule and not the exception. I will return to this question in the next to last section of this chapter.

In any case, ascertaining sustainability after the requisite information has been gathered remains a major challenge for all sustainability C&I processes. This function is often built into the design of systems analysis approaches in the form of quantitative thresholds or similar logical mechanisms (see Singh et al. 2009 for a good example of this approach). While the provision of such an explicit sustainability calculus is an admirable goal, the strategy faces severe challenges related to rigidity, oversimplification, and the complexity arising from numerous contingent mitigating factors, as will be demonstrated bellow in regard to socioeconomic measures. Social process approaches, on the other hand, often disassociate the assessment process from the data gathering and reporting process. This was the tact taken in the *National Report on Sustainable Forests—2010*, where we explicitly sought to maintain a distinction between the data reporting relative to the C&I and subsequent interpretation of these data relative to sustainability.[3] The underlying assumption here is that better data will lead to better dialogue and thus better decisions, with the responsibility for dialogue and decisions lying mainly outside of the formal reporting process. The assessments and interpretations that *are* found in the report take the form of qualitative narrative similar to the policy recommendations that commonly accompany reports bridging the gap between science and policy, but these are presented more as an entry to further discussion than as definitive conclusions regarding sustainability. Additionally, the Roundtable on Sustainable Forests, a national stakeholder group designed to support the forest sustainability reporting effort, has developed a set of policy recommendations based in part on the report's findings. While an explicit yes-no, thumbs up or down determination of sustainability was not forthcoming, the overall effort provides an example of how social process can be used to address sustainability in a more fluid setting.

## The Montreal Process C&I Framework

The Montreal Process originated with the Santiago Declaration of 1995.[4] The effort's 12 member countries possess over 90 % of the world's temperate and boreal forests, and each has committed to a periodic reporting process based on the C&I framework established by the declaration (formally the Montreal Process Criteria and Indicators

[3]This distinction was not always easy to maintain in practice. Many of the indicators in the MPC&I are not liable to simple or concise reporting, and numerous choices had to be made in regard to what findings would be highlighted and what data elements would be reported and how. As a result, a degree of subjectivity was unavoidable even in the data presentation portions of the report.

[4]For a reprint of the Santiago Declaration, see *Journal of Forestry*, Volume 93, Number 4, 1 April 1995, pp. 18–21. Current information on the Montreal Process can be found at the project website: http://www.montrealprocess.org/

for the Conservation and Sustainable Management of Temperate and Boreal Forests, or "MPC&I" as abbreviated here). At the international level, a committee of representatives from each member country is responsible for managing the reporting process as well as periodic revisions to the MPC&I itself. This is an international process in every sense of the word, involving diverse perspectives and inevitable compromises. To date, each country has exhibited considerable independence in how it has addressed the reporting challenge, and the process as a whole can best be described as fluid and adaptive but not rigorously integrated. In particular, no quantified aggregate reporting across countries has been produced for any of the indicators.

The 64 indicators of the MPC&I are arranged under seven criteria. The first five of these focus on the biophysical characteristics of forests including (1) the structure, extent, and biological diversity of forests; (2) the productive capacity of forests; (3) forest health and disturbance processes; (4) forests soils and water resources; and (5) carbon accounts associated with forests (as a measure of forest impact on climate change). Containing 20 indicators in total, Criterion 6 addresses the socioeconomic dimensions of forest sustainability. And Criterion 7, also encompassing 20 indicators, covers the legal, institutional, and economic frameworks in which forest management takes place. The total number of indicators is distributed across the ecological, social, and economic dimensions—what has come to be known as the "triple bottom line" of sustainability.

A fundamental aspect of the MPC&I is that it seeks to be comprehensive. The product of international collaboration, it incorporates a diverse set of components that members feel are important to the question of forest sustainability, and there is little logical integration between the various indicators aside from their organization under overarching criteria. A corollary to this is that data availability was not a requirement for the inclusion of specific indicators, and many present considerable challenges in terms of data acquisition and even in terms of devising concise metrics irrespective of the feasibility of actually gathering usable data. Criterion 7, in particular, suffers from a lack of concise measures and applicable data,[5] but similar issues apply for many indicators in the other criteria including several of the socioeconomic indicators in Criterion 6. A number of these indicators will likely never be addressed in a fully satisfactory fashion, but their inclusion reminds us that they are nonetheless important.

## Results from the 2010 National Report

Before turning our attention to the socioeconomic indicators in Criterion 6, it is useful to review the overarching conclusions of the report as a whole. Overall, there is no evidence that we are "using up" our forests in the United States. In fact, at

[5]This is, in part, the reason why the Montreal Process has considerably revised and abbreviated the Criterion 7 indicators for the next round of the reporting process.

approximately 751 million acres, the total area of forests has been stable to slightly increasing over the last half century or more, and the gross volume of wood found on these forests has increased over 50 % during this same period. So, simple depletion does not appear to be an issue, but there are a number of other causes for significant concern.[6] Fragmentation and outright loss of forests (and the ecosystem services associated with them) are occurring in more populated regions; in spite of its failure to register at the national level of aggregation, this loss is no less significant in the regions and localities in which it occurs (Theobald 2005). Even more troubling is the increase in forest disturbance events that has occurred over recent years, pointing to dynamic changes in forest ecosystems that are at least partially the result of human activity but will often be beyond human control. Specifically, in addition to smaller increases in other disturbance measures, the report finds that insect-induced tree mortality associated with the pine bark beetle and other insect pathogens has increased over threefold in the last decade. This result stands out as the brightest red flag in the whole report, and it is likely that changing disturbance patterns will dominate our discussions of forest management for decades to come. Looking to the future, climate change could significantly compound the risks and uncertainties associated with these issues, and indeed impacts may already be evident (Allen et al. 2010; Bentz et al. 2010).

## *Criterion 6: Socioeconomic Dimensions of Forest Ecosystems*

Criterion 6 is titled "Maintenance and Enhancement of Long-Term Multiple Socioeconomic Benefits to Meet the Needs of Societies" (a title by committee if there ever was one), but it is best seen simply as a list of essential attributes of human systems associated with forests. The 20 indicators in this criterion cover socioeconomic aspects such as production, employment, trade, and investment in the forest sector (including non-timber forest products);[7] forest uses including subsistence and recreation; conditions in forest-dependent communities; equity issues linked to the distribution of wealth generated by forests; and cultural and spiritual values associated with forests. The resulting agglomeration of information spans the breadth of human association with forests. Certain of the indicators are reported in concise quantified terms, but many must be approached in a more narrative fashion

[6]The following represents only a partial list of sources for concern. Among others, conservation of water resources and of biodiversity has been highlighted as major issues needing attention. Unfortunately, the current state of data availability at the national scale precludes definitive statements about trends for these resources, though regional and anecdotal evidence indicates that they are in decline.

[7]The MPC&I terms these "non-wood forest products," which presents challenges for reporting in the United States where "wood" products such as Christmas trees are commonly reported in the non-timber product category. This and several other definitions (such as what actually constitutes a forest) have resulted in surprisingly heated debates over the years, pointing to the importance details can attain when attempting to institute statistical reporting protocols.

relying on fragmented pieces of information. Owing to incomplete data, stochastic variation over time, or the imprecise nature of many of the concepts being considered, it is often difficult to discern clear trends in the indicators, and, even when such trends are evident, the implications for sustainability are not immediately apparent, as will be discussed further below.

## Economic Trends in the Forest Sector

Many of the indicators in this area enjoy fairly good data coverage owing to long-standing economic reporting activities associated with the timber industry, though coverage for non-timber products (e.g., mushrooms and floral greens) is far less developed. Overall, per capita consumption of wood products has been falling slightly over the last two decades, with gross consumption holding steady in response to the rise in US population. At the same time, timber commodity production has been slightly declining, with the difference between production and consumption being increasingly supplied by imports. Forest sector employment has been declining in line with growing labor productivity and an increasing reliance on imports, and there is growing evidence of disinvestment in forestry and the wood products sector, particularly in the western regions. On the other hand, payments for ecosystem services—primarily government transfers for conservation but also a growing component of private sector payments for conservation easements—have been expanding rapidly.

The economic statistics presented for many of these indicators are directly linked to the traditional concepts of sustainability associated with the output of commodity products, concepts such as the "normal forest" of traditional German forestry and the "sustained yield" provisions of US Forest Service management throughout much of the last century. However, as noted above, overall forest area is stable and timber volume increasing, so the question of sustainability here is focused more on the human realm than on the physical capacity of the forest to produce commodity outputs. The increasing dependence on imported timber may be an indication of an unsustainable situation, but much of this timber is sourced from Canada and a significant portion of the remainder from high-yield forest plantations in the Southern Hemisphere. It is unclear whether these developments represent sustainable or unsustainable trends, both in the USA and in its supplier countries. Good arguments can be made for either interpretation.

Likewise, declining timber sector employment has resulted in considerable hardship in many localities, but to the extent that this is related to labor productivity gains, it is difficult to claim that this development is unsustainable or even undesirable, impacts to timber-dependent communities notwithstanding. And finally, declining US per capita consumption of wood products could be construed as a positive development, particularly in light of comparatively high US consumption rates relative to other countries, but this is only true if per capita declines are not offset by increases in other products such as steel or concrete construction materials, products that may entail a much larger ecological footprint than wood.

Each of these cases points to the fact that forest sustainability must be interpreted in a broader context subject to many contingent factors outside of the purview of the

MPC&I or whatever other C&I framework you happen to be using. Moreover, the determination will depend on the interpretational frameworks of analysts and decision makers; neoclassical economists, for example, may see increasing trade as a good thing, while rural sociologists may not. Overall, this is not a problem that can be logically hardwired into an explicitly quantified decision calculus.

## Other Indicators in Criterion 6

Economic measures associated with production, consumption, and trade are conceptually integrated under the rubric of economic theory, and they are subject to relatively complete data coverage via standard economic reporting practices. This does not apply to most of the other indicators in Criterion 6. As a result, it is difficult to report the results for these indicators, important as they may be, in an abbreviated fashion. Instead, each exists somewhat as a story in and of itself, constructed specifically for the MPC&I and whose implications for sustainability emerge in a piecemeal fashion if they are discernable at all.

Forest-based recreation activity constitutes a partial exception to this rule since it has been a focused area of study and subject to ongoing surveys for a number of years now (Cordell et al. 1999). The National Report finds that forest-based recreation participation has increased over 4 % since 2000, continuing what is assumed to be a long-term trend. At the same time, however, anecdotal evidence is pointing to decreasing participation in outdoor activity by members of a younger generation who have access to a growing array of electronic entertainment options (Zaradic and Pergams 2007). The implications of this for future engagement in forest-based activities, and for the values that this activity engenders, are troubling. This example highlights the fact that a given indicator may not tell us essential pieces of information. At the same time, however, the ad hoc inclusion of additional information because it is available and may have bearing on the underlying objective of the indicator is problematic for the goal of concise, replicated reporting. Here again, synthetic interpretation of the indicator results within their broader context is required.

Many of the other indicators related to recreation and cultural values (as well as those related to soil and water resources in Criterion 4) are based on land area managed for a specific objective (e.g., recreation, cultural values, and subsistence use). The challenge here lies in the US tendency to manage forest lands, and public forests in particular, for multiple uses. No exclusive use is identified for any parcel of land, and the analyst is left with the problem of judging the relative emphasis of a particular use among many in forest planning and management activities. The bottom line here is that around 40 % of US forests are in public ownership, primarily in federal holdings in the West, and these lands are generally open to variety of activities with certain restrictions on those uses that negatively impact other users. There is growing evidence that private lands, on the other hand, are more and more subject to restricted access (Teasley et al. 1999), resulting in declining opportunities for many forest users, particularly in the more populous regions of the East.

Two of the Criterion 6 indicators required substantial initial development. These were (1) the "Resilience of Forest-Dependent Communities" and (2) the "Importance of Forests to People." From the comments we received through our public participation activities, it is clear that these two indicators were of particular interest both to social scientist and our stakeholder community at large. The teams charged with populating each indicator opted for primary data collection via survey as their data acquisition strategy. The community resilience indicator relied on the concept of community capital for its theoretical foundation and on community sampling through directed surveys as its data gathering strategy (Magis 2010). The importance of forests indicator team chose focus group sampling as a means of avoiding the response bias they felt would be unacceptably high for particular minority groups and underserved communities. In either case, and especially in regard to community resiliency, the resources demanded for primary data precluded the possibility of a true nationwide coverage for their respective indicators, and it is an open question as to whether the protocols developed will be implemented in future reporting cycles. Here, given the limited resources available for the project and the need for reporting at national scale, the desire for concise and replicable reporting practices inherent in the MPC&I came into conflict with what the indicator teams felt was necessary to adequately address the spirit of their respective indicators. This, in turn, points to the need for a realistic assessment of feasibility, especially when initiating pilot applications that will later be expanded to a national scale.

## Forest Sustainability Revisited

Having gathered, to the best of our ability, the data needed to address the 64 indicators in the MPC&I, the task remains for us to determine what it means in terms of forest sustainability. In the absence of a quantified, systems definition of sustainability specific to the MPC&I, we cannot automatically provide an answer to this question but must rely on synthetic analysis instead. At the highest level of generality, we can conclude that there is no evidence of simple depletion of America's forest resources—we are not, for example, harvesting more wood than the forest can grow—but there are a number of areas that give rise to significant concerns, particularly in the area of forest health. In regard to the socioeconomic dimensions of forest-human systems, there are also a number of developments that *may* indicate challenges for forest sustainability in the future. In both cases, however, the dynamic nature of these developments and that of the overall forest systems in which they occur preclude an easy determination of sustainability or suggest immediate course corrections to put us back on a sustainable path.

Increases in forest disturbances are the most troubling finding in the report and provide perhaps the most striking example of the challenges of applying the concept of sustainability to dynamic systems. The underlying causes of this trend in disturbance are various, interrelated, and complex, involving relatively proximate causes such as a century of fire suppression in fire-adapted ecosystems to more distant

sources such as climate change and globalization (through the introduction of exotic pathogens and invasive species). The important point here is that there is no simple set of prescriptions, such as "harvest less timber," that will return us to a sustainable baseline. Indeed the identification of such a baseline is in itself problematic, and, in any case, there is no guarantee that forests will return to that baseline in the absence of human pressures. The fundamental question for sustainability in this context often is not "are we using up the resource?" so much as "where is the system heading and what can/should we do about it?"

The one general prescription that does arise is that we will need to continue to grapple with the issue of forest sustainability and commit ourselves to the adaptive management responses that this requires. In regard to forest ecosystems, this will mean provisions to forestall forest fragmentation and loss through land development and a more flexible approach to management in the face of disturbance, often working with disturbance processes as opposed to simply trying to forestall or eliminate them. In the socioeconomic sphere, this may entail efforts to increase opportunities, enhance resiliency, and alleviate economic hardship in forest-dependent communities, but this should occur within the context of broader social policy decisions.

None of these ideas are new, and none flow solely from an analysis of the MPC&I and the National Report on Sustainable Forests. Likewise, there is no definitive finding regarding the sustainability of our forest ecosystems and their related socioeconomic systems. Rather, the MPC&I and the National Report help highlight key developments and provide an additional data foundation for discussions regarding forest sustainability, discussions that are already underway and that will continue through the decades to come. In that it explicitly organizes a comprehensive set of information spanning the ecological, social, and economic dimensions of forest sustainability, the MPC&I is expressly designed for this purpose. With the refinement and institutionalization of data streams through repeated iterations of the reporting cycle, its utility will increase in the future.

Through the range of data they consider, the National Report and the MPC&I explicitly recognize the linkages between social and environmental conditions and thereby social and environmental policy. What is more, the process through which we determine sustainability and attempt to secure it through appropriate adaptive management must be viewed as a fluid social process combining human values and perceptions with changing information on ecological and human systems. In this way, the linkage between social and ecological dimensions is inherent in the process of sustainability as well as in its desired outcomes.

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# Chapter 6
# Forest Sustainability and Social Policy: The Role of Ecosystem Services

**Evisa Abolina and Valerie A. Luzadis**

## Introduction

The impact of human activity on natural resources and the Earth's ecosystems has been tremendous, especially over the last 50 years (MEAs 2005a). Industrialization, growth in global population, and increased abilities to produce and consume have resulted in excess demands for food, freshwater, timber, fiber, fuel, and other goods and services, at times going well beyond the levels of carrying capacity of the environment to provide and satisfy these needs (MEAs 2005a; Meadows et al. 2004). While on one hand industrial development has led to an increase in human well-being through raised living standards, improved education, and access to healthcare, the benefits of such progress have not been equitably distributed among all regions of the world (Meadows et al. 2004; MEAs 2005a). Generally, the success of development has been achieved at the cost of transformed or even irreversibly degraded natural ecosystems, causing disturbance in the Earth's ecological stability and a decrease in its natural resilience to withstand increasing pressures associated with human demand (MEAs 2005a; Rapport et al. 1998). It is clear, nevertheless, that natural and human systems are closely linked and interdependent, where the events occurring in one system have resonance in other systems.

Concern grows about the limitations of separately assessing social and environmental impacts, lacking integrated approaches to problem solving (Liu et al. 2007). Failure to merge and address environmental and social aspects in conjunction has caused deceleration in the progress to better understand the complexity of coupled human and natural systems and to proceed with more advanced and well-suited solutions.

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The complexity of human and natural systems goes far beyond one's ability to fully capture the whole spectrum of aspects and elements in play. Even though deep understanding of each system element is crucial, it, however, can only bring partial answers and solutions to the issue as a whole. Organizational division, reductionism, and poor communication across disciplines have caused a lack of understanding of the interlinkages and different ways human and natural systems self-organize (Carpenter et al. 2006). Perverse effects that occur even when the most well-intended incentives are applied give clear signal that systems and their organizational and structural complexities are only vaguely understood. To achieve a more holistic picture of system functioning, one has to depart from the traditional frames of a single discipline or organizational unit and engage in more collective, participatory, and discursive forms of learning, knowing, and governing (Norgaard 2010).

Multiple frameworks exist aiming to better understand the complexity and various aspects of natural and human systems (Norgaard 2010). Ecosystem services approach offers one such framework which has been designed for advanced understanding of human and nature interactions in helping to achieve better organization and harmonious coexistence between social and environmental systems to further avoid evitable destructive calamities.

Using the example of forests, we attempt to guide the reader through a complex ecosystem which has suffered various human interventions and degrees of degradation and to briefly review some of the most important events and agreements that frame the concept of sustainable development and forest management. Sustainable forest management aims to prevent human-induced destructions of all types of forests while maintaining their use for human well-being. Secondly, we introduce the concept of ecosystem services which requires us, by its very elements, to look at ecological and social systems in conjunction and to, furthermore, examine the integrity between sustainable forest management and – the ecosystem services concept. In addition, we offer a brief look at the strength and weaknesses of one of the most recently invented social and environmental policies for forest conservation – Payments for Ecosystem Services (PES).

## The Ecological and Socioeconomic Importance of Forests

Forests, as a natural resource essential to the preservation of the global environment (Sitarz 1993), economic development, and social well-being, present a case of continuous human impact resulting in resource degradation and depletion. Forests play a vital role in ecosystem maintenance, providing basic life-support services, including a wide range of economic and social benefits to humankind (MEAs 2005b; FAO 2005; UN 1992). Forests provide "consumption goods, regulate local and global climate, buffer weather events, regulate the hydrological cycle, protect watersheds and their vegetation, water flows and soils, and constitute a vast store of genetic information" (Nasi et al. 2002, p. 2). Forests and woodlands play a significant role in the global carbon cycle, thus accelerating and decelerating global climate change (MEAs 2005b).

Lastly, in many societies, especially indigenous communities, forests are vital to their cultural, spiritual, and recreational well-being (MEAs 2005b).

Despite their crucial contribution to human well-being, forests are still facing continuous destruction through anthropogenic activities. As human-dominated ecosystems, forests suffer from a devastating combination of increasing human demands and underestimated values for their goods and services provided (Noble and Dirzo 1997). While they account for roughly 30 % of the total land area, which is approximately 3,952 million ha (FAO 2005), forests have been reduced by one half over the past three centuries (MEAs 2005a). Between 2000 and 2005, the world lost forested area at a rate of 7.3 million hectares per year (Worldwatch Institute 2009). Deforestation, mainly forest conversion to agriculture, and wood extraction including logging and clear-cutting, has been the primary forest "cancer" and a serious environmental, social, and economic problem, especially in developing countries (FAO 2005; MEAs 2005b). The populations most vulnerable to deforestation, and to the negative effects of forest ecosystem malfunctioning, are the rural poor who are particularly dependent on forest resources for their livelihoods (MEAs 2005b; UNEP 2009). In addition, deforestation, degradation, and other forest clearing account for about one quarter (20–25 %) of total GHG emissions contributing to global climate change (IPCC 2001; Madeira 2008).

Although the causes of deforestation and forest degradation might vary from country to country, they tend to share common characteristics (FAO, UNEP, UNDP 2008). Social and economic pressures such as population growth, poverty, increasing demands for agriculture land to produce food and fuel, large-scale logging and forest clear-cuts, as well as lack of alternative employment opportunities are some examples of the direct and indirect drivers causing forest mismanagement and resulting in the underestimated values of forests as a resource (MEAs 2005b; Worldwatch Institute 2009). Poor institutional structures and weak capacity of the public sector to govern forest use, along with vaguely considered alternative economic incentives to encourage sustainable private sector initiatives (Noble and Dirzo 1997), have likewise resulted in adverse effects and perverse policies, causing obstacles for sustainable forest resource management (MEAs 2005b).

## *Towards Sustainable Forest Management*

Alarmed by the increasing rates of deforestation and forest degradation, the United Nations and its collaborative partners introduced and adopted a series of initiatives and policy frameworks to foster sustainable forest management and help countries to sustainably manage, monitor, and account for forest resource (UN 2008; MEAs 2005b). The initiatives were derived originally from the "Forest Principles" adopted during the Rio Summit in 1992 (UN 1992).

The United Nations Conference on Environment and Development (UNCED), also known as the Rio Summit 1992, was the first attempt to raise the question of future development, held in response to the growing global concern over the impact

**Box 6.1**

The most recently adopted *Non-legally Binding Instrument on All Types of Forests*, deriving from the "Forest Principles," serves as the legal framework for all types of forests along with the four Global Objectives on Forests:

> (1) To strengthen political commitment and action at all levels to implement effectively sustainable management of all types of forests and to achieve the shared global objectives on forests;(2) To enhance the contribution of forests to the achievement of the internationally agreed development goals, including the Millennium Development Goals, in particular with respect to poverty eradication and environmental sustainability;(3) To provide a framework for national action and international cooperation (UN 2008)

of human actions on the environment, and "to help governments rethink economic development and find ways to halt the destruction of irreplaceable natural resources and pollution of the planet" (UN 1997). The Conference became a turning point for the global community in considering the linkages between development and the environment and for governments to design policies that would respect and "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987). The Rio Summit resulted in three core agreements adopted by more than 178 governments, among those the "Forest Principles" – a framework for forming future decisions on sustainable development and forest resource management (UN 1992).

After intense negotiations during the Rio Summit, it was finally agreed that "forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations" (UN 1992). Sustainable forest management (SFM) became a concept "intended to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations" (UN 2008, p. 2). SFM served to provide an advanced set of policies and tools "for setting forest management on a more sustainable trajectory" (MEAs 2005b, p. 587) (Box 6.1).

Once the global agreement on the road map towards sustainable development and resource use was reached, its implementation became another challenge, especially in the developing world. Introduced into both national and international policy agendas, the implementation of SFM, however, faced economic, political, and institutional obstacles to adequately address deforestation and forest degradation (MEAs 2005b). SFM thematic elements (Table 6.1) aimed at providing a common framework to facilitate the country reporting process on forest resources as well as to help identify certain forest characteristics and services (UN 2008). The Food and Agriculture Organization (FAO) further extended the SFM elements and included several variables for the purposes of Global Forest Resources Assessment (FRA) (Table 6.1) (FAO 2005).

**Table 6.1** SFM thematic elements and FRA variables

| SFM thematic elements | FRA variables |
|---|---|
| Extent of forest resources | Area of forest (ha) |
| | Area of other wooded land (ha) |
| | Growing stock of forests ($m^3$) |
| | Carbon stock per hectare in forest biomass (tons/ha) |
| Forest biological diversity | Area of primary forest (ha) |
| | Area of forest designated primarily for conservation of biological diversity (ha) |
| | Total forest area excluding area of productive forest plantations (ha) |
| Forest health and vitality | Area of forests affected by fire (ha) |
| | Area of forests affected by insects, disease, and other disturbances (ha) |
| Productive functions of forest resources | Area of forest designated primarily for production (ha) |
| | Area of productive forest plantations (ha) |
| | Commercial growing stock (m3) |
| | Total wood removals (m3) |
| | Total NWFP[a] removals (tons) |
| Protective functions of forest resources | Area of forest designated primarily for protection (ha) |
| | Area of protective forest plantation (ha) |
| Socioeconomic functions of forests | Value of total wood removals (US$) |
| | Value of total NWFP removals (US$) |
| | Total employment (pers.yrs.) |
| | Area of forest under private ownership (ha) |
| | Area of forest designated primarily to social services (ha) |

UN 2008; FAO 2005

[a]*Non-wood forest products* are goods of biological origin other than wood, derived from forests, other wooded land, and trees outside the forests (FAO 2000)

Despite the improvements made to facilitate the reporting process, the FRA reported considerably poor country performance on the conditions and trends of forests (MEAs 2005b). Most countries were identified as suffering from a lack of financial, technical, and knowledge capacity to provide sufficient and quality data (MEAs 2005b), causing obstacles for successful forest inventory and stifling the development and implementation of sustainable forest management policies and practices.

It became increasingly evident that SFM is not only an environmental concern but also significant social issue that cannot be seen in isolation with for a more integrated approach for forest resource management (UNEP 2009; Funston 1995; Folke et al. 2002; MEAs 2005b). As such, related policies cannot be considered as solely environmental or solely social. Greatest effectiveness and efficiency can be achieved by considering such policies as one and the same. Perhaps we might refer them as integrated social–environmental policies.

## *The Concept of Ecosystem Services: An Integrated Approach to Resource Management*

Faced with a set of sustainable development targets for the new millennium and armed with a set of policy frameworks, it was recognized that more sophisticated and innovative approaches will be needed to operationalize and comprehensively address the issues of development and environmental degradation (Costanza and Daly 1992).

The ecosystem services concept became a new paradigm to understand the crucial linkages between development and the environment and the various levels at which natural and human systems operate (Daily 1997; Norgaard 2010; Carpenter et al. 2006; Hammod 2003). As a concept, it "integrates ecology and economics to help explain the effects of human policies and impacts both on ecosystem function and on human welfare" (Faber et al. 2006, p. 121; Constanza and Folke 1997; Daily 1997; NRC 2005). The concept originally emerged from the field of science, being based on the laws of thermodynamics and principles of self-organization and general systems theory, contributing to the wider understanding of a systems approach between natural and anthropogenic processes (von Bertalanffy 1968; Odum 2007; Meadows and Wright 2008). It is rooted in the belief that "biological structures could not be understood in isolation, but instead has to be considered in relation to their environmental context" (Hammod 2003, p. 40). The understanding of a system through the "stock and flow" diagrams (Odum 2007; Meadows and Wright 2008) became a common approach for scientists to interpret and analyze various aspects of social and environmental interrelations. Within time, recognition of its value filtered into the field of resource economics (Box 6.2).

Ultimately, the ecosystem services concept was designed to offer a more holistic view about the world around us, enabling a better comprehension of "the complex linkages among societies, ecosystems, and governance" (UNEP 2009, p. 5) and the search for a "full understanding of the connections between ecosystems and human well-being and the drivers and respondents to change" (Carpenter et al. 2006, p. 258). The ecosystem services concept literally gave light to new opportunities to be tested.

## *REDD Initiative and the Challenge of the 2nd "D"*

The initiative on *Reducing Emissions from Deforestation and Degradation (REDD),* launched after the Conference of the Parties (COP) to the climate convention in Bali in December 2007, aimed at helping countries, particularly the developing countries, tackle deforestation and forest degradation (FAO, UNDP, UNEP 2008). It was recognized that "reduced deforestation and forest degradation may play a significant role in climate change mitigation and adaptation, can yield significant sustainable development benefits, and may generate a new financing stream for sustainable forest management in developing countries" (FAO, UNDP, UNEP 2008, p. 1).

**Box 6.2** Definitions and Examples of the Ecosystem Goods and Services Provided by Forests in Accordance with MEA Frameworks (MEAs 2005a; Farber et al. 2006)

*An ecosystem* is "a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit" (MEAs 2005a).

*Ecosystem services* are "the benefits people obtain from ecosystems; these include (1) *provisioning services* such as food, water, timber, and fiber; (2) *regulating services* that affect climate, floods, disease, wastes, and water quality; (3) *cultural services* that provide recreational, aesthetic, and spiritual benefits; and (4) *supporting services* such as soil formation, photosynthesis, and nutrient cycling" (MEAs 2005a, p. V).

**Provisioning Forest Services**

*Wood forest products* (e.g., industrial wood, fuelwood)
*Non-wood forest products*:

- Plant products (e.g., food, fodder, medicinal and ornamental plants, exudates)
- Animal products (e.g., honey, beeswax, bushmeat, medicine, edible animal products)

**Regulating Forest Services**

*Ecological* – water and soil protection, health protection, climate regulation

**Cultural Forest Services**

*Amenities* – cultural, spiritual, historical
*Social* – recreational, sports fishing and hunting, ecotourism

**Supportive Functions Essential for Forest Ecosystem Services Production and Delivery**

Nutrient dispersal and cycling, pollination, hydrological cycle, net primary production

If the meaning and causes of the 1st "D" (deforestation) under the REDD initiative were more straightforward and considerably well measured and reported within FRA frameworks, the 2nd "D" (forest degradation) presented a challenge for its assessment and overall understanding of the term (Lanly 2003). "Forest degradation," defined by forest-related organizations as "the reduction of the capacity of a forest to provide goods and services" (FAO, IPCC, CIFOR, IUFRO, UNEP and WMO 2002; FAO 2009), was recognized to be one of the many definitions used for forest degradation (Simula 2009; Lund 2009). The perceptions over the meaning of

forest degradation varied "depending on the driver of degradation and the main point of interest" (FAO 2009), whether it is on biodiversity conservation, carbon sequestration, nutrient cycling, or otherwise (FAO 2009). Forests were recognized to be degraded "in terms of loss of any of the goods and services that they provide (e.g. fiber, food, habitat, water, carbon storage and other protective, socioeconomic and cultural values)" (FAO 2009). With that, defining forest degradation, in particularly under the REDD, became a challenge which shed valuable light on the true complexity of natural resource management in general and forest management in particular.

## *Lessons Learned from the REDD Initiative*

In 2009, the FAO initiated a study to identify the elements of forest degradation and the best practices for assessing them (Simula 2009). Part of the assessment was done through a literature review on country practices to identify "proven or promising methodologies and tools for assessing different aspects of forest degradation" (FAO 2009). The SFM elements (Table 6.1) served as a framework to identify characteristics and services provided by forests (Simula 2009), and FRA variables (Table 6.1) were used "to identify suitable indicators to assess the degree of forest degradation of a forest at different management levels" (FAO 2009). The analysis of 146 case studies indicated that the meaning of forest degradation is somewhat alien and mostly understood as deforestation and loss of forest cover, lacking clear distinction between the terms (Abolina 2009; Simula 2009). Only a few studies clearly defined the meaning and use of forest degradation for their purposes; pointing out several obstacles in the assessment of forest degradation, such as a lack of data and baseline information, time constraints or large costs associated with conducting long-term forest monitoring, and observations to measure changes in forests (e.g., Acharya and Dangi 2009).

The current status of measurement of forest degradation is that it is primarily qualitative in nature (Lanly 2003), rather than reflecting quantitative significance of forests to produce goods and services (Abolina 2009). The SFM elements, along with FRA variables that were chosen to identify the aspects of forest degradation through the review of the available literature and case studies, were well suited to fill out the information on quantitative measures such as the total area or stock or area designated for conservation (Table 6.1). The qualitative aspects of forests, however, were largely left uncaptured (Abolina 2009). SFM elements and FRA variables lacked the necessary foundation for more sophisticated approach to forest data reporting and the assessment on both the quantity and quality of forest resources. Regulating, cultural, and supporting services have no particular measures under this framework. An ecosystem services framework provides a much more comprehensive approach to more fully measure the loss of forest goods and services as defined under the generic definition of forest degradation. The lack of ecosystem service categories under SFM elements and FRA variables, for global forest resource accounting and

reporting, might inadvertently contribute to the poor country performance on data availability for ecosystem goods and services reported by FRA (FAO 2005). Full accounting that includes all categories and types of forest goods and services is essential for forest quality monitoring and the development of more comprehensive social and environmental policies and programs to be implemented.

The valuation of forest goods and services through an entirely *utilitarian–economic* (monetary) approach (MEAs 2003) was the only valuation method incorporated in SFM elements under socioeconomic functions. The monetary value of wood and non-wood removals is the only ecosystem service presented under SFM elements and FRA variables. Both present the types of provisioning ecosystem services under those particular frameworks. Case studies mostly assessed forest degradation and forest values as "goods" rather than "services" (Joshi and Singh 2003; Ykhanbai 2009). FRA reports also indicate that their assessment is done by measuring and assigning monetary values to each of the services separately and then aggregating them all to a one single total value of wood or non-wood forest products (FAO 2005). The accuracy of such monetary valuation assessment methods used under FRA and individual studies for the true values of forest goods and services remains a question.

Suitable techniques, such as remote sensing, have become popular tools to monitor and assess deforestation and changes in forest biomass and were recognized to be vaguely suited to measure forest degradation (e.g., Murdiyarso et al. 2008). Better accounting and high-quality data on forest degradation may be better achieved through continuous ground measurements, using traditional techniques and inventory methods, in combination with remote sensing (e.g., Baldauf et al. 2009; Gibbs et al. 2007; Acharya and Dangi 2009). Community involvement to do field inventories could bring a compromise to the high costs associated with the installation of remote sensing technology, especially in low-income countries, as well as bring new benefits such as increased awareness and knowledge about the importance of forest resource and new employment opportunities for local communities and indigenous people and reduce the costs associated with data gathering for monitoring purposes (e.g., Skutsch et al. 2009). An ecosystem services framework would serve well as the foundation for such integrated social–environmental policies precisely because it encompasses both concerns itself.

## Payments for Ecosystem Services (PES) Programs for Sustainable Forest Management and Conservation

Economic incentives play an important role in forest management, providing "*powerful instruments to regulate the use of ecosystem goods and services*" (MEAs 2005a, p. 95).

A fairly new emerging economic incentive that has been discussed in the context of market-based instruments for ecosystem services is "payment for ecosystem services" (PES). "PES is based on the beneficiary pays rather than the polluter pays

principle" (Engel et al. 2008, p. 663) and was initially designed to address the need for poverty alleviation and to finance biodiversity conservation in developing countries (Pagiola et al. 2005) – explicitly integrated social–environmental policy. The PES mechanism "enables individuals, firms or public sector to pay resource owners to provide particular services" (MEAs 2005a, p. 96). The PES approach is based on the idea that "those who benefit from environmental services should pay for them, and those who contribute to the generation of these services should be compensated for providing them" (Dasgupta et al. 2008, p. 14). Therefore, by enabling the transactions between service users and service providers, PES assumes mutual self-interest between the two without government intervention (Dasgupta et al. 2008). PES can be considered an opportunity for generating new financing, especially in areas where it "would not otherwise be available for conservation" (Dasgupta et al. 2008, p. 14). The initial goal of PES programs is "to make privately unprofitable but socially-desirable practices become profitable to individual land users" (Engel et al. 2008, p. 670).

## *Lessons Learned from PES*

The most extensive experience with PES applications is in Latin America, where PES has been introduced, particularly through the World Bank-funded projects for PES implementation, to achieve environmental improvements in developing countries (Pagiola et al. 2005; Pagiola 2008; Engel et al. 2008; Dasgupta et al. 2008). PES typically targets biodiversity conservation, watershed protection, carbon sequestration, and landscape beauty (Wunder 2005; Pagiola et al. 2005).

Costa Rica has pioneered in implementing the most extensive PES programs, offering some innovative approaches to sustainable forest management, where "land users can receive payments for specified land uses, including new plantations, sustainable logging, and conservation of natural forests" (Pagiola et al. 2005). For instance, hydroelectric power generators and industrial water users would pay the upstream land user (e.g., a farmer) for forest conservation practices to ensure watershed protection. This is due to the fact that the changes in forest cover (e.g., logging) can seriously affect the quantity and quality of water flows downstream (Pagiola et al. 2002).

In some cases, the government, NGO, or an international agency would act as a "buyer" (Engel et al. 2008). For example, the government would collect taxes and pay those to ecosystem service providers to protect forest resource. These would usually be large-scale projects with complex legal and market systems where private sector has certain difficulty to operate.

