



Sustainable development: Agents, systems and the environment

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Abstract

This article provides an overview and analysis of sustainable development from a sociological perspective. It is divided into three parts. The first presents selected relevant sociological research before there was ever a concept of ‘sustainable development’. The selected focus is on work falling under the rubrics of environmental sociology as well as development sociology. The second part briefly discusses the context and process that led to conceptualizing ‘sustainable development’. The third part considers the response of several sociological theories to sustainable development issues, with the focus on a selection of four major system theories: world systems theory, neo-Marxist ‘treadmill of production’ theory, ecological modernization theory and modern systems theory, all of which have addressed development issues and more recently sustainability questions. The article ends by identifying an ongoing global transformation, the sustainability revolution, which can be compared and contrasted to the Industrial Revolution. Whether this emerging revolution will take place fast enough and comprehensively enough to save the planet earth from multiple disasters remains to be seen.

Keywords

Development sociology, environment, environmental sociology, social structure, sustainable development, sustainability revolution, system theories

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Background

Sociological legacies

Long before there was a conception of sustainable development, sociologists (as well as other social scientists) were conducting research on development issues (such as modernization, socioeconomic development, distorted development, unequal development, etc.) as well as sustainability issues (pollution, environmental degradation, resource depletion, key resource struggles and politics relating to oil, water, land, etc.).

Selected sociological studies of environment and also development are briefly presented below, each in turn, before we go on to consider the emergence of the concept of sustainable development and some features of sustainable development as a sociological area of theory development and empirical research. In the conclusion, the article suggests that a new societal paradigm relating to sustainable development is emerging – and the study and conceptualization of this paradigm is a major challenge to contemporary sociology.

Environmental research

‘Environmental sociology’, encompassing a substantial body of research, can be understood as the study of the interaction between society and the physical environment (Wehling, 2002). Studies include investigations of attitudes toward energy use, pollution and environmental degradation, the extent people say they are ready to try to conserve energy or protect the environment. In addition to attitude studies, considerable research has been conducted on, among other phenomena, actual patterns of household energy use and energy efficiency, innovations in energy technologies, human factors in and response to pollution and environmental degradation, and the politics of environment and energy as well as other resources such as land, water and minerals. Sociologists have especially studied environmental movements and in some instances, their interactions with states (a considerable part of this latter research has been institutional as well as historical in character).

Much of the substantial and important work of environmental sociologists emerged initially in the context of mainstream sociology blended in with many other studies up until the 1970s. From the early 1970s, the term ‘environmental sociology’ came into increasing use. The section ‘Energy and Society’ (Research Committee 24) was established within the International Sociological Association in 1971, and some years later (1977) the ‘Environment and Technology’ section was formed in the American Sociological Association.

Several of the major contributions of environmental sociology include (this listing is not comprehensive in designation of either research areas or the many sociologists who have contributed to important bodies of knowledge in the diverse areas; this highly selective listing is merely intended to suggest the diversity of areas – and some of the intensity – in which sociologists are engaged):

- *Surveys of attitudes and opinions* toward the environment and environmental issues (Dunlap, 1994; Hamilton et al., 2012a, 2012b; McCright and Dunlap, 2011, among others)