Though sound in theory, PES nevertheless poses a challenge in practice. Several aspects have been outlined indicating the types of burdens that PES implementation faces. First and foremost is lack of knowledge and inadequate data to monitor and assess the effectiveness of generating the desired ecosystem services (Pagiola 2008). Secondly, not all ecosystem services are valued as equally scarce, meaning that

some services are valued higher than others which in turn impacts a buyer's willingness to pay (Wunder 2005). A third criticism arises from the current dominant paradigm of considering social and environmental policies separately – it is unclear how well these policies indeed effect environmental change (or maintenance, depending upon program goals). If understood as integrated social–environmental policy, analysis of PES would be more comprehensive and likely to prompt insights that would be more systemically useful.

Similarly, as in the already discussed REDD example, most of the forest functions are targeted on the "goods" rather than "services." Constraints with ecosystem service valuation pose a challenge to adequately apply economic incentives such as PES. Even though different concepts and valuation methods exist (MEAs 2003; Faber et al. 2002, 2006), many ecosystem services do not have or simply cannot be considered in terms of monetary values, most of which fall into the category of supportive and regulating services.

It is also most likely that ecosystem services having direct impacts on human health and well-being, such as provisioning services (e.g., food, water, and fiber supply), have higher monetary values attached than the less "visible" ones such as supporting services (e.g., soil formation and nutrient cycling). This does, however, not necessarily mean that the latter has lower ecological or social importance. For instance, the FRA assessment indicates that wood forest products, such as timber, have higher tradable values attached per unit in comparison to non-wood forest products (NWFP) (FAO 2005). In 1997, Nobel and Dirzo wrote that "An important step in the transition to sustainable forest use is a full valuation of forest products, including non-timber products, such as fruits and water catchment and intangible values" (Noble and Dirzo 1997, p. 524). Non-timber forest products "also provide more than a half of the formal employment in the forestry sector" (Abramovitz 1997, p. 99).

Unfortunately, to date most of the services still suffer from a simplified approach to valuation and assessment and are usually assessed individually. The assessment of ecosystem goods and services is usually made for separate, single services such as pharmaceuticals, clean water, and biological species, lacking integrated approach and knowledge to do more comprehensive assessments (Bennett et al. 2009). The reasons for failing to do full valuations are several. Some are related to the high levels of uncertainty and lack of profound understanding of the relationships between different ecosystem services (Bennett et al. 2009; Norgaard 2010). Others fail due to a lack of data and reliable baseline indicators for monitoring purposes (Pagiola 2008). Questions also remain regarding if the benefits from PES actually accrue to those in need. Finally, there are different perceptions over values, as well as financial or time constraints, to do comprehensive ecosystem quality studies and assessments. Besides, "people simply assume that the greatest value can be derived from an ecosystem by maximizing its production of a single commodity, such as timber from a forest" (Abramovitz 1997, pp. 98–99). The problem is, however, that actions to increase and reward one ecosystem service can cause the degradation of other services (MEAs 2005a; Abramovitz 1997), missing the key trade-offs (Carpenter et al. 2006).

Intangible benefits, such as cultural and spiritual values of forest for their inhabiting communities, are hard or even impossible to fully value in monetary terms (MEAs 2003). Being outside of monetary capture, these benefits cannot be regulated by economic and financial instruments, such as PES (MEAs 2005a). They are instead left to governments that might not have the requisite knowledge, institutional capacity, political will, or financial support to design appropriate policies for their management.

The PES can be praised for its innovative approach, being an example of a "good will" to target resource conservation through the reward-type social policies and economic incentives which ease the burden on governments to intervene in resource management and conservation. However, PES does have its own limits in trying to capture the full potential to adequately manage, monitor, and reward. In this context, PES presents only one type of the solution to sustainable resource management and one that would be better served by understanding it as integrated social–environmental policy.

## Discussion: The Way Forward from Lessons Learned to Actions Taken

In light of the preceding examples, what can be learned to further avoid failures in resource management? PES and REDD are both examples of attempts to link social and environmental policies to meet multiple goals – conservation of natural resources and reduction of poverty. The lessons from PES programs and the REDD initiative have indicated some possible ways to proceed for future policy development and applications to better meet the integrated social–environmental goals. PES programs and studies carried out under the REDD initiative both stress the importance and potential benefits of community involvement through market-based instruments used in resource management. Some of the burdens that resource managers face now can be overcome by taking a new approach to implementing new practices. Joint forest assessment and collaborative forest management (CFM) offer new potential for SFM. For instance, the costs and technology constraints for ecosystem services monitoring and assessment could be overcome through the involvement of local communities and indigenous people to do forest inventories (Skutsch et al. 2009). Community involvement in resource management opens the doors for employment opportunities with multiple benefits to both public and private sectors. NLBI of forests under the United Nations policy frameworks has already recognized the importance of multi-stakeholder dialog and the involvement of indigenous people to foster sustainable forest resource management. A more integrated approach to the already existing frames, such as PES programs, could also serve as a good base on which to build and implement new more advanced practices.

It nevertheless requires redesigning the existing frameworks, as well as developing more liberal and democratic social and institutional processes, to empower local communities and "strengthen their participation in natural resource understanding and

valuation of the broad array of ecosystem products and services" (Gray et al. 2001). Community-based ecosystem management offers new potential for integrated approaches to tackling environmental and social problems in conjunction (Gray et al. 2001).

Setting clear guidelines and adding more detail to the existing frameworks might encourage and facilitate improved country performance to achieve better results in reporting on both the quality and quantity of data. Emerging market incentives and policy frameworks to tackle resource degradation and climate change increase the importance of achieving affordable and reliable quality-related data.

## Concluding Remarks

Heir of the Rio Summit, the Millennium Summit in 2000 became the world's global response to the emerging problems of poverty, social injustice, and inequality, along with environmental and resource scarcity, with a focus to sustaining human well-being (UN 2000). Speaking on behalf of the world's poorest – the most vulnerable to the increasing environmental and social pressures – the Summit sent a strong signal on the need for integrated approaches to achieving agreed sustainability targets and to acknowledging the linkage between poverty and environmental degradation. Scientists and policy makers recognized environmental problems to be closely linked with the problems of social organization and with that the need for environmental and social systems to coevolve in a way that brings a positive change and balance in natural and human systems (Norgaard 1994).

The lessons learned from the REDD and PES examples teach us to critically rethink the existing frameworks and their limitations and to proceed creatively through multiple avenues of knowledge (Norgaard 2010). Through the studies that offer potential opportunities to tackle environmental and social problems in conjunction, such as community involvement in forest monitoring, we can acquire new ways and forms on learning, knowing, and governing. Nevertheless, it requires better reception of innovative approaches at local and national scales as well as willingness for change. A failure to merge environmental and social aspects to capitalize on the existing frameworks and concepts will only add to the pool of scientifically sound, yet practically infeasible, theories. By introducing the challenges that the ecosystem services approach poses, it can be viewed as one type of solution to address the complexity of natural resource management – however, not the only option towards sustainable development.

With the sustainable development targets and the Millennium Development Goals (MDGs) "to improve human well-being by reducing poverty, hunger, and child and maternal mortality; ensuring education for all; controlling and managing diseases; reducing gender disparities; ensuring sustainable development; and pursuing global partnerships" (WHO 2005) can be achieved through multiple other integrated ways that allow us to work together towards a world without poverty, social inequity, injustice, and environmental degradation.

The challenge remains in our willingness to accept the continuous need for positive change, which will require a modification of existing habits and consideration of alternative ways of thinking and doing. Behavioral and institutional change requires action and flexibility for adaptation. By remaining naively comfortable with the present condition, we may be gradually creating a silent killer of the well-being of future generations.

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# Part II
# Developing New Urban Spaces

# Chapter 7
# Sustainable Urbanism: Creating Resilient Communities in the Age of Peak Oil and Climate Destabilization

**Gary J. Coates**

## A Perfect Storm

It is becoming increasingly clear that the twenty-first century marks a turning point in human history (Berry 1999, 1988; Korten 2006; Lazlo 2006), the outcome of which will be determined by our collective response to two intractable and interconnected problems that are already combining to create a perfect storm which threatens the human prospect (Kunstler 2005).

There is a growing consensus among petroleum geologists, energy analysts, and other observers that we are now riding on the "bumpy plateau" of peak oil and that the era of easily accessible, cheap oil has now passed (Heinberg 2005; Roberts 2004; Deffeyes 2001). At present we consume four times as much oil per year as we discover each year, and discoveries worldwide peaked in 1965. While projections vary, it is estimated that by 2030 the world will have approximately 25 % less oil than is currently available and 50 % less by the year 2050 (Hopkins 2008–2009, 20; Pfeiffer 2004, www.peakoil.com). This irreversible and exponential decline in available oil supplies will be occurring against the backdrop of exponentially increasing world demand, driven in large part by the emerging economies of India and China and by an exponentially increasing world population that is expected to grow from about 6.7 billion today to more than 9 billion by 2050.

Since every activity and process in the modern world is dependent upon the ready availability of a constantly growing and inexpensive supply of fossil fuels, the onset of the age of peak oil, with natural gas and coal soon to follow (Heinberg 2009a; Darley 2004), signals not only the end of globalization but the end of global industrial civilization as we have known it (Hopkins 2008–2009, 18–53). It is no

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longer possible to produce our way out of this energy crisis, and no combination of alternative energies will be able to be put in place soon enough and at a large enough scale to avoid the radically disruptive effects of the end of cheap oil (Trainer 1996, 2007; Heinberg 2005, 2009b; Newman et al. 2009, 26–27).

The linked crises of exponential population growth and the irreversible decline in availability of cheap fossil fuels are occurring within the context of a dramatically worsening process of climate destabilization and environmental degradation caused by human activity. Without rapid and truly effective action to limit the production of greenhouse gases, it is now virtually certain that in this century we will cross key climate change tipping points leading to a world inhospitable to life as we have known it since the arising of human civilization some 5,000 years ago. A number of leading climate scientists, such as James Hansen (2009), have concluded that we may have already crossed some of these thresholds and set in motion an irreversible process of runaway climate change driven by positive feedback processes over which we have no control (McKibben 2010; Orr 2009; Hansen 2009; Lovelock 2006). At the very least, it seems certain that the world is now committed to a global temperature increase of nothing less than 3° C in this century with consequences that will continue for many thousands of years. The potential implications of even this level of global warming are almost unthinkable, including the disappearance of Arctic summer sea ice; the melting of much of the Greenland and West Antarctic ice sheets by the end of this century, which in itself would result in a rise in average sea level of some 7 m (Hamilton 2010, 8); the complete melting of the Himalayan glaciers, which feed the great Asian rivers that supply water to some 2 billion people; the retreat of the world's boreal forests much further to the north; the loss of at least half and perhaps all of the Amazon rainforest; and, possibly, the melting of the great Siberian permafrost which would release enough methane and carbon dioxide to cause over time the melting of all the remaining ice on the planet, causing a sea level rise of some 70 m (Hamilton 2010, 11).

For the 150,000 people who currently die each year because of climate change-driven events, this grim future is already happening, and for the 250,000,000 or more people who will become climate change refugees by mid-century, the consequences of continued burning of fossil fuels will soon be all too real (Orr 2009, xi).

Even without runaway climate destabilization, human beings are already the cause of the greatest extinction of species since the period 65 million years ago when the dinosaurs became extinct (www.well.com/~davidu/extinction.html). Indeed a growing number of scientists conclude that we are now living in the era of the Sixth Extinction (Leakey and Lewin 1996; Ehrlich and Ehrlich 1981). It is estimated that by the end of the century, one quarter or as many as half the species on earth will vanish due to habitat destruction driven by population growth and urbanization, toxic pollution, and ecosystem collapse due to rapid climate change (www.well.com/~davidu/extinction.html; Orr 2009, 157). It is all but certain now that the combination of oceanic warming, acidification, and rising sea levels will cause the death of all the world's remaining coral reefs as early as mid-century, which will contribute greatly to the continuing collapse of oceanic fisheries. With more than 60 % percent of all the earth's ecosystems already stressed beyond sustainable levels, the radical instabilities that will continue to be created by global climate change

threaten to completely overwhelm all the earth's living systems, further fraying the fabric of life and undermining our belated efforts to sustain a civilized human presence on this planet (Millennium Ecosystem Assessment 2005, www.millenniumassessment.org/en/Condition.aspx).

## Alternative Futures

Various authors have mapped out possible responses to this rapidly developing crisis of crises, especially with regard to the future of cities (Coates 1981b, 53–88; Newman et al. 2009; Heinberg 2004; Holmgren 2009; McKibben 2010; Orr 2009). At present more than half the world's people live in urban areas, and it is estimated that by 2030 there could be as many as 5 billion people living in cities, or some 60 % of the global population (Newman et al. 2009, 4). Buildings produce 43 % of the world's carbon dioxide and consume as much as 48 % of the world's supply of energy (Newman et al. 2009, 4). Furthermore, the location and distribution of buildings determines the energy intensity, size, and nature of the transportation sector. It is not possible, therefore, to consider how we can respond to peak oil and climate destabilization without addressing the question of the design and functioning of buildings, towns, and cities.

If our urban areas are a major part of the problem, the good news is that they might also become a significant part of the solution. It is estimated that in the United States alone, a shift away from sprawl toward more compact, mixed-use development could result in a savings of some 80 million metric tons of carbon dioxide annually by 2030 (Newman et al. 2009, 5). It is for this reason that the four images of the future that are described below focus on our urban areas.

### *Civilizational Collapse*

Similar to Richard Heinberg's "Last One Standing" scenario (Heinberg 2004, 55–85), this image of the future could simply be called business-as-usual. All that is required for global industrial civilization to collapse of its own life-denying tendencies is for existing power structures, such as the fossil fuel industry and the politicians they own, to continue to deny the reality of both peak oil and climate destabilization and to continue to block all action to make the transition to a more sustainable, renewable energy-powered society based on ecological design principles. The longer such denial and inaction continues, the more certain the collapse scenario becomes.

Given the present lack of any meaningful action on either climate or energy issues in the United States as well as the rest of the world, it is not hard to envision what the near term future will look like. If and when the global economy recovers from the Great Recession, demand for oil and other fossil fuels will rapidly increase. Since we are now at or near the peak of oil production, rising demand will soon

outstrip supply, leading to a dramatic increase in energy costs, which will cut short any economic recovery, plunging the world back into recession. If oil prices remain high, there is even the possibility of a return of "stagflation" (rising prices combined with falling demand) which we saw in the 1970s since oil is the basis for nearly all the world's economic production. Market-driven responses to peak oil will continue in this way to destabilize the world economy until it is no longer possible to deny that indeed the peak has arrived and that the future will only bring an ever-increasing gap between supply and demand as well as ever-rising costs (Heinberg 2007). This realization will lead to even greater speculation on oil futures, which will drive the price of oil to new, unheard of levels perhaps plunging the global economy into another great depression. At this point, unless the nations of the world can agree that global capitalism and "free markets" are incapable of dealing with finite energy resources and decide instead to cooperate in creating protocols for sharing the world's diminishing supplies of oil (and soon natural gas and coal), it is virtually certain that there will be more economic upheavals as well as more wars over access to oil (Heinberg 2005; Ruppert 2009).

As this economic, social, and political crisis unfolds, the effects of rapidly accelerating climate destabilization will compete for headlines (Orr 2009, 17–27). Rising sea levels and stronger and more frequent hurricanes will continue to threaten all the coastal cities of the United States and other nations, resulting in massive property loss and, as was the case in the aftermath of hurricane Katrina, the beginning of the migration of people away from low-lying areas to higher ground. Droughts in the mountain west and southwest of the United States will continue to worsen, threatening water supplies for Phoenix and Los Angeles, and even formerly rainy regions such as the southeastern states are likely to see a recurrence of the serious droughts which have occurred there in recent years. As the Sierra snowpack continues to decline, there will be even more frequent and severe water shortages in the central valley of California and, as Steven Chu recently observed, by century's end it is entirely possible that "there's no more agriculture in California" and that the viability of the state's urban areas also will be threatened by permanent and critical water shortages (McKibben 2010, 156). Higher temperatures, as well as larger floods and longer droughts, will continue to combine in the Midwest to significantly reduce agricultural productivity in that vital region. Tropical diseases will begin to spread into previously temperate regions, and new diseases will emerge that affect people as well as the native flora and fauna of every bioregion in the country. All of these trends will accelerate the decline of biological diversity and ecosystem resilience throughout the nation and the world. As this future unfolds, more and more capital and labor will need to be siphoned off from other needs, such as the creation of an alternative energy infrastructure, to fight forest fires, provide disaster relief, protect existing coastal cities against rising seas and violent storms, and rebuild and eventually relocate displaced communities in an age of diminishing real wealth created by irreversible declines in net energy availability.

In these and many other unforeseeable ways, the complex interaction of peak oil and climate destabilization will confront the United States and, indeed, all of humankind, with crises of unprecedented urgency, scale, and complexity. Regardless of how it plays out, sometime within the next 10–15 years, it will become obvious

to all the peoples of the earth that we have entered what author James Howard Kunstler calls the "long emergency" (Kunstler 2005). It will then be all too clear that without urgent and drastic action to prevent or mitigate the catastrophes toward which the world is headed, the collapse of global industrial civilization over the course of the twenty-first century is a very real, even likely, possibility (Tainter 2003; Diamond 2005; Catton 1982; Homer-Dixon 2006, 2009).

The only question remaining will be how the peoples of the earth will manage the collapse. Will the process be chaotic and violent or will it proceed by humane and measured steps (Dobrowski and Walliman 2002)? Will it be guided by the principles of equity and social justice or will it be guided, as it is now, by the principles of power and privilege? Will we attempt to prop up global industrial civilization by using the last drops of increasingly dirty oil and the last reserves of even dirtier coal, thereby accelerating the process of climate chaos, or will we move forward together toward a new, more life-enhancing future built around renewable energies and clean technologies? It is within this context that the following three scenarios will present themselves as possibilities.

## *Sustainable Enclaves for the Wealthy*

This image of future, which involves creating "sustainable" enclaves for the rich," is quite similar to the "divided city" scenario described by Newman et al. (2009, 47–51). Especially in the United States, where the last 30 years have seen an unprecedented growth in income inequality as well as the creation of age, race, income, and class-segregated gated communities for the wealthy, it is easy to imagine a future in which American elites will in fact recognize the reality of peak oil and climate destabilization but will use their power and wealth to build "eco-enclaves" entirely for themselves (Newman et al. 2009, 48). As is now increasingly the case, the poor and the rapidly diminishing middle class will be left to fend for themselves in a nation and world visibly falling apart.

It is unlikely, however, that in the long run, this attempt to prop up existing elites and power structures will be able to prevent the decline and eventual collapse of the US economy and, eventually, global industrial civilization itself. But the very attempt to preserve and extend a predatory capitalist system which is based on the creation of scarcity and structures of inequality would very likely lead to violent internal conflicts which would threaten to unravel the entire fabric of society (Klein 2007). So, in the end, the strategy of creating eco-enclaves for the rich would turn out to be simply another scenario for civilizational collapse.

## *Urban Deconstruction and Re-ruralization*

Whereas the previous scenario would involve the preservation and the creation of some mixed-use urban areas for the privileged, as well as some tightly guarded and redeveloped suburban and exurban districts and food-producing regions, the "urban

deconstruction" scenario presumes that the great population concentrations in the nation's (and the world's) metropolitan areas would no longer be able to be sustained with increasingly scarce and expensive fossil fuels and the more diffuse energies of renewable energy sources that will be available in the future. Thus, it is presumed that civilization as we now know it would enter an irreversible period of deconstruction into simpler social forms. This scenario envisions that, over the course of this century, the populations of existing cities and nations would be radically reduced by pandemics, food shortages, extreme weather, and other natural catastrophes, as well as terrorism and armed conflicts at home and abroad. Some of the survivors, it is imagined, would be dispersed to small towns and rural areas, while those remaining in metropolitan areas would be absorbed into a network of eco-villages (gen.ecovillage.org; Newman et al. 2009, 44–47; Bang 2005; Jackson and Svensson 2002) aimed at providing a significant portion of their own basic needs for energy, food, housing, and work by renewable means (Holmgren 2009, 42). At their best, such enclaves might function in a way similar to Heinberg's "Lifeboats," attempting to preserve the best of global industrial civilization's knowledge and skills amidst the turbulence of its decline (Heinberg 2004, 139–161).

Some advocates for this scenario of the collapse and re-ruralization of cities (think Detroit) see the suburban and exurban perimeter of our sprawling, multi-centered metropolitan areas as opportunities for sustainable energy and food production, rather than as the slums of the future as many of those envisioning the complete and rapid collapse of our auto-dependent cities imagine (Holmgren 2002, 2009; Newman et al. 2009). In a sense this rather dystopian image of the future bears an uncanny, if ironical, resemblance to Thomas Jefferson's idea that Americans should not pile themselves up in cities, as in Europe, but should preserve freedom and virtue by creating a decentralized nation of yeoman farmers and household-scale manufacturers living close to the earth (Coates 1981b, 72–73). Once again, however, this scenario for adaptation to the ongoing process of civilizational collapse during the twenty-first century would likely fail because of the great interconnectedness of global industrial civilization. It is not possible for any individual or any group to escape the collapse of the larger whole of which they are a part and upon which they ultimately depend.

## *Toward a Meta-industrial Society: Creating Resilient Cities and Sustainable Bioregions*

The previous three scenarios are all one-sided images of the future that offer only limited and limiting visions of human possibilities. Since they are merely reactive rather than proactive scenarios, they fail to inspire the action necessary to change our direction and respond creatively and effectively to the challenges of our time. Yet, as poet William Blake once said, "Everything possible to be believed is an image of the truth" (Blake 1994). The future is likely to be made up of aspects of all these scenarios as we struggle amidst growing chaos to respond to the "long emergency" that we can no longer prevent or avoid.

The meta-industrial image of the future, first articulated by cultural historian William Irwin Thompson in 1978 (Thompson 1978, 57–103) and expanded upon by Gary Coates in 1981 (Coates 1981b, 53–88), envisions a cooperative, planetary process of change aimed at the creation of a world of more humanly scaled, renewable energy-powered eco-communities, self-reliant cities, and sustainable bioregions (Coates 1981b, c, 525–551). This vision of human possibilities is based on the presumption that the peoples of the earth are indeed capable of understanding the nature and magnitude of the crisis of sustainability and that they can and will rise up to work together to avoid either a complete civilizational collapse, a world of divisive and divided cities for the elites, or a massive "die-off" and the loss of all the civilizing effects of urban areas characteristic of today's complex societies (Coates 1981b, 53–88). This scenario is based on the understanding that the unavoidable deconstruction of global industrial civilization is in fact the necessary precondition for the creation of a spiritually based, ecologically derived, and life-enhancing planetary civilization based on the principles of tolerance and cooperative community and supported by the intelligent use of environmentally and humanly appropriate technology (Coates 1981b, 73–85; Schumacher 1973, 1979; Da Samraj 2009). While it is difficult to imagine that such a utopian vision of the human future is even a remote possibility, it is the only scenario that is capable of inspiring action toward a more hopeful future.

The meta-industrial vision is similar in many ways to aspects of Richard Heinberg's "Powerdown" scenario, which he describes as being the "path of self-limitation, cooperation, and sharing" (Heinberg 2004, 87–115). It also has many of the characteristics of the "energy descent" scenarios outlined by permaculturalist David Holmgren (Holmgren 2002, 2009, 56–89), the "Transitions Towns" movement inspired by Rob Hopkins (2008–2009; Chamberlin 2009), and the "resilient cities" image of the future articulated by Newman et al. (2009). All of these positive scenarios propose that we can simultaneously address the crises of both peak oil and climate destabilization by working cooperatively to create more livable, resilient, and sustainable communities for all the peoples of the earth and not just for the wealthy elites within and among nations (Coates 1981a; Chamberlin 2009; Hopkins 2008–2009; Friedman 2008). This hopeful vision of a sustaining and sustainable future, as it relates to the design of resilient cities and their surrounding bioregional landscapes, is articulated by Newman et al. (2009, 51–52) in the passage below:

> The resilient city scenario occurs when the access and alternate forms of fuel and buildings in eco-enclaves that were the province of the wealthy in the divided city scenario are provided for all. People will have access to jobs and services by transit or walking as well as the use of electric cars for short car journeys. Intercity movements will move toward fast electric rail and will be reduced considerably by the new generation of high quality interactive video conferencing. Green building design and renewable fuels will be a part of all neighborhoods. The city will develop new rail links to all parts of the city, walkable centers will be created across the city-region using the best green buildings and infrastructure. In the areas between the intensively developed transit centers and corridors, urban eco-villages will be established to help manage the city's ecological functions such as extra renewable energy production and water and waste recycling: these will be linked into a citywide green infrastructure through clever control systems and local management. Urban eco-villages

> will also grow specialized agricultural produce and manage areas of urban biodiversity: they will be largely self-sufficient though they will still be within a reasonable distance of the city for many urban functions.
>
> In the rural regions around cities most agricultural and forestry production will focus on food and fiber and biofuels for the city and its region, thus reducing food and fiber miles. The manufacturing of products will become more localized and be more biologically based to replace petrochemicals. The towns where goods are produced will be well linked by freight rail to the city.

As Buckminster Fuller once said, "The best way to predict the future is to design it." The design of such resilient human ecologies, which would have to be carefully and gracefully integrated within the naturally occurring ecosystems of which they are a part, constitutes both the means and the ends of the great transformation that lies ahead. Like any naturally occurring ecosystem, the rate at which energy and resources flow through any human ecology is directly determined by the structure of the system. The structure of global industrial civilization, especially as it is hard programmed in the sprawling auto-based pattern of human settlements in the United States, was created by, and can only be sustained by, uninterrupted flows of ever-increasing amounts of cheap concentrated fossil fuels. In theory and in practice, it is impossible for the material culture of such societies to be operated with any combination of more diffuse renewable energies (Trainer 2007; Heinberg 2009b). Thus, to create a society capable of being sustained by renewable means, it is essential that the human habitat itself be restructured in ways that make such an outcome possible. All policies for economic, social, and political changes must be evaluated according to their ability to create new settlement patterns comprised of resilient and sustainable buildings, towns, and cities as well as more ecologically and socially viable rural landscapes and bioregions (Coates 1981d, 401–414).

Emphasizing the eco-technical aspects of sustainability, Newman et al. (2009, 55–148) list seven characteristics for the design of resilient cities, which they see as the building blocks for the creation of a sustainable society:

1. *The renewable energy city*. Urban areas should be sustained by renewable energy technologies at every scale from the region to the neighborhood to the building level.
2. *The carbon-neutral city*. In order to address the crisis of climate destabilization, it is necessary to create carbon-neutral urban (and rural) environments.
3. *The distributed city*. Rather than relying on large-scale, centralized, and centralizing energy, water, and waste technologies, wherever possible, smaller-scale, community-based systems should be used.
4. *The photosynthetic city*. By "greening" the infrastructure of existing and new settlements, it will become possible to provide a significant amount of the necessary food, fiber, and other ecosystem services locally.
5. *The eco-efficient city*. By closing the loops of existing "waste" streams, cities will be able to provide a significant portion of their needs for energy, materials, and nutrients necessary for sustainable organic food production.
6. *The place-based city*. By creating climate-adapted buildings, towns, cities, and landscapes through the use of more locally sourced materials, it will also be possible to strengthen local economies while establishing an authentic sense of place.

7. *The sustainable transport city*. Only by creating more compact, pedestrian-friendly, mixed-use places to live, will it also become possible to provide renewable energy-powered options for public transit and personal vehicles.

## Resilient Cities: A Case Study of the Sustainable Urban District of Kronsberg (Hannover), Germany

While there are at present no existing cities anywhere in the world that meet all seven of these criteria for resilience, there are a number of urban districts which begin to come close, including "Solar City Malmö" in Sweden (www.solarcity.se, Ritchie and Thomas 2009, 161–169); Hammarby Sjöstad in Stockholm, Sweden (www.hammarbysjostad.se/); "Eco-Viikki" in Helsinki, Finland (Eco-Viikki 2005; Gauzin-Müller 2002, 82); and the Vauban and Rieselfeld districts in "Solar City Freiburg," Germany (Gauzin-Müller 2002, 69–74; Guzowski 2010, 52–67; Ruano 2002, 92–93). However, the largest and, in many ways, the most exemplary project to date is the garden city of Kronsberg, located on former agricultural land near the Hannover trade fairgrounds in northern Germany (Farr 2008). Planned within the frameworks of William McDonough's "Hannover Principles" (McDonough and Braungart 1999) and the United Nations Agenda 21, Kronsberg was designed and built through a participatory process as a model sustainable urban district for EXPO 2000, a world's fair hosted by the city of Hannover. As a model sustainable community, Kronsberg is a moderate- to high-density (47 dwelling units per acre) urban district (Farr 2008, 242; Copur 2007, 8) that successfully demonstrates the integration of the technological, social, ecological, and human aspects of sustainable community design (Coates 2009). It was designed through a very public and participatory process to include the following elements:

*A compact urban fabric*, comprised of five medium to high-density mixed-use neighborhoods planned to house a socially diverse population of 15,000 people in 6,000 energy-efficient dwelling units when it is fully built out sometime between 2010 and 2015. To date two neighborhoods have been built with more than 3,300 dwelling units housing some 6,600 residents. Development is continuing with the construction of large private residences to the north.

*Multimodal transportation linkages*, providing connections to the nearby expo trade fairgrounds as well as Hannover city center by means of a light-rail line (less than a 20-min ride), as well as automobile arterials and bike paths which connect to Hannover and its surrounding region.

*Diverse public amenities*, including a primary school, sports hall and sports fields, a comprehensive high school, three day-care centers, a youth center, community meeting rooms in every housing block, an arts and multiservice community center, a health center, and a shopping center located at the meeting of the two neighborhoods.

*An ecological landscape design (the "city as garden" theme)* maximizing on-site rainwater retention and natural aquifer recharge, providing tree-shaded streets

lined by sidewalks and bioswales, as well as a varied network of pedestrian paths connecting all the therapeutically restorative and recreational green spaces within each residential block.

*Integrated living and working* realms through the provision of employment opportunities at the nearby fairgrounds and an adjoining office park that itself provides more than 3,000 information industry jobs, all within easy walking distance of all the neighborhoods.

*An efficient, decentralized, and integrated energy system* that uses two natural gas-powered CHP (combined-heat-and-power) units to provide district heating as well as electricity to the entire community.

*Renewable energy systems* for additional electrical power in the form of three large wind generators located on nearby Kronsberg hill, as well as building integrated photovoltaics placed on the primary school and community center, that, combined with the CHP units, provide more electricity than the district needs (with a 74 % reduction in carbon dioxide emissions in 2001 compared to ordinary developments).

*Urban agriculture* in the form of the nearby *Kronsberg organic farm and rural workshops*, containing an organic farm, dairy and cheese-making operation, butchery, brewery, bakery and farmers' market, houses for business proprietors and farm workers, and an inn for participants in workshops on sustainable agriculture.

*An ecologically varied adjoining landscape,* comprised of restored native woodlands, wetlands, and pastures for recreation and nature study, that also provides links by means of walking and cycling trails to Hannover's many forests, parks, and gardens.

## *The Kronsberg Planning Area*

Kronsberg is located on the western slope of a long low hill adjoining the Hannover industrial fairgrounds as well as an existing office park. Rising some 30 m above the surrounding landscape, this locally prominent landscape feature offers residents of Kronsberg clear views in all directions and is preserved as an ecologically varied landscape for recreation and nature study. It is also the site for three large wind generators (3.58 MW), which provide a significant portion of the electrical power needs of the community.

The site is surrounded by high-speed automobile arterials which connect it to Hannover city center as well as more distant cities. A new tramline links the center of Kronsberg to the center of Hannover with a journey time of 20 min. Walking and bike paths provide additional connections to the fairgrounds and the city center (Schottkowski-Bähre 2000, 9).

An international competition, which was held in 1992 for the design of the fairgrounds as well as the adjoining proposed new urban district of Kronsberg, was won by Arnaboldi, Cavadini, and Hager of Locarno and Zurich. Within the framework of this scheme, a competition for the Kronsberg area itself was won by Welp/Welp and Sawadda of Braunschweig in 1993 (Schottkowski-Bähre 2000, 11). This plan, which is based on the creation of identifiable neighborhoods linked by a gridded

network of local streets, became the basis for further competitions for the design of individual blocks. The Kronsberg development is a model for participatory planning led by city government, which worked with citizens to set the social, ecological, and technological goals for the district as a whole, and the private sector developers and architects who realized these goals through their particular block designs.

From the beginning, a primary aim of the master plan was to create a compact high-density district with clear edges. A 3.5 km tree-lined aleé stretches along the eastern edge of the neighborhoods, forming a border with the fields and wooded areas of Kronsberg hill. The tramline and through road forms the edge of the neighborhoods on the western side of the development. Between this transportation spine and the existing neighborhoods of the nearby Bemerode community is an area providing a district park, schools, and sports fields. Perpendicular to these two bounding transportation arteries are wide green corridors and hillside avenues designed as parks to absorb rainfall and provide places for small social gatherings and quiet contemplation. These avenues visually and functionally join the densest part of the community to the nature preserve, creating a sense that Kronsberg is indeed a city in a garden.

To date two of the planned five neighborhoods have been built, providing housing and related commercial and public meeting spaces, for some 6,600 people. Each neighborhood is focused around a neighborhood park. The district square, which was planned with the participation of residents, is located adjacent to the tramline in the northern neighborhood where it connects with Kronsberg-Mitte. It includes a shopping center with stores, cafes, and restaurants; a church center; a health center; a structure containing various community meeting spaces; and a facility for the elderly.

In both neighborhoods, large perimeter blocks (on average 360 ft on edge) with highly varied green communal interior courts encourage social interaction, while also shaping coherent street cavities on their public sides for auto and pedestrian movement. Mixed-use blocks up to five stories high line the tramline and thin out to two-story terraced housing (10 % of all housing) as the landscape rises toward the Kronsberg hill to the east. Access to all the residential blocks is provided by a grid of narrow tree-shaded streets, designed to allow access for local traffic to all dwelling units. Bounded by the aligned facades of apartment buildings, all of Kronsberg's streets encourage walking as well as casual neighboring. A well-shaded pedestrian and bicycle lane runs straight through both neighborhoods on a north-south axis. The east-west distributor streets, which run perpendicular to the slope, visually and functionally connect the tramline to the Kronsberg hill nature preserve. Streets running north-south, which are parallel to the slope of the site, are used solely for making connections with residential parking areas. Altogether, everything has been done in order to discourage car use while encouraging walking and bicycling within the entire Kronsberg area.

## *Planning for Social Diversity*

Planning for social diversity, which is a necessary part of social sustainability, is equally as important as planning for technological and ecological sustainability. The

mix of housing types in Kronsberg was based on a desire to provide for flexibility as the needs of tenants change and to encourage social diversity through the provision of a mix of varied apartment sizes, including apartments designed for large families as well as units supporting new lifestyles. By mixing a variety of financing and ownership forms within blocks and limiting the proportion of social housing, the desire was to avoid the problems created by social and economic division. To promote owner-occupied housing, which can have a stabilizing effect in a new community, 300 terraced units were erected in the early stages of development.

While Kronsberg was initially planned primarily for market rate housing, with only 20 % planned for social housing, changes in demographics have meant that social mix has changed from what was initially intended: at present about 40 % of residents are immigrants with German ancestors who have moved to Germany from the former Soviet Union and other east bloc nations. These families were accommodated by raising the minimum thresholds for social housing income (Kier, personal communication, 2008).

Another highly successful initiative intended to support social diversity and the integration of diverse populations is the Habitat International housing block, a residential block of apartments for families from many nations and ethnic and religious traditions, including Muslims, that is located in Kronsberg-Mitte. Its public plaza opens directly off a local north-south running street, inviting residents and visitors to stop at the resident-operated café (Schottkowski-Bähre 2000, 116–117).

Because of the responsive and effective social services available on-site at the KroKuS multiservice community center as well as the high-quality and socially supportive unit and block designs, the graffiti-free Kronsberg district continues to experience a high level of user satisfaction.

## *Ecological Open-Space Design*

The street grid, along with urban design guidelines provided as part of the master plan, has created a unifying framework within which more than 40 private architecture and landscape design firms have designed an architecturally varied townscape. The district includes a large amount of open space as well as a variety of intensively used green spaces. A number of playgrounds are located close to the apartments throughout the block in each neighborhood. Ground floor apartments feature private patios and gardens. The inner courtyards of apartment blocks, which meet rigorous standards for on-site rainwater retention set by the municipality of Hannover, offer highly varied spaces for social interaction among all the residents as well as play spaces for children.

Rather than using the traditional closed perimeter blocks found in Berlin and other German cities, a network of off-street pedestrian paths connects the open playgrounds and parks of the green interior courts with the gridded streets, offering residents richly varied paths for walking as well as opportunities for encountering others living

throughout the district. Children freely roam from one inner court area to another to engage the unique play opportunities offered by each. In addition to providing recreational spaces and therapeutically restorative gardens and green spaces throughout the fabric of the neighborhoods, the community's open spaces maximize on-site water retention in artistically designed ways that encourage play with and appreciation for water. The green avenues linking the eastern and western borders of the neighborhoods also serve as play areas and neighborhood-linking linear parks.