- *Lifestyle and consumer behaviour studies* (Boström and Klintman, 2011 [2008]; Dietz et al., 2003; Spaargaren and Van Vliet, 2000, among others).
- *Environmental movements* (Brulle, 2000; Brulle and Jenkins, 2005; Flam, 1994; Jamison et al., 1990; Pellow and Brulle, 2005; Richardson and Rootes, 1995; Rootes, 1997, among others).
- *Studies of regulation and governance* (Carson et al., 2009; de Man and Burns, 2006; Fonjong, 2008; Kasemir et al., 2003; Lidskog and Sundqvist, 2011; Lindén and Carlsson-Kanyama, 2007; Midttun, 2010; Nikoloyuk et al., 2010; Pellizzoni, 2011).
- *Energy politics and policymaking* (Andersen and Burns, 1992; Baumgartner and Midttun, 1986; Midttun and Finon, 2004; Pachauri et al., 1991; Woodward et al., 1994, among others).
- *Studies of innovation and entrepreneurship relating to alternative energy technologies, energy policies and sustainability issues* (Baumgartner and Burns, 1984; Elzen and Wiczorek, 2005; Elzen et al., 2005; Klemmer et al., 1999; Wiczarek and Berkhout, 2009; Woodward et al., 1994, among others).
- *Special sector studies: climate change* (Broadbent and Vaughter, 2014; Broadbent et al., 2015; Giddens, 2008; Merlinsky, 2010; Nigel et al., 2009; Norgaard, 2011; Rosa and Dietz, 1998; Stehr and Von Storch, 2010); *biofuels* (Bozzini, 2012; Carolan, 2009; Carrosio, 2012; Mol, 2007); *fisheries* (Burns and Stohr, 2011a; Finlayson, 1994; Hamilton et al., 2005; Jentoft, 2005); *forests* (Bunker, 1985; de Man and Burns, 2006; Nikoloyuk et al., 2010; Puy et al., 2008); *tourism* (Hamilton et al., 2003; Salvatore and Maretta, 2012); *transport* (Baker, 1994; Wang, 2012; Whitt, 1982; Yago, 1983); *air transport* (Midttun, 1992); *water and sewage* (Azpiazu, 2010; Merlinsky, 2011; Tàbara and Ilhan, 2008; Tàbara et al., 2008); *environmental education* (Schmidt, 2004; Schmidt et al., 2011).
- *Global environmental change studies* (Christen et al., 1998; Kaushik and Srivastava, 2003; Pretty et al., 2007; Redclift, 1987; Redclift and Woodgate, 1997; Rosa et al., 2010; Stern et al., 1992; York et al., 2003).
- *Ecofeminism* (Mellor, 1998; Mies and Shiva, 1993; Salleh, 1997, 2009; Shiva, 1992).
- *Social theory, the environment and nature–society relationships* (Benton and Redclift, 1994; Buttel, 2002; Christen et al., 1998; Dickens, 2002; Drummond and Marsden, 1999; Dunlap et al., 2002; Mehta and Ouellet, 1995; Murphy, 1997; Strydom, 2002; Wehling, 2002).

All in all, a substantial number of sociologists – although definitely a minority and to some extent marginal to mainstream sociology – have conducted considerable research on a wide spectrum of environmental questions and issues. A significant part of the research was concerned with human caused environmental degradation (fisheries, forests, pollution, etc.). Also, societal damage and loss in the face of environmental degradation has been important, especially its impacts on, among other issues, health, habitat, marginal communities and groups (for instance, women’s subsistence livelihood [Mies and Shiva, 1993]). It is an impressive accomplishment and deserves much wider recognition within sociology.¹

In sum, already starting in the 1960s and 1970s, sociological studies were investigating and theorizing about environmental issues and the relationship between social and natural systems (Dunlap et al., 2002: 329). Environmental sociology extended its empirical research net (see later) and developed a number of particular concepts and models; it criticized mainstream sociology – and sociological theory in particular – for ignoring the biophysical environment, and arguing generally that the ‘material world’ was not sufficiently taken into account in sociology (Buttel, 2002; Catton and Dunlap, 1978; Dunlap and Catton, 1979; Dunlap et al., 2002: 331). Buttel (2002: 39) points out that, indeed, there existed a classical environmental sociology: ‘Elements of environmental sociology have roots deep in nineteenth-century social thought. Not only did Marx, Durkheim, and Weber incorporate what we might regard as ecological components in their work, they did so from a variety of standpoints. Among the multiple ecologically relevant components of their works are materialist ontologies (in the case of Marx and Engels), biological analogies (Durkheim), use of Darwinian/evolutionary arguments or schemas (Marx, Durkheim, and Weber), the notion of nature-society “metabolism” (Marx), and concrete empirical analyses of natural-resource and “environmental” issues (Marx and Weber)’ (see Dickens, 1997, 2002). At the same time, this emerging sub-discipline was viewed by many if not most sociologists as marginal to mainstream sociology. In the mid-1970s, Catton and Dunlap (Catton, 1976; Catton and Dunlap, 1978; Dunlap and Catton, 1979), among others, articulated what they referred to as the ‘new ecological paradigm’, which became an important legacy of environmental sociology (not only in the USA but internationally). Buttel (2002: 38) claims that the core of North American environmental sociology – and, in particular, the new human ecology – emerged in part in opposition to mainstream sociology.

Development research

Development research emerged as a major sociological undertaking after the Second World War (there were parallel developments in the other social sciences); ‘development’ referred to a multidimensional transformation of society (although there are many different conceptions in the details) (Lepenies, 2008). It was more than a field of study, it was an aspiration, an ideology (or several) (Bernstein, 1971: 142). The research was particularly oriented to ‘less developed’ or ‘non-industrialized’ societies that were undergoing (or could be expected to undergo) a transition to industrialization (the transitions usually occurred under some form of capitalism but communist countries also launched massive industrialization and modernization programmes). A major part of the early efforts had a particular theoretical perspective, namely ‘modernization theory’ (Bernstein, 1971; Eisenstadt, 1966; Huntington, 1968; Inkeles, 1974; Lerner, 1958; Moore and Cook, 1967, among many others) and referred to the emergence of modes of social life, organization and economy which appeared in Europe from the seventeenth century onwards and which came to have worldwide influence (Giddens, 1990). In other words, modernization referred to development or change toward ‘modern’ economic, political and social systems such as those characteristic of the USA and Western Europe. (See also Apter, 1965; Halpern, 1966; Levy, 1966; Nisbet, 1969; Rogers, 1962.) The approach postulated more or less linear movement from ‘traditional societies’ to ‘modern societies’

(the latter bearing considerable similarity to the USA): the emergence of 'rational' thinking and calculation, professionalization, monetization, market economy, urbanization, representative democracy, advanced educational systems, the spread of mass communication systems and literacy, extensive research systems, modern family structure and much more. 'Successful' development (economic, political and cultural) was expected over time for all nations, and, consequently, a global convergence was predicted: faster or slower as the case may be. In a word, it was a theory not only of societal development but social transformation (Halpern, 1966).

In response to the takeoff of modernization theory in the 1960s and 1970s (see references earlier) there emerged widespread critique as well as a number of counter-approaches to this analysis of society and its development (and underdevelopment): among others, dependency theory (Amin, 1976; Cardoso and Faletto, 1979; Frank, 1967), neo-Marxist theory (Benton, 1989; Dickens, 1997; Schnaiberg, 1980, among others), world systems theory (Hopkins and Wallerstein, 1982; Wallerstein, 1974, 2004) and modern systems theory (Baumgartner et al., 2014; Buckley, 1967; Burns and Flam, 1987; Burns et al., 1985; see also Archer, 1995).

Criticism of modernization theory focused on its simple dichotomization of traditional/modern, the transparent western ethnocentrism and strong assumptions of reductionism (individuals and personality structures as key explanatory variables). The critical perspectives highlighted the importance of class and international power relationships, unequal exchange (developed countries gaining at the expense of less developed countries) and 'underdevelopment' as a source of constraint as well as other perverse developments and distortions appearing in weaker, peripheral parts of 'the Third World'. The opposition became a counterpoint to the optimism and apparent 'value neutrality' of 'modernization theory', emphasizing rather class exploitation, the perverse 'development of underdevelopment', 'blocked development', divergence in development patterns, and global inequality generally.

By the end of the 1970s, modernization theory faded (only to return a decade later as ecological modernization theory emphasizing ecological considerations, societal learning and institutional and cultural analysis [see later]). World systems theory, neo-Marxist and modern systems theory presented and elaborated their considerations of societal development (the following discussion is drawn from Burns, 2006). World systems theory, in particular, evolved into a major sociological research programme on development, which continues to be active and flourishing and which has in the last decade also embraced environmental issues (see later) (Bergesen, 1983; Chase-Dunn, 1997; Chase-Dunn and Grimes, 1995; Chase-Dunn and Hall, 1993, 1997; Hopkins and Wallerstein, 1982; Wallerstein, 1974, 2004).