## *Walking and Multimodal Transportation Planning*

Kronsberg has been planned as a compact, pedestrian-oriented community that also offers a variety of transportation options. Automobile traffic is channeled along the eastern edge of the community parallel to the tramline to reduce noise and traffic in the neighborhoods. There are no through-traffic routes in the neighborhoods themselves. Additional traffic-calming measures include 30 km/h speed limits, right-before-left turning priorities, frequent constrictions in road widths, and selectively placed bollards. A dedicated bicycle road traverses the district from north to south for some 1.5 km (Schottkowski-Bähre 2000, 19)

Overall, a third of the cars are placed in underground parking, a third in sunken car parks, and a third in surface parking. No large parking lots are allowed and the small surface lots that are provided make use of topographical changes and landscape plantings to mask their presence.

In order to further minimize the presence of the automobile, the city of Hannover passed a special bylaw for the Kronsberg district that requires only 0.8 parking spaces for each apartment, providing for an extra 0.2 on-street parking. This change in parking regulations allows for greater efficiency of parking during the day and reduces the total number of parking spaces required. All rainwater running off the small, carefully shielded, and dispersed parking areas throughout Kronsberg is channeled into bioswales and artistically designed catchment areas for water cleansing and retention.

## *Wind Power and Efficient, Integrated Energy Systems*

Central to the design of Kronsberg as a model sustainable community is the integration of energy infrastructure and efficiency measures with the district's urban design. The community was designed to reduce carbon dioxide emissions by 60 % compared to the current standards for conventional low-energy residential buildings at almost no extra cost. This goal was achieved through energy-efficient building construction as well as the use of energy-conserving appliances (Rumming 2004, 50–69). In addition the aim was to achieve even greater carbon dioxide reduction of up to 80 % through the use of wind power and innovative design and technical systems, such as superinsulated Passivhaus design. This higher target has nearly been

achieved: detailed measurements from 1999 to 2001 indicate that carbon dioxide emissions for each Kronsberg resident were 74 % less than the already high-performing German base case standards (www.passivhaustagung.de/zehnte/englisch/texte/PEP-Info1_Passive_Houses_Kronsberg.pdf, www.hannover.de/data/download/umwelt_bauen/h/co2praesent99-01eng.pdf).

Two district heating systems powered by decentralized natural gas-powered combined-heat-and-power (CHP) plants, which provide both space heat and electric power, further increase total community energy efficiency (Rumming 2004, 60–63). Additional reductions in emissions have been achieved by integrating on-site renewable energy production from building integrated photovoltaics (45 kW peak) on some of the community structures as well as three wind electric generators (3.58 MW total) located on Kronsberg hill (Rumming 2004, 68–69). Altogether more electricity is generated at Kronsberg than the district needs, and the surplus is sold as "green power" to other users in the utility supply district (Rumming, personal communication, 2008).

The ability to achieve these ambitious carbon reductions, and the ability to provide a significant portion of those needs with renewable energy, is based on Kronsberg's commitment to radical reductions in energy demand. One of the most successful architectural experiments in Kronsberg in this regard is the "Lummerland" passive house development, which consists of 32 terraced houses, all with green roofs and private outdoor areas. Based on a 3-year audit (1999–2001), these dwellings met and even exceeded the goal of 15 kWh/square meter heating energy consumption (Rumming 2004, 64–65). It has been determined that if all dwellings in Kronsberg and in Germany were built to this level of efficiency, all residential building energy needs could be provided by renewable means. This finding has led the city of Hannover to mandate the Kronsberg passive house standard for all new and retrofit construction.

## *Ecological Systems*

The Kronsberg urban district was designed to demonstrate environmentally responsible best practices with regard to water and soils as well as waste reduction and management. "The Ecological Optimization at Kronsberg" plan was recognized at EXPO 2000 as one of the best decentralized projects in the world (Schottkowski-Bähre 2000, 26).

The rainwater management plan was aimed at ensuring that the development would not negatively affect the existing balance of on-site water absorption and aquifer recharge. This goal made it necessary to develop an entirely new form of green urban infrastructure for rainwater management. Rain falling on the gridded network of narrow streets within the district is absorbed by the bioswales which line them. All rainwater falling on buildings and paved areas within the blocks is collected, absorbed, and slowly released in the green spaces of interior courtyards.

This process of on-site rainwater retention is treated as an opportunity for design expression in the form of ponds, wetlands, rock gardens, and intermittent water courses. By thus making water visible in an aesthetically beautiful and ecologically functional way, residents are made aware of the beauty and centrality of this primal element that is so central to all forms of life.

Water conservation is also built into the design of all dwelling units in the form of water-saving fixtures. Educational exhibits and information packets are used to increase resident awareness of the need to conserve water in all aspects of everyday life.

A primary goal of the "waste" management plan was to avoid creating waste in the first place, even during the construction phase of the project, where recycling rates of 80 % were achieved (Schottkowski-Bähre 2000, 29).

Waste separation and collection is encouraged on an everyday basis through the placement of presorting bins within each apartment and attractively designed containers close to the houses in each block. Composting of organic waste is also encouraged and supported by a grants program.

Low-waste consumer habits are supported by a variety of means, including the provision of a network of repair and alteration services that operate under the motto of "mend it, don't dump it." An advisory board monitors the effectiveness of the waste management system and prepares educational materials for residents and businesses.

A central part of the Kronsberg soil management program was to reuse the large amounts of soil excavated during the construction phase of the project. Rather than transporting some 100,000 truckloads of soil away from the site, the excavated soil was used to create biotopes typical of the area, make two hills from which to view the surrounding landscape, build a sound buffer alongside a nearby highway, fill and seal an old landfill, and provide landscape enhancements for the nearby world exposition grounds (Schottkowski-Bähre 2000, 30).

## *The Kronsberg Nature Preserve: Creating Biodiversity*

In addition to being the location of the three wind electric generators, Kronsberg hill has been shaped as an ecologically varied landscape for food production, recreation, and nature study. Its woodlands, meadows, parks and avenues, pasture, and arable land, which are linked to other such preserves in the Hannover region, offer residents of this dense urban district a chance to experience the natural world close at hand, demonstrating that nature, technology, and the city can coexist in harmony. The creation of this biodiversity preserve was made possible by the original decision of the city to build a compact urban district on this greenfield site rather than allowing the spread of low-density suburban development to cover the entire area.

## *Urban Agriculture*

If we are to create a sustainable pattern of settlements, it will be necessary to shorten the distance between where food is produced and where it is consumed. This goal was achieved, at least while it was in operation for a number of years, by the provision of the Kronsberg organic farm and rural workshops, which were located within walking distance of all residents. This complex, which was also developed as an EXPO 2000 demonstration project, was created to integrate agricultural production, food processing, and marketing. It was designed to be powered by building integrated photovoltaics and methane from anaerobic digestors fueled by animal and agricultural wastes. The complex included an organic farm, a dairy and cheese-making operation, butchery, brewery, bakery and farmers market, houses for business proprietors and farm workers, as well as an inn for participants in the many workshops held in the farm's educational facilities. By locating such an operation close to the Kronsberg urban district, the idea was that children as well as adults would not only be able to buy locally produced organic food but they would also be able to develop knowledge of and appreciation for a part of life that, in less holistically integrated settings, remains abstract and distant. While in the end this farm operation has not been able to sustain itself financially, it remains a key part of the Kronsberg sustainable city development paradigm. The design of all neighborhoods, towns, and cities, whether newly built or retrofitted, must include provisions for urban agriculture and agricultural urbanism (de la Salle and Holland 2010) if we are to create more secure and resilient communities in the age of peak oil and climate destabilization.

## *Final Thoughts on Kronsberg as a Model Resilient and Sustainable Community*

It is clear that in order to create a resilient and sustainable pattern of human settlements, we must create socially diverse, mixed-use, humanly scaled, and livable eco-communities, both urban and rural, that integrate renewable energy production, compact design, multimodal transportation linkages, climatically adapted architecture, organic agriculture, and ecologically based land use planning. Based on the dictum that "whatever exists is possible," Kronsberg demonstrates that it is indeed possible even now to create such livable communities which radically reduce our carbon footprint and are capable in the future of operating entirely with renewable energy.

While Kronsberg is in many ways exemplary, there are some areas where it has fallen short. The organic farm and market did not succeed financially, perhaps because it was located too far away for residents to walk to and it was not located near enough to the tramline, making it only accessible as a destination by car.

Also, to date, Kronsberg has not been able to support the number and variety of shops and businesses necessary to make it an economically self-sufficient district with regard to shopping for everyday needs. Perhaps if Kronsberg had not been built on a greenfield site but, rather as some proposed, as an infill project within Hannover proper, it might have been possible for its shops to have had a large enough catchment area from

adjoining areas to be more successful. Achieving a critical mass of urban density must therefore be seen as the key to economically viable sustainable urbanism.

Some architects and urban planners have also criticized Kronsberg for not being dense enough to be a real urban district and for being too dense to be a truly suburban development, concluding that it is the worst of both worlds. There is some truth to this observation. Because Kronsberg has large blocks with open green interior courtyards, it often feels like it is a city set inside a very large garden. Green nature is everywhere, and one seldom sees large numbers of people out on the streets as one would see in a densely populated urban area. While residents do have access to nature in the public realm, they have only limited private outdoor space for gardening and other activities. In a lower-density real suburban district, residents would have much larger patios and gardens.

Yet, in the end, the design of Kronsberg may turn out to be a prophetic new model for urban/suburban design in the age of peak oil and climate destabilization. In the future, as natural gas becomes depleted and prohibitively expensive, it would be possible in principle for Kronsberg's combined-heat-and-power district heating systems to be powered with biofuels, making the entire district capable of operating entirely with renewable energy. In the face of the radical increases in food prices and disruptions in food supplies that can be expected in the years and decades ahead, the green interiors of Kronsberg's open blocks are large enough to accommodate highly productive and beautiful edible landscapes, fruit and nut tree orchards, organic vegetable gardens, and year-round food-producing greenhouses, thereby providing a significant percentage of the residents' annual food needs from within its own borders. Also, in the energy- and resource-scarce future Germany and the entire world will be facing, the Kronsberg organic farm may once again be seen as an invaluable asset and be brought back to life, making the community even more self-reliant in the provision of its basic necessities.

Because Germany is experiencing a population decline at the present time, it does not seem likely that more large-scale greenfield projects such as Kronsberg will be built in that country anytime soon. Ironically then, Kronsberg, both as a participatory planning and design process and as a model sustainable eco-community design, should be of greatest interest to the only industrialized country in the world that is presently experiencing significant population growth, i.e., the United States. If we can learn from all aspects of the Kronsberg project, including the effective and creative public/private partnership which made its development possible, we may end up resettling America based on lessons learned from sustainable urban districts such as the garden city of Kronsberg, Germany.

## Conclusions

Clearly the transition from a global industrial civilization to a planetary meta-industrial civilization will require a profound combination of economic, social, political, and technological changes. To make this transition, we must first come to understand that all social policy is inevitably environmental policy and that all

environmental policy is necessarily social policy. The integration of these two modes of planning into a seamless and democratically constituted whole is a prerequisite for the creation of an equitable, socially just, and environmentally sustainable pattern of human settlements. All social and environmental policy must, in the end, result in the creation of resilient new communities such as Kronsberg (Hannover) and the transformation of existing metropolitan areas into a pattern of compact, humanly scaled, transit-oriented mixed-use developments (TODs) and regenerative agricultural landscapes (Condon 2010; de la Salle and Holland 2010; Tachieva 2010; Dunham-Jones and Williamson 2009).

Such a radical restructuring of our presently unsustainable human ecology will require nothing less than what architect William McDonough calls the "Next Industrial Revolution," a great transformation based on three interrelated principles of ecology: (1) "Waste equals food," (2) "Respect diversity," and (3) "Use solar energy" (McDonough and Braungart 1998, 2002). Rather than having a sole emphasis on labor productivity and a constantly growing GDP, as is the case now, meta-industrial economies will be based on conservation, efficiency, resource productivity, and the creation of a growing sense of real security, happiness, and personal as well as social well-being. Rather than being powered by dirty fossil fuels and large-scale centralized energy systems, the next economy will be operated on the basis of a new generation of clean energy technologies and a decentralized network of distributed power generation. Rather than privatizing profits and socializing costs, this new form of socially and ecologically responsible "natural capitalism" (Hawken et al. 1999; Hargroves and Smith 2005) will convert wastes into resources and be guided by the principles of ecology, equity, and social justice to achieve maximum public benefit rather than maximum private profit.

While even broaching the idea of such a radical transformation of global industrial civilization might seem at the present time to be hopelessly utopian, any future that simply projects a continuation of existing values, institutions, and ways of life merely offers us a hopeless future that is beyond belief. While environmentalists such as Lester Brown (2009), Bill McKibben (2010), and James Hansen (2009) describe possible scenarios for the creation of a renewable energy-based economy resulting in reductions in carbon dioxide emissions that are great enough to avert climate catastrophe, they also tell us that we have only a few short years to change course before the whole matter is beyond human control. While it now appears to be too late to avoid the greatest energy crisis the world has ever faced, as well as the chaos of radically disruptive climate changes already well under way, it is still possible to avoid a catastrophe of Biblical proportions.

As the discussion of the perfect storm of peak oil and climate destabilization at the beginning of this chapter should have made clear, however, there can be no realistic basis for anyone to be optimistic about the human prospect. Yet, there is always the possibility and the necessity of what political scientist, educator, and environmentalist David Orr calls "authentic hope" (Orr 2009, 184–185), a state of mind which requires as its foundation a fearless confrontation with the full reality and truth of our situation rather than willful ignorance, blind optimism, or wishful thinking. As Orr reminds us, Vaclav Havel's understanding of hope must be our guide in

the years ahead: "Hope is not prognostication. It is an orientation of the spirit, an orientation of the heart; it transcends the world that is immediately experienced, and is anchored somewhere beyond its horizons…Hope, in this deep and powerful sense, is not the same as joy that things are going well…but, rather, an ability to work for something because it is good" (as quoted in Orr 2009, 182).

The reason for presenting this vision of a meta-industrial society based on the principles of resilient urban design, as exemplified by a case study of Kronsberg (Hannover), is to offer a concrete image of what a sustainable society might look like and what needs to be done practically to sustain "authentic hope." From the example of Kronsberg, it should be clear that by redesigning and remaking the structure, and therefore the functioning, of new as well as existing human settlements, it is in principle possible not only to prevent the most devastating effects of both peak oil and climate destabilization but also to create more beautiful, diverse, and humanly livable communities. The question before us at this moment in history is "what path to the future we will choose?" The time for decision is now, and whatever path we choose, we shall bear the consequences for all future time on this blue-green planet.

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# Chapter 8
# Planning Sustainable Cities: Why Environmental Policy Needs Social Policy

**Matthias Drilling**

## Sustainability and Urban Development

With the appointment of Norwegian Prime Minister Gro Harlem Brundtland to chair the World Commission on Environment and Development (WCED) in 1984, the United Nations invited the development of a worldwide political action plan. In its final report, *Our Common Future*, the "Brundtland Commission" (World Commission on Environment and Development 1987) in the spirit of the report of the Club of Rome (Colombo and Turani 1986; Meadows 1974) pointed out the limits of growth and development strategies aimed exclusively at monetary and short-term gain. With the aid of the "sustainable development" concept, the commission developed an alternative scenario for present and future generations. In the concept growth (economy) and preservation of the natural environment (ecology) were presented as one single issue rather than conflicting ones, as had been discussed previously. In addition, social objectives were included in the concept.

In the years following the publication of the Brundtland Report, numerous proposals and models were developed for the diverse policy areas including the environment, education, social sphere, construction, diet, health, mobility, employment, equality, integration, and spatial development. Pushed by a succession of international conferences, the demand for sustainability became a cross-cutting task which was based on a normative theory of justice and aimed at equity between generations (intergenerational justice), individuals (intragenerational justice), and territories (intraterritorial justice).

This process gave rise to a planning vision for the survival of the Earth system (Weidner 2002, 13). At the same time, critics claimed that connecting the three dimensions has remained largely unfulfilled. In the context of sustainable urban

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development, three positions are particularly interesting: (1) Ecological, social, and economic objectives cannot be combined, because economic goals always target growth, and ecological goals always target limits (e.g., Haber 1994); (2) the option of striving to meet goals in environmental protection (protection of ecospheres), economic stability (continuously steady economic development), and social justice (equal survival chances) *concurrently and with equal value* (Dangschat 2001, 76) allows for previous action strategies to be reformulated as future oriented; and (3) the sustainability approach is a strategy of modernized securing of domination. Furthermore, it is part of a new hegemonic concept, because it does not make the power relations the subject of discussion which are indeed the bases of the destruction of the environment and poverty. In this sense, the sustainability concept simply does not go far enough (e.g., Eblinghaus and Strickler 1996).

Today the fundamental criticism of the sustainability concept continues to be part of the sustainability discussion and accounts for why sustainability in its practical application is in many places restricted to measures against global warming. The guidelines are clear: According to the full assembly of the Intergovernmental Panel on Climate Change (IPCC), until 2050, considerable global emission reductions by at least 50 % below the 1990 levels are needed to meet the 2 °C limit for temperature increases. National legislations are on the way to implement these guidelines.

How this implementation relates to urban development was worked out at the EU follow-up conferences to Rio. It was pointed out that the consequences of the global environmental crisis are mainly caused by the cities. The Aalborg Charter of European Cities & Towns Towards Sustainability stated that it is in the cities that "environmental imbalances damaging our modern world" arise (Charter of European Cities and Towns Towards Sustainability 1994, 2). The agenda of the 1996 United Nations Conference on Human Settlements (Habitat II) in Istanbul explicitly called for commitment to achieve a breakthrough in sustainable settlement planning.

## From Ecological Urban Development to Sustainable Urban Development

The call to act led to a break in the history of the relationship between urban planning and ecology. Urban planner like Ruano (1999) argued that earlier approaches, such as the idea of the garden city around the turn of the twentieth century, viewed themselves as an answer to the unhealthy conditions of life in the industrialized cities. Movements in the 1970s like Paolo Soleri′s arcology approach and Arcosanti, Soleri′s city utopia, were based on a "back-to-nature" stance owing to the oil crisis and criticism of modern US cities. Following Soleri, nature is always capital that people must handle carefully but that people can also acquire and exploit. Nature is merely the backdrop for urbanization, and green spaces represented just another function that the city must provide for the comfort of its residents (Haas-Arndt 2000, 9).

After Rio ecological thinking freed itself of its limited role as mere guilty conscience, for ecology now contributed to scientific findings on the basis of which project developers can make their decisions. Thinking about the city, its neighborhoods, and settlements from the standpoint of ecology led in the 1990s to a direction in planning that was called "ecological urban design," "eco-urbanism," and "urban environmentalism" (Gauzin-Müller 2002, 34). From this new direction in planning, a number of sustainable model sections of cities in Europe were developed. The model sections targeted mainly changes in mobility behavior such as the promotion of public transport and nonmotorized transport as opposed to private transport. The careful use of resources with the main focus on the use of building materials, energy, and water and the issue of waste and the reduction of area used (e.g., through use of unexploited areas, natural restoration measures, and demolition) were additional targets. In the social area, only the participation of users in the planning process was demanded but not operationalized in the same depth as the other topics.

With the signature of the Kyoto Protocol, the measures for reducing $CO_2$ emissions once again focused strongly on individual buildings and building efficiency (Homlong and Springler 2006, 2007). These efforts are accompanied by assessment and norm systems that set indicators for buildings′ environmental performance (such as *Minergie* + and *Minergie ECO* in Switzerland, *Passivhaus* and *Plusenergiehaus* in Germany, *Haute qualité environnementale des bâtiments* in France, the DCBA method in the Netherlands, and environmental assessment method for buildings in the United Kingdom).

As a result of focusing on environmental concerns, the point of view gained acceptance that the three dimensions of sustainability, although *of equal value*, are not *equal in rank*. The social dimension was consequently assigned a subordinate optimization and safeguarding role (Brandl 2002, 14).

## Concepts of Social Sustainability for Urban Development

In the mid-1990s the model of sustainability was given stronger consideration in the social sciences, which led to a more precise definition of the term "social sustainability" (for more detail, see Empacher and Wehling 2002). In the spirit of the safeguarding idea, the focus at the start of the discussion was on securing health, securing social stability, and securing the development and functional capability of society. From this discussion the guiding principle of social justice emerged. Criticisms of the feasibility of such global objectives have continued up to today. As a result and in contrast to the ecological dimension of sustainability, the dimension of social sustainability seems to be a highly individual matter. This is the only way to explain why in the area of social sustainability, the EU Commission focuses on the following priorities: old-age provisions, health, poverty, and social exclusion (Biart 2002). However, Bramley and Power (2009) conclude on the basis of an analysis of the research literature that the variables "social equity" (access to social infrastructure and opportunities for social mobility) and "sustainability of

community" (possibilities for exchange in a neighborhood) have been established as the key dimensions of social sustainability:

> From the … review of literature there are two recognisable, overarching concepts at the core of the notion of social sustainability within an area context. These are social equity issues (access to services, facilities, and opportunities) and issues to do with the sustainability of community itself. … With regard to the first dimension, we are particularly interested in access to local services, while recognising that a fuller account of the equity dimension would also encompass access to jobs and affordable housing. … Turning to the second dimension, … we argue that the following aspects are likely to be significant in helping to sustain communities at the neighbourhood level: interaction with other residents or social networks, participating in collective community activities, pride or sense of place, residential stability (versus turnover), security (lack of crime and disorder). (Bramley and Power 2009, 32–33)

If in addition to these social-planning macro-perspectives we also consider the research on social sustainability conducted in disciplines that deal with urban planning but do not themselves belong to the planning disciplines (sociology, psychology, communication), then three understandings can be distinguished: "technical-structural approach," "behavior-oriented approach," and "democratization approach" (see extensive account in Drilling 2009).

## *Social Sustainability as a "Technical-Structural Approach"*

In this context sustainability means, starting from a safeguarding idea, to formulate what serves health and sense of comfort through technical-structural innovations in the individual building. This includes the question of what serves the maintenance of social and cultural values, for example, through innovations in the arrangement of the building stock and its exterior space such as the housing development, the neighborhood, and the city district. The thesis is that buildings that have a positive effect on health and sense of comfort will foster both the amount of time residents spend in the buildings and the users′ feeling of responsibility towards their buildings. This counteracts property decline owing to insufficient maintenance (objective: economic sustainability), reduces motivation to move, and thus reduces the land demand (objective: ecological sustainability). Here health and well-being are influenced by the interplay of the following factors: hygrothermal comfort (e.g., air temperature, relative humidity), visual comfort (e.g., light intensity, blinding), air quality (e.g., smells, dust), and acoustic comfort (noise emissions, room acoustics).

As Eberle (2008, 156) wrote, socially sustainable buildings not only convey a feeling of safety and security but also create diverse opportunities for social contacts through their spatial arrangement and carefully planned exterior grounds. With exterior spaces, green spaces are especially important, for they have direct positive effects on health, as an international comparison and review of the research literature showed (Finke 2009). And because user behavior has emerged as a significant

factor in energy use, proponents of this approach (e.g., Richter et al. 2002) develop building, grounds, and policy measures for compensation of user behavior, for example, needs-adjusted ventilation systems, heat recovery, or improved pump technology in heat production.

## *Social Sustainability as a "Behavior-Oriented Approach"*

The behavior-oriented approach is diametrically opposite the technical-structural approach. Here social sustainability is understood as a change in consumer behavior. According to this thesis, the structure of the building, housing development, or city district can play a considerable role in consumption decision (for a fundamental account, see Harloff 1993; Richter 2008). In these two fields, mainly the importance of communicating ecological goals is emphasized: Direct and verbal communication on consumption, however, takes place only in neighborhoods where social networks exist (Harloff et al. 2002, 7). In highly cohesive neighborhoods, residents more frequently talk to each other about consumption than residents of neighborhoods with low cohesiveness do. Cohesion is understood as the community spirit and solidarity of a group. Cohesion is accompanied by personal contacts, conversations, and mutual exchange and suggestions (Hinding 2004, 255). In conversations of this nature, norms are perceived as, for example, to do the "right," environmentally friendly thing. Norms influence conversation participants to adapt. Cohesive neighborhoods are established through the perceived (not actual) homogeneity of the residents and the perceived image of the residential area. For example, one can feel close to a person even if the person does not belong to the same social status. Social networks in turn are established through similar interests and personal situation such as being retired and having children. Hence, the relationship between social structure and neighborhood is mediated through processes of social perception.

Cohesive neighborhoods develop mostly in row houses with yards; in small, multifamily row houses; and in apartment blocks of 4–5 stories, which usually house 5–6 families. These neighborhoods develop less so in very large buildings such as high-rises. In big structures, predominantly stepping-stone neighborhoods prevail where most of the residents have their friends elsewhere but people know each other and interact. In continuous row houses and parklike housing developments, transitory neighborhoods where most people know each other by sight and know approximately who lives in what apartment, levels of interaction are low.

Corresponding advice for planning also targets the height of buildings, which are built not more than five stories high, the settlement size (groupings of a maximum of 25 households and units of 10 to a maximum of 30 groups of housing developments), and the exterior spaces. Exterior spaces are the common areas, which should allow for courtyards (see Harloff et al. 1999; Harloff and Ruff 1993).

## *Social Sustainability as a "Democratization Approach"*

The democratization approach comprises a number of different approaches, which all have the common goal of creating community through forms of self-determination in urban development. Among these approaches are the new social movements of the 1960s and 1970s, the community-oriented settlement projects of the 1980s, and, in recent years, the movements towards informalizing the planning process.

The democratization approach is a brainchild of the social criticism phase of the 1960s and 1970s. It is the time of differentiation and polarization in politics, in economics, and in society; people go to the streets and hold protests for better living conditions, for fair trade relations, and for new forms of living together. Cities grow rapidly, and connected to their growth are segregation and impoverishment of the neighborhoods. Public debates are held on the inhospitality of the cities (Mitscherlich 1965), on grave errors in town planning (Ragon 1972), and even on the decline and death of the cities (Jacobs 1961). The new social movements drew the power of their arguments from their experiences with town planning and architecture, which at the time was reduced to the role of "translator of economic interests." The Pruitt-Igoe urban housing project in St. Louis, Missouri, is representative of this form of "architecture as ideology" (Berndt et al. 1968). Designed by architect Minoru Yamasaki and built in 1950, the project with over 2,000 public housing apartments was praised by a magazine in 1951 as "the best high apartment" of the year. Because social conditions in the project left no other choice, the building was demolished by implosion starting in 1972. Architectural critics asserted that the demolition of Pruitt-Igoe signaled the end of the modern style architecture.

In the 1960s and 1970s, community-oriented forms of living together were rediscovered: the kibbutz movement, cooperative building movement, the youth movement, and the Vienna settlers′ movement took their starting point. Even the housing cooperative Wogeno in Switzerland, which was founded in 1981 in Zurich, left its mark and influenced the founding of cooperatives in Germany (Koch and Kurz 2007, 28). With these new community-oriented living forms, the social movements came very close to the model of sustainability – because they postulate that a renewed focus on community contributes towards improving quality of life in a housing development or neighborhood.

Whereas the new social movements and the supporters of community-oriented housing projects rarely made cooperating with planning experts a subject for discussion and instead tried to find their own way, the movement to informalize planning specifically sought such a cooperation (e.g., Freisitzer et al. 1987). The purpose of the movement is to show how planning can consider the needs of the later users and how user opinions can combined to form an additional basis for planning. This process is democratization of house building through participation. The Netherlands is an influential case in point: Citizen initiatives in the Netherlands protested against rents, demolition of houses, or traffic planning such as roads. At the Eindhoven University of Technology, students founded an organization called the *Bouwkundig Adviesbureau voor Buurtbewoners* that supported residents′ committees in political fights.

This resulted in election victories for parties that swung over to citizen participation. In 1978 the municipality Den Helder organized the first architecture fair at which citizens could actively participate in planning the new city residential areas. The result was the emergence of experimental architecture and town planning which tried to achieve high-density housing and also fostered community living (see examples in Schreiber 1982). Connected with these movements is also a break with the earlier separation of functions that was anchored in the Athens Charter as a role model. The principle of combined functions was seen as more promising: Areas should be assigned various uses, each area having equal weight. For instance, streets should be planned not only as traffic routes but also as spaces for social activities, where features as seating and playground equipment are installed. Rows of trees surround the area with each tree and the surrounding area being cared for by tree sponsors, a position which can be found today in the urban agriculture movement.

## Social Policy and Environmental Goals: Major Steps in an Ambivalent Relationship

For planning, the stronger consideration of the equal rank of social sustainability in urban development was an expansion of the previous understanding: Instead of putting plans before the public that had been developed in a technocratic way and with limited (or no) public input, now the idea was to give the public a say. In this context the principle of open planning emerged (Uhl 2007), which calls for participation of the residents already in the goal-setting phase (Brech and Lölhöffel 1999).

But again there was criticism expressed by social sciences: It is too simplified to reduce the social dimensions of sustainability to questions concerning public participation. Social sustainability as a part of the normative concept carries ideas about social justice that lead to demands in social policy. What kind of new demands is social policy confronted with, and how and when can these demands inform – via policy, which in the end decides on the formal process of urban development – the planning of new city districts? This will be shown in the following, international comparative study on sustainable neighborhood development. Included in the study were the three city districts Rieselfeld (Freiburg, Germany), Werdwies (Zurich, Switzerland), and SolarCity (Linz, Austria). These districts came into being as a result of city expansions in the mid-1990s, and today they are still considered reference models of sustainable urban development owing to their ecological, economic, and social innovations.

The goal of the comparative study (see Drilling 2009; Drilling and Weiss 2011) was to find out which objectives of social policy were formulated at what point in time, whether and how they could be pushed through, and in what relationship (conflicting or in harmony with) they stood to the ecological goals. The study surveyed actors from the areas of planning (administration, urban planning), interest group representatives, and the intermediary institutions (e.g., city district offices, youth workers).

The thesis of the following explanations is that the interplay or the competition among goals can be described mainly in terms of processes on the basis of major steps. Major steps are situations where goals of social policy have to be weighed against environmental policy goals and a decision made. This decision will set the frame for all the future considerations, the weighing up of different factors, and all the future decisions on how to proceed. Three major steps of this kind can be named: (1) location decision, (2) the urban design competition, and (3) structural- and social-planning realization (development scheme neighborhood plan, master plan, and so on).

## *Major Step: Location Decision*

In many places, the loss of urban quality owing to unfavorable locations (e.g., shady site along major traffic routes) and house building largely oriented towards financial speculation have resulted in the emergence of disadvantaged neighborhoods. The answer to the question about *where* measures for urban renewal or urban expansion are realized has therefore been judged for many decades to be an issue of importance for social policy.

Connected with the model of sustainable urban development is a more precise weighing up of the possible social consequences of newly planned housing estates. This opens up the possibility to consider the objectives of socio-policy in an interdisciplinary dialogue in the same depth as has been the case for the environmental policy objectives for a long time.

The importance of negotiating between social and environmental policy objectives when making a location decision can be traced back to the case of the Rieselfeld district, a newly planned neighborhood in Freiburg, Germany. The expansion of the city was closely connected to a serious housing shortage in the late 1980s. At that time the city had one of the highest levels of rental prices in Germany, comparable only with Munich, Hamburg, or Frankfurt. As growth of income was not equivalent to the rise in rental prices, there were 2,500 households with nearly 6,000 persons on a list of hardship cases waiting for subsidized public housing. “Freiburg needs new housing urgently,” the mayor told the public through the press at the end of 1990. He predicted that 6,500 additional social housing units would be needed in the coming 5 years. At the same time, the mayor commissioned the town planning office to prepare the clearing of a forested area outside the city, where a satellite housing project was projected.

The town planners fought against this project, because it contradicted the principle of dealing economically with the land. The town planning office presented 20 possible sites for development within the city as an alternative to building in the open countryside. But citizens formed groups to protest every one of the alternative sites. No one wanted to live near the socially weak. As a provocation, the planners then proposed the building of a new town district in the eastern part of the city, with

affordable public housing. The new district was to be built directly adjacent to the residential areas of the more comfortably off. In those areas the existing social infrastructure such as schools and day-care centers was not used to full capacity. The planners′ proposal was a calculated one: They knew that their idea would not go through, but in the negotiations, they could shoot down the satellite city, proposed by the politicians. As the former head of the town planning office put it: "Why must public housing always go West? In the East there is sufficient infrastructure, and it is not being used to full capacity. The proposal failed splendidly, but as a result the forested area was not cut down and the ground water basin did not suffer as a consequence."

Subsequently, Rieselfeld entered the discussion as a compromise; with more than 320 ha (hectares; one hectare is equivalent to 2.471 acres), it was the largest adjoining unbuilt land on city property. Since the houses were to be built on the city′s own ground, the politicians hoped for a speedy construction. Since the ecological side also brought forward the importance of Rieselfeld as a man-made natural landscape (marshland), the politicians agreed to put an additional 250 ha of the drainage land under landscape protection. After this compromise solution between social policy and ecological goals, preparation work for the urban design and landscape planning competition for the 70-ha area designated for building could get underway.

## *Major Step: Urban Design Competition*

Competitions have been used for centuries to find the best ideas and solutions for architectonic and urban design tasks. The program for an urban design competition states the basic strategies for the urban development ideas. The strategies refer to forms of use and also include energy goals. One finding of comparative urban settlement research is that in planning, if planning is indeed guided by the model of sustainability, the possibility that social policy can inform the competition program is feasible, because it is precisely in this context that new governance models can be tested. The innovation consists particularly in changing the understanding of the administration in terms of planning and participation, for it is the administration which is responsible for the sustainability policy (see Baxamusa 2008). The dominating hierarchical bureaucratic self-understanding is based on the principle that all planning competence lies in the hands of the public authorities (Albers 1996). This principle is implied to be suboptimal, for instance, when a cross-agency strategy is considered or when all relevant local actors are included in the strategy. Instead, a network-oriented self-understanding planning theory has been proposed. The theory aims to destandardize planning and views planning as an attempt to reach an agreement (Fig. 8.1) (Keller et al. 2006).

The negotiations that arise out of the network-oriented understanding bring into the planning process a more in-depth formulation and also include objectives of social policy. For example, in the city of Freiburg – under the model of sustainable

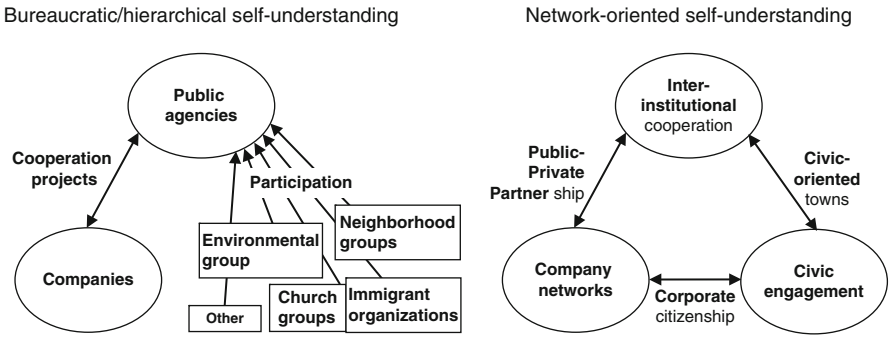


**Fig. 8.1** Planning theory self-understandings and sustainable urban development (Source: adapted from Baxamusa (2008))

urban development – the city council developed a project structure which was based on the following four pillars: (1) cooperation among city departments, (2) acceptance through political process, (3) inclusion of external authorities, and (4) citizen participation. An interdepartmental working group under the central coordination of the town planning office integrated other offices/agencies (environment, energy, social) in a binding way. Even years before the actual start of the housing construction, a working group, compiled of district councilors from all political factions, made possible the condition for participating. In order to facilitate the participation of Freiburg′s citizens, the mayor convened a citizens′ advisory council. This council also included opponents of the project. In the interest of "active citizen participation," citizens were provided with information regarding the development of the site and were asked to express their ideas. For social issues connected with the new part of town such as evaluation and review matters, a cooperation with the university was established. Finally, the University of Applied Sciences in Social Work was consulted on questions concerning neighborhood development.

The expanded participation in the preparations for the urban design competition served mainly as a means to differentiate the actors in the social area. Nevertheless, controversy and debate arose among the institutions with regard to whom the new part of the city should provide living space to and in what form. In addition, representatives of ten institutions (neighborhood groups, nature conservation organizations) as well as the Protestant and Catholic church communities were selected to serve on the judging panel of the urban design competition.

Also in the Zürich-Werdwies project, the question during preparations for the urban design competition was once again how a new housing development can contribute to neighborhood development, a development that reflects the city and prevents segregation processes. The decision to demolish the existing development built in the 1950s was made unanimously at a broadly supported workshop at the initiative of the political representatives of the city together with representatives of and stakeholders in that part of the city. The efforts to clearly define the various user requirements were also present in the text written for the urban design competition.

For instance, for the participating planning teams, the requirements stated: (1) As many use-neutral spaces as possible are to be planned so that they can be used according to need. (2) As many apartments as possible should be handicap accessible. In addition, these apartments should be able to be adapted to the needs of persons with disabilities if needed. (3) Building and exterior space use should be carefully planned. Exterior spaces and play areas that put forth a strong image and identity are desired.

What are the objectives of social policy that must be achieved through the urban design competition, in order for social policy cornerstones to frame the further decision-making? The study worked out five topics that are called the guiding criteria of social sustainability:

1. *Mixed social structure*: Housing developments and parts of town should be composed of a heterogeneous population (mixed population); this prevents the shutdown and contributes towards the stability of a housing development. To build neighborhoods with a mixed social structure, indicators such as plot size, rent price levels, and apartment sizes have to be taken into account. This can be based on average values for the city as a whole (e.g., percentage of apartments for persons with disabilities in the housing development corresponds to the city average).
2. *Mixed use*: A lively housing development ambience and contact with people with different lifestyles are raised by the option of diverse uses (e.g., place of residence, workplace, recreational space). Housing developments should not stand empty during the daytime, and they should house various infrastructures (such as care facilities, meeting places). To achieve this, the individual subareas should be secured (e.g., via gross floor area) and developed in parallel.
3. *Accessibility*: What a housing development (and also the housing units) offers must be able to be used by people independently of their individual mobility restrictions, age, and social and cultural backgrounds. This entails a change in philosophy: Instead of building to meet the needs of people with disabilities as in the past, the new philosophy means building in a way that serves all users (people with disabilities, adults, children, parents with strollers, and so on).
4. *Short routes/mobility*: Housing developments and parts of town where daily life can be conducted by means of short travel routes prevent housing developments from becoming islands (fragmentation). People can encounter one another on various routes with different purposes (ways to work, ways to shopping). Interaction between people contributes to social integration in a housing development and also to identification with the housing development. To achieve this, work, shopping, and recreational opportunities have to be created nearby. Also, networks of routes should be designed so that important places (playground, youth center, senior center) can be accessed by various groups independently of motorized private transport.
5. *Participation*: Participation is an aim with regard to the development project. Participation should be a structural aim. Actors' participation should not be limited to the role of discussion partner. By creating intermediary institutions

**Table 8.1** Indicators of social policy and ecological objectives to achieve guiding criteria of social sustainability

| Major step in the planning process | Guiding criteria | | | | |
|---|---|---|---|---|---|
| | Mixed social structure | Mixed uses | Accessibility/design for all | Short routes/mobility | Participation |
| | Indicators (examples) | | | | |
| Political decision: location | Plot size | Distribution of percentages for housing, work, shopping, recreation, and education | Consideration of specific family, women, and children aspects | Creation of workplaces near housing | Expanded forms of participation (forums, working groups, etc.) |
| | Affordable housing<br>Consideration of special housing forms | | Foster integration of immigrants and low-income households | Accessibility of local mass transit | |
| Program for the urban design competition | Define use areas (density ratio, ground floor area, gross floor area, etc.) | Define gross floor space ratio for mixed uses | Accessibility | Coordinate network of routes for motorized traffic, public transport, and private transport | Appoint to serve on the jury |
| | | Design of courtyards and recreational areas | Accessible housing and shopping | Plan for parking space | Plan social infrastructure |
| Development scheme | Vary size of apartments | User-oriented development schemes | Target-group-specific access and directional guidance systems | Catchment area for stops on the mass transit lines | Ensure user participation in drawing up the plan |
| | Mixed forms of ownership | | Usability for daily life | | At the same time, social planning with users (plan education infrastructure, recreational areas, associations, etc.) |

(such as neighborhood management), the decision-making process can the influenced as well.

## *Major Step: Structural and Social Planning Realization*

The objectives outlined in the urban design competition find implementation in further plans (such as the development scheme). These plans are again an amalgamation of ideas: Enriched by the responses of the teams of architects who were participating in the urban design competition based on the guiding criteria (see Table 8.1), the planners responsible clearly define their implementation. In many cases, suggestions based on ecological, economic, and social points of view have to be prioritized for financial reasons. From the perspective of social policy, it must here once again be remembered that the social issues must not be reduced to the issue of participation. This major step, which comes up anew in every project, is thus a litmus test for socially sustainable urban development.

The project must be framed in a way that the connections, worked out in an interdisciplinary manner, must be safeguarded as fully as possible. In all of the housing development projects that the study examined, project management attempted to fulfill this frame. In close cooperation with the institutions that came into being in the course of the participation process, indicators were defined on the basis of which ecological objectives and which objectives of social policy can be harmonized to achieve the guiding criteria.

For example, in the Rieselfeld neighborhood in Freiburg, it was decided to connect the new development to the streetcar network already during the first phase of construction. Although this was not profitable from an economic yield perspective, it was justified for ecological and sociopolitical reasons: The aim was to keep the part of town as free of automobiles as possible, and the plan was for future area residents to be able to travel into the city with favorably priced subscription tickets. This appealed to a lower socioeconomic population class.

Although affordable housing made up a large portion of the housing in the part of town and the construction of these apartments had to be done economically, a block-type thermal power station was built which supplied the entire part of town with heat and power. In addition, all of the apartment buildings (also the affordable housing buildings) were built as low-energy buildings.

A certain amount of area was specified for drainage purposes. Therefore, this area could not be hollowed out underground (e.g., for underground parking garages). The resulting space, such as inner courtyards of the apartment blocks and the areas between buildings, was left to be designed as playgrounds and unbuilt open space.

Through a differentiated route network for public transport and nonmotorized traffic, a network of streets, routes, and paths was created. The network offered routes independent of one another for children, young people, people with reduced mobility, and elderly people, and this layout made it possible to navigate easily short distances to locations for work, shopping, education, and recreation.

Together with the very first residents, intermediary institutions and self-help organizations were created in the interest of environmental topics and social cohesion. On the part of the project management, the volunteers served as a sounding board. Also at their initiative, an automobile-free housing estate was built at the perimeter of the new part of town. Today the estate can still house medium-income families with several children.

By means of special rental and ownership models, it was made attractive for medium-income families to purchase their own homes. Because the purchase was done in a group, costs for the architect and other costs associated with the purchase of land were lower. However, the cooperative purchase made the bank costs higher; to make this purchase still possible, a project management supported the home-building cooperatives.

Through combining environmental and social policy measures, it was possible to successfully develop a part of town that takes account of both protection (e.g., landscape consumption, alternative heat production methods, low-energy building) and the heterogeneity of the population and the social structure of the city, which prevents exclusion and segregation processes (see Table 8.2).

## Conclusion: Urban Development, Environmental Policy, and Social Sustainability

Urban development aims to produce optimal development conditions for inhabitants and the economy. With the increasing global orientation of cities and the accompanying competition for knowledge and service companies, providing a lot of jobs for highly qualified employees, this connection between urban and economic development has been seen more as a geographical challenge. Urban development today is shaped by models like "competitive city," "knowledge city," or "economic city."

With the sustainability debate in recent years, mainly the tradition of ecological urban development could be newly positioned. Through the climate conferences,

**Table 8.2** Social and living structure in Freiburg

| | Freiburg-Rieselfeld | Freiburg overall |
|---|---|---|
| Inhabitants (1.1.2010) | 8,970 | 219,924 |
| Germans | 71 % | 86 % |
| Foreign nationals | 29 % | 14 % |
| Average number of persons per household (December 31, 2008) | 2.7 | 1.9 |
| Average living area per person | 28.5 sq. m | 36.5 sq. m |
| Percentage of households with more than 2 children | 59.1 % | 48.3 % |
| Percentage of all households with children with a single parent | 22.8 % | 22.6 % |

international agreements, and national energy programs, urban development has become a control instrument of urban conversion to low environmental impact.

The extension of the sustainability discourse to include social sustainability opens up opportunities for social policy objectives to become more a part of the current debate on urban development. From the social policy perspective, questions about the social qualities of a city can be raised. Social qualities can be described at three levels: (1) the level of the things that bind people together (the "putty" of social cohesion, like joint participation, solidarity, civic engagement), (2) the level of equipping a city with infrastructure that fosters and stimulates these social interactions (e.g., meeting places for old and young people, people with disabilities, people needing care, etc.; neighborhood coordination and associations), and (3) the level of geographically fair distribution of opportunities and burdens (e.g., through distribution of public space, support of local small businesses). Social qualities become related to ecological urban development based on the thesis that achieving environmental objectives is possible not through technical innovations alone and that the social area in a city can be steered through social policy.

The empirical examples indicate that for the quality of the relationships between socially and ecologically sustainable urban development and between social policy and environmental policy, there are "major steps" of prime importance. It is here that basics are decided on what will form the framework conditions for the further planning process. From a process perspective, these basics are (1) the political process decision that establishes which development projects will be realized at what locations and with which social policy objectives, (2) the urban design competition program that defines the concrete goals of the project and serves as guidelines for the planners, and (3) the legally valid implementation, for example, in the form of the development scheme.

At the present time, it can be ascertained that in comparison with environmental objectives, social policy concerns have a rather hard time of getting through; this is also because an implementation-oriented understanding of social sustainability has not yet been fully formulated. Basically, it is anticipated that "social policy" can be equated with "social" and "social" equated with terms such as "comfort," "well-being," "neighborhood," or "community."

However, the examples presented here also show that in model projects of sustainable urban and housing developments, social policy cornerstones can be pushed through more readily, because the model of sustainable urban development is more conducive to broader discussion of the city′s development and growth than the models of "entrepreneurial city," "competitive city," or "knowledge city" are. In this connection, it will be the future task of those responsible for social policy to contribute more strongly to the discourse on sustainability and sustainable urban development.

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# Chapter 9
# Chinese Model Cities and Cancer Villages: Where Environmental Policy Is Social Policy

**Lee Liu**

Environmental policy tends to be implemented without considering its social impacts despite being directly associated with social issues such as health, poverty, equality, and justice. This has been the case for China. Chinese social–economic policies tended to focus on promoting rapid economic growth with little regard to the environment. When environmental crises became a threat to economic growth and social stability, the government created environmental policies and programs to clean up the pollution in an attempt to defuse the crises. In 1996, the "Developing Environmental Model Cities Program" was created. It has accredited 76 environmental model cities as exemplars of urban environmental protection (Tai 2008). Hundreds of other cities are making efforts to win future accreditation, which specifically requires pollution control, among the economic, social, and ecological standards set by the Ministry of Environmental Protection of China (MEP) (2010).

On the other hand, various forms of Chinese sources have reported a total of 459 cancer villages in 223 counties across China (Liu 2010a). My research indicates that some model cities have cancer villages on, next to, or close to their territories. This finding agrees with my observation during field research in China from 2006 to 2010 that polluting factories relocated from the municipal district of model cities to nearby rural areas and to neighboring cities which were not seeking model city accreditation. Some of these factories have caused severe pollution in their new location.[1]

The Chinese government uses the model cities to showcase its environmental achievements and promote environmental protection. Some officials and scholars believe that environmental conditions in some parts of China have improved along with economic growth. However, it is important to see the environmental and social consequences of the environmental policy: while some places become model cities,

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other places are turned into cancer villages. Sometimes, environmental improvement in the model cities is achieved at the cost of environmental health in other places.

This chapter will first provide an overview of the development of model cities and the occurrence of cancer villages, followed by an examination of the possible relationship between environmental protection and industrial transfer by the model cities and the growth of cancer villages. Finally, the chapter discusses lessons from the Chinese experience for environmental and social policy.

## The Development of Model Cities

China's cities have long been known for their environmental and sustainability problems, especially with air and water pollution (He et al. 2002; Liu 2009a; Gu et al. 2010; Wei and Yang 2010; Watts 2010a). Many of the world's most polluted cities are found in China. On the other hand, the Chinese government has taken steps to control pollution and promote sustainable urban practices. In 2000, the MEP selected 47 key cities for pollution control and required them to conduct quarterly environmental performance evaluations. The number of this kind of cities increased to 113 by 2003. Cities all over the country are currently required to meet certain environmental standards (Li 2009), in addition to the model cities.

Assessment criteria and accreditation procedures for model cities were published in 2002 and have gone through a revision in 2005 and another in 2008 (MEP 2010). Most of the criteria are concerned with environment quality, requiring model cities to have above national average performance in all aspects of environmental protection. However, there are also economic requirements, which are fewer but listed before environmental requirements in the MEP document, indicating a strong economic element in model city accreditation. Model cities have to be more economically developed. Model city assessment before 2005 was done mainly in the City Administrative District while more recently it has been expanded to include the entire city region. In practice, few inspections have been carried out beyond the core areas of the city due to lack of funds. A very important requirement has been the use of environmental protection performance to evaluate governmental officials. Regulations on developing and managing model cities were published in 2006. These regulations require cities to follow a public notification rule. Information on the would-be accredited cities is posted for public feedback on local, provincial, and state government Web sites. However, the feedback period is rather short, only 10 days. The accredited model cities are required to report their progress each year to the Provincial Environmental Protection Bureau and be reviewed every 3 years by the MEP.

Before 2008, model cities used to be required to have above national level average gross domestic product (GDP) growth rate in the previous 3 years and GDP per capita above CNY15,000 (the Municipal District alone for cities in Western China). China's national GDP growth rates were about 10 % a year which was impossible for cities to achieve without following the "grow first and clean up later"

development approach. The GDP requirements may also be the reason that model cities tend to be large cities, provincial capitals, and cities on the eastern coast, where economic growth has been the strongest. The 2008 revision is much improved as it gives more emphasis to environmental criteria and less to economic requirements. However, the economic standards are still difficult to meet and require extra administrative and financial efforts, diverting funds away from environmental protection. Besides, meeting the environmental criteria tends to be dependent on economic growth and financial resources. They emphasize the cleanup aspects rather than controlling pollution from the beginning. As a result, economic growth remains a key factor for the accreditation. Environmental justice or social equality is not considered for model city accreditation. It is questionable how sustainable the model cities are. There are indications that model cities do not meet all the accreditation criteria; however, they do tend to have better environmental conditions than cities that are not model cities (Liu 2009a).

The MEP (2010) has released more optimistic reports recently insisting that it has been effective in pollution control as pollution reduction targets are more likely to be reached in 2010. Some publications have argued that urban air quality has improved in major cities based on the MEP air quality index (AQI) reports, which are based on data from air quality monitors in major cities (Zheng et al. 2010). However, some aspects of environmental quality in some cities or some parts of the city have improved through pollution transfer at the expense of other cities and rural areas. As a result, the overall conditions for the entire city region may have often worsened. Furthermore, city governments are known to play tricks by improving air quality around the installed air quality monitors to boost their air quality index. Many times when I was in Shanghai and Nanjing, the outside air was choking and I had to retreat to my hotel. However, the daily MEP AQI for the cities appeared to be "excellent" or "good." I was probably not at where the air quality monitors were. Other reports maintain that China's urban environmental conditions continue to decline. Jacobs (2010) argues that the world's most prodigious emitter of greenhouse gas continues to suffer the downsides of unbridled economic growth despite a raft of new environmental initiatives. The MEP also admits that total pollutants have increased (MEP 2010). Chinese officials tend to overlook rural pollution and argue that levels of pollution in rural areas are much lower than in urban areas, which is often true. However, rural pollution leads to more deadly results due to poverty and lack of sanitation, medical care, and environmental awareness in rural areas. Rural pollution is a social policy issue beyond the traditional environmental protection policy.

## The Occurrence of Cancer Villages

Cancer villages are communities with greater than expected cancer rates. Most of them are still or used to be farming villages. Industrial pollution is believed to be the main cause. Such villages became known to the Chinese public when in 1998, China Central Television (CCTV) reported on the high incidence of cancer in a

Hebei village along the Hai River which was heavily polluted by industries (CCTV 1998). Cancer rates were 1.3 and 2.1 % for two Tianjin cancer villages along the Hai River and 0.12 % for the entire Tianjin City, while the national average was 0.07 % (News.china.com 2005). More and more cancer villages have been reported across China. For example, air pollution from nearby fertilizer and steel factories was blamed for cancer cases in Longjing Village in Shaanxi. Many cancer-causing metals were found, several times exceeding the safety limit, in the villagers' hair, buildings, fields, and crops (Wang et al. 2001). Only four of the 30 village families had not had a cancer victim, while cancer killed four entire families by 2001 (Wang et al. 2001). Industrial pollution has also been blamed for high cancer rates along the Huai River, the most severe case being Zhouying Township with 21 cancer villages. Factories in the more developed cities in northwest Henan polluted all the water sources so much that water in the river, ponds, and channels in Zhouying was all unusable for human consumption (Wang 2009). In Huangmengying Village, about 80 % of the young were sick all year round and the death rate was higher than the birthrate (Xu and Huo 2004).

Various reports have put the number of cancer villages in China to be over 100, 200, or even 400 (Deng 2009; Sun 2009; Liu 2010a). While some researchers believe that poorer provinces tend to have more cancer villages (Yu and Zhang 2009), others have shown that more developed areas have more cancer villages (Lu and Zhong 2009; Sun 2009). According to recent research (Liu 2010a), cancer villages tend to concentrate in more developed eastern China and population clusters. The concentrations include six coastal provinces with their six neighboring inland provinces. These provinces form a cancer-village belt in eastern China starting with Hebei in the north and ending with Hainan in the south. The belt includes 86.3 % of China's 459 cancer villages, over 55 % of China's population, and over 59.3 % of China's gross domestic product (GDP). However, there is a large income gap within the belt between the wealthy coastal provinces and their poor inland neighbors. For instance, Zhejiang and Jiangsu's per capita GDP is about three times that of their inland neighbor Anhui.

The existence of such large numbers of cancer villages suggests that China's environmental efforts are only partially successful (Liu 2008; 2009b; Zhang et al. 2009). It questions China's environmental policy that focuses on urban areas and developing models while sacrificing rural areas. Eastern China has an intensive concentration of chemical and electronic factories, some next to or within China's wealthiest counties or cities. Social and environmental injustice is intensified by the fact that the rich, some of whom got rich through the polluting factories, live in better environmental conditions, while poor farmers bear the consequences from the pollution.

The cancer villages present a challenge for environmental and social policy. China's development and environmental policies favor urban areas. Environmental programs have been urban centered (Liu 2010a). These efforts focus on environmental "bright" spots and neglect "dark" spots creating a divide in environmental protection (Liu 2009a, b). China's urban–rural disparity is one of the worst in the world and has been increasing (Liu 2009c). Many rural areas are extremely poor. Due to economic, social, and political disparities, the poor rural people continue

their tradition of drinking water directly from natural sources. The villagers have no healthcare and rarely do physical exams, so cancer is usually found at a late stage. They are too poor to pay for treatments, which results in higher death rate. Compared to their urban counterparts, the villagers are more likely to be excluded in the decision-making process when a potentially polluting factory is put in their areas and are powerless against the alliance of corporation and government. As a result, polluters get rich quickly and are not concerned with destroying the local environment (News.china.com 2005). Financial profits generated by polluting factories go to the corporation and government in the urban area, not the villages. Besides, urban environmental protests are more likely to succeed due to better organization, legal support, and media attention.

## Possible Relationship Between Model Cities and Cancer Villages

Having studied both the model cities and cancer villages, I realized that the two were related to each other to a certain degree. As cancer villages are much more numerous and widespread than model cities, many cancer village areas do not have model cities. Where both are present, cancer villages and model cities appear to be spatially related. Geographic information systems (GIS) analyses indicated that 19, or 25%, of the model cities had cancer villages and 12, or 16 %, were next to counties with cancer villages.[2] In Jiangsu, five model cities have cancer villages in their rural areas. Chinese cities seeking pollution control have been relocating polluting factories from municipal district to periphery rural areas of the city, or to a lesser extent, to another city within the province.

The polluting factories are traditional resource-based industries often located by the river and near the mountains such as electroplating, metallurgy, leather manufacture, coal industry, chemical industry, chemical fiber, and papermaking industries. Industrial transformation and upgrading are sometimes too costly to do. Thus, relocation becomes the only way to clean up the urban areas (Tang 2009). Pollution transfer often includes relocation of polluting factories, or the part of the factories or the dated equipment that causes pollution, and polluted materials such as toxic waste and polluted soils that are too costly to treat.

Pollution transfer has been going on in China since early 1980s when the worst polluting industries in Shanghai relocated to southern Jiangsu. Now polluting industries are moving to less developed northern Jiangsu and Wannan area (southern Anhui) (CCTV 2006). While the government insists it is cleaning up pollution far faster than other nations at a similar dirty stage of development, many toxic industries have simply been relocated to impoverished, poorly regulated rural areas (Watts 2010b).

Within the province, polluting industries often relocate from more developed large cities to less developed areas. For example, the worst polluting small-scale industries in major cities in Guangdong Province, such as Guangzhou and Shenzhen, have all been shutdown or relocated to less developed areas in the province (CCTV 2006).

Beijing and Tianjin have relocated their worst polluting industries from the municipal districts to surrounding rural areas (Li 2006; Yang and Chen 2007). Many factories drain their wastewater directly into hidden infiltration wells, and underground water is severely polluted in 64 % of China's cities, and water is considered clean in only 3 % of the cities (Jin and Luo 2010). The worst victims tend to be the rural residents in surrounding villages who use water directly from wells for drinking and cooking. In addition to relocation, model cities have recruited new less polluting industries in pursuit of achieving economic growth while controlling pollution. The following are the cases at the city and provincial levels.

### *Hangzhou*

Located at the southern wing of the Yangtze River Delta, the west end of Hangzhou Bay, the lower reaches of Qiantang River, and the southern end of the Grand Canal (Beijing-Hangzhou), Hangzhou is one of the most important central cities and a hub of transportation in southeast China. It is an international tourist city with beautiful sceneries and is one of China's early model cities. However, industrial pollution was severe in the industrial parts of the city in the 1980s and the early 1990s. Then, Hangzhou started to clean up and developed a chemical industrial park in Hangzhou's rural areas of Nanyang Township in Xiaoshan. Polluting industries were relocated from the municipal district to the industrial park. Several fuel-producing and over 20 chemical factories including Hangzhou General Farm Chemicals settled in the industrial park and caused severe water and air pollution that ruined Xiaoshan which used to be the "land of fish and rice." A 2003 survey indicated that nearly 60 people, 3% of the 1,500 population, died of cancer in the two villages near the industrial park. Cancer rates in the villages were over a dozen times the provincial average of 0.192% (Ma 2005).

Under pressure from frequent local protests and media exposure, the Hangzhou government in 2005 decided to clean up the pollution in Xiaoshan and close down many of the major polluters. While a few factories moved away, some major polluters such as pharmaceuticals, textile dying, coal-fired power, and heating plants remained. As of May 2009, pollution problems were still severe so that the remaining polluters needed to be monitored and managed, according to the Xiaoshan government (2009).

### *Dalian*

As part of the Northeast China Old Industrial Region, Dalian's economy was based on petrochemistry, heavy industries, locomotive making industry, shipbuilding, and chemical works. Polluting factories intermingled with residential and commercial areas. To clean up and improve environmental condition and appearance, the Dalian government took action in 1995 to relocate old industries out of the municipal district

into the economic and technology development zone that was developed out of farmland in the early 1990s. Dalian government completed relocating nine major projects by 2005, including Dalian Machine Tool Plant and the Angang Dalian Steel Rolling Mill. It started relocating another three major enterprises in 2006: Dalian Chemical Works, Steel Mill, and Dalian Cement Works (Dalian Economic and Information Technology Committee 2006). Factories have to relocate to nearby areas because their employees reside in the municipal district near the old factory sites. Factories have to bus them to the new location each day, increasing traffic pollution. Now air pollution is worse in the development zone than in the municipal district.

The Dalian government plans to relocate all major manufacturing enterprises out of the municipal district by 2020 to support urban ecological construction. Municipal district will adopt strict environmental protection measures to avoid pollution and be turned into centers of commerce, finance, information, and tourism. At the same time, heavy polluters will be moved to the development zone and specific industrial parks (Dong 2010). Away from Dalian's municipal district, 12 development zones and industrial parks totaling 422.41 $km^2$ have been set aside to house the relocation as well as many new projects (Dalian Association of Enterprises with Foreign Investment 2010). Most of the new projects are petrochemical and likely to produce significant pollution. One of the new projects is Fujia Dahua's aromatics complex which produces 700,000 tonnes of paraxylene (PX), the largest such project in China. The same project was first proposed for Xiamen, a model city in Fujian in southern China, but was terminated after years of protests by Xiamen residents. Ironically, it settled in Dalian and became operational in 2009 before being noticed by Dalian residents. The city made international news headlines in July 2010 when two oil pipelines exploded releasing an oil spill which polluted its famous beaches and extended into the Yellow Sea. The explosions took place close to the PX project which was about 20 km from downtown Dalian, a city with a population of six million. They caused increased concern for pollution and safety among Dalian residents (Xie 2010). While no cancer villages have been reported in and near Dalian, residents I interviewed in the summers of 2009 and 2010 were very worried about their health and complained about increased cancer rates in the communities near the polluting factories (Liu 2010b).

## Jiangsu Province

Jiangsu has been one of the first provinces to clean up its industrial pollution and develop model cities. China's first model city Zhangjiagang is in southern Jiangsu. Jiangsu currently has 18 model cities, nearly one-quarter of China's total. Accredited in 2004, model city Wuxi provides a typical case of the "southern Jiangsu model" of rapid economic growth and outrageous pollution intermingled with aggressive cleanups (Huang 2007). Developed on the shores of the Tai Lake with beautiful sceneries, Wuxi used to be called "the pearl of the Tai Lake" and was also dubbed "the Little Shanghai" due to its close proximity to Shanghai, fast urbanization and booming economy.

While cleaning up to meet the model city standards, the Wuxi government relocated polluting industries from municipal district to new development areas near the Tai Lake (Wuxi Government 2005), where a few cancer villages have been reported. China Consumer Newspaper first reported the unusually high rates of cancer in Guangfeng Village in 2003. Other media reports followed later making the village one of China's best-known cancer villages. Villagers blamed air and water pollution from Wuxi's largest petrochemical factory for the increased cancer rates. Under increasing political and social pressure, the factory relocated its smokestacks further away from Guangfeng Village but closer to Xiangyang Village. Now Guangfeng villagers are increasingly victims of cancer and have constantly complained to the government to remove the factory. The nearest residents live only 20 m away from the smokestacks. The factory is still in operation and emits pollutants under the disguise of night. The air smells so bad that villagers find it difficult to go to sleep (Xiao 2010).

Worsening water pollution devastated the Tai Lake, China's third-largest freshwater body supplying water to 30 million residents, including about one million in Wuxi. In the hot summer of 2007, algae outbreak made the Tai Lake water so unsafe that drinking-water supplies for hundreds of thousands of people nearby were suspended for several days (Huang 2007).

> Shamed by damage to a renowned beauty spot, the government spent hundreds of millions of dollars on sewage works and other measures. Hundreds of nearby factories were closed in an effort to reduce the effluent that causes algae to grow. The clean-up campaign launched by the government 3 years ago has made little progress; a similar outbreak happened in the summer of 2010. (*The Economist* 2010)

In addition to intracity pollution transfer, there is also intra-province and inter-province transfer. Jiangsu Province began to transfer industries from south to north in 1994; the majority of them were polluting industries such as chemicals, printing and dying, and metal electroplating. Northern Jiangsu's Yancheng City first received polluting factories from the model cities in southern Jiangsu and now is relocating these industries as it is developing a model city itself. For the industries transferred to Yancheng's Funing County from 1990 to 2009, 70 % of them came from southern Jiangsu (Economic Observer 2009).

Governments in less developed areas recruit polluting industries for poverty reduction as a social–economic policy. Consequently, the transferred industries are allowed to operate at lower or nil environmental standards (Economic Observer 2009). For example, Biaoxin Chemical Company in Longgan Township was designed and supposed to recycle all its wastewater when it was built in 2002 at a small scale. The company kept increasing its scale of production without following pollution control procedures. It discharged untreated water directly to the Mangshe River that supplies freshwater for the municipal district of Yancheng. The water became so dangerously contaminated with cancer-causing chemicals that the water supply to the municipal district with over 200,000 residents was completely shut off for 3 days in February 2009 (Wang 2009; Ta Kung Pao 2009).

After the incident, Yancheng government decided to transfer all 30 plus chemical factories from Longgan Township to Funing County 100 km away (Economic Observer 2009). Funing is already one of major clusters of chemical factories in

Yancheng City and home to a couple of China's earliest cancer villages. A farm chemical factory and two chemical industries were relocated from southern Jiangsu to Funing in 2004. Pollution from these three factories was blamed for increased cancer rates in Yangqiao Village where 70% of the deaths were due to cancer in the past 3 years (Long Sheng Water Treatment 2007).

The Yancheng Village of Xingang used to be called a Taohua Yuan (land of peach blossoms), with many rivers, productive rice fields, and lush vegetation. It was a prime getaway and tourist spot in the region. Things changed in 2001 after an industrial park was built on the village's farmland. Toxic gas and water from the chemical factory poisoned the land. Rice yield dropped from 9,750 to 2,250 kg per hectare in 4 years and the rice is toxic. Pigs died in large numbers, making villagers quit pig farming. The village fell into poverty. From 2001 to 2005, 55 villagers developed cancer and 40 of them died of cancer (Nan and Su 2006). The arrival of additional factories will make pollution in Funing even worse.

The cases discussed above indicate a close relationship between model cities and cancer villages and between environmental policy and social policy. The same kind of industrial transfer has happened in all the 16 model cities I visited from 2007 to 2010. All the cases involve using administrative power to relocate polluting industries within the administrative region to improve environmental condition in one part of the region, considered politically more important by the administration, at the expenses of another part, usually rural areas and periphery counties. The social–economic policy to recruit polluting factories for poverty reduction has caused environmental degradation and health problems. Obviously, not all cancer villages are suspected to be caused by industrial transfer from model cities.

## Pollution Transfer: Lessons for Environmental and Social Policy

Pollution transfer has been noted as a serious concern as the intensity of dirty industry is rising in the developing world just as it is falling in the industrialized world (Clapp 2002). A pollution haven occurs when dirty industries from developed nations relocate to developing nations in order to avoid strict environmental standards or developed nations imports of dirty industries expand replacing domestic production (Cave and Blomquist 2008). Pollution transfer in China is mainly caused by growth-centered regional development policies, disparity in local environmental policies, and urban–rural and interregional inequalities. Significant inequality persists between urban and rural residents in terms of income and public services. In the more developed areas, economic growth is usually associated with an increase in environmental demand as well as costs for running the polluting factories. Worsening environmental conditions have caused widespread media attention and have hurt the city's reputation. Both the government and the factories are under increasing pressure to do something to control pollution. The relocation is the combined result of the model cities' environmental policy and poor areas' social–economic policy.

When the government decides to clean up pollution in certain areas, it has to determine which factories are the main polluters, which of them can be relocated, which are able to adopt newer facilities to reduce pollution, and which must be closed down. Relocation here means transfer within the city's territory. The policy applies mainly to state-owned factories. The government will also want to keep private enterprises, and it tends to be very successful. It gives the enterprises discounts for the land they are relocating to and tax breaks so that the enterprises sometimes feel they are better off in the new location. Due to increased land prices, the small piece of land they leave behind is worth more money than the large piece of land they will get in the new location.

The government needs to minimize revenue loss and unemployment caused by the cleanups. Many polluting factories generate significant revenue and employment for the city but are expensive or impossible to upgrade to reduce pollution. The governments of the receiving areas normally unconditionally welcome the new factories; local governments, especially those in debt, often lobby the city government for the relocation eyeing the economic benefit these factories will bring. Lowering environmental standards to attract new industries benefits the investors and government officials but harms the ordinary people.

Recently it has been common to hear government officials claim that they want both the gold and silver mountains (GDP) and clear water and green mountains (environment), in their attempt to show environment-friendly development approaches. On the other hand, some northern Jiangsu County officials openly proclaimed that they would rather die of poison than of poverty, arguing for their recruitment of polluting industries as a policy for poverty reduction. It has to be pointed out that the poor people are usually the ones who get poisoned and still live in poverty, if not in deeper poverty. The officials became wealthy but are less affected by pollution because they do not live near the factories nor consume the polluted water.

## Conclusions

China created environmental policies for urban pollution control to defuse the environmental crises that threaten economic growth and social stability. Model cities have been accredited to encourage better urban pollution control. These cities appear to have made significant progress, though many problems exist because the accreditation criteria are dependent on economic growth and financial resources and emphasize the cleanups rather than pre-pollution prevention. Furthermore, the urban cleanups have caused industrial transfer that degrades the environment in other places, especially in poor rural areas; numerous cancer villages have been related to the pollution transfer. Focusing on creating model cities, China's environmental policy neglects environmental degradation in other places and fails to consider the spatial disparity and injustice it creates. Meanwhile, the social–economic policy in less developed areas adopted to recruit polluting industries for poverty reduction has grave environmental consequences.

Green development programs have good intentions. However, they sometimes result in unintended consequences (Zimmerer 2006a, b; Jiang 2006; Liu 2008). The occurrence of cancer villages may be unintended. I do not blame model cities for adopting strict environmental regulations. However, governmental policies should pay attention to environmental and social justice by avoiding greening one area at the expense of another. Recruiting polluting factories for poverty reduction is a social policy with a grave environmental and social impact. China needs to take an innovative policy approach that combines social policy for justice with environmental policy to ensure sustainable development. This social–environmental policy should include elements that control pollution transfer and encourage adopting the same environmental standards in all parts of the country. The Chinese experience highlights that environmental policy is social policy and vice versa. Sustainability must be examined from a holistic perspective with concerns for many interrelated dimensions of environmental protection, social justice, and economic security.

## Notes

1. It is necessary to note that a city in China is an administrative area at or above the county level. In addition to a large rural area in the periphery, the core area of a city is the Shixia Qu (Municipal District) which includes Cheng Qu (Urban District) and its suburbs. Cities above the county level may include a few counties and county-level cities. For example, Changchun City, Jilin Province, includes the Municipal District, with one Urban District and five suburban districts, and five cities and counties, which are mainly agricultural areas, in the periphery. There are also two kinds of villages in rural China: natural and administrative. An administrative village includes one to a few natural villages depending on the population and location of the natural villages. The reported cancer villages are mainly natural villages with limited number of administrative villages. As a result, there are more than 459 natural cancer villages in China.
2. Only county-level GIS was available for the analysis though it would be ideal to have village level GIS to enhance precise mapping and spatial analyses.

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# Chapter 10
# A Peek Over the Fence: Urban Agriculture as an Instrument of Social and Environmental Policy (A Case Study from Toronto)

**Monika Jäggi**

## "The Farm" in the City: Setting the Stage

Walking through Toronto's residential downtown neighborhoods on a summer evening makes you wonder whether you have just stepped into a small farming town. Passing by front yards, you will come across vegetable gardens with rows of beans, tomatoes, basil growing tall, or heaps of yellow pumpkins. Branches of cherry or apple trees may be hanging over the fence, and vines, full of grapes and ready for vine making, are covering the porches. Peaking through the laneways between the town houses, you will spot even more vegetable gardens and fruit trees in the backyards.

Summer evenings are lively in these neighborhoods. The urban farmers of Toronto are busy working in their gardens. They are watering the plants. They might be harvesting fruits and vegetables, while talking to their next door neighbors who are also tending to their yards. They are most likely also sharing the produce from their gardens with each other. At the intersection just up the road, you will find the local corner store catering to the urban farmers in the neighborhood, selling plants and seedlings. Down the road, you will bump into the big garden center, which carries most everything urban gardeners need, such as organic seeds and soils, pots and supplies, and herbs or leafy greens.

A casual visitor to the city might shrug these activities off as a temporary trend. However, Toronto has long been a leader in the community food security movement, including urban agriculture (Nasr et al. 2010:11). And interest in growing food in an urban setting has been soaring to new heights over the last 10–15 years, with thousands of Torontonians attempting to produce some of their own food or

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buy locally grown produce. A sure sign of the growing interest in locally produced food is the many farmer markets that get set up each day of the week in a different downtown neighborhood to provide fresh produce from local farmers. Organic food sales continue to climb.

Even conventional food producers are going out of their way to market to people, who value locally grown and organic food. In the media, food topics are covered on a regular basis, and food organizations are growing in numbers (Roberts 2010:299). So are the numbers of new books about local food. New studies on food topics are published regularly, and any number of conferences, exhibitions, workshops, or lectures covering food and food-related topics can be attended citywide.

One of the major drivers of urban agriculture in the city is an active and growing food movement. The environmental movement has followed suit. Over the years, the city too has become more and more involved in developing food policies: Toronto has a Food Charter, has adopted a Food Strategy, and identifies local food production as a key action in its climate change mitigation and adaptation strategy. Urban food production is viewed as an integral part of all these strategic developments (Nasr et al. 2010:10). Today, Toronto is generally recognized as the city with the best food planning and urban agriculture governance system in North America (Flint Urban Agriculture Legal Framework 2009:7).

However, looking at Toronto from an outside perspective, thoughts of the urban farm could not be further away from one's mind: Toronto is a city with congested freeways and a place, where smog days and heat alerts have become a regular occurrence in summer and a huge environmental concern for the population (Field 2010:2). It is a city with a rapidly growing population. Approximately 150,000 new immigrants come to live in Toronto every year. The City Official Plan calls for "intensification" within the city and for hundreds of thousands of new apartments to house the newcomers. This is to be achieved by building denser neighborhoods on vacant or "underutilized" land through infill housing and brownfield development (Tyndorf 2002). This development may impede attempts to designate land for urban agriculture, which begs the question: Is there space left for growing food in the city and where? Or will public land be built over by real estate developers and speculators?