World systems theory shared the Marxian historical perspective paying close attention to economics but shifted the focus from a single state to a global world economic system linked by trade. More attention was paid to market and trade expansion than to modes of production, the latter much emphasized by conventional Marxists. It focused on imperialism and dependency among nations and considered 'development' in a global and comparative perspective.

In the world systems theory perspective, competing states (and their economic agents) are linked together in a global system which is structured as core (rich developed, and

powerful) and periphery (poor, underdeveloped and relatively weak). Centre–periphery is, in a word, relational. The former dominates the latter, yet the functioning of each part is interdependent in the global system. Major wealth and other gains accrue to the core, which is characterized by high profitability, high wage levels, multiple benefits and high-skill developments producing diverse and advanced goods and services. Profitability in the core, it is argued, is achieved without the brutal exploitation of labour. On the other hand, peripheral areas are systematically ‘underdeveloped’ and are characterized by low profitability, low wages and the production of less advanced goods and services; labour tends to be highly exploited. Contrary to the view of many Marxists, it is the periphery (not the developed centre) that is the locus of high exploitation (and increasing environmental degradation, as suggested later in the article).

By conceptualizing positions of societies in a matrix of global trade and diplomacy, world systems theory contributed to breaking out of the framework utilized by most sociologists, modernization theorists as well as Marxists, that is, the investigation of the development of individual societies in isolation from one another (Chirot and Hall, 1982: 102). World systems theory also articulated a variety of systemic concepts and analyses, such as structures of domination, centre–periphery relationships, semi-peripheral regions (halfway between centre and periphery in terms of economic structure and power), unequal exchange and accumulation and anti-global system movements (Wallerstein, 2004). While world systems theory has played an important role in development sociology, it neglected until recently the biophysical environment (a failing it has acknowledged). Increasingly, it gives attention to global environmental issues (see later).

The historical approach of Marx conceived of all societies as evolving in a series of stages. Each stage was characterized by a particular structure, a certain mode of production as well as related structures, for instance, the ‘superstructure’ of politics and culture derived from and dependent on the substructure of production. Human beings generate these structures through their own actions, but not always under the conditions of their own choosing or in the ways they intend. Marxist theory identified and explained why certain modes of production, that is, particular social structures, give advantages to one group or class rather than another. The relative power of social classes is determined by the particular mode of production, the ownership of productive property and the authority system required by a given technology (Stinchcombe, 1968). Classes have not only different interests (ideology and modes of mental production) but also different capabilities and means of political mobilization and influence.

According to Marx, because of contradictions between structures, the capitalist system has been historically characterized by economic crises, conflicts and tendencies for continuous transformation not only of its economic relations but also other social relationships. Advances in technology and knowledge and increasing size of production units contribute to changes in the mode of production and redistribute power among classes over time. Those agents or classes of agents with growing power under emerging conditions increase their influence over institutional and cultural conditions.

Actor system dialectics (ASD) developed by Buckley, Burns and their associates dealt with some of the same issues as world systems theory and Marxist theories. In investigating and analysing societal dynamics and development (and underdevelopment), ASD stressed the role of human agency, institutional, cultural and power factors, interactions

(conflict, exchange and struggle), as well as innovation and sociopolitical mobilization and transformation. Active agents with their distinctive characteristics, motivations and powers interact with one another and contribute to establishing and transforming structures such as institutions, sociotechnical systems and physical and ecological structures but always do so within the existing constraints and opportunities and not in precisely the ways the change agents intend. Complex, dynamic social systems are described and analysed in terms of the interplay between stabilizing mechanisms (morphostasis) and destabilizing mechanisms (morphogenesis) (Archer, 1995; Buckley, 1967; Burns et al., 1985). The structural and cultural properties of society are not only carried by but transmitted and reformed through individual and collective actions and interactions. ASD has been especially used to identify and analyse mechanisms of innovation and the development and transformation of technologies, infrastructures and social and ecological structures (Baumgartner et al., 2014; Burns and Hall, 2012; Carson et al., 2009; Woodward et al., 1994).

In general, agents are seen to generate structural reproduction, elaboration and transformation through their interactions (see also Archer, 1995). They play transformative roles – constructive as well as destructive – in the context of complex sociocultural systems. In such terms, agents and the institutional and stratification structures in which they are embedded contribute to creating and re-creating themselves in an ongoing developmental process.