This type of conflict highlights the important role the city plays in balancing the requirement to build a denser inner city against the need to keep urban spaces open for future food production and for food security reasons. Balancing these requirements is particularly important for Toronto. The city is surrounded by a shrinking agricultural land base, where most family farmers experience a difficult time making a living from their farms, even though they live on fertile land and next to a prime market (Field 2010:2).

One wonders: Is Toronto on the verge of becoming a food-deprived city? Yet, Toronto is a thriving metropolis with abundant food choices, from restaurants to supermarkets, to small food stores and cafés. The city appears to have all it takes to be food secure. What provoked the city to develop an urban agriculture strategy and to rethink its food system?

While not listing every recent food initiative in the city, this chapter considers more closely the history of food in Toronto, the role of government, and the rising food movement in Toronto.

By also examining the environmental concerns and problems facing the growing metropolitan city, this chapter evaluates the expansion of social food policies into environmental issues of today and provides the context for suggesting how government and both the social and environmental movements need to work together and find ways to implement urban agriculture strategies in the city.

## Food for Survival: Food Banks

Food issues are not new to the city. As recently as during the 1980s and 1990s, the problem of hunger was closely tied to the immigrant community and to the deepening poverty of Toronto's low-income citizens. How did food rise from low charity profile to priority issue and eventually become institutionalized?

Toronto is known as the city of immigrants and is often described as one of the most ethnically diverse cities in North America. Immigrants from Italy, Portugal, and Greece and from South Asia and China came to Canada after the World War II. They settled in the downtown area in what are today Toronto's most trendy neighborhoods (Little Italy, Seaton Village, Little Portugal). The immigrant families not only brought their labor, language, and culture along but also plant seeds from their country of origin. Over the years, they turned their front and backyards into small urban farms, starting a new gardening trend[1] in Toronto and providing much needed economic support to their families.

However, the newcomers to the city were also often more vulnerable to poverty, unemployment, underemployment, and social isolation than long-established residents. These factors contributed to poverty among immigrants and to a decline in their health over time (Toronto Public Health 2010b:3, May). In order to fight a looming food crisis and health problems, food banks were established in Toronto during the early 1980s.

To prevent dependency on food charity from becoming a permanent institution in Toronto, the city founded (and funded) FoodShare in 1985. Its mandate was to coordinate emergency food services and to collect and distribute food for people in need (Flint Urban Agriculture Legal Framework 2009:7).

By the end of the 1980s, it became clear that the food problems were not just temporary, and despite the city's efforts, they were accelerated during the 1990s:

[1] In contrast to a fairly steady existence in Europe, urban community gardens have seen waves of popularity in North America, most often corresponding to times of war and recession like the Victory Gardens in Toronto during World War II or the Veterans Gardens after World War II (Palassio and Wilcox 2009:292).

Income inequalities and unemployment were increasing. Due to the loss of jobs in manufacturing, construction, and service sectors since the introduction of the North American Free Trade Agreement (NAFTA), Toronto faced serious economic challenges (Cosgrove 1998:11). Other reasons contributed to poverty such as low salaries and minimum of social benefits (Rosol and Weiss 2005:5). Rising rents during the 1990s meant that people with a low income were forced to spend their earnings almost exclusively for paying their rent.

## Food for Health: A Municipal Priority

Food banks appeared to be here to stay. In a second attempt to solve dependency on food charity, and in the absence of federal and provincial leadership on food security, the public health department, the Toronto Board of Health (TBH), created the Toronto Food Policy Council (TFPC) in 1991[2] (Cuthbert 2009:55). The TFPC has an advisory role to the government. It was instructed to specifically investigate the potential of urban food production as a tool to secure future food supply and to develop food-related projects.

Over time, the TFPC developed comprehensive reports on how government can contribute to food security, including a report on community gardens in 1995 and a report in 1999 showing how Toronto could produce 25 % of its fruits and vegetables by 2025. But in its beginnings, the TFPC started out with smaller food initiatives. Particularly community gardens[3] were seen as a community development tool leading to urban awareness of the food system (Cosgrove 1998:14). As interest in community gardens increased, the Toronto Community Garden Network (TCGN) was established. It was at the suggestion of the TCGN that Toronto's City Council adopted the Community Garden Action Plan, which called for the creation of a community garden in a park in every ward (Toronto Community Garden Network 2010).

What started out as a small initiative over 10 years ago turned into a mainstream urban agriculture practice, which today is officially entrenched in the city's policies. The city acknowledged that community gardens are, essentially, participatory landscapes, places where people shape the shared resource of public land (Johnson 2010:135, 147). The TCGN advocates on behalf of community gardeners throughout

[2]The TFPC was created through the World Health Organization's healthy cities program. The program supports communities around the world in search of means to make food supplies secure, especially for low-income and at-risk citizens.

The TFPC operates under the jurisdiction of the Toronto Board of Health (TBH) (Cuthbert 2009:55).

[3]A community garden is defined as a space on private or public lands, where people who live in the community nearby meet to grow and care for vegetables, flowers, and native plant species. They can either have individual plots or communal growing areas (Toronto Community Garden Network 2009).

Toronto and specifically works with the city's parks, forestry, and recreation division to ensure the accessibility for gardening in city parks.

One of the looming problems identified back in the late 1990s was the lack of a clear city policy on food or hunger. Supporting low-income families through food initiatives proved not enough. Across Toronto, about 400 community groups and organizations run approximately 1,400 initiatives. They provided a wide range of food-related services and supports. Many of these programs had been in existence for 10–15 years and by 2000 had become permanent fixtures in Toronto. There was little consistency among programs and no overall coordination.

Moreover, many programs depended heavily on donations and volunteer labor. Toronto depended on charitable organizations to provide food to people living in poverty. Because so many people relied on them as sources of food, the organizations acted as an unofficial, nongovernmental "top-up" to social assistance benefits or minimum-wage incomes (City of Toronto 2000:36).

Also rising obesity and diabetes levels became a concern and increased interest in healthy eating and in fresh food. Clearly, it was time to reexamine the city's dependence on food charity and to develop a new food policy that involved more than establishing food banks and community gardens for poor families (City of Toronto 2000:38).

## A Food Charter for Toronto

The timing for a new take on food policy was right, since Toronto in 1997 had just become an amalgamated city – the old downtown merged with the suburbs – and the new city had no unified policy of its own yet. The Food and Hunger Action Committee (FAHAC) was formed in 1999 to study food security in Toronto and to present a policy to reduce hunger and improve the nutritional health of Torontonians.

The starting point for developing a new food policy was the Toronto Food Charter, which was written by the FAHAC and the TFPC in 2001 (Toronto Public Health 2010b:9, Appendix 1). The charter outlined food rights and a food vision for the city for the next 20 years. It codified the city's commitment to food security and was staking a claim for food policy as an area of municipal jurisdiction (Roberts 2010:197) Toronto City Council adopted the charter unanimously in 2001 and voted to become a food-secure city; food secure in the sense that everyone in the city has access to healthy, fresh, and affordable food (City of Toronto 2001).

Although the charter had no legal significance, it provided the terms of reference for the TFPC's future work. The charter recognized that "food security is not just a set of problems. It creates opportunities" and cites several reasons "why investments in food security are among the smartest ethical investments a city can make" recognizing, for example, that food security means more local jobs, is environmentally friendly, saves on medical care, reduces traffic pollution, is neighborly, and is good business. For the first time, it was reasonable to think that the city supported

sustainability, in particular it recognized that food production has social and environmental implications and retains economic benefits. What provoked this new perspective that producing food in the city was part of the solution to making the city and its environment more sustainable?

## Environmental Reasons for Rethinking the Food System

In fact, by 2001 the interdependence between city and agriculture was becoming obvious. There was concern in the city – raised by a growing food movement – that the current food system was not working well: First, Ontario's reliance on imported food kept growing. In 2005 Ontario imported $4 billion more in food than it exported (Metcalf Foundation 2008:10). If the transport of foods was suddenly brought to a standstill, according to estimates by retailers, the fresh food supply would be eaten up in 3 days. It is a food system, which is very much depending on open borders and is based on a philosophy of just-in-time delivery (Cuthbert 2009:54). Secondly, decisions affecting the food system in the city were increasingly made by absentee business owners owing to the sellout of Ontario's agricultural lands and to the globalization of the food system. Thirdly, the food production and distribution system was not sustainable.

In 2008, approximately 8 % of Canada's population or 2.65 million people live within the Greater Toronto Area (GTA); approximately 6 million people live in the surrounding GTA: They make up 30 % of all recent immigrants and 20 % of all immigrants in Canada (City of Toronto 1998–2013). The GTA is one of largest and fastest growing urban areas in Canada and the fastest growing region in the province. Within the GTA, Toronto's population is projected to rise to 3.27 million in 2036. Outside the GTA the population is projected to increase from 6.1 million in 2009 to 9.1 million in 2036 (Ministry of Finance Spring 2010:14).

By 2021, approximately 600,000 acres or 35 % of the GTA's 1.7 million acres will be urbanized (Natural Resources Canada 2010). Much of the land being converted to suburbs is prime agricultural land. Between 2001 and 2006, the number of farms in the GTA dropped by 7 % (Toronto Public Health 2010b:4, May). One of the biggest challenges for agriculture in the past was the difficulty of protecting the land from suburban sprawl. Several reasons accounted for this (and some still do today): Most farmers opposed farmland protection because it upsets their hope to cash out of farming by selling their farms to real estate developers. In Toronto, the development and building industry is the main driver of urban growth, both politically and economically. And until very recently, no control mechanism was stopping the developers from buying up farmland, paving it over, and turning it into "suburbia." As a result, the city has been spreading out and growing out of control. In addition, and due to the lack of control, thousands of acres of farmland are now owned by a limited number of developers in the expectation that urban areas will eventually expand to allow them to be developed (Metcalf Foundation 2008:18).

The concentration of farm ownership in the Greater Toronto Area and the dominance of agro- businesses in Southern Ontario contributed to worries about the long-term effects of monocultures. The unease about the loss of biodiversity was growing in the population as is the unease over the harmful effects of pesticides and fertilizers on soil and groundwater. The need to reduce their use and find alternative methods to sustain productivity and protect food crops from pests and disease was growing. These concerns led to the demand for pesticide- free or "organically grown" food (which may or may not be grown locally) (Metcalf Foundation 2008:10).

Another factor, which contributed to the unease about the current food system, was the growing awareness about the connection between energy use and climate change (Toronto Public Health 2010b:4, May). Cheap food was increasingly being transported from far- flung locations in order to get to the markets in Toronto. Between 50 % and 60 % of all produce consumed in the city is imported, mostly from Florida, California, and Mexico. This is happening in a province that boasts of more than 50 % of Canada's best agricultural land (Johnson 2010:44). The current food system is highly energy inefficient and is a major contributor to greenhouse gas accumulation. Long-distance transportation of food by air or truck adds to these emissions and to climate change.

The growing awareness by city folks of the loss of control over food production methods and about food dependency has generated an unprecedented level of interest in environmentally and socially friendly produced local food. The topic may have reached what Malcolm Gladwell in 2000 calls "the tipping point," to describe what appears to be the sudden transition that occurs when a cluster of small-scale events evolves into a widespread social trend (Metcalf Foundation 2008:13). Today, Toronto food practice is no longer just about food charity. The topic has expanded to include the topic of food security. Food practice has turned into a social policy issue and has expanded to include environmental concerns. From this perspective urban agriculture-related social policy entails and can also be thought of as environmental policy and vice versa.

## When Social Activism and Environmental Concerns Merge: Partnerships

What started out as a social food and charity issue in the 1980s turned into something much broader in the 1990s and during 2000: the merging of social activism with environmental concerns. A good example for how this synergy worked out is the Greenbelt Act: Due the uncontrollable loss of farmland around the GTA, the Toronto Food Policy Council (TFPC) urged the Ontario government to provide some planning to the region and to protect the fertile farm belt around Toronto from suburban and box store expansion with a protective Greenbelt.

At the time, the one group as far away as any from understanding local food issues was the environmentalists. They saw a Greenbelt as a way to save threatened flora and fauna, not endangered farms and agricultural lands (Roberts 2010:193).

It was the food activists, namely, the TFPC, who started the ball rolling by introducing environmentalists to the food issue through the Greenbelt initiative. In a major effort, both sides lobbied the provincial government for what became the Greenbelt Act in 2005. The province of Ontario declared a large territory (1.8 million acres or 728,000 ha) in Southern Ontario as Greenbelt and off limits to property developers. The Greenbelt wraps around the Golden Horseshoe encompasses the Niagara Escarpment, the Oak Ridges Moraine, Rouge Park, agricultural land, pristine environment, and hundreds of rural towns and villages. The Places to Grow Act, also introduced in 2005, will guide the development on either side of the Greenbelt. It serves as land use and transportation plan and encourages intensification in urban centers (Boudreau et al. 2009:99).

This newly formed partnership between social and environmental activists came in handy when the time was ripe to bring urban agriculture to town. Not only were social and environmental activists working together on this issue but government and nonprofit organizations also started to collaborate. Particularly, the TFPC was instrumental in forming these new partnerships by coordinating and releasing new strategies and initiatives to support the growing of food in the city (Roberts 2010:178).[4]

## City Food Initiatives

One such initiative by the TFPC is the Buy-Local-Food Policy of 2008. Its aim was to support the relationship between consumers in the city and local area food producers. The local purchasing policy grew out of the Climate Change Clean Air and Sustainable Energy Action Plan (2007), a strategy developed by the city of Toronto to reduce the emissions that contribute to climate change (Biggs 2008/2009:38, City of Toronto 2007). The idea behind the Buy-Local-Food policy is that once an institution commits to buying locally produced food, everyone who gets food from that institution is automatically a consumer of local products. The policy is also intended as an economic incentive for local farmers to keep working their land in the Greenbelt. The policy was endorsed by the city and in 2010 led to the Toronto Food Strategy, the latest food-related initiative in Toronto (City of Toronto 2010).

Going hand in hand with the Toronto Food Strategy is a new certification scheme, which was introduced by government: Local Food Plus (LFP) is a nonprofit organization that certifies local sustainable food producers. To obtain certification eligible farmers must commit to reduce or eliminate pesticide use, treat their animals well,

[4]Wayne Roberts, the outgoing manager of the TFPC, predicts that the TFPC will become the fastest growing, institutional innovation in food governance over the next 25 years and will become as common-placeas the city departments of public health or of recreation (Roberts 2010: 173).

conserve soil and water, protect wildlife habitat, provide safe and fair working conditions, reduce energy use, and sell produce locally wherever possible. The certification scheme assures a local sustainable supply of food to the city and helps farmers connect with consumers as well as businesses and public sector organizations. The University of Toronto was the first client to implement this new certification scheme through a contract with LFP and to buy products from certified farmers (Biggs 2008/2009:38). So far, this is the largest contract for local and sustainable food in North America (Roberts 2010:182).

This connection symbolizes a new partnership between consumers and producers and is the central idea behind the Toronto Food Strategy – to establish Toronto as a "Sustainable Food Center" in North America by strengthening the connection between Ontario's cities and towns and their surrounding food-producing farmers. The idea is to attract a new and younger generation of farmers back to the land and encourage them to produce organic food, which they can sell in the city (Parsons 2010). This will help reduce Toronto's dependence on food imports.

## Grassroots Organizations Moving On

Even though many initiatives and programs facilitate the implementation of urban agriculture in the city, it is the grassroots organizations and urban farmers alike that carry the effort of advancing urban agriculture on the ground and in people's minds.

A highly successful example is Not Far From the Tree, a nonprofit organization launched in 2008. Its goal is to tap into the many unused fruit trees in the city, which grow in private gardens. The organization helps homeowners unburden their fruit trees by harvesting the untapped residential crop. One-third of the picked fruit goes to the homeowner, one-third to the volunteers, and one-third to local community groups who help feed the city's homeless and disadvantaged (Charlton 2009:45–46).

Picking fruits in community orchard is the latest effort to take the cause of fruit trees in the city to public spaces. A local neighborhood and community group called Growing for Green has initiated the first community orchard in a downtown public park (Johnson 2010:136).

Field to Table is an organization in charge of buying fresh fruits and vegetables directly from farmers and from the Ontario Food Terminal. Volunteers pack the produce and distribute the "good food boxes" to daycares, apartment buildings, or churches. Field to Table is also initiating farmers' markets in Toronto's neighborhoods.

Individual communities such as co-op housing communities or a neighborhood community can initiate urban agriculture projects through the Live Green program, which also emerged out of the Climate Change, Clean Air, and Sustainable Energy Action Plan. Live Green is a 5-year program designed to work with community members and volunteers to initiate emissions reduction activities and provides many

resources such as grants for community- based green projects. These projects can be green roofs, installing solar panels or initiating community food gardens (City of Toronto 2007:3).

With city hall's approval, community gardens, community orchards, farmers' markets, and even bread and pizza ovens are springing up in parks and public spaces, and homeowners are busy creating their own little farm in their back and front yards (Hood 2009:21). With all these activities going on in the city and with the growing interest in urban agriculture, urban farmers are also detecting an economic niche market – green jobs.

## Green Jobs Through Urban Agriculture

An example is the recently created Toronto Urban Growers, an alliance of individuals whose mission is to bring together the extensive but dispersed actors in Toronto's urban agriculture movement (Nasr et al. 2010:10). The group aims to shape policy, develop plans, share ideas about growing plants and vegetables within the city, and as such advance the cause of urban agriculture, creating more economic opportunities in the local food sector.

Food is already an essential part of Toronto's local economy. The sector is the city's number one service and industrial employer. One in eight people in the city works in the food sector, which includes restaurants, food stores, and large food manufacturing plants (Field 2010:2). Toronto is the fourth biggest metropolitan area in North America and considered "the market" for farmers (Roberts 2010:182). The city is served through the Ontario Food Terminal, which is located in Toronto.

The facility represents Canada's largest wholesale fruit and produce terminal, providing mainly imported fruits and vegetables from all over the world and serving all provinces and some of the Northern States in the United States. Because the terminal facilitates the long-distance food trade, it is often criticized as an obstacle to local food in Toronto. However, others suggest that the terminal could also play an important role in the local food system because it also provides a market for the region's family farms (Elton 2010:144). As such it strengthens the local food economy by creating new food-related jobs.

## Innovative Spatial Solutions

This book chapter has analyzed some of the factors that led to the emergence of the food movement and to the merging of social food activism with environmental concerns. It has looked at some of the new targets, policies, and initiatives that were developed to support the growing of local food in the city and to keep agricultural land surrounding the city open for production.

In the city, one of the remaining problems is the lack of accessible land. The city surface is 63,175 ha with 75 % of that surface being developed (MacRae 2010:2). What will happen to the remaining 25 % is currently being figured out by city groups. Recommendations are being brought forward on how to accommodate urban agriculture and the need for land in the city. There is potential in farming zones, in parks, as well as in community gardens. However, due to the buildup of the city, other solutions and new spaces for growing food in the city had and have to be found. Such spaces can be found on rooftops, which are great for growing food and a substitute for the lack of growing space on the ground.

The TFPC was promoting green roofs already 15 years ago, when urban farmers identified rooftops as the perfect space for growing food atop roughly one-sixth of the landmass in a busy and dense city. Green roofs were profiled positively in a number of important city reports, including the Toronto Environmental Plan of 2000, the Food and Hunger Action Plan of 2001, and the Official Plan of 2002. The Toronto Planning Department recommended a test program for green roofs. Since Toronto is increasingly prone to smog days during hot summer months, the rising temperatures and their effect on the health of the population were not lost on city council. In 2009, the council voted for mandating green rooftops for new Toronto high-rises (Roberts 2010:185, 186). The next step will be to legalize rooftop edibles productions to make rooftops truly accessible spaces for food production.

More recently, previously unlikely places for food production were found by turning neglected spaces into productive landscapes. One example is the Don Valley Brick Works, a collection of once deteriorating heritage buildings situated in the lush Don Valley in downtown Toronto. The nonprofit organization Evergreen has renovated buildings and transformed them into the "Center for Urban Sustainability" at Evergreen Brick Works (Toronto Public Health 2010b:15, May).

A second example of how a neglected public space was turned into a vibrant and multifaceted community center is the Artscape Wychwood Barns, which used to be the former Toronto Transit Commission (TTC) Barns. Through a collaboration among nonprofit food and arts organizations, the city of Toronto, and many community and government stakeholders, and the Wychwood Barns were renovated. They now offer public green space, a greenhouse, a farmers' market, and office space for many community groups. This kind of food project made full use of partnerships among different levels of government with citizens and community groups. Both projects are promoted as Centers of Innovation for Toronto (Parsons 2010).

Another very unlikely place for growing food in Toronto is Downsview Park. What used to be a military base has been turned into Canada's largest urban national park and today hosts FoodCycles, a nonprofit group in Toronto. FoodCycles is also the name of the newly established urban farm and food learning center based in the Park that was built on reclaimed lands. The group raises worms, produces soil compost, and grows vegetables, fruit, and eventually fish and honey on an acre of land outdoors, indoors, and upwards. It is FoodCycles' goal to create a just and ecological city food system. FoodCycles is supported by the city of Toronto's Live Green Community Program, the Toronto Food Policy Council, and Toronto-based nonprofit food organization, among them Evergreen, FoodShare, and others (Johnson 2010:116).

As these examples show, finding solutions for growing food in the city has the potential to create innovative spatial solutions. This not only has food activists and environmentalists working together; implementing urban agriculture in the city also has an impact on urban design and includes urban planners, architects, and landscape architects.

## From Community Gardens to Urban Farms: What Has Been Achieved?

Growing food in urban centers, be it for subsistence, profit, or fun, is an idea whose time has come. Public awareness is at an all-time high. Torontonians – the public and the government – increasingly understand that food is as much about social and community interaction as it is about poverty, hunger, and health issues. Food is also about population growth, urban planning, and suburban sprawl covering fertile land and about food control and food security. Moreover, it is also about climate change and air pollution. Today, these factors top the list of social and environmental issues. They have become a primary concern for urban social and environmental policy making in Toronto with clear implications for future food production in and outside of the city.

Awareness by government about these issues and access to government are improving. As a result, urban agriculture is now officially on the agenda of the city of Toronto, having farmers, producers, slow food people, as well as government agencies and nonprofits all working together. Toronto seems to have successfully moved the discourse about food from grassroots movement to food stores, businesses, and government. Government is still behind the food stores in responsiveness but with its food strategy is catching up (Roberts 2009:298–299). Toronto has installed a Food Policy Council, which has been instrumental in creating awareness for food issues at government level. Today, the Toronto Food Policy Council is the most important food advocate inside the government and also the best financed food council in the world (Roberts 2010:174).

And apart from achieving social and environmental benefits, local food has also entered the purview of economic development; research reports are starting to identify the connections between food, health, the environment, and income. Also the impact of food on urban design and planning is visible: Urban agriculture has slowly but steadily had a positive impact on the environment and the socioeconomic structures of Toronto's downtown neighborhoods, where urban farms, private vegetable gardens, rooftop herb gardens, and community gardens have become a familiar sight. Over 200 community gardens are found in Toronto's parks, on rooftops, in senior citizens' residences, on school board properties, around churches, and more.

Furthermore, grassroots organizations are dedicated to supporting new ways of producing food in the city for everyone. For example, FoodShare, the long-established and still-needed charity organization, has changed its approach to charity food distribution according to the new mood in the city. Through its Urban

Agriculture program, FoodShare runs many projects to increase access to fresh and healthy food for people in need. Today, the organization is helping community groups and individuals to start and sustain community gardens and seeks to educate groups and individuals on the aspects of community garden implementation. FoodShare is now the largest city-based food security organization in North America (Roberts 2009:295). Food banks are also moving away from the provision of packaged food and more towards programs that combine urban agriculture, local economic development, and skills training.

One of the remarkable achievements is the fact that it is neither the government nor the private sector driving the movement; it is a community-driven bottom-up effort, which is non profit oriented and involving lots of partnerships with government and the private sector.

## What Still Needs to Be Done: Future Challenges

What are the future challenges for the city? The restructuring of the food system is underway and so are a multitude of efforts to create and advance urban agriculture and to identify existing barriers for growing food in an urban setting.

At the core of the problem is an outdated food system designed for the export market that is not producing local food for local markets (Metcalf Food Solutions Reports 2010:1). Instead, farmers and processors have become suppliers to global food chains, rather than local communities. Farmers are in a financial crisis, family farms are still going out of business, and agricultural land in Southern Ontario is still disappearing despite the Green Belt Act. According to critics – monitoring the enforcement of any such legislation has increasingly become an important element of NGO strategies – the province does not exercise enough control, and both Acts, intended to curb sprawl, are not enforced strictly enough (Tomalty 2005:13).

And one of the main problems still remains unsolved: More immigrants are predicted to come to settle in the GTA; where will they all be housed? In an already densely build-up city that calls for intensification, what will happen to the public lands? Given these challenges and given that the interest in food security in general and growing and supplying food within the city in particular is increasing, where and how will future urban design and planning accommodate these challenges?

The Toronto Official Plan, to be reviewed by 2012, offers the opportunity to accommodate this conflicting situation. The current Official Plan already includes reference to urban agriculture such as guidelines for creating food-friendly neighborhoods and reaching out to family farmers, but more is needed such as references to urban agriculture as land use[5] (Nasr et al. 2010:16), for example, a provision for

[5]In the 2002 Official Plan, references to urban agriculture as a land use, community service, or natural feature were totally missing (Wekerle 2002:1). The 2007 version includes these references.

green roofs to be legally turned into as spaces for urban agriculture production and a permission such as a license for urban farmers to sell their city-grown products at downtown farmers' markets.

Toronto still has too many food programs and initiatives, and food bank use is increasing. Toronto food banks serve about 60,000 people every month. At least one household in ten cannot afford regular meals and a healthy diet. Diabetes is on the rise. The rates are much higher among recent immigrants. And alongside hunger, approximately one in three children is either overweight or obese. The city estimates that 20 % of the CAN $17 billion spent annually on health care in Ontario could be traced to diet-related health problems. Health is declining due to a lack of access to nutritional food. To fight this trend, Toronto Public Health recommends for the city to make food system innovations an intentional part of all that the city does. This means that all city divisions, agencies, board, and commissions identify and implement opportunities to embed food system initiatives in city policies and programs.

The future challenge to Toronto will be to support a food system, which reconciles population growth, inner city intensification, local farm viability, land use, and urban and landscape planning, architectural design, and more.

## Summary

Toronto has long been a global leader in the community food security movement. Urban agriculture is a component of that larger food security movement. During the 1980s and 1990s, the problem of hunger was closely tied to the production and distribution of healthy food to low-income citizens and to their deepening poverty. However, growing social concerns over the production and distribution of food and newer environmental concerns such as climate change and population growth have broadened the discussion and the practice of urban food production: The GTA is experiencing extensive urban sprawl, which is threatening the preservation of agricultural land and future food production.

Together, these long-standing social concerns and newer environmental concerns are creating the impetus to change the existing food system. Efforts to rebuild the local food supply chain and restructure the Greater Toronto Area's food and agriculture system have been gaining momentum in the last few years and are now underway.

Today, the city is one of the most advanced cities in the world in terms of supporting and implementing urban agriculture-related policies. Toronto is the first city in North America to have established a Food Policy Council (since 1991) and the first city to have a Food Charter (since 2001). The city identifies local food production as a key action in its climate change mitigation and adaptation strategy. Toronto is one of the first cities in Canada to fund community food projects. In 2010 the city adopted an associated Food Strategy. Urban agriculture is viewed as an integral part of all these strategic developments, yet the potential for urban agriculture has not yet been fully realized.

**What About Urban Agriculture?**

Urban agriculture is often considered conservative: either backwards or a subsistence activity, something antiprogress. To the contrary, today urban agriculture has become part of a vision for the cities of the future. Urban agriculture is an innovative response to the problems within the food system and takes advantage of the metropolitan environments to provide a range of solutions in order to meet the food demands of the metropolitan population.

Urban agriculture, broadly defined as cultivation of plants, herbs, fruit trees, and the raising of animals in cities to support the household economy, is widespread in rapidly growing cities of the Third World, where the population has to be fed and housed with limited resources. It is argued that the poor and unemployed can gainfully be engaged in urban agricultural activities. It is also proposed that Western cities can be made more ecological – greened – if they become centers of food production, especially if the grey and brownfield areas are turned into land for growing food. By the same token, it can be argued that by greening the city, more factors can be employed such as creating green habitats in the city, supporting biodiversity, and at the same time, reducing greenhouse gases.

More and more international organizations, local and national governments, NGOs, universities, and social and environmental movements have recognized urban agriculture and have begun promoting it as an integral part of urban management.

Through these initiatives, Toronto aims to establish the city as a center for local food production, while simultaneously tackling environmental issues such as sprawl and climate change, social problems like poverty, and food-related health issues. Moreover, Toronto seeks to create economic business opportunities and use urban planning as a tool for creating a food-friendly city with walkable neighborhoods and access to fresh produce. The revision of the 2012 Official Plan offers an opportunity to fully integrate urban food production into urban planning through including of an urban agricultural and zoning designation, allowing for the possibility of permanent protection for food-growing spaces.

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# Chapter 11
# When Environmental and Social Policy Converge: The Case of Boston's Fairmount Line

**Jeremy R. Levine**

## Introduction

In February of 2010, the US Environmental Protection Agency (EPA) announced the creation of the federal Office of Sustainable Communities, the formal embodiment of an interagency partnership between the EPA, Department of Housing and Urban Development (HUD), and Department of Transportation (DOT). The goal of the newly commissioned office—as well as the partnership more generally—is to coordinate affordable housing development, access to transportation, and energy efficiency policies under one unified, integrated effort. The partnership is unprecedented. Never before have social and environmental policies been more closely intertwined at the federal level.

In their February announcement, the EPA selected five initial pilot programs to serve as exemplars of this new federal vision of sustainable urban policy. One of the pilots, the expansion of the Fairmount commuter rail in Boston, proposes housing and brownfield development in conjunction with the construction of four new stations along the line.

The Fairmount line—the only commuter rail line completely enclosed within the city of Boston—stretches for 9.2 miles between downtown Boston and the city's southernmost tip. The line directly bisects two of Boston's poorest inner-city neighborhood districts, Dorchester and Mattapan, but includes just three stops. Before the announcement of new stations, these neighborhood districts relied exclusively on private automobiles and public buses to serve their transit needs. Newfound support from the Office of Sustainable Communities aids 12 Boston nonprofit organizations currently coordinating affordable housing, greenway, and economic development projects in line with the new commuter rail

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stations. The result is federal support for transit-oriented development in two of Boston's historically disadvantaged neighborhood areas.

Yet the EPA's announcement comes after a decade of local struggle for improvements along the Fairmount Corridor. Indeed, the federal government's interagency partnership mirrors a similar inter*organizational* partnership between the 12 nonprofits coordinating efforts along the Fairmount Corridor. Like the federal Office of Sustainable Communities, so too is this partnership unprecedented. The 12 groups span disparate missions, priorities, and goals yet have coalesced around advocacy for a single transit expansion. They formalized their partnership with Memorandums of Understanding (MOUs) and hold frequent planning sessions. These organizations—including environmental activists, youth advocates, and community developers—have each found a seat at the figurative table of sustainable policy in Boston.

Their victory involved relentless political organizing but also a little bit of luck. The campaign for new stations on the Fairmount line began in 1999, and in response, policymakers from the Massachusetts Bay Transportation Authority (MBTA) launched two reports assessing the community need for increased transportation access. Both reports concluded in the affirmative, recommending the construction of four new stations along the line. Yet the Commonwealth of Massachusetts failed to secure funds for the project based on the recommendations of the reports alone.

In 2005, an unrelated lawsuit filed by the Conservation Law Foundation—New England's premiere environmental law firm—sued the Commonwealth for failure to comply with the US Clean Air Act. A previous agreement of public transit investments was reevaluated, and serendipitously, the Fairmount expansion was substituted into the Commonwealth's State Implementation Plan for compliance with the Clean Air Act. The new stations were no longer seen solely as a social need but also as an environmental imperative. In 2007, the Commonwealth allocated over $100 million for improvements, and in April of 2010, construction began on the first of four new stations.

In this chapter, I detail the case of the Fairmount line in Boston. I begin with a discussion of the process of collaboration between grassroots social policy and environmental policy advocates. But the Fairmount case also involved a political evolution from above: Local and regional policymakers reimagined the initial social policy as an environmental policy, ultimately interpreting the transit expansion as both socially and environmentally beneficial. Sustainable policy development requires integrated partnerships, and I conclude with lessons for policymakers and practitioners alike.

## Background

From 1856 to 1944, the present day Fairmount commuter rail line carried passenger and freight service under a variety of owners and official names. In 1944, with the rise of private automobile use and associated decrease in public transit patronage, the state ended passenger service on the line.

Until the late 1960s, interstate highway expansion flourished nationwide, often at the expense of public transportation investment (Altshuler and Luberoff 2003). In Boston, public approval of highways waned significantly, and in 1968 a group of

local activists formed the Greater Boston Committee on the Transportation Crisis (hereafter GBC) to oppose urban highway expansion. This "grand coalition" included 20 individual groups representing Boston neighborhoods, northern suburbs, and national environmental advocacy groups (Gakenheimer 1976; 88). The group was principally concerned with the proposed "Southwest Expressway," an 8-lane highway slated to bisect three residential neighborhoods in Boston. The anti-highway coalition formed, in part, out of fear of resident displacement.

With pressure from the GBC mounting, Massachusetts Governor Francis Sargent assembled a task force to reevaluate the state's highway plans. Named the Boston Transportation Planning Review (BTPR), the task force offered a sharp critique of highway expansion in a 1969 interim report, prompting Governor Sargent's famous 1970 moratorium on all urban highway construction. After 4 years of analysis, the BTPR released a much-anticipated summary report in 1973, extending Governor Sargent's moratorium to an outright cancelation of all proposed highway expansions.

"I have decided to reverse the transportation policy of the Commonwealth of Massachusetts," Sargent wrote. "We were wrong. Today we know more clearly what our real needs are—what our environment means to us—what a community means to us—what is valuable to us as a people." Sargent immediately stopped four major highway expansions and realignments, including the aforementioned Southwest Expressway. Additionally, he proposed a number of public transit investments to take priority over highway construction, intending to use federal highway funding for transit improvements. Yet the Commonwealth had already bought and cleared 120 acres of land in preparation for the new expressway. In its place, Sargent proposed a realignment of Boston's transit infrastructure, shifting an existing light rail line—the "Orange Line"—to the cleared land in order to "spur renewal" and guard against disinvestment.

As the realignment commenced in 1979, a number of commuter rail lines sharing the Orange Line tracks required temporary rerouting during the course of construction. Consequently, the state shifted all commuter trains destined for downtown Boston to the previously unused "Dorchester Branch"—the present day Fairmount line.

At the time, the Boston Globe editorial board dubbed the Fairmount line "the [MBTA]'s hush-hush line," baffled that the MBTA would increase passenger service without formal notice or announcement (The T's Hush Hush Line, 1987). The line's existence was best characterized as "hush-hush" until 1999 when the Greater Four Corners Action Coalition sparked an 11-year long campaign for increased service, resulting in the renovation of two existing station platforms and culminating with the allocation of Commonwealth funds for four new stations.

## Finding Common Ground from Below

In 1999, the Greater Four Corners Action Coalition (GFCAC), led by Marvin Martin, spearheaded an organizing campaign for "transit equity," arguing that the neighborhood of Four Corners was underserved by paltry transportation options. Located within the larger Dorchester neighborhood district, Four Corners residents are cut off from the city's extensive rail system. To make matters worse, the

Fairmount line runs directly through their neighborhood without stopping—a situation City Councilman Charles Yancey referred to as "the height of insensitivity" (Cambanis, 2003).

To label the Greater Four Corners Action Coalition a "coalition" is a slight misnomer; the group is in fact an autonomous organization with an independent staff. The organization focuses on broadly defined "comprehensive development" in Four Corners, a Dorchester sub-neighborhood containing nearly 8,000 residents. In 1991, Reverend Dennis Paul of Grace United Methodist Church helped establish the Action Coalition, intending to create a secular collaboration between various Four Corners health centers and community development groups focused on crime and public safety. The Hyams Foundation provided initial funding for the group's efforts at reducing crime in the area but ended support when the organization expanded to cover multiple forms of resident organizing and economic development within Four Corners.

The absence of rail access in Four Corners carries a conspicuous racial component: According to the US Census, the neighborhood was 60.9 % African-American and 17.6 % nonwhite Hispanic in 2000. The neighborhood's median household income was a mere $33,018, over $6,000 below the citywide median. To GFCAC Executive Director Marvin Martin and other activists in Four Corners, the lack of rail represented more than access itself; it signified gross negligence, indignity, and according to one former organizer, "transit racism" (Fig. 11.1).

Seeking to sway the tide of disinvestment, the Greater Four Corners Action Coalition launched a grassroots campaign for more stations along the Fairmount line, prompting the MBTA to conduct a Feasibility Study in 2002. In addition to proposing a Four Corners station, the independent study concluded that a total of four new stations were needed—three in the Dorchester neighborhood district and one in Mattapan. The report stated that projected ridership would exceed the cost of new construction, much to the surprise of MBTA officials. After noting his initial skepticism of the project, for example, MBTA general manager Mike Mulhern reluctantly admitted, "Many of the advocates were right on target" (Hanchett, 2002).

As the state considered funding options, Jeanne Dubois—Executive Director of the Dorchester Bay Economic Development Corporation (DBEDC)—recognized the potential for a large-scale development opportunity in conjunction with the new stations. A former community organizer in Chicago and social justice advocate, DuBois brought her emphasis on organizing to the development-focused DBEDC in 1988. Dubois, a deft fundraiser and dynamic leader, transformed Dorchester Bay EDC into one of Boston's leading community development corporations.

Though community development corporations like DBEDC vary in size, capacity, and focus, all share a 501(c)3 nonprofit distinction and emphasize physical redevelopment in urban communities.[1] Some are more "community based" than others; some choose sites for redevelopment based on (broadly defined) "community" benefit, while others simply aim for maximum returns on investments. Most,

[1] See Grogan and Proscio (2001) for more on the history of community development corporations.

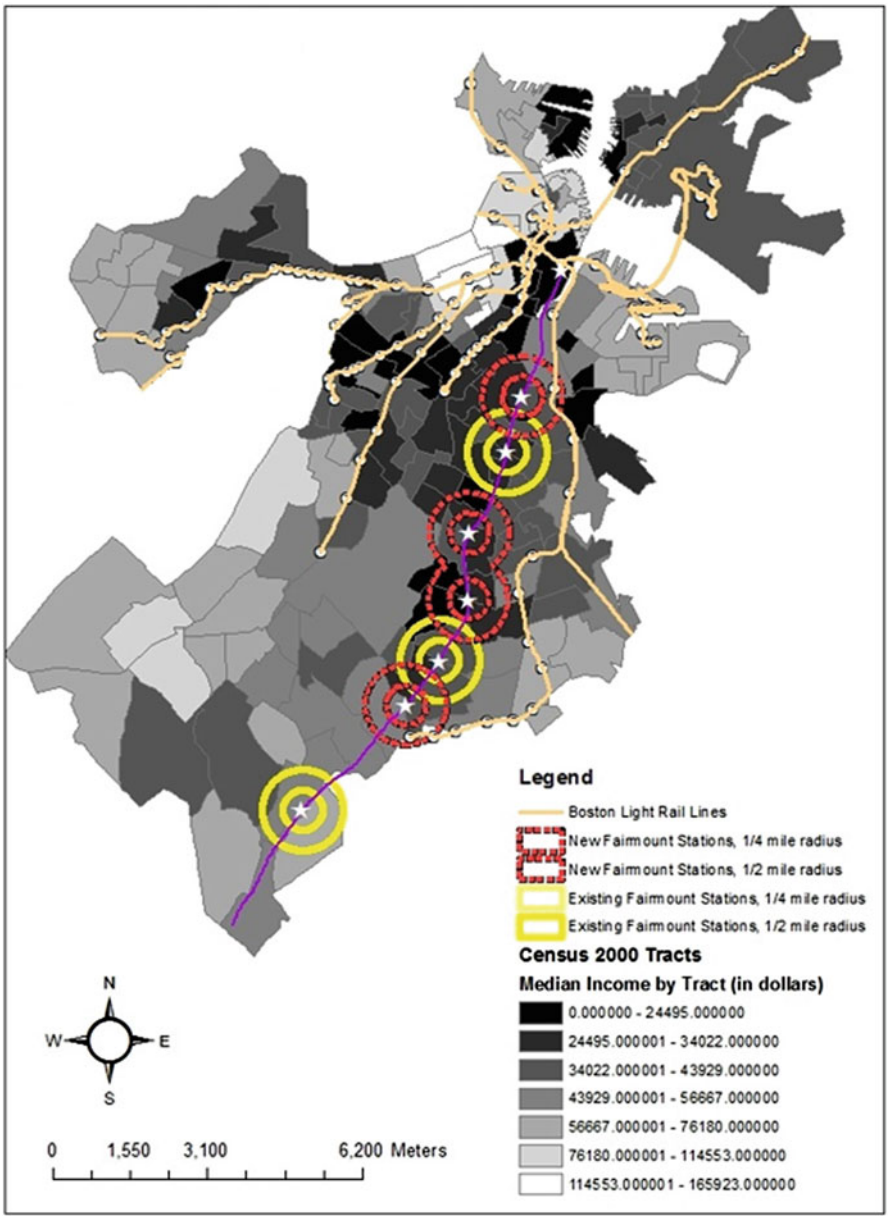


**Fig. 11.1** Urban rail in Boston with median household income by census tract (Source: Author's rendering. Data Source: Massachusetts Office of Geographic Information (http://www.mass.gov/mgis))

however, are a mix of the two extremes. DBEDC is an example of a "mixed"-emphasis CDC, purporting a strong commitment to community issues like youth violence but staffed by project managers with varied professional backgrounds.

The Fairmount line's lone Dorchester station was located just blocks from the DBEDC offices, but DuBois had not considered the social and economic potential of transit expansion until a colleague mentioned it in passing in 2004. A spark went off: The construction of new stations could be paired with affordable housing construction and economic activity, creating "transit-oriented development"—a focal point of environmentally friendly urban planning. For poor populations dependent on public transportation, the proximity of mass transit to affordable housing is critical. Savvy urban planners and policymakers have recently proposed new projects linking public transit access to housing options, hoping to reduce America's carbon footprint and reliance on private automobiles. Transit-oriented development, as such, directly ties together issues of social justice and environmental sustainability: By reducing fuel emissions and pollution, this type of development can significantly reduce fuel and commuting *costs* for low-income populations, alleviating major financial burdens. For DuBois, the Fairmount line represented an opportunity to apply these principles in Boston's low-income minority neighborhoods. But how could she make this grand vision of urban revitalization a reality?

DuBois's organizing background prompted her to craft an intricate cross-neighborhood, cross-sector organizational partnership. The process of organizational collaboration took a number of steps. First, DuBois engaged three other CDCs with service areas along the corridor: Codman Square Neighborhood Development Corporation (CSNDC) in Dorchester, Mattapan Community Development Corporation (MCDC) in Mattapan, and Southwest Boston Community Development Corporation (SWBCDC) in Hyde Park.[2] In combination, the contiguous service areas of the four CDCs spanned the entire Fairmount Corridor and included over 90,000 residents.

DuBois approached each organization with a simple but novel idea: Join political and financial forces, create a unified partnership, and coordinate new affordable housing and local business development along the Fairmount Corridor. Each Executive Director agreed, and DuBois drafted a Memorandum of Understanding (MOU)—a formal agreement of the partnership's core values and vision—to make the newly minted Fairmount Collaborative official.

In 2004, DuBois created the Fairmount Collaborative—the formal coalition of CDCs along the Fairmount line—without consulting the Greater Four Corners Action Coalition (GFCAC), the original source of mobilization for new stations and state investment. Gail Latimore, Executive Director of Codman Square NDC, recognized this as an oversight. "As we got together for the Collaborative, I said that [GFCAC] had to be part of the process—we have to go back and speak with them and see their role because they started this all off," Latimore said in an interview. "It was me saying to Jeanne [DuBois] 'We need to consult with Four Corners.'"

[2]While Hyde Park was not scheduled to receive a new station along the Fairmount line, SWBCDC was included in the partnership because the southernmost station falls within the group's service area.

Yet engaging GFCAC—an organization focused on issues of youth violence and transit equity, not affordable housing construction and economic development like the CDC Collaborative—would not be a simple task. While each organization works to serve a broadly defined "community"—the *same* communities in Boston, in fact—their respective organizational priorities, goals, and directives rarely converge.

In DuBois's own words, cross-organizational partnerships required "broadening" the original vision of transit access to include associated housing and commercial development. To create a truly powerful collaboration along the entire Fairmount corridor, DuBois believed she needed to engage local grassroots organizing groups along the Fairmount Corridor—and doing so necessitated a reframing of the benefit of transit investment.

DuBois explained her "pitch" to local grassroots organizations: "Everybody agrees on new stations…Everybody sees that transit connects you, connects you to jobs, revitalizes your neighborhood, becomes an economic mobility program… [The message was] 'Healthy affordable food, jobs, and being an anchor that rebuilds the business district.' Same message, over and over again." As DuBois explained, the original push for transit access emphasized access itself, but she extended the message to include a variety of associated benefits. Broadening the original message to include related issues—what sociologists David Snow and his colleagues (1986) call "frame extension"—pushed Marvin Martin and GFCAC to extend their vision of new stations from mere transit access to include transit's connection to housing and commercial development.

Frame extension followed a logical progression. "It builds on itself—like physics," DuBois recalled. "It's like an atomic reaction: it just keeps triggering more stuff." The CDCs capitalized on preexisting mobilization and organizing, broadening a singular focus on transit access into a corridor-wide development plan. As a result, three community-based social justice organizations located throughout the Corridor—Dudley Street Neighborhood Initiative (DSNI), Alternatives for Community and Environment (ACE), and Project RIGHT—as well as New England's premiere nonprofit environmental law firm, the Conservation Law Foundation (CLF), quickly joined GFCAC to form the Fairmount Coalition working in tandem with the Fairmount CDC Collaborative.

Shortly thereafter, the Coalition and Collaborative broadened their vision again, inviting two local environmental groups—the Boston Natural Areas Network (BNAN) and "02136-All Things Hyde Park"—to collectively assemble a Fairmount Greenway Task Force. The Task Force began the planning process for a corridor-wide contiguous green space, linking local destinations with a linear bike path along the rail line. With the creation of the Greenway Task Force, the new organizational structure currently includes three wings: transit equity, real estate development, and open space preservation and recreation.

During the summer of 2010, the CDC Collaborative hired a landscape architecture and urban planning firm to craft a conceptual plan for the proposed greenway. Each CDC in the Fairmount Collaborative partnered with each grassroots organizing group in the Fairmount Coalition and hosted a community charette—a community meeting in which local residents meet with the professional planners to discuss

designs. In turn, resident input drove green space development strategy in private Task Force meetings.

Assembled through effective frame extension, the new Fairmount organizational structure included 12 distinct organizations and geographically spanned throughout the entire 9.2 mile corridor. They lobbied the state for a single action—transit expansion—but did so for a number of divergent reasons. Predictably, collaboration of this type did not emerge organically. Rather, the CDC Collaborative forged cross-sector ties through a careful process of frame extension, expanding the original focus on transit access to include a corridor-wide community development agenda. To use DuBois's words, the CDCs "broadened" the preexisting groundswell mobilization and organizing for the new stations, extending the original vision—or frame—of the grassroots organizations to create a newly interconnected organizational structure.

Importantly, successful frame extension required the project to *actually* serve social and environmental needs. Both environmental and social justice groups viewed greenway preservation as beneficial, for example, because providing open-air recreation serves a social need for low-income populations while simultaneously protecting natural resources. Preserving the environment allows urban residents to lead healthy lives, and providing open space for residents helps preserve the environment. As such, local advocacy organizations were able to merge disparate interests into a coordinated effort, integrating social needs with environmental concerns. This novel organizational structure, in turn, became a crucial political force in the policymaking process.

## Crafting an Integrated Urban Policy

After 3 years of organizing, the grassroots mobilization strategy was successful in lobbying the MBTA to conduct a Feasibility Study in 2002. The Feasibility Study recommended four new stations and repairs on two existing Fairmount station platforms. The report stated that projected ridership would exceed the cost of new construction, fulfilling a social need for transit in a heavily transit-dependent section of Boston. In 2003, Massachusetts Governor Mitt Romney announced an anti-sprawl agenda placing development priority on mass transit. Along with Secretary of Transportation Vineet Gupta, the state announced an emphasis on providing transit options where car ownership was the lowest (Gupta, 2003).

Nevertheless, funding for the Fairmount project remained an open question. With local pressure mounting but funding unclear, the MBTA released a second study in 2004 after 2 years of inaction. The 282-page "Fairmount Improvements Project Needs Assessment" included detailed recommendations for bridge repairs and new station construction. The study confirmed the claims of local activists: Public investment in these poor minority neighborhoods was necessary, and residents therein would benefit greatly from increased transit access.

Beginning in 2005, a series of events dramatically shifted state priorities, culminating in new stations along the Fairmount line. A seemingly unrelated

environmental lawsuit filed by the Conservation Law Foundation, suing the Commonwealth for failure to comply with the provisions of the US Clean Air Act, catapulted the Fairmount project to a top investment priority. As a result, the political vision of the transit expansion reimagined the project as both a social *and* environmental policy initiative.

The unrelated lawsuit has its roots in Boston's costliest transportation investment: the Central Artery/Tunnel project of the early 1990s, colloquially referred to as the "Big Dig." Costing over $14 billion, the plan extended Interstate 90 to Logan International Airport and suppressed Interstate 93 into an underground tunnel beneath the city. The Big Dig remains the most expensive highway project in the United States to date.

The environmental impact of the Big Dig was profound. In 1991, the environmental law firm Conservation Law Foundation (CLF) sued Secretary of Transportation Fred P. Salvucci and Massachusetts Governor Michael Dukakis for failure to comply with the federal Clean Air Act Amendments (CAA) of 1990, citing the construction's negative effects on regional air quality. Days before leaving office, Salvucci and Dukakis settled with CLF, agreeing to a set of investments in public transit. They wrote the list of investments—termed the "mitigation" efforts—into Massachusetts' State Implementation Plan (SIP), the formal written compliance with the US Clean Air Act.

Yet the mitigation investments never materialized; there was never an actual timeline attached to their completion, and subsequent administrations failed to allocate sufficient funds for implementation. In March of 2005, CLF threatened to sue again, citing the state's failure to offset the regional air pollution caused by the Big Dig. At the time, state government officials were certainly receptive to the idea of public transit investment: Governor Romney held fast to his aforementioned anti-sprawl political agenda, and his "*Super* Secretary" of Development Douglass Foy was the former President of CLF and architect of the law firm's initial 1991 lawsuit.[3]

According to Foy, the state took a "fresh look" at the transit investment package, running new cost-benefit analyses to reevaluate project priorities. Population shifts impacted previous ridership projections and, as such, influenced projected carbon emission reductions. New demographic trends required new analyses, ultimately shifting state priorities and the allocation of funds.

The Fairmount project was not included in the original mitigation agreement of 1991. In fact, there was no such thing as a "Fairmount project" until the 1999 mobilization effort in the neighborhood of Four Corners. But by 2005, with the newfound CDC

[3]It is important to note that CLF's involvement in the Fairmount Coalition emerged irrespective of their lawsuit against the state. In fact, they did *not* lobby for the Fairmount project to take precedence over other transit investments. When CLF sued the state in 2006, Carrie Russell was working on transit issues for the Massachusetts office. Along with the rest of CLF, she was sympathetic to the Fairmount advocates' claims of transit inequities yet questioned the ability of the Fairmount improvements to have a substantial environmental impact. But since the estimated reduction in carbon emissions from the Fairmount project satisfied the federal requirements, it supplanted CLF's preferred transit investments. Moreover, the groundswell local consensus and support for the project—of which CLF was a contributing member—made the Fairmount expansion especially attractive to the state.

Collaborative, Fairmount Coalition, and Fairmount Greenway Task Force interlocking organizational partnerships, the project had gained considerable political visibility. To Foy and the rest of the state, the Fairmount expansion project "made sense"—meaning revenues would exceed cost, an underserved portion of the city would receive better transit access, and carbon emissions would be reduced significantly. Equally important, the project would satisfy vocal constituencies. As a result, Foy and Romney wrote the Fairmount expansion into the state's new plan of compliance with the Clean Air Act, substituting it in place of previously agreed upon projects.

After running new, independent analyses and rewriting the list of projects included in the mitigation agreement, the state issued a bond authorization of $770 million to fund the various projects. Yet the Commonwealth is not necessarily obligated to fund a bond authorization, and CLF, understandably skeptical, officially sued in November of 2006. The ultimate settlement in early 2007 included a firm timeline for completion of the new list of transit investments—December 31, 2011. This represented a legally binding commitment unparalleled by previous lawsuits.

The state was certainly receptive to an expansion of the Fairmount line as early as the 2002 Feasibility Study, but the 2007 settlement with CLF made the project a top priority by linking it to Massachusetts' compliance with the federal Clean Air Act. The seemingly unrelated Clean Air Act provided the political opportunity for a dramatic investment in two of Boston's most impoverished neighborhoods. The state now had new political and legal incentives—made visible by local organizational collaboration and mobilization—to invest in the Fairmount line. Moreover, the investment was no longer simply social policy; it was now, additionally, written as environmental policy.

Yet it was not simply the case that public transit expansion *qualified* as both a social and environmental policy. Rather, satisfying the social needs of low-income residents produced a positive environmental impact, and efforts to reduce carbon emissions yielded significant social benefits. State policymakers agreed that low-income residents needed better transit access as a social welfare measure, but increased transit access also produced positive environmental externalities by reducing air pollution. Moreover, reductions in carbon emissions directly benefit a population suffering from disproportionate rates of asthma and other health inequalities. As a social policy, the Fairmount expansion was viewed by policymakers as environmentally beneficial; as an environmental policy, the Fairmount expansion was seen as satisfying a valuable social need.

After a series of community meetings and debates over station placement, the Commonwealth awarded a $17 million contract to S&R Construction in March of 2010 for construction on the first of four new stations. Construction began on April 1, 2010 at the very site where mobilization began: the neighborhood of Four Corners.

## Lessons

What can policymakers and practitioners learn from the Fairmount case in Boston? First, local consensus building is critical for the development of sustainable urban policy. But consensus building does not emerge organically; by contrast, a careful

reframing or rearticulating of the problem at hand is required to incorporate seemingly disparate interest groups. Each community organization along the Fairmount Corridor—from the housing developers to the environmental advocacy groups—stood to gain from new stations on the commuter rail line. Yet it was not until Jeanne DuBois extended the message of expansion from a social need to a comprehensive social *and* environmental imperative that the organizations recognized their shared interests.

The political process was also crucial and, like local consensus, did not proceed organically. Government officials originally conceived the Fairmount project as a social policy initiative but reimagined the transit expansion as an environmental imperative following the CLF lawsuit. Tying the project to Massachusetts' compliance with the US Clean Air Act positioned the Fairmount project as environmental policy, while policymakers at the same time recognized the social need for transit access. The singular transit expansion became both environmental and social policy simultaneously.

The development of sustainable urban policy in Boston required meaningful partnerships at multiple levels of governance, recognizing the social and environmental benefits of a single transit expansion. Environmental and social justice community organizations joined forces at the grassroots level, mirroring the convergence of environmental and social interest in the Fairmount project at the state level. The project—simultaneously social and environmental policy, advocated by an interlocking group of grassroots organizations coordinating social and environmental community development—was then recognized by the Office of Sustainable Communities, a partnership between social and environmental policymakers at the federal level.

Such partnerships rarely occur naturally and instead emerge from concerted effort and political will. Seeing a singular project—such as a public transit expansion—as both social and environmental policy is possible, as the Fairmount case in Boston illustrates. But doing so necessitates a reframing and reimagining of urban policy. The social and political process of policy rearticulation requires the will to imagine what is possible.

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# Part III
# Work and Ecology, Tourism, University Management

# Chapter 12
# Social Policy Is Environmental Policy: Paid Work, Unpaid Care Work, Gender, and Ecology

**Lynn Duggan**

> *Prior conditions of every economy are a functioning ecosystem and working human relationships. Different from other economic goods, they cannot be produced at any given time but have to be cared for and sustained according to principles which fundamentally differ from the existing economic principles.*
>
> (Maren Jochimsen and Ulrike Knobloch 2010, 128)

Economists who study the ecological environment and those who study the gendering of household caring activities may seem at first glance to have little in common. Upon further reflection, a similarity stands out: the objects of study in both of these fields are fundamental but undervalued parts of market economies. Further, both nature and the caring sphere are subject to market failures. Markets cannot foster values such as love, empathy, and responsibility; nor can they, on their own, promote environmentally sound business practices that do not pollute the air, water, and soil and cause climate change. When toxins are released into the environment and when caring activities and community involvement are neglected, repercussions of these actions and inactions impact nature and relationships, tearing both environmental and social fabric.

Both the ecological environment and human relationships require stewardship that must take place outside markets due to competitive pressures within markets. Without institutions and safeguards, species become extinct as food chains are poisoned in the drive for profits; civilizations are threatened by the prospect of territorial wars due to diminishing bodies of fresh water. Similarly, without

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stewardship to protect unpaid caring work and activities, these are becoming rarer, leading to a growing "care gap." Poor countries send people abroad to care for children and the elderly in wealthy countries, leaving their loved ones behind.

Reducing the scope of markets and amending outcomes would contribute to the preservation of both the ecological environment and the realm of unpaid care, though for different reasons. In other words, a reduction in business transactions – reduced hours of employment and purchases – would benefit both the environment and the family and community.

This chapter focuses attention on two key market failures that result in higher employment hours and consumption levels than consumers and workers would choose if these failures were corrected, through government action or some other means: the Veblen effect (also known as the market failure of "positional goods"[1]) and the incentive for partnered family members to perform extra labor force work to avoid economic vulnerability should the partnership fail. Drawing on the work of several important scholars in consumption and feminist economics, I will show that social policy that reduces inequality leads to improvements for the environment and for families/communities. Several policy approaches are suggested to achieve these goals.

## Market Failures

Mainstream economic models are famous for assuming the very conditions under which models produce desirable results. The default assumption in models of markets is that business transactions include costs of production and reflect consumers' tastes and wants. Predictably, when these conditions exist, markets can be said to generate socially optimal outcomes.[2] But, as may be expected, they rarely exist. Mainstream economists readily admit that such assumptions are "heroic," but the emphasis placed on these divergences from reality varies.

A "market failure" is said to take place when the interactions of buyers and sellers in markets result in outcomes that are undesirable, usually due to non-excludability and/or non-rival consumption of a good or service. Mainstream economics recognizes two main forms of market failure, externalities and public goods, the former referring to situations in which parties outside a business transaction are burdened or blessed with costs or benefits of the transaction that are not included in the price (external costs or benefits) and the latter, to situations when parties outside a transaction cannot be excluded from receiving benefits of the transaction. Pollution and cigarette smoke are oft-used examples of externalities and roads and national defense, examples of public goods. Because markets give rise to (or cannot address) market failures, other institutions must be used to solve or ameliorate these problems. Examples might include village councils, governments, or international agreements.

As markets are not likely to soon be replaced by planning or another system to allocate natural resources and time, most economists believe that the society surrounding business transactions must mitigate market failures by forcing companies to "internalize" the costs they are tempted to impose on society and nature. Significant sanctions, fees, tax incentives, and laws can lead private

actors to behave as good citizens; however, enforcement is key. Consumer boycotts and campaigns may be used when laws are unenforced or unsustainable practices are unregulated.

The 8-hour day is an example of a law that attempts to preserve the family/community sphere. Setting legal limits on industrial emissions can act to preserve nature. The fair trade movement aids in the preservation of family/community space for workers in poor countries by increasing their selling price, thus reducing necessary work hours. Efforts to negotiate international standards for greenhouse gas emissions are aimed at preserving the natural environment globally. In wealthy countries government tackles certain market failures through direct regulation, taxes, subsidies, or public provision of needed "cleanup"; in the Global South governments act to correct fewer market failures, however, some communities manage to do so.

Alternatively, to attempt to force firms to internalize their external costs, the society surrounding these transactions may, in effect, "stage"[3] free market actors through government subsidy. An example of such staging is publicly provided childcare, widely available in Sweden and France. These countries see parents' investments in children as producing positive externalities, including law-abiding future citizens and productive future employees whose taxes will help fund previous generations' retirement security. In the absence of societal subsidies of childrearing, childless individuals may be said to "free-ride" on parents, who sacrifice income and leisure to raise children (Folbre 1994; Folbre and Nelson 2010). Likewise, without societal support of environmental cleanup, insufficient care (as judged by society) will be taken to preserve the natural environment, resulting in pollution, overuse, and depletion. Wildlife habitat will be degraded in the absence of public goods, such as parks and wilderness areas.

For both the family/community sphere and the environment, the scope of market failures is difficult to measure. Economists typically assess costs using numbers, and both nature and nonmarket activities are difficult to quantify. To estimate foregone caregiving in families and communities, unpaid work can be compared to its counterpart in the market; however, qualitative differences between working for money versus love or responsibility render the comparison impossible beyond a certain point. Certain activities (like playing with children) are sometimes work, sometimes leisure, and sometimes something else entirely (Himmelweit 2010). Likewise, the value of maintaining the planet's air, water, resources, and natural beauty for future generations of people (let alone, other species) cannot be quantified. In the end, values placed on the environment and time with children, other relatives, and community members are qualitative, "intrinsic" values, described by Mark Sagoff as valuable precisely because they are not measureable (Sagoff 1988).

Awareness is growing that the above types of cleanup and staging efforts are inadequate to deal with the degree to which the environment and family/community relationships are undermined in industrial and postindustrial societies. Ackerman (2009) argues that the very possibility that greenhouse gas emissions are causing climate change requires that we take steps to "insure the planet" through more aggressive environmental safeguards. This argument can be made for a wide range of environmental impacts as well as family/community impacts that are staggeringly qualitative. But the question remains how to bring about such insurance; what form should it take?

Parallels between nature and the family/community, such as those noted above, may help increase understanding of possible interventions to correct market failures in these two spheres. In what follows we examine market failures that generate high work hours, which impact both nature and the caring sphere. We close with policy suggestions to reduce these tendencies.

## The Veblen Effect and Its Relevance to Nature, Family, and Community

Thorsten Veblen, writing at the turn of the twentieth century, theorized that much consumption is motivated by a desire to emulate the consumption standards of higher classes in order to increase one's status. According to Veblen, the historical roots of the leisure class lie in early hunter and later warrior societies, where individuals sought to accumulate spoils of the hunt (food) and war (slaves and other booty that could be transported home as a symbol of physical strength). Wealth is equated with an honored position in society, a position that can only be attained when these items are seen by others, rather than merely consumed. Veblen postulated that much consumption is motivated by "pecuniary emulation" of the consumption standards of a society's elite.

> The quasi-peaceable gentleman of leisure, then, not only consumes of the staff of life beyond the minimum required for subsistence and physical efficiency, but his consumption also undergoes a specialization as regards the quality of the goods consumed. He consumes freely and of the best, in food, drink, narcotics, shelter, services, ornaments, apparel, weapons and accoutrements, amusements, amulets, and idols or divinities… Since the consumption of these more excellent goods is an evidence of wealth, it becomes honorific; and conversely, the failure to consume in due quantity and quality becomes a mark of inferiority and demerit. (Veblen 1973, 63–64)

Veblen posited that such "conspicuous consumption" is "conspicuous waste" – unproductive spending – because such purchases do not achieve their aim of conferring status when others acquire them. The outcome of individuals' drive to acquire positional goods (indicating one's relative position in society) is to make purchasers worse off, because they forego leisure for the purpose of acquiring status yet achieve no such gain (Golden and Altman 2008).[4]

The existence of consumption for reasons of status (positional consumption) is difficult to prove; however, recent multivariate analysis findings support the existence of the Veblen effect. Neumark and Postlewaite (1998) show that, after controlling for other factors, married women whose sisters' husbands earned more than their own were 16–25 % more likely than others to seek employment. Similarly Park (2005) finds that married women were more likely to be employed if men of similar age in the same locality earned more than their own husbands, again, after controlling for other variables. Luttmer (2005) finds evidence of this type of market failure as well in that an increase in average neighborhood income results in reduced happiness, all else equal. Bowles and Park (2005) find that work hours are positively correlated with inequality, both within countries over time and across countries (Also see Osberg 2003).[5]

As Frank (1999) and Eaton and Eswaren (2009) note, the recent literature on GDP and happiness documents the Veblen effect with the key finding that, overall, people are not made happier by higher incomes but, rather, by reaching thresholds of economic security. As each class emulates the consumption habits of the one above, positional consumption cascades downward through the income brackets (Frank 1999), yet the goods acquired in this process make people less happy than they would be had they not sought higher status, presumably because they have little to show for their efforts.

To return to the original theme of this chapter, despite the lack of happiness associated with it, consumption of this type exacts a heavy toll on producers, nature, and the family/community, resulting in greater amounts of unnecessary work and an upward spiral in resource depletion and carbon emissions, yet little time left to enjoy the purchases with friends and family. The Veblen effect also supports planned obsolescence of products, as new products are in continual demand in order to demonstrate status.

## The Disappearing World of Unpaid Care

Turning now to the topic of unpaid care activities in families and communities, we examine another type of market failure that likewise results in higher employment hours than people might choose (if not for undesirable market outcomes). We begin with a simple analysis of childrearing partnerships, using the analogy of the "prisoners' dilemma," a common model in game theory. The dilemma refers to two prisoners who have agreed not to give information to their captors but, separated, fear that the other will "talk" to improve his/her relative situation; both will suffer an absolute loss if one breaks the agreement. Planning a family involves a similar dilemma in that the costs and commitment involved in raising children are seen as too heavy for one person to manage alone, yet partners lack assurance that the other person will not default. In order to proceed, would-be parents need institutions to reduce the risk that the other partner will later opt out or to insure individuals in the event that the union disintegrates (Ott 1992).

Marriage and, more recently, childrearing subsidies have historically served this purpose; however, marriage accorded fewer rights to women. In the last two centuries, women's rights have expanded, increasing access to education and labor force earnings; however, the tradition of women's greater responsibility for children, homemaking, and care in general remains largely intact, though women in high-income couples may escape significant amounts of caring work by making use of childcare centers and hiring housekeepers and nannies.

As Joan Acker argues, industrial capitalism has involved a labor process stratified by race, class, and gender, embedded in a gendered division of paid production and unpaid domestic and caring activities, the latter of which are unacknowledged.

> The commodification of labor… is an integral part of this process as family provisioning and caring become dependent upon wage labor. The abstract language of bureaucratic organizing obscures the ongoing impact on families and daily life. At the same time, paid work is

> organized on the assumption that reproduction is of no concern. The separations between paid production and unpaid life-sustaining activities are maintained by corporate claims that they have no responsibility for anything but returns to shareholders. (Acker 2010, p. 138)

Although heterosexual marriages now include paid work for women as well as men, women's earnings in full-time jobs generally average only 75–80 % of men's, while most part-time work is performed by women. The gender pay gap fuels a vicious cycle in which couples assign the lower-earning partner a higher share of caring duties, a process that reinforces skill and pay differentials and perpetuates a bias among employers against hiring and promoting women, (regardless whether this bias is legal). The result is a continued systematic gender imbalance within homes and "family flight" in favor of longer hours on the job (Hochschild 1997) – if not on the part of the carers, then others who witness their relative lack of power, including the generation being raised by these carers.

A theory of marital bargaining over household decisions has gained broad acceptance, based on partners' relative fallback positions – what each person will "walk away with" if the partnership breaks down (Manser and Brown 1979). England and Kilbourne (1990) summarize the reasons that traditional gender roles result in lower effective bargaining power for women than men as follows: To begin with, cultural forces devalue activities traditionally done by women and encourage women to cultivate selflessness and men to cultivate self-interest in household bargaining. Second, much domestic work contributes to the well-being of children rather than men, thus women's fallback position, the withdrawal of their services, is a less direct threat than men's, the withdrawal of financial support. Third, many of women's traditional skill investments have tended to be relationship-specific, such as investments in children or in learning how to relate to and deal with a particular partner's idiosyncrasies, while breadwinners' investments in labor force skills are more easily transportable to a new relationship. Finally, although some of women's investments may be transferable to new relations, women (or anyone who specializes in caring/household work) lack financing after a breakup, thus, may not be able to find a new partnership while savings last.

All of the above factors except men's and women's different socialization apply to gender role reversals in caring and labor force work, as well as to same-sex partnerships. When partners specialize in caring and breadwinning, respectively, the carer risks economic disadvantage regardless of his/her sex.[6]

This income and power inequality between those who work for pay and those who perform unpaid care work is clearly a problem. It is also harmful to unpaid caring activities, due to the devaluation of those who perform such activities. This inequality gives rise to family members' greater participation in the paid labor force than is necessary for the family's sake, due to the fact that cash income is the ultimate source of security and power.

Another related externality, the devaluing of household/caring work generates a tendency for children to scorn household and community work and involvement and to derive their self-worth disproportionately from paid work, which is based in a competitive, rather than cooperative, system of values, unlike the values that underlie dynamics in families and communities.[7] Due to the devaluing of caring work,

parents strive to spend less rather than more time in their households. Children absorb their parents' patterns and these are perpetuated into the future. Ultimately, children are the best guarantors of a sustainable future economy, but the domination of the paid sphere over the unpaid sphere has the effect of reducing unpaid activities in households and community in general when more such activities are needed to set a course for a sustainable economy.

Folbre and Nelson (2010) note that society does not stand to gain from the devaluing of care: "…if individuals who respect and fulfill norms of care come to be seen as losers in the competitive economic game, we may see a gradual erosion of the supply of unpaid care services" (2010, p. 146). Drago (2007) estimates that 17.5 % of the US population (considering only children, elderly, and the disabled) suffers from insufficient care. He postulates a "new gender gap," defined as the "heightened distinction between those women who succeed in professional careers and those who engage in care work for low or no pay" to fill the above care gap (2007, p. 3).

## Long Work Hours and Climate Change

The foregoing examples of market failures that generate high work hours are meant to show an upward bias in the time people spend working for pay. The result of both the Veblen effect and of inequality in intra-household fallback positions is to impose unnecessary and unproductive costs on the environment, as well as on the family/community and on workers' physical and psychological health due to long hours of paid work.

Work hours vary greatly among industrial countries, with an OECD average of 1,764 annual hours among its 34 member countries, where annual hours ranged from 1,389 in the Netherlands to 2,256 in South Korea in 2008. The US average of 1,796 h is slightly higher than the OECD average, but it is much higher than the average for Western Europe (OECD 2010).

In the USA, 76 % of US workers worked 40 or more hours per week in 2008, while in Europe 58 % worked 40 or more (OECD 2010).[8] Meanwhile, unemployment is at record highs in most countries.

Not only are Western European work hours shorter than American, energy use is also approximately half as high. Research by Rosnick and Weisbrot (2006) is suggestive of possible directions for the future. They estimate that if Americans (who currently work 16 % more hours than EU-15 nations[9]) were to adopt the work hours of these nations, US energy consumption could fall by 20 %. Conversely, if the EU-15 were to adopt work hours and other practices of Americans, European energy use could increase by 25 % (Rosnick and Weisbrot 2006). Further, they assert that the rest of the planet, including rapidly growing middle-income countries such as China, may choose to follow one of these two models. With the US model, the world would likely consume 15–30 % more energy by 2050 than with the European model, and such a choice could ultimately result in 4.5 °C in global warming, rather than 2.5 ° (Rosnick and Weisbrot 2006).

The upward bias in work hours fostered by the above market failures is clearly environmentally unaffordable. A further illustration, among the top 20 countries in volume of carbon dioxide emissions, the USA ranked highest after Australia in 2008, at 19.2 tons per capita and 20.8 tons, respectively.[10] The lowest of the 20 largest emitters were India and Indonesia with per capita emissions of 1.3 and 1.8 tons per capita (Union of Concerned Scientists 2010).

Additional pressures that result in high employment hours and consumption levels include the creation of consumer wants via advertizing, planned obsolescence in product design, and a structural bias within firms toward longer hours. Schor (2005) notes that employers are biased toward higher employee work hours for four reasons: to increase workers' dependence on one employer, to reduce employment-related costs ("employee benefits"), to extract greater profits by replacing hourly with salaried positions, and to enable the continuous use of machines and equipment. She argues that declines in work hours only occur when groups such as trade unions are able to exert pressures to counter firms' bias toward longer hours.

## The Family/Community Economy as an Alternative to Store-Bought Things

Summing up, while the upward bias in work hours may be in the interest of firms, it is not in the interest of the rest of society. An alternative to long hours in the formal sector of the economy is the family and voluntary/community sector of the economy, which embodies environmentalist goals of labor-intensive, local production. The family/household and community could absorb significant shares of economic activity from the formal sphere of paid employment, where international and domestic transportation and packaging involve capital-intensive production, resulting in higher levels of resource use for any given level of consumption. The greater the share of local community-level production, also the smaller the share of resources and time that are absorbed in advertising, marketing, and display.

A small but growing movement seeks to reduce unnecessary work, consumption, and transportation, via, for example, the increased use of bicycles, improvements in public transportation, community gardening, local systems of exchange, and community shares in nearby farms in exchange for produce. Alternative currencies (or other systems of exchange) provide a way to facilitate local production and build community, as well as a source of goods and services for those who lack jobs and the working poor. Such currencies operate on the principle that anything of value can exchange for community goods and services of like value. *Time Magazine* notes that local currencies have proliferated in recent years: "…in hip U.S. towns or South African townships, in shops, markets and even banks, people throughout the world are exchanging goods and services via thousands of currency types that look nothing like official tender" (Schwartz 2008). The Community Exchange System website lists 268 registered exchanges in 33 countries (CES 2010).

Alternative currencies provide a way for some families to withdraw labor from low-paying jobs to engage in care and other community work based on another mode of exchange. As the Community Exchange System (2010) notes, "CES money is 'created' by its users so it can never be in short supply."[11]

There has also been a shift to more porous boundaries between home and work and higher education on the other, largely a product of the Internet. Recent studies have found that American parents are spending more time with children since the late 1990s (Parker-Pope 2010), due in part to gender role changes, and perhaps also related to an increase in telecommuting. Gender roles have become more flexible, as can be seen in the growing incidence of "house husbands" in certain parts of the world. Same-sex relationships have increased in legitimacy, increasing options in gender roles.

To advocate that a larger share of production take place within family and community is not to suggest a return to the traditional gender division of labor, in which women spend more time in the home with an associated inequality in a couple's fallback positions. A shift in the opposite is needed in order to reduce gender inequality and give families the basis to potentially arrive at a lower total number of work hours. When unpaid care is performed primarily by one group (such as women, people of color, or immigrants), norms are reinforced that devalue this work and the people who perform it. As noted above, traditional gender roles are likely to generate greater total work hours, as caregivers seek to overcome their low relative fallback positions, status, and power in the household. When equity is absent, people seek to increase their individual labor force earnings.

## Policy Solutions: Reducing Inequality

Both market failures on which we have focused, the Veblen effect and gendered fallback positions in families, raise work hours by generating inequality, and this makes for straightforward policy recommendations to increase equity across gender, class, and other systems of oppression. Such policies include investment in schools, public childcare, early intervention programs, and other resources to level the "playing field"; childrearing and elder care subsidies for those who, because of care responsibilities, are less able to work for pay; and greater progressivity in tax structures.

Aside from the tendency of equity to moderate our drive to emulate higher consuming individuals and families, equity is worth pursuing for its own sake, an intrinsic value like planetary health that cannot be quantified. Gender equity in particular may foster new consciousness that translates into changed behavior, as policies to value care work support a shift from compulsive formal sector work to greater involvement in nonmarket care and community-level work. Social policy that enables primary parents and other caregivers to maintain labor force skills is also needed, along with policy to reduce the pay and benefits penalty of part-time work. An example of the latter, when part-time work became a right in the Netherlands in

2000, work hours fell appreciably, resulting in 35 % of workers working part-time by 2004 (Faggio and Nickell 2007); a similar fall took place in Australia when part-time parity was introduced (Drago 2007).

However, in both the Netherlands and Australia, as elsewhere, most part-time workers are women (though men too increased their part-time work in the Netherlands) (Bennhold 2010).[12] Increased entitlements to part-time work and pay parity are similar to caring subsidies in that, when used within the framework of current relative earnings, caring work is likely to be assigned to lower-paid household members and to contribute to the vicious cycles that devalue caring work. This is a separate concern to be addressed through expanded opportunities for girls and women.

A shorter workweek, set by law, is of great value to the environment and caring spheres as it increases time available in the family and community, and an additional benefit is redistribution of work hours to those who lack jobs. Schor (2005) notes that an increase in free time may be expected to reduce demand for speed and convenience, both of which are damaging to the environment.

Also important are policies that may act to increase the resources for caregiving and investments in children's well-being. Tax incentives for greater community participation in childcare and elder care might include credits for the construction of housing areas with adjacent or nearby child and adult care centers and gardens where community members may volunteer.

Although there is little doubt that the path to sustainability will be long and that it requires changed consciousness, the above examples of vibrant community-based production and exchange may facilitate such consciousness raising. An assortment of approaches and policy tools is needed to transition to a new economic system based increasingly on community cooperation and family equity, fundamental principles required for environmental sustainability.

The current inequalities foster insecurities due to income, status, and power differentials, which translate into direct pressures. People's voting and day-to-day decisions are based on immediate interests and threats, regardless of awareness of future environmental dangers. Thus, for example, in our current world of high inequality and work hours, hopping in the car wins out over a 30-min bicycle ride; and the prospect of global warming in a distant uncertain future wanes in relative importance. When there is no time to visit loved ones or to be active in one's own community in the here and now, we tend to discount the impacts of our actions on people in far off coastal regions a decade from now.

The same can be said of righting inequities in general, because ideological commitment is difficult to sustain in the face of a lack of time to nurture family and community relationships. To care about inequities that harm strangers while forced to neglect people nearby invokes cognitive dissonance. Increased time and engagement in family and community, such as schools and childcare centers, may thus have far-reaching effects, not only on neighborhood children, but also on the lives of volunteers as well as those affected by social policy changes brought about by different voting behavior.

## Conclusion

The purpose of this chapter was to show that social policy and environmental sustainability are complementary and overlapping – effective environmental policy entails social policy and vice versa. As we have seen, market-based production and exchange result in longer hours on the job due to never-ending competitions for status in highly unequal international economies. Similarly, the devaluing of unpaid work associated with traditional gender roles gives rise to another spiral of longer work hours per family member and correspondingly higher consumption. Unaddressed, present inequalities despoil the environment and limit consciousness of the connections between people, plants, and animals and between people of today and people of tomorrow.

In reducing inequality across class, gender, and other groupings, social policy moderates the forces pushing for higher earnings. And in reducing energy and resource use, environmental policy moderates the trend to emulate consumption patterns of national elites in favor of building local relationships that augment time with family and community. These policy directions will slow the pace of environmental destruction and help move us closer to becoming a society that values fairness and care work.

## Notes

1. The term "positional goods" was coined by Fred Hirsch (Hirsch 1977).
2. Abstract models do not reflect realities of present-day economies, such as firms' advertizing departments or wealthy countries' disproportional voting rights the World Trade Organization. However, in this chapter, I merely argue for an expanded concept of market failures.
3. As in the definition of stage, "to furnish with a stage or staging, stage set, etc." http://dictionary.reference.com/browse/stage
4. Golden and Altman (2008) provide a brief review of some of the literature on the Veblen effect, noting the phenomena of prideful displays of "conspicuous exhaustion" as well as high consumption levels leading to consumer debt with long work hours to avoid high interest-balances and personal bankruptcy.
5. A gender analysis of working hours is not included. See Osberg (2003) for a German-American comparison that differentiates between men's and women's work hours.
6. There are exceptions to these average outcomes, such as in cases when individuals have sizable assets, an inheritance, or a talent that is always in demand.
7. Households may be uncooperative and paid workplaces cooperative, however, between firms and to varying degrees within firms competition drives capitalism. Cooperation has historically characterized households, although this does not mean households are based on altruism.
8. This includes Eastern Europe. The figure for the EU-15 is 50.5 % (OECD. Stat Extracts, 2010).
9. The EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.
10. India's and Indonesia's per capita emissions were lowest at 1.3 and 1.8 tons per capita (Union of Concerned Scientists 2010).

11. http://www.community-exchange.org/index.asp (Community Exchange System 2010).
12. According to the New York Times, 75 % of women and 23 % of men work part-time in the Netherlands (Bennhold 2010), compared to 41 % in other European Union countries and 23 % in the United States, compared to 10 % across the European Union and in the United States; another 9 % work a full week in 4 days (Bennhold p. 2).

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# Chapter 13
# Envisioning Environmental Policy as Social Policy: The Case of the International Cruise Line Industry

**Ross A. Klein**

Cruise tourism is a good industry for illustrating the dynamic relationship between social policy and environmental policy. It is not just the environmental impact cruise ships have on coastal waters and on air quality, but problems associated with people pollution – when cruise passenger's numbers exceed the carrying capacity of a port – and the subsequent impact on the sociocultural heritage of a location. While the cruise industry effectively draws governments into valuing (often overvaluing) economic benefits of cruise tourism and development, it generally succeeds in keeping environmental concerns off the table. Regardless, as will be illustrated, social and economic policy is often also environmental policy and, vice versa, environmental policy is social policy.

This chapter looks at the intersection of social and environmental policy as regards cruise tourism. It considers several scenarios and through analysis argues that better policy-making results from a conscious consideration of the overlap and relationship between social and environmental concerns. Case examples are used to demonstrate problems associated with attempting to treat one policy in isolation of the other and to illustrate the value of seeing the two policy domains as inextricably linked such that social policy is environmental policy and environmental policy is social policy.

Before looking at the cases, there will be a brief discussion of the cruise industry. As well, a framework will be described for considering the impact of cruise tourism on a location.

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## The Cruise Industry

Cruise tourism is the fastest growing segment of leisure tourism, increasing 7.2 % annually since 1990, doubling every decade (CLIA 2010). While typically greatest in North America, growth is in recent years increasingly at a quicker pace elsewhere in the world. Between 2006 and 2009, passenger numbers in North America were virtually unchanged, compared to a 68 % increase (an average 17 % annually) in passenger numbers outside North America (CLIA 2010). Growth "Down Under" has been even greater. Carnival Australia reports a 26 % passenger increase between 2008/2009 and 2009/2010 (see www.carnivalaustralia.com/html/). New Zealand reports a 513 % increase between 1996/1997 and 2009/2010, an average 37 % per year (Tourism New Zealand 2010).

This growth is in part a result of redeployment of older ships from North America to other parts of the world, including Europe and Australia (see Davies 2009). The growth also reflects construction of ever-larger ships. Carnival Cruise Lines' and Royal Caribbean's first ships carried 1,024 and 724, respectively. Their newest ships carry 4,000 and 6,000 passengers, respectively (Klein 2005a).

As the size of ships has grown and the number of ships has increased, new ports have been established and existing ports have found ever-growing numbers of day visitors. The growth for some has been phenomenal. Belize saw a 2,000 % increase in cruise passenger arrivals between 1999 and 2009 (an increase of 1,591 % in just 4 years between 1999 and 2003) (Caribbean Tourism Organization 2010; Klein 2005a). Over the same period, the Bahamas, Saint Maarten, and Antigua saw increases of between 110 and 120 % (Bahamas now logs more than 3.25 million passengers annually). The increases, however, are not always linear. After a 13 % decrease in passenger arrivals between 1999 and 2003, Dominica experienced an increase of close to 300 % between 2003 and 2009; conversely, Cozumel experienced an increase of 108 % between 1999 and 2003 but a decline of 18 % between 2003 and 2009 (Caribbean Tourism Organization 2010; Klein 2005). It is not only the Caribbean. Cruise passenger arrivals in Victoria, British Columbia, and Seattle increased more than 1,000 % between 1999 and 2009 (Klein 2005b; Port of Seattle 2010; Port of Victoria 2009), while arrivals in neighboring Vancouver decreased 5 % over the same time period (Klein 2005b; Port of Vancouver 2009).

Cruise tourism's growth has brought with it concern about environmental impacts, including the footprint left ashore by cruise tourists. As well, there are debates about the economics of cruise tourism – the value of cruise passenger spending and costs associated with infrastructure required to host ships – and about the impact of cruise tourism on local culture and society. These three areas of concern – the environment, economic benefits, and maintaining cultural integrity – are embedded in the concept of "sustainable tourism."

However, the question must be asked as to sustainable for whom. Corporations, including cruise lines, talk about "best practices" as an example of sustainable practices, or they equate meeting or exceeding international regulations with sustainability (Seatrade Insider 2010a). They fail to include directly impacted local

communities and stakeholders in the determination of sustainability. One way to put communities and stakeholders into the equation is to think in terms of responsible tourism. Responsible tourism is a useful lens for assessing the impact (or sustainability) of cruise tourism and for considering the range of environmental and social policy issues and how these issues are interrelated and at times synonymous.

## The Concept of Responsible Tourism

Responsible tourism emerges from the movement for sustainable tourism. Sustainability was defined in 1987 by the Brundtland Commission as "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). Five years later, the Earth Summit's Agenda 21 offered a blueprint for sustainable development focusing on environmental issues and equitable distribution of economic benefits derived from development and tourism (UNEP 2002). According to the UNEP Program on Tourism,

> Sustainable tourism development meets the needs of the present tourists and host regions while protecting and enhancing the opportunity for the future. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled, while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems. (Responsible Travel Handbook 2006:12–13)

Ten years later, in 2002, the World Summit on Sustainable Development was convened. A preliminary report jointly prepared by four industry bodies (including the International Council of Cruise Lines) gave direction for the summit. The report reflected industry's interests and concerns, focusing more on best practices, certification programs, and the economic benefits of tourism than on the inherent challenges to achieving sustainability. The primary focus when it came to cruise tourism was waste management practices and procedures (see UNEP 2002) even though there is a wide range of environmental concerns (Copeland 2008; EPA 2008).

Immediately preceding the World Summit on Sustainable Development was the first International Conference on Responsible Tourism in Destinations (RTD). The conference shared the same concerns as sustainable tourism (i.e., a focus on environmental, economic, and sociocultural impacts) but was grounded in ethics and human rights – companies are expected to do what is morally and ethically "right" (McLaren 2006) from the perspective of consumers and communities. It is not a matter of simply reducing negative impacts but of mediating and/or ameliorating those that persist. RTD concluded with the Capetown Declaration. It defined responsible tourism as:

- Minimizing negative economic, environmental, and social impacts
- Generating greater economic benefits for local people and enhancing the well-being of host communities, improving working conditions and access to the industry

- Involving local people in decisions that affect their lives and life chances
- Making positive contributions to the conservation of natural and cultural heritage, to the maintenance of the world's diversity
- Providing more enjoyable experiences for tourists through more meaningful connections with local people and a greater understanding of local cultural, social, and environmental issues
- Providing access for physically challenged people
- Maintaining cultural sensitivity, engendering respect between tourists and hosts, and building local pride and confidence (see RTD-1 2002)

Responsible tourism effectively focuses attention on both social policy and environmental policy concerns and is a reminder that tourism policy necessarily includes both social and environmental policy issues.

## Dynamic Relationship Between Social and Environmental Policy

The most frequent scenario for cruise tourism is where social policy – based mainly on a mistaken belief that a cruise ship is a cash cow – is the driving concern. In these cases, social policy becomes the de facto environmental policy. For example, Environmental Impact Statements (EISs) may not be undertaken, or they may be compromised by political and economic interests, or a decision to open a port community to unlimited growth of cruise tourism may very quickly cause the local community to deal with increased air pollution, larger volumes of solid waste as a result of day visitors, and concentrations of people that undermine locals' quality of life.

In some cases environmental issues emerge later as grassroots community groups become concerned, engage in action, and attempt to demonstrate how social policy decisions have, because of their impact on the environment, been de facto promulgation of environmental policy. There are some cases when grassroots organizations are able to "force" the consideration together of environmental policy and social policy (or they are at least on the table at the same time) so policy-makers see that decision on one is also a decision on the other. There are rare occasions where environmental policy proceeds first. In those instances social policy issues are drawn into the equation when industry becomes concerned and engages in action – again bringing into focus the synonymous nature of environmental policy and social policy. Each of these three scenarios will be considered in turn.

### *Social Policy as Environmental Policy*

The most common scenario is where a country or port community grows cruise tourism without regard for environmental issues – in these cases social policy decisions are de facto decisions about environmental policy. Even though information is

available from impeccable sources – the US Congressional Research Service and US Environmental Protection Agency – ports in the United States and elsewhere choose to unquestioningly believe cruise corporations' claims about environmental responsibility and economic benefits to ports (if ports receive less than the norm, they are told it is related to what they are doing, not a reflection of cruise passenger spending patterns). For some, such as ports in the Caribbean, it is a matter of economic interests overriding other concerns, including those for the environment. Resulting social policy reinforces existing economic class divides, including inequities in access to employment and required government services; places priority on where revenues to the public purse are spent; and reifies the power of decision-makers. For other ports, such as new ones "Down Under" and in Europe, cruise tourism is new and issues about the environment and about overcrowding have yet to arise. The interrelationship of social policy and environmental policy has yet to be realized even though environmental policy had already been set by default.

The country of Belize presents a good example of how social policy has become synonymous with environmental policy. While environmental issues are at play, the problems identified have not been addressed. The government's social policy is also its environmental policy. The government of Belize is driven largely by a belief that cruise tourism will bring lots of money into the economy, which is not necessarily the case (see Klein 2005a). Even though cruise passengers account for 75 % of foreign visitors, there are two issues at play. One relates to the distribution of income – despite the number of visitors brought to the country, cruise tourism accounts for a mere 10 % of employment in the tourism industry (CESD 2007). The other issue is the problem of people pollution.

## Distribution of Income

Passengers arrive by tender at Fort Street Village in the center of Belize City. The village is contained by a wall and security fence and has within a range of shops and eateries/bars, many of which are found in other Caribbean ports (including Diamonds International, which until 2011 co-owned the village with Royal Caribbean). The retail space is expensive so few local merchants can afford to be there; there is a small crafts market for them in another area, but the rents again are relatively significant given the degree of income. The result is that merchants in the village have income, despite heavy overhead costs, but merchants outside do less well given the relatively few cruise passengers who venture independently from the village. The barricaded nature of the port today is quite different than when I visited in 1994 – passengers debarked the ship and after a short walk through a vegetable and crafts market area were in downtown Belize City.

Most passengers take shore excursions. These are major moneymakers for the cruise ship, which holds back 50 % or more of what passengers pay onboard for a tour. This creates two problems. First, a passenger spending $50 for a shore excursion expects a $50 product, but the shore excursion provider only receives $25. While the cruise ship walks away with its cut, the shore excursion provider must

provide a quality product that pleases passengers and the cruise line while still retaining a small profit. If passengers are unhappy, they will blame the shore excursion provider, unaware of the cruise line's cut, which is sometimes more than 50 %: there is a shore excursion in St. Vincent and the Grenadines where the cruise line retains 90 % (CMC 2007) and an excursion in Halifax, Nova Scotia, where it retains 80 % (Sandiford 2003).

A related problem is the distribution of economic benefits within the port community/country. Still using Belize as an example, there were several speakers at the third International Conference on Responsible Tourism in Destinations in October 2009 who spoke about a small handful of individuals making large amounts of money from cruise tourism, but the majority of Belizeans realize little if any benefit. In fact, cruise tourism earns considerably less for the economy than traditional land-based tourism. A 2007 study found cruise visitors spent less than half as much per day as land-based visitors ($44 versus $96). And as already indicated, cruise passengers accounted for 75 % of arrivals to Belize, but only 10 % of employment in the tourism industry (CESD 2007). While cruise tourism brings many more visitors, its economic impact is relatively small compared to land-based tourism and capital is concentrated in a few hands.

## People Pollution

People pollution refers to the point at which the carrying capacity of a port is exceeded (Baekkelund 1999). Curson (2009) describes the cruise passenger problem differently, calling it pack behavior: "almost as if all passengers were connected by a common behavioural umbilical cord, is the order of the day. Thousands disembark together, congregate in the terminal area, and then proceed through the city centre en masse, often producing more than a ripple of unease to run through the local population, who may well avoid the downtown area when large cruise ships are in." This can be seen in most ports in Alaska that see 10,000 or more passengers a day in communities such as Skagway with a population of less than 1,000.

The sheer number of cruise passengers raises the question of whether visitors have an opportunity to interact with and to experience local culture and whether local cultures are treated respectfully. In Belize, for example, locals warn visitors not to visit Xunantunich on "cruise day," one of the main Mayan sites for cruise passengers (Krohn 2010). Passengers' experience of the sacred site is limited by both the length of time spent and by the number of other cruise passengers sharing the site – on most days the site is quiet. Cruise day is especially busy for the operator of the hand-cranked bridge that crosses the river to get to the Mayan site (quaint when crossing in a single vehicle on a lazy day), and for some of the craftspeople selling wares at the crossing point, but otherwise passengers get back on their bus (it is a two-and-a-half-hour ride from the ship to the site) and are whisked someplace else. There are many other sites in other countries about which the same can be said – where the sheer number of passengers negatively impacts the quality of the sociocultural experience.

People pollution and inequitable income distribution are artifacts of social policy, even though the volume of passengers has clear environmental implications. The government of Belize, however, has chosen to ignore environmental issues, even though they have been raised. As when the captain of a Royal Caribbean ship, interviewed on Belize television, said in response to a question of where the ship discharged its sewage that the ship's sewage was discharged where it was anchored, between Belize's mainland and barrier islands off the coast – an area where under international convention discharge was prohibited. Like other destinations, there is an apparent fear that upholding environmental regulations will mean a loss of cruise tourism and its perceived economic benefits. Social policy is driven by perceived economic benefits and inadequately addresses environmental and sociocultural issues.

## *Environmental Issues Raised by Grassroots*

Another scenario is where grassroots organizations have effectively put environmental issues on the table. There are two types of situations. In one grassroots interests have successfully added consideration of environmental policy to discussion of social policy. In the other type of situation, environmental policy issues are put on the agenda parallel to the social policy issues related to cruise tourism. There are variations in success.

### Adding Environmental Policy Issues to the Debate

One case where environmental issues been added to the discussion, after social policy decisions had been made, is Alaska in 2000; however, in this case each policy was considered independent of the other. Royal Caribbean International had just been fined $18 million by the US government and $3.5 million by the State of Alaska for discharging hazardous chemicals, oily bilge water, and other wastes in Alaska's coastal waters (Royal Caribbean, in sum, was fined $30.5 million in 1998 and 1999). Under broad-based citizen pressure, the governor introduced a voluntary program for testing the effluent from ships discharging wastewater in Alaska – only 11 of 24 ships agreed to participate. The results of the monitoring were, in the words of Alaska's governor, "disgusting and disgraceful." Seventy-nine of 80 ships' effluent had levels of fecal coliform or total suspended solids that would be illegal on land – up to 100,000 times the federal standard (Klein 2002). This led to the Alaska Cruise Ship Initiative, passed in 2001 despite strong lobbying against it by the cruise industry. The Initiative set standards for wastewater discharges in Alaska state waters and put in place a program of sampling, testing, and reporting of wastewater and air discharges that was paid for by the cruise industry. This was Alaska's first step in implementing environmental policy applying to the cruise industry; it subsequently put in place monitoring of ship discharges and enforcing limits based on

science. Environmental policy is social policy in that cruise ship air pollution is reduced (which has direct health implications) and the quality of coastal waters (from which many Alaskans earn their livelihood as fisherpersons) is preserved.

Key West, Florida, gives another example. There were always concerns about the environmental impact of cruise ships, especially given its location in the Florida Keys National Marine Sanctuary, but these tended to come from environmental organizations or other segments of the community. Then in 2003, problems caused by huge numbers of cruise passengers led to broad-based citizen action. Cruise passenger numbers had risen sharply from 375,000 in 1995 to close to a million in 2004. Many on the two-by-four-mile island saw cruise tourism as a major reason for the "getting ugly" label assigned by *National Geographic Traveler's* 2004 "Destination Scorecard." Key West scored 43 out of 100. Concerns extended beyond the congestion at tourist attractions, the kitschy shops that had sprung up around the port, the disruption caused by Conch Trains running cruise passengers around the town, and the assertion by *National Geographic Traveler* that the city's character was lost. Restaurant and hotel owners saw that cruise tourism was displacing people who in past would stay at a hotel for a week or more, spend money in restaurants and bars, and shop in the stores. The president of the Lodging Association of the Florida Keys and Key West complained that cruise passengers change the nature of a destination (Babson 2003).

Citizens in Key West directly confronted the problem in January 2003. A grassroots organization, Liveable Oldtown and its political action arm Last Stand, held a panel discussion entitled "Keys in Balance," which looked at the good, the bad, and the ugly of cruise ships in Key West. While acknowledged that cruise ships generate approximately $2.5 million in disembarkation and docking fees for the city's yearly budget, there were questions about the impact of cruise ships on the fragile marine environment surrounding the lower keys, the risk of dependence on cruise ship dollars, and the social impact of thousands of cruise passengers pouring into town each day. The overarching question was stress on Key West's 27,000 residents from the daily influx of cruise ship passengers. A public education and political action campaign followed from the forum (Klein 2005).

Anger peaked in March 2004 when local residents learned the city had been violating a 1993 resolution that placed a limit of seven cruise ship visits per week at Pier B – a privately owned dock adjacent to the Hilton Hotel – one of the city's three cruise docks. Liveable Oldtown called for a protest on March 11, 2004, when there would be five ships (more than 12,000 passengers) visiting the city. They encouraged residents to drive up and down Duval Street between 11 a.m. and noon. Though cruise passengers barely noticed the added congestion, the point was well made with city residents and city councilors by the hundred or so protestors (see O'Hara 2004).

The protest had the desired effect. Solidarity increased in calls from the community to cutback cruise tourism. The city was forced to address the concerns, which 1 year later were leant support by a city-funded quality of life study that looked closely at social, economic, and environmental impacts of cruise tourism (see Murray 2005). City councilors who favored scaling back cruise tourism were

elected following the study's release, and the city began reducing cruise passenger numbers. The success in improving the status of environmental issues, much like in Alaska, was the strength of a broad-based community coalition pushing the issue.

Efforts to put environmental policy issues on the agenda elsewhere have met with varying results. The Friends of Casco Bay and Casco Waterkeeper in Portland, Maine, utilizing the labor and knowledge of a group of law students, prepared legislation to protect Maine state waters from cruise ship discharges. In 2004, the Maine Legislature passed LD 1158 which bans discharge of gray water or any sewage from an MSD into state waters but allows discharges from AWTS meeting Alaskan standards. The legislation is less stringent than originally drafted as a result of stiff lobbying and opposition by the cruise industry. But the Friends of Casco Bay had been successful in achieving something, achieved in only three or four jurisdictions (Klein 2005). Subsequently, the state successfully petitioned the US Environmental Protection Agency (EPA) to declare, in 2006, Casco Bay a No Discharge Zone. Consequently, while discharge from an AWTS meeting Alaska standards is permitted in state waters, it is banned in Casco Bay (Klein 2009).

The James Bay Neighborhood Environmental Association in Victoria, British Columbia, has had less success. The neighborhood is adjacent to the cruise port (Ogden Point), which has seen a 1,000 % increase in cruise passengers in 10 years – in 2009, the port received almost 400,000 passengers in a four-and-a-half-month season. The James Bay community is concerned about noise from ships as they leave port, most at midnight, but mainly about air quality on cruise ship days, both from ship emissions and from increased vehicle traffic for passenger and crew tours and taxis. The organization engages in public education, conducts community forums, and regularly engages in discussion with the port (Klein 2008), but it has not garnered broad-based support in the city. The port, supported by the cruise industry through the North West Cruise Ship Association, resists much of what the Association would like. At the same time, the neighborhood has been successful in having a series of air quality tests during cruise season, and these have demonstrated that air quality on those days is below prescribed World Health Organization standards (Cleverley 2010). Regardless, they have not been able to effect policy change, despite having a vocal and strong representative in Parliament.

## Environmental Issues and Social Issues in Concert

In some cases environmental issues and social issue are considered together, yielding an ideal situation where environmental policy and social policy are recognized for their interrelationship and requiring explicit decisions about each other. This may be a formal decision as was the case in 2002 and 2003 when the San Francisco Board of Supervisors included environmental and community groups (e.g., Bluewater Network, San Franciscans for a Clean Waterfront, Campaign to Safeguard America's Waters) in discussions of how to ameliorate the anticipated impacts of a new cruise terminal. Economic, social, and environmental concerns were considered in balance with one another.

This is similarly the case where ports have coupled expansion (based mainly on socioeconomic policies) with measures to reduce environmental impacts: speed limits in San Diego and Victoria; cold ironing (plugging into shoreside power) in Juneau, Seattle, San Francisco, Los Angeles, and elsewhere; and in one case unsuccessfully linking use of low-sulfur fuel with use of a new cruise terminal (Klein 2009). In 2003, the Port of Seattle had a requirement for ships using its newly constructed Terminal 30 to use fuel with no more than 0.5 % sulfur while home porting (McClure 2003). Cruise lines initially agreed to the condition, but the port never enforced it so the cruise lines never followed through. This became known in 2004 when the California State Senate was holding hearings on legislation that would have required ships in California waters to use low-sulfur fuel (0.5 %). Proponents used the requirement in Seattle to justify the legislation, but the cruise industry responded that they were not using low-sulfur fuel in Seattle and effectively killed the legislation (Klein 2005).

Environmental issues and social issues also become linked when grassroots, community groups become involved. In some cases environmental policy advocates are largely environmental organizations. In other cases there are broad-based coalitions including a range of interests.

Vanuatu provides a good example of a broad-based coalition. On November 13, 2006, *The Sunshine Coast Daily* in Australia reported taxi drivers in Vanuatu had gone on strike, refusing to transport passengers aboard P&O Australia's *Pacific Sky*, forcing them to walk 5 km to town. Other service providers also withheld service. It had just been learned that the company had illegally dumped one-half million liters of oil on the island.

Apparently, deep holes were dug, lined with thin plastic and then filled with oil and raw sewage. The site was within 1 km of a village and school and just above a river used for drinking, washing, and swimming. The motivation is as follows: it would cost US$30,000 to appropriately dispose of the waste at approved facilities in the region, whereas dumping illegally costs less than $200. The company faced a potential fine of $35 million but in the end was able to convince the government that an apology and commitment to clean up the mess were sufficient. Had there not been a citizen reaction, the government may not have held the company accountable. Environmental concerns are now part of discussions about cruise tourism. This case illustrates vividly how a passive environmental policy had potentially dire social implications and how social policy was compromised by not explicitly recognizing environmental issues. The decision about one is a decision about the other.

Save Our Spit in Gold Coast, Australia, similarly succeeded largely because it had a strong community base. The organization was established after the Queensland government in 2004 announced plans to build a cruise terminal on the spit overlooking the entrance to the bay where Surfer's Paradise sits. A broad-based coalition of business, recreational users of the area, and environmental interests joined together and formed Save Our Spit. Though comprised of groups with sometimes diverse and competing interests, the organization's sole purpose was to prevent construction of a cruise terminal and to preserve the spit for recreational boaters, surfers, and citizens who would spend a leisurely day out in Douglas Jennings Park. Its efforts also reflected concern

about overblown expectations for income from cruise tourism and displacement of an already thriving tourism industry. A 2-year fight included public rallies, community education campaigns, and lobbying of state and federal governments.

Success appeared elusive, but an election call in 2006 led to the main election campaign period coinciding with an already planned major event. An international expert was brought in for press conferences and media work, and Save Our Spit planned a rally expected to attract more than 5,000 people. Two days after the media blitz began and a day before the rally, the Queensland Government announced it was canceling plans for the cruise terminal. Save Our Spit had succeeded. Its success, like the success of citizens in Key West, is attributed in large part to the fact that the organization and effort had a single focus and goal. As a result it could not be sidetracked or bought off by competing interests or trades that would give concessions on a different issue. Though coalition partners were approached with deals that gave them individual concessions on others issues, Save Our Spit as the collective organization could not be bought and remained steadfast (see Klein 2008).

Monterrey, California, similarly had a broad-based coalition, but in this case, the coalition was strengthened by a cruise line's behavior. In April 2002, representatives from environmental organizations, the City of Monterey, the State of California, and the Monterey Bay National Marine Sanctuary, met with cruise lines planning to visit Monterey and told them that if they could not refrain from dumping pollution into the Bay, they were not welcome. Crystal Cruises was among the four cruise lines that travel into Monterey Bay and it sent a letter to the city promising not to discharge any sewage or trash from its ship *Crystal Harmony* while in the Bay (Madigan 2002). The May 2002 letter to the California Regional Water Quality Control Board was signed by Crystal's vice president, Joseph Valenti, who reiterated the company's environmental commitments at a public lecture given by this author at the Monterey Institute for International Studies on January 14, 2003. He complained both publicly and privately that he had been denied time to present the cruise line's point of view at the lecture; however, he did make statements during the lecture asserting that Crystal Cruises was an exemplary company in the industry given its high environmental standards. Members of the audience were visibly being swayed by Valenti's claims, and in the aftermath, there was less solidarity among the various stakeholders concerned with cruise ship pollution.

Then in late February 2003, it was learned that the *Crystal Harmony* had in fact discharged over 36,000 gal of wastewater into Monterey Bay. When asked why they had not reported the discharge when it occurred, Valenti defended the silence by saying the company had only broken its promise; it had not violated any laws (Laidman 2003a). International Council of Cruise Lines President, Michael Crye, also dismissed the violation telling a news reporter the ship's discharge occurred 14 miles from the coast so it was not illegal (Fletcher 2003). These statements served to cement solidarity around environmental concerns among wide and diverse segments of the region. The people of Monterey expressed their extreme displeasure with these discharges, and on March 18, 2003, the Monterey City Council voted to bar all Crystal Cruises ships from entering the port of Monterey for 15 years and barred the *Crystal Harmony* forever (Madigan 2003; Laidman 2003b).

**Environmental Policy Takes Precedence**

Emission Control Areas (ECA) is a recent example of environmental policy taking priority as regards cruise tourism. These regulations requiring low-sulfur fuel have been implemented largely to reduce the negative health effects of ship emissions. The European Community issued Directive 2005/33/EC requiring all ships while in European ports to use fuel with sulfur content of 0.1 % or less effective January 1, 2010. Six months later, provisions in Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL) regarding Sulfur Dioxide Emissions Control Areas (Baltic Sea, North Sea, and English Channel) placed a limit of 1.0 % sulfur content; the limit reduces to 0.1 % in 2015. Following developments in Europe, the USA and Canada partnered to establish the North America Emission Control Area (extending 200 miles from the coast), which was ratified by the International Maritime Organization on March 26, 2010 (Lagan 2010). It limits sulfur content in fuel to 1.0 % effective 2012 and 0.1 % by 2015.

The cruise industry argued against the emission control areas in Europe (Seatrade Insider 2010b). It also voiced concern about increased fuel costs associated with the North American ECA (Canadian Press 2010) and asked that consideration be given to "…alternative means, such as scrubbers, that ships could use to meet emissions goals, and to take a piecemeal, rather than blanket approach. 'The ECA area should be tuned to prioritize those areas where urgency exists and the greatest health and environmental benefits can be achieved'" (Stueck 2010). Ironically, while saying they support the health and environmental goals behind the creation of the ECA, cruise industry associations questioned the research on which the regime is based and warned it could hurt the Canadian and North American cruise sector insofar as ships relocating elsewhere (Stueck 2010; Power 2010).

The state of California also implemented environmental policies that, though opposed by the cruise industry, gave priority to environmental issues. The legislation was pushed by a coalition of environmental organizations, including Bluewater Network. California Assemblyman Joe Simitian, who sponsored a number of bills, gave as his reason for introducing legislation to regulate cruise ship discharges in state waters: "Regrettably, cruise lines have a history of violating their agreements and gaming the system. 'Trust us' is no longer an effective environmental policy" (Weiss 2003: B1). He saw Alaska and viewed legislation with enforceable standards and penalties as the only way to go. Between 2003 and 2004, the state banned discharge of all wastewater (including from AWTS), sewage sludge, hazardous wastes, and oily bilge in state waters. It also banned the use of incinerators in state waters.

The Alaska Ballot Initiative similarly focused primarily on environmental policy concerns but also had social benefits. On the environmental side, it increased fines for wastewater violations; mandated new environmental regulations for cruise ships, such as a state permit for all discharges of treated wastewater; and introduced environmental observers (ocean rangers) on all cruise ships in state waters. On the social policy side, it established a $46 per passenger head tax and taxed revenues from casinos when operating in Alaska state waters. Revenues from the taxes are disbursed to local communities affected by tourism and used to fund public services

and facilities used by cruise ships. Supporters of the initiative contend the cruise industry does not pay enough in taxes to compensate for its environmental harm to the state and for the community and social services it uses. Opponents argued that the initiative would hurt Alaska's competitiveness for tourism. The cruise industry worked hard to defeat the legislation, first at the ballot box (a campaign reportedly costing more than $2 million) and later in the courts, but was unsuccessful (Klein 2008). Elements of the ballot initiative continued to be fought over in the Alaska legislature until mid-2010 when the legislature reduced the head tax from $46 to $30 per passenger.

Moloka'i, Hawai'i, is another example where environmental issues were brought to the forefront after they had been ignored in social policy. Here again there was broad-based community solidarity. In October 2002, members of *Hui Hoopakela Aina* ("Rescue the Land") raised concerns about the potential adverse impact on the ocean and reefs off Kuanakaki Harbor when Holland America Line's *Statendam* visits December 28. It would be the first large cruise ship to stop at Moloka'i. In addition to very specific concerns about problems associated with 1,200 passengers offloading onto a small island with limited facilities (including public toilets), the community complained about the absence of a proper environmental review. According to one community leader: "There was no process to even ask questions … It took us 6 years to move just a traditional fish pond stone, and these guys can drive up to our reef with a floating city with no process at all" (Kubota 2002).

With Holland America remaining steadfast in its plans, Earthjustice represented *Hui Hoopakela Aina* and went to court. It claimed the state had failed to require an environmental review before granting access to Moloka'i. The state and cruise lines said no such review was needed. Earthjustice asked for a temporary injunction because of the environmental impact. The judge agreed to hear the matter, but not until after the *Statendam* had made its first visit. On December 28, 2002, *Statendam* dropped anchor off Moloka'i, with more than 100 demonstrators lining the harbor, and many media people watching from beyond. It was a wonderful photo opportunity and one that was well exploited by *Hui Hoopakela Aina*. After a short while, *Statendam* sailed on claiming rough water and windy conditions prevented safe use of tenders for transfer of passengers to shore. The *Statendam's* next visit on January 22 was also canceled because the ship was asked by the coast guard to assist three people aboard a sinking sailboat. The Earthjustice lawsuits did not succeed, but there have been no visits to Moloka'i by large cruise ships since, purportedly because of an agreement between the state and cruise industry (Klein 2005).

## The Dynamics of Intersection

Cruise tourism is interesting for seeing the dynamic between social policy and environmental policy and how policy decisions in one realm are equally decisions about policy in the other realm: environmental policy is social policy. While the economic benefits of cruise tourism are clearly social issues, concerns around pollution and

overcrowding are environmental issues. It appears the industry is effective in most jurisdictions in keeping the focus on social issues (for them, economic benefits) and away from environmental concerns. Relatively few cruise ship destinations have taken on environmental issues, many fearing the loss of business should they protect their environmental interests. Their social policy has, by default, articulated an environmental policy that gives license to the cruise industry to behave as it likes.

As seen, there are examples where grassroots community organizations have forced environmental issues on the agenda and have kept them there. Even when the issue is mainly environmental, it appears that success in having their concerns reflected in environmental policy is related to a broad community-based coalition of groups and/or individuals: the broader the coalition, the greater the likelihood for success. An environmental organization alone is less likely to succeed. This was certainly the case in the case examples given here.

Recently implemented environmental policies by governments and policies "forced" by grassroots organizations give interesting insights. In these cases, it is often the industry that becomes active and attempts to change the environmental policy, in some cases, through existing social policy that heretofore had downplayed or ignored environmental concerns. The industry links social issues and environmental issues in an attempt to increase its persuasive pressure. This is illustrated in the industry's threats to take ships away from Canada and the USA in retribution for the North America ECA. The perceived socioeconomic costs associated with loss of business are intended to weaken each government's resolve; a threat that may not have the desired effect on the USA or Canada, but one that can very easily succeed with many small island nations and ports that have become dependent on cruise tourism.

Overall, there is an interesting dynamic between social policy and environmental policy. When social issues take precedence, at the exclusion of environmental issues, the cruise industry is relatively silent. In contrast, when community groups are successful in putting environmental concerns on the table, the industry becomes more activist. It actively promotes its economic value, with an implicit threat that addressing environmental concerns could have social and economic costs; at the same time, the industry touts its environmental responsibility. These arguments become stronger when environmental issues take precedence over social issues. On the other hand, environmental groups and citizen coalitions are most active when they are working to get environmental issues and concerns onto the agenda. Some are relatively quiet once they succeed.

There is no doubt a relationship between environmental policy and social policy. Each is defined either explicitly or one or the other is defined implicitly by its core issues not being addressed. This is particularly the case with cruise tourism – if the cruise industry had its way, governments would promulgate social policy without regard for environmental concerns. There is a failure to recognize that such a social policy is itself environmental policy. It appears counterproductive to develop cruise tourism with a solitary focus on only social issues or environmental issues. The two are inextricably linked. If a government pursues a social policy at the expense of (or while ignoring) environmental issues, it risks a backlash response from

environmental and community groups. Conversely, if it pursues an environmental policy at the expense of (or while ignoring) social issues, it risks a backlash response from industry. An efficient and productive strategy is to recognize the synonymous nature of social policy and environmental policy and to pursue them as they should – in concert with one another. The responsible tourism framework helps focus decision-makers on the range of social and environmental concerns. It also helps identify stakeholders that need to be involved in the responsible growing of cruise tourism.

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# Chapter 14
# Sustainable Universities: Rhetoric Versus Facts

**Valerie Padilla Carroll and Rhonda R. Janke**

In the past few years, colleges and universities in the USA have begun to pay more attention to sustainability. The October 2006 issue of "The Chronicle of Higher Education" was devoted to asking "what is a sustainable university?" The chronicle pointed out that there seems to be little agreement on the kinds of actions needed to achieve sustainability and noted that few universities have incorporated sustainability into their teaching and research (Anonymous 2006). Uhl et al. (1996) were some of the first to make a case that sustainability education should be a primary mission within universities, echoing David Orr's (1992) even earlier calls to promote ecoliteracy as a fundamental goal of higher education. Rowe's later paper (2002) illustrates examples where this is beginning to happen within higher education. One way that universities have embraced sustainability is through the development of programs and courses specifically focused on sustainability. Some may have implications for environmental policy, but generally don't impact university social policy. However, a more common way for universities to show that they are enacting sustainability policies is though assessment tools.

In the rapidly growing field of sustainability assessment, most assessments are loosely based on the UN Bruntland Commission (1987) definition of sustainability as the concept of "meeting present needs without compromising the ability of future generations to meet their own needs." Others focus more on what is now called the "triple bottom line" of environmental, economic, and social sustainability.

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Assessment can include indicators, indices, and other measures of progress against a baseline or starting point. Some compare organizations to one another using a scoring or ranking system. Many of these involve metrics that may or may not require policy change.

Tools used for sustainability assessment by business and universities have been around for many years, and there is a growing body of literature comparing these tools. These comparisons range from determining if the "assurance provider" involved in a sustainability report comes from the auditing profession (Simnett et al. 2009) to the more complex analysis of Ness et al. (2007) who determine whether specific tools are indicators, are product-related, or are integrated assessment tools. Their comparisons include a wide range of indicators including "sustainable national income" used by the Netherlands, to various life cycle assessments to risk and vulnerability analysis.

In this chapter, we are more interested in sustainability criteria and assessments that are being used or could be used by colleges and universities. Shriberg (2002) rated the efficacy of the "first generation" of 11 assessment tools, only one of which is still in use (the National Wildlife Federation's Survey). Shriberg's intent was to look at the quality of the tools in actually assessing and moving toward sustainability from a campus perspective and to point out which ones are doing a better job than others.

Such is our intent as well but with additional components. Here we will critique several of the current sustainability pledges and rating systems/scorecards. We are assessing them as tools to promote sustainability and also examining the degree of transparency of intent, execution, and presentation of data. We are interested in whether these assessment tools and pledges address social policy, or only environmental issues and policy. Additionally, we consider more fundamental issues and questions by examining the wider cultural concepts that underpin the structure of universities in the USA and their social and environmental policies (Stewart 2010). We find that these assessment tools and the wider cultural concepts that underpin them promote a system where social and environmental policy is problematically treated as separate.

## Sustainability Scorecards and Pledges

We will examine nine pledges and scorecards/assessment systems. Eight of these were developed specifically for use within the context of institutions of higher education, while one was developed for industry, but could be used by universities. Details are summarized in Table 14.1 and they are discussed roughly in order of complexity from the most focused to the more comprehensive.

One of the simplest measures or proxies for sustainability is carbon footprint. This is the main focus of the "American College and University Presidents' Climate Commitment." As of 2010 this program includes 673 colleges and universities as signatories, representing 5.8 million students, or 1/3 of the postsecondary student population in the USA according to its organizers. Of all of the sustainability

**Table 14.1** Examples of current programs/pledges/scorecards to promote sustainability within higher education in the USA (some are global)

| Name/sponsor/website for more information and purpose | Year started/level of participation | Pros and cons | Include social policy? |
|---|---|---|---|
| *American College and University Presidents' Climate Commitment* (www.presidentsclimate-commitment.org) Led by a steering committee of 22 university and college presidents, hosted and staffed by Second Nature, a Boston-based nonprofit, with support from AASHE, and also EcoAmerica<br>*Purpose*: To reduce carbon emissions. The commitment involves a series of voluntary reports, including (1) an implementation profile due within 2 months of the start date, (2) a greenhouse gas emissions inventory due within 1 year, and (3) a climate action plan due within 2 years | This program was initiated in December of 2006 and has grown from 12 to 673 colleges and universities. As of July 2010, 15 schools have been removed from the signatory list due to not following through with required reports | Encourages universities to develop an inventory, set targets and goals, and then follow up on those. Requires commitment and signature from the highest level of administration and active follow-up by staff responsible for implementation.<br>Of all of the sustainability programs examined, this one has the narrowest focus—carbon | No |
| *The Graduation Pledge* is a project of Bentley University Alliance for Ethics and Social Responsibility (www.graduationpledge.org)<br>*Purpose*: Graduating students sign a pledge that states the following: "I pledge to explore and take into account the social and environmental consequences of any job I consider and will try to improve these aspects of any organizations for which I work" | This program has a 20+ year history, over 100 participating schools at this time, plus a short list of schools who have participated in the past but aren't currently active | Promotes personal involvement and responsibility.<br>Nothing binding, and no institutional commitment is required | Is part of the pledge |

(continued)

**Table 14.1** (continued)

| Name/sponsor/website for more information and purpose | Year started/level of participation | Pros and cons | Include social policy? |
|---|---|---|---|
| *Talloires Declaration* (www.ulsf.org/programs_talloires.html) Registrar for the declaration is the organization University Leaders for a Sustainable Future (ULSF), Washington DC<br>*Purpose*: By signing the declaration, institutions of higher learning will be world leaders in developing, creating, supporting, and maintaining sustainability. The agreement must be signed by the university's chancellor or president and includes commitment to ten actions | Had its origins at a conference in 1990 in Talloires, France. As of June 2010, there were 419 signatories from 52 countries on 5 continents, including 163 from the USA | Required institutional commitment to ten actions including the following: (1) increase awareness of environmentally sustainable development, (2) create an institutional culture of sustainability, and (3) educate for environmentally responsible citizenship.<br>It is not clear if there is any follow-up to see if they are actually following any of the ten action steps | Commitments are vague and subject to interpretation—can't tell |
| The *National Wildlife Federation's Campus Report Card 2008* (www.nwf.org/Global-Warming/Campus-Solutions published on-line August 21, 2008) The National Wildlife Federation partnered with the Princeton Survey Research Associates International to conduct the survey<br>*Purpose*: To provide a national profile of environmental performance of America's colleges and universities. They cover broad topic areas including transportation, building energy efficiency and use of alternative energy sources, and water conservation. Institutions are not scored or ranked, and only aggregated data are presented in the summaries | In 2001, on-line survey sent to 4,100 accredited 2- and 4-year degree granting institutions received 891 completed surveys. In 2008, similar survey was sent to 3,915 institutions, with a response rate of 1,237. A total of 348 schools filled out surveys in both 2001 and 2008 | Is one of the few programs at this point that have enough data to compare the same questions answered by the same institutions at two points in time.<br>Only "medium" in terms of transparency. There were questions about whether the campus had a commitment to preserving wildlands, use of water conservation, etc. but nothing about local food or organic practices. There was also nothing about research priorities, extension, or university outreach | This survey included nothing that looked at social policy or social justice issues as far as we could tell from the published summary |

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|---|---|---|---|
| *College Sustainability Report Card* conducted annually by the Sustainable Endowment Institute (http://www.greenreportcard.org). The institute was founded as a special project of the Rockefeller Philanthropy Advisors<br>*Purpose*: To compare schools with significant endowments with one another and over time and to encourage more sustainable practices, as defined by their survey instrument. The surveys include nine categories including administration, climate change and energy, food and recycling, green building, student involvement, transportation, endowment transparency, investment priorities, and shareholder engagement. A letter grade is assigned to each category, and an average grade overall is posted ranging from A+ to F | The institute was founded in 2005 and they've been publishing the "green report card" since 2007. The 2010 report card profiles 332 schools in the USA and Canada | High level of transparency—surveys and responses is published on-line. Persons responsible for each area actually fill out the surveys for their institution. High response rate. High emphasis on endowment, which other surveys often leave out.<br>Only the largest institutions in terms of endowment are invited to fill out surveys. Others must "apply" to be included. Does not assess anything related to university teaching, research, or extension/outreach. A different and longer survey is sent out each year, so year-to-year comparisons are problematic | Only as it relates to endowment "investment priorities" or "shareholder engagement" |
| *Sierra Cool Schools: The Third Annual List* (published on-line Sept./Oct. 2009, http://www.sierraclub.org/coolschools). Conducted by the Green Living editor of the Sierra Club magazine<br>*Purpose*: Publish a top-10 list, also an honor roll list of the top 20 and a longer list of 135 schools with ratings for individual categories, final score, and final grade. Grades range from A to F | The year 2009 is listed as the "third annual," so was the first list published in 2007. Their longest list includes 135 schools. Not clear if more are considered or not | There are eight categories worth ten points each and a bonus category. The categories are efficiency, energy, food, academics, purchasing, transportation, waste, and administration.<br>Not clear how the list of schools is chosen, who is rating them, and what data are used to do the rating. They receive an "F" for transparency! | Nothing in their categories on social policy or social justice. Individual questions and criteria not available to assess |

(continued)

**Table 14.1** (continued)

| Name/sponsor/website for more information and purpose | Year started/level of participation | Pros and cons | Include social policy? |
|---|---|---|---|
| *Princeton Review's Guide to 286 Green Colleges* published April 2010 http://www.princetonreview.com/green-guide.aspx<br>The motivation for the guide came out of the past 3 years of surveys of high school students "Colleges Hopes and Worries Survey." In 2009, 66 % said they would value having information about a college's commitment to the environment<br>*Purpose*: To create a "green directory" of colleges and universities. Data is based on 10 questions on sustainability: (1) % food that is local or organic, (2) alternative transportation, (3) is there a sustainability committee, 4) are new buildings required to be LEED certified, (5) waste diversion rate, (6) environmental studies major, minor, or concentration, (7) environmental literacy requirement, (8) greenhouse gas emissions inventory and target, (9) % of energy from renewable sources, and (10) is there a full-time sustainability officer | First version published in April 2010. In 2009, it was sent to over 2,000 school administrators, completion rate of 30 %, which resulted in green ratings for 697 colleges and universities. Of the 697, the 286 included in the guide book scored 80 or above | Provides a useful short list of green criteria alongside other college descriptors such as number of students, cost of tuition, and % students on scholarships. Schools are not ranked but can use this data as part of their promotional information. Not all data from survey presented in school profile. Schools may also purchase ads in the Green Guide | No |

| | | | |
|---|---|---|---|
| *Sustainability Tracking Assessment & Rating System* (or STARS) http://stars.aashe.org developed by the AASHE (Association for Advancement of Sustainability in Higher Education). AASHE was founded in 2005.<br>*Purpose*: Is intended to be a voluntary, self-reporting framework. The goals are as follows: (1) provide a framework for understanding sustainability in all sectors of higher education, (2) enable meaningful comparison over time and across diverse institutions, (3) create incentives for continual improvement, and (4) build a stronger, more diverse campus sustainability community | It was launched in January 2010, after a 3-year development and pretesting phase involving about 70 colleges and universities. Too soon to tell potential level of participation | The point credits are divided into 3 main lists: (1) education and research, (2) operations, and (3) planning, administration, and engagement. Categories and scoring weight developed in a transparent, participatory process.<br>This is the newest system; the website is not populated with completed scorecards. There may also be some "survey fatigue" among the sustainability coordinators and directors in terms of time to fill out a new survey | Social policies mentioned in the Human Resources section related to access to benefits, childcare, sustainable compensation, etc. There is also a question about "sustainable policy advocacy" but criteria are vague |
| *G3: Global Reporting Initiative Sustainability Reporting Framework* (www.globaalreporting.org). Started in Boston in 1997 by nonprofit Ceres, UNEP (United Nations Environment Programme) joined as partner in 1999. GRI relocated and incorporated in the Netherlands in 2002<br>Purpose: Provide a systematic sustainability assessment for corporations (including nonprofits). The "triple bottom line" is the basis for the overall framework, which includes sections titled economic, environmental, and social | First guidelines released in 2000, used by 80 organizations. Draft G3 (3rd) version released in 2006; currently used by over 1,000 major corporations and other enterprises | Use is free and voluntary. Is available on-line. Detailed questions and manuals are available on-line. Since this is the 3rd version, a lot of work has gone into development and seems to have wide acceptance.<br>Filling out the forms for this would be a full-time job for someone, or even a whole department. Might not be affordable in terms of staff time for smaller businesses. The website gives bragging rights to corporations one wouldn't normally think of as "green" | Does the best job compared to others of incorporating at least some social policy aspects into the assessment |

programs examined, this one has the most narrow focus—carbon. This is a weakness but also possibly a strength, as it encourages universities to develop an inventory, set targets and goals, and then follow up on those, even if they are 20 years into the future. Also, by looking for carbon neutral strategies, universities will inevitably also look at conservation of energy as part of an overall strategy. Another simple program is known as "The Graduation Pledge in 2010." This program has a 20+ year history and over 100 participating schools at this time. Their website maintains a database of graduating students that provide contact information. One key difference with this program is that it emphasizes personal responsibility but doesn't require any institutional commitment—especially from the university from which the student is graduating.

A third program, the Talloires Declaration, had its origins at a conference in 1990 in Talloires, France, and requires institutional commitment to a sweeping set of goals and actions. The goal is that by signing the declaration, institutions of higher learning will be world leaders in developing, creating, supporting, and maintaining sustainability, and the agreement must be signed by the university's chancellor or president. However, it is not clear if there is any follow-up to see if they are actually following any of the ten action steps. Their website has some resources and examples of implementation plans and steps, and the list of signatories is public on their web page, so perhaps interested parties (current or future students, alumni) could apply influence to hold the institution accountable to its pledge.

The National Wildlife Federation's Campus Report Card sent out similar surveys in 2001 and 2008 and is one of the few programs at this point that have enough data to compare the same questions answered by the same institutions at two points in time. They found progress in some areas and a surprising lack of progress in others. For example, schools with a formal declaration of commitment to environmental sustainability or stewardship have increased from 27 to 37 %, while those campuses that regularly set and review goals for reducing solid waste and recycling went down from 32 to 29 %. Orientation sessions about sustainability or environmental programs to faculty grew from 11 to 22 %, but the percentage of schools offering an undergraduate major in environmental sustainability studies dropped from 35 to 27 %, and those having a minor dropped from 32 to 26 %.

The content of the questions covers broad topic areas including transportation, building energy efficiency and use of alternative energy sources, water conservation and use of integrated pest management practices on campus grounds, student access to sustainability curriculum, campus recycling, faculty and staff access to sustainability training, whether the campus has an office of sustainability, and at what level that person reports (e.g., to central administration or to a department). Each question is paired with a similar question asking if the campus has plans to implement a particular practice. The survey included nothing that looked at environmental or social justice issues, nothing about research priorities, extension or university outreach to their community, and nothing that we could determine related to social policy.

A scorecard that seems to be gaining traction is the "College Sustainability Report Card" conducted annually since 2007 by the Sustainable Endowment

Institute. The 2010 version of the report card profiles 332 schools in the USA and Canada—300 colleges and universities with the largest endowments and an additional 32 who applied and were accepted to also be evaluated. The focus on the endowments seems to set this group apart from some of the others, plus the use of a letter grade and ranking which attracts media attentions. They claim that these 332 schools control over $325 billion in endowment assets, which "puts them in a unique position to model successful integration of sustainability into both campus operations and investment practices." One can see however that schools without sizeable endowments are not included in the rating unless they specifically apply to be included, thus making this a somewhat exclusive club.

Of the included universities, they seem to have a high participation rate, ranging from 75 % for the student survey to 91 % for the dining survey, and of those, 95 % of respondents gave permission to post their surveys on-line, so there is quite a bit of transparency to at least this portion of the process. A letter grade is assigned to each category in the survey, and an average grade overall is posted ranging from A+ to F.

Though there is transparency in the responses, there is not as much in terms of who developed the questions and scoring system. Also, a different and often much longer survey is sent out each year, so the scores are not truly comparable from year to year. A large gap is that teaching, research, and extension are completely left out. Social policy is left out here too, except to the extent that it translates into endowment and investment priorities and practices.

When looking at the details of the survey, as with some others we examined, some things that seem good on the surface, for example, an emphasis on locally grown food, purchasing organic and sustainably produced food, can be misconstrued. For example, at our own university we score high on local food purchases because meat is purchased from our own animal science unit and counts as local, when in fact this practice undercuts a potential market for other local farmers. Also, there is not any local food purchase requirement for the contractors and caterers who serve food at the university, which is a significant and growing portion of the food served.

Another scorecard that receives a lot of attention in the media is the "Sierra Cool Schools." This report card also uses a grading system with grades ranging from A to F. While there is no written documentation about their methods, a radio interview with the Green Living editor for the Sierra Club magazine is available on their website which provides sketchy documentation. According to the interview, there are eight categories worth ten points each and a bonus category worth up to five points, for a total of eighty-five. The top-scoring school had 69 (A) and the lowest had only 11 for an "F" rating. An obvious problem with this sustainability rating system is its lack of transparency in methods of collecting and compiling data or even how a university gets on the list of 135 ranked schools. The qualifications of the Sierra Club staff to perform these rankings could also be questioned.

It may have been this "Cool Schools" list that prompted the July 19, 2010, "open letter to sustainability evaluating organizations" from 43 campus sustainability

coordinators, directors, or officers (Kidd et al. 2010). The main points of the letter were as follows:

1. Be fully transparent. Evaluating organizations should disclose their process of assigning scores, rankings, or grades, and the underlying assumptions, principles, and values upon which benchmarking metrics are based.
2. Be accountable. Make certain that it is up to date and accurate.
3. Disclose professional credentials of the evaluating organizations.
4. Embrace the diversity of the institutions you are evaluating. A "one size fits all" approach is inadequate for comparing progress.
5. Surveys should recognize the balance of results-oriented tactical efforts with long-term strategies.
6. Use uniform metrics.
7. Reject financial conflicts of interest. Evaluating organizations should not accept any form of financial compensation from the schools being evaluated.
8. Evaluating organizations should accept that campus sustainability teams reserve the right to prioritize limited resources to maximize progress toward strategic sustainability goals. They may need an "opt out" option, especially if the survey is conducted annually due to limited staff time.

Conversations with sustainability coordinators at two institutions in our state indicate a high degree of frustration over rating tools and lists over which they have no control or input. They are often given limited staffing resources and large mandates of change and find that a low score on a national ranking can undermine their standing within the university and the progress they are making.

In 2010, at about the same time this letter was being drafted, the two newest sustainability guides were just coming out. "The Princeton Review's Guide to 286 Green Colleges" was published in April 2010 and differs from some of the other report cards and lists because it does not attempt to rank the schools. Data is compiled based on ten questions related to sustainability and a "green rating" is achieved with a score between 60 and 99. Of the 697 filling out the survey in 2009, the 286 included in the guide book scored 80 or above. They are not ranked, and scores are not published, but highlights and abbreviated responses are in the guide, along with other background statistics about the school. The guide tends to highlight the questions with positive response and the summary paragraph includes quotes written by the school administrators, so it reads like a promotion piece for the school. At the end of the guide, there is a section for basically paid advertising from schools who wish to send in full-page formatted information. This is an obvious conflict of interest in the rating tool (see #7 in letter above) and could lead to the perception of the Princeton Guide being a greenwashing tool rather than an agent of change.

The newest rating system is the "Sustainability Tracking Assessment & Rating System" developed by AASHE (Association for the Advancement of Sustainability in Higher Education), launched in January 2010, after a 3-year development and pretesting phase involving about 70 colleges and universities. Institutions can sign up on-line, and it is intended to be "a voluntary, self-reporting framework for recognizing and gauging relative progress toward sustainability for colleges and universities." A good thing about this rating system is that it gives equal weight to three major

theme areas: education and research, operations, and administration/planning. It also has developed modest, but perhaps realistic, goals for institutions to achieve full point credits for certain categories. Other good things about the system are that it promises to be transparent, with scores included in an on-line database, presumably accessible by potential students, alumni, other institutions, etc.

Like other systems examined however, it includes questions that are more likely to deal with environmental issues and policy than with social, though there are a few attempts. For example, there are points available in the "Diversity and Affordability" section, which includes diversity and equity coordination, campus diversity culture, support for underrepresented groups, support for future faculty, and affordability and access. Other credits are available for gender neutral housing, employee, and student "cultural competence" training opportunities. In the Human Resources section, points are available for items ranging from sustainable compensation, benefits, childcare access, etc., but many of these seem to be "business as usual" guidelines, not anything particularly progressive or revolutionary. In the Public Engagement section, there are points available for something called "sustainable policy advocacy."

This system goes further than others in including social policy in the assessment, but ironically, we found a more developed set of indicators in a reporting framework developed for industry, known as the "G3: Global Reporting Initiative Sustainability Reporting Framework." The "triple bottom line" is the basis for the overall framework, which includes sections titled economic, environmental, and social. The interesting thing with respect to our comparison to university report cards and pledges is that the social section is subdivided into 4 sections (labor practice, human rights, society, and product responsibility) thus seeming to give more emphasis to the social side of the "three-legged stool." Specific performance indicators for these include "percentage of employees covered by collective bargaining agreements" and "ratio of basic salary of men to women by employee category." In the "society" performance indicator list, one aspect considered is corruption, including risks of corruption, training in anticorruption practices, and actions taken in response to incidents of corruption.

It is interesting that in the sustainability scorecards for colleges and universities, the one question universally *not* addressed is the one related to the source of research funding used at the university. Most universities and individual faculty members combine funding streams including "hard dollars," or those provided by the university's endowment and/or state or federal funding streams, and "soft money," or dollars raised through grants and contracts. The "hard money" usually pays the faculty member's salary, pays for office and lab space and expenses, and often not much more, leaving the faculty member in a position of needing outside funding to be able to bring in graduate students, technicians, and postdocs and to have the resources required to do research and publish papers. The soft money may be from charitable foundations, from state or federal granting agencies, or from private industries. The grants and contracts may take the form of a general agreement to do research in a particular area, or a more specific contract to test "product x" or to develop "product y" in an environment that is more product focused than process or basic research oriented. We argue that funding sources can lead to bias in terms of which research

agendas are pursued, and which are ignored. The research outcomes are generally determined by rigorous scientific protocols regarding data collection and analysis, so we are not suggesting that the data itself is flawed or misinterpreted. We are suggesting that who asks the questions and what questions are asked in the research setting determine the nature of the solutions proposed.

Busch and Lacy (1983) pointed this out in a series of research papers and later in a monograph summarizing the work, stating that "…scientists with commodity association and private corporation grants frequently appear to make corporate goals their own" (pg 233). The problem with this is the role of most universities, and in fact the mission statement of most land grant, or agricultural universities, is to do research for the public good, including both farmers and consumers. A bias is introduced in terms of beneficiaries by the funding sources. They go on to state that "… the tendency of agricultural research products to be capital intensive tends to benefit those individuals with ready capital to invest, i.e. large farmers and agribusinesses" (pg 233).

A more recent study along those same lines, asking what influences researchers to make choices toward commercial priorities over public good or basic research (Cooper 2009), found that due to the overall size of their research budget, colleagues from private industry and representatives from their university technology transfer office had the most effect on university research choices according to regression analysis of questionnaire responses. The survey did *not* ask specifically about the *source* of the research dollars. The paper concludes by saying that "These influences play a critical role in the kind of scientific research done within the university and whether this research is directed at the generation of private goods or the public interest. Additionally, this approach locates faculty as key actors in the commercialization of the university." Thus, any sustainability assessment of universities with a research program *must* include an analysis of where funding streams are coming from and what strings are attached, either explicit or implicit, that might bias research agendas. This same funding source bias could also affect teaching or extension/outreach programs.

As our analysis thus far has shown, there are both strengths and weaknesses with the measurement of sustainability of universities and colleges in the USA. While we applaud these efforts, most ignore social policy, especially as it affects faculty, staff, and the surrounding community in terms of outreach, extension, etc. There is a tendency to allude to social policy change only in broad brush generalizations, for example, to suggest "creating an institutional culture of sustainability," and "foster environmental literacy for all" as part of the Talloires Declaration. To integrate the importance of social policy with environmental policy—to enact and measure sustainability at universities—it is necessary to go deeper. There are fundamental systems and bedrock beliefs/values in Western cultural that must be addressed to achieve sustainability. While there are many kinds of cultural systems, beliefs, and values, here we will focus on (1) an economic system with an emphasis on consumerism and (2) a belief system that values the individual over the communal. While in reality these two systems are mutually supporting, here we separate them out to show that by constructing responses, programs, and policies of sustainability within

cultural systems that are in direct opposition to sustainability; the efforts toward sustainability never make the fundamental changes needed to truly create sustainable campuses and societies.

## Capitalism, Consumerism, and Sustainability

Social systems are bound up in social structures like economy. The dominant economic systems of Western culture (and globally) is capitalism. While there are many variations, capitalism as a concept is an economic system that is underpinned by (1)the private ownership of the means of production, distribution, and personal property and (2) defining the purpose of market exchanges as deriving profit, which is produced through competition and the growth of both production and consumption (Centeno and Cohen 2010). While "pure" capitalism does not exist, the ideas that underpin it are highly influential in how we develop policy. Put simply these beliefs about capitalism structure social, political, and environmental policy. For example, the claimed desirability of growth of production and consumption directly influenced the promotion of consumerism as a policy in the United States.

Consumerism is an ideology where the ever-increasing consumption of goods and services is promoted as necessary and good for society. While consumption and luxury has existed in many cultures and times, modern consumerism as mass consumption began full force after WWII in the United States as a vehicle for economic growth. Although actually a critic of consumerism, Victor Lebow (1955) summarized the US policy of consumerism well when he wrote:

> Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction and our ego satisfaction in consumption. We need things consumed, burned up, worn out, replaced and discarded at an ever-increasing rate. (p. 7)

Since the 1950s, consumerism became the primary focus of the US economy. For example, after the September 11 attack of 2001, then President Bush called for all Americans to shop as a patriotic act (Bush 2001). Even after the economic downturn of 2008–2009, about 2/3 of the US economy is based on consumer spending. Without this level of consumption, the system could collapse.

US universities are predominantly structured on capitalist/consumerist concepts like treating faculty as competitors and students as consumers. Ideally in capitalism, competition is seen as necessary to promote the development of better goods and services while driving out fraud and the weak from the market. As capitalism as an economic system and as a social ideology grew in the nineteenth century, it began to draw heavily from the concept of Social Darwinism which justified social policies that entrenched power in the elite while promoting the subordination of "undesirables" as an evolutionary process or the survival (and flourishing) of the fittest [sic]. Thus, the survival and success of the capitalist class becomes "proof" of their right to power, privilege, and wealth.

For universities, one of the best examples of promotion of competition as necessary and good is the way that faculty members are required to be in direct competition with each other; again, the idea is to weed out the "weakest." Universities create an environment of competition not collaboration. Tenure, merit raises, contracts, and even employment itself are based primarily on research, grants, and publications. Faculty compete for limited funding from government grants and corporations. Faculty are expected to be the primary if not only author of academic publications to earn tenure or merit raises. Collaborative academic publications needed for tenure are often given less weight fostering an environment of competition between faculty.

In addition to the competitive aspects of faculty life, faculty must also engage with a consumerist model. For all faculty but especially nontenured faculty, student evaluation of classes can be a stressful time. Merit raises and even continued employment are often strongly based on evaluation numbers (Simpson and Siguaw 2000). Faculty often believe that more entertaining and easier courses lead to higher student evaluations and adjust accordingly, even though it has been shown that this belief is not true (Sojka et al. 2002). Moreover, there has been an increased outsourcing of teaching from tenured faculty to graduate students and adjunct faculty leaving the fundraising and "research" to the tenured and tenure-tracked minority, elite class (Schibik and Harrington 2004).

Related to the faculty marketing of courses is the way that students increasingly view the university not so much as a place to learn but as a consumer experience. Students often respond on course evaluations by "playing the informed consumer" telling the instructor what areas need improvement in the product (Edmundson quoted in Delucchi 2002). The student as consumer mirrors the American move from citizen to consumer that has been happening since the late nineteenth century and accelerated in the 1950s to the hyperconsumerism of the beginning of the millennium. By understanding the student as a consumer, education becomes "edutainment": a way of entertaining the student while presenting banal ideas. What is lost is a liberal education that teaches learning as a process rather than simply the accumulation of knowledge (DiContini 2004). The growth of "practical" education trains education, business, and journalism students for a particular job and integrates the career as part of the work/buy cycle of modern consumerist capitalism.

It is important to remember that we are not critiquing the universities as the only examples of institutions too mired in a capitalist/consumerist economics to achieve sustainability. Almost all of Western culture (and now globally) is mired within these frameworks. This is what makes capitalism and consumerism so powerful and so hard to change. They seem to be the natural course of human activity: they are naturalized and thus we do not question the structures. But capitalism and consumerism as it is structured now is completely incompatible with sustainability because they require an open-ended system of continued growth that externalizes costs to nature, the poor, other nations, and future generations. This is the peril of economic growth that is at the heart of fundamental issues that must be dealt with (see, e.g., McKibben 2007 and Shiva 2004). When universities, like our culture, predicate responses to environmental issues from a capitalist/consumerist perspective, they

start out flawed. These responses include thinking in terms of cost-benefit analysis that externalizes costs.

While capitalism and consumerism are based in unending growth and consumption, there is a deeper concept on which they are based: individualism. Individualism defines the primary value of humans at the individual level meaning the interests of the individual are more important than the interests of the group or community. The concept of individualism is deeply rooted in Western, especially American, culture where the rights of individuals are enshrined on founding documents and laws. Individualism helps define (naturalizes) the unequal distribution of goods and services in culture. This inequality, much like the competition in capitalism, is seen as necessary and good leading humans to better themselves with the idea that the society as a whole benefits by promoting the interests of individuals within that culture. Left out of this focus on individuals are the needs of the many, the community, and the commons. While there are Western bedrock beliefs and values that support communities too, the primacy of individualism trumps them all. For sustainability the primacy of the individual over the community has dire consequences for the environment.

The importance of the individual is evident in US public policy, social policy, and economic policy decisions. At the university level the way that sustainability is measured is constrained/structured by market thinking, profit motives, and consumerist mentality. It is also constrained by the valuing of the individual over the communal. Very few of the scorecards and programs covered here even mention the importance of social justice in sustainably. But social justice is at least as important as efficient energy use, organic food policies, and recycling programs. The needs of the people in general to just laws, fair wages, rights of assembly, and free speech (without losing one's job) are lost in sustainability pledges and scorecards that focus on the individual actions that effect the environment.

## What Can We Do?

So how can we work for these shifts in understanding and action? How do we live in the world of today and make a better world tomorrow? Like this chapter there are two major areas to work on: measuring and evaluating the policies and then questioning the underlying ideologies and beliefs.

To begin, question the measurement of sustainability:

1. Is my university sincere in its attempts to "go green," or is it a clear cover-up, or greenwashing? If answer is "sincere," proceed to other questions. If not, expose the greenwashing for what it is.
2. If my university is sincere, is it promoting significant structural change, or only partial tweaking or modification of business as usual? Are there significant resources in terms of money or staff put toward the effort? Do staff include upper-level administrators with power, or only entry-level half-time sustainability coordinators with no real authority, staffing, or funding, run largely with the help of well-meaning but inexperienced volunteers?

3. Is the "economic" portion of sustainability emphasized over, or along with the environmental? For example, are cost savings due to energy conservation emphasized over other things? Is the "social" side of sustainability in the picture at all?
4. What is your university doing to promote/enact/model social justice? How will this impact faculty, students, staff, administrators, and the surrounding community if successful? What is your vision of social justice in these contexts?

   The answers to these questions will help you assess both your university's policies and the scorecards and pledges that define sustainability. Once these questions have been answered, we need to remember to delve deeper into the cultural frameworks that question the beliefs, values, and ideologies that structure these policies.
5. Does your university question or encourage questioning by students, faculty, and staff of the larger framework within which it is constrained? For example, what cultural framework is being used to examine the sustainability question? Are capitalism and consumerism put forward as solutions to the problem, or the root cause of the problem?

The next step after questioning is action. Take classes in the humanities, women's studies, and philosophy departments of your university. Learn about environmental sustainability but also social justice, different cultures and histories, and different economic systems. Seek out works by environmental visionaries like Bill McKibben and Vandana Shiva. These authors and those like them not only seek to explain environmental issues but connect them to the importance of social justice. But perhaps the most important and even the simplest step toward learning about and enacting real sustainability is to question the frameworks with other people. Create and participate in group discussions about these topics. Change happens from the roots. Taking actions with others to address specific local and global issues is the ultimate questioning of frameworks like capitalism and consumerism.

To summarize, our chapter starts with a review of several calls for higher education to adopt more sustainable, environmentally friendly practices, policies, and environmental literacy courses. We reviewed nine pledges and scorecards in use that contain metrics to determine if the university is making progress toward sustainability goals. We found that most of the scorecards consider only environmental policy and only two included any social policy recommendations. In the next section, we applauded the efforts of colleges and universities to move toward sustainability but point out how cultural systems, specifically the concepts that underpin capitalism and consumerism are problematic when used to structure both universities and their environmental policy. Finally, we end with specific recommendations for students (and others) including a starting point and suggested questions to ask to get at the underlying issues. Not only should one question the university's sincerity—rhetoric versus fact—as well as the metrics used to define progress, but also whether their policies embrace both social and environmental issues. Higher education needs to address both environmental policy and social policy to achieve genuine sustainability goals.

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