The concept of sustainable development emerges

There is a substantial scientific consensus that the major global environmental threats are the consequences of human factors – cultural forms, institutional arrangements, social practices and behaviour: overconsumption of precious resources (such as water, forests, fossil fuels), overexploitation of nature's 'capital' and destruction of ecosystem services, unsustainable land practices, the unabated release of toxic chemicals, and emissions driving climate disruption, among others. The result is the disruption of carbon, ocean, climate, biotic and other biogeochemical cycles and the loss of biodiversity, deforestation, environmental degradation, overexploitation of nature's 'capital' and 'services' (Rosa et al., 2010; Strydom, 2002). A biosphere catastrophe (beyond one or more of several tipping points [see below]) threatens to wreck the economy and society as we know them.

A short look backward – to the decades just before the current millennium – reveals the remarkable acceleration in the pace, scale and spread of human impacts on the global environment (Rosa et al., 2010). Looking forward, greenhouse gases now in the atmosphere will remain there for a millennium; will increase by releases to which we are already committed; and will almost certainly contribute to weather extremes, flooding and drought, which will seriously affect agriculture and the life conditions of people living on islands and along coastal regions. This, plus the spread of tropical diseases, increased vulnerability to vast epidemics, sea level rise and more severe storms, will reduce – are already reducing – the welfare of many human communities and populations. A biosphere catastrophe (beyond one or more of several tipping points) threatens to wreck the economy and society as we know them (Stockholm Memorandum, 2011).

Arguably, the Greenhouse effect is already transforming global and local weather patterns, 100 year floods become frequent events, as do the frequency of powerful hurricanes, continental forest fires and other 'natural' disasters; all of these draw down the reserves of insurance companies and the emergency funds of even the most prosperous states. The poor ones suffer their fates or in the best of cases receive some relief through international aid.

Despite widely held scientific views about the potentialities of biosphere catastrophes. The policy decisions needed to deal with these threats have been disappointing – thus far arguably not up to the level necessitated by the challenge. Meanwhile, the accumulation of greenhouse gases (GHGs) continues unabated (and humanity still lacks a clear agreement or strategy for enforceable reductions), species extinction rates accelerate to thousands of times 'background' extinction rates and more and more toxic compounds accumulate globally.

Figures 1 and 2 show the exponential growth since the 1750s of several of the major 'drivers' of environmental change and destruction (the systems producing more and more built environments, cars, fossil fuels, electronic goods, tourism, water use, garbage consumption, etc.) and some of the physical impacts (also, exponential growth curves): gas emissions, collapse of fisheries, tropical deforestation, biodiversity loss, water shortage, and much more.

Modernization – whatever its current forms and however it is brought about – appears to make human life increasingly unsustainable on this planet.² And global environmental changes touch upon every facet of human existence – health, diet, leisure, quality of life, everyday practices; production, consumption, education, research, politics and societal values.

Sustainability: Emergence of a public normative concept

The literature on the concepts 'sustainability' and 'sustainable development' is vast. These influential concepts emerged out of political and administrative processes, not scientific ones. Like the concept of development itself, sustainable development has been a contentious and contested concept, not only with respect to controversies between advocates of capitalism and those of socialism, between industrialized and developed countries, or between modernization advocates and their diverse opponents. In other words, to earlier contentious issues have been added environmental issues. These have been and continue to be divisive, for instance between those who advocate constraining or blocking socioeconomic development in order to protect or reclaim the environment, and those who stress the need of socioeconomic development to alleviate poverty and inequality, if necessary at the expense of the state of the environment.

Historically, the linkage of sustainability and development has been, in large part, the result of global political and administrative processes and the diverse interests driving these processes. The term 'sustainable development' was coined as a political-administrative term to bridge differences between developed and developing countries in the context of UN negotiations and resolutions. The UN World Commission on Environment and Development (hereafter, World Commission), chaired by Gro Harlem Brundtland (former Norwegian Prime Minister), produced an influential report in 1987, *Our Common*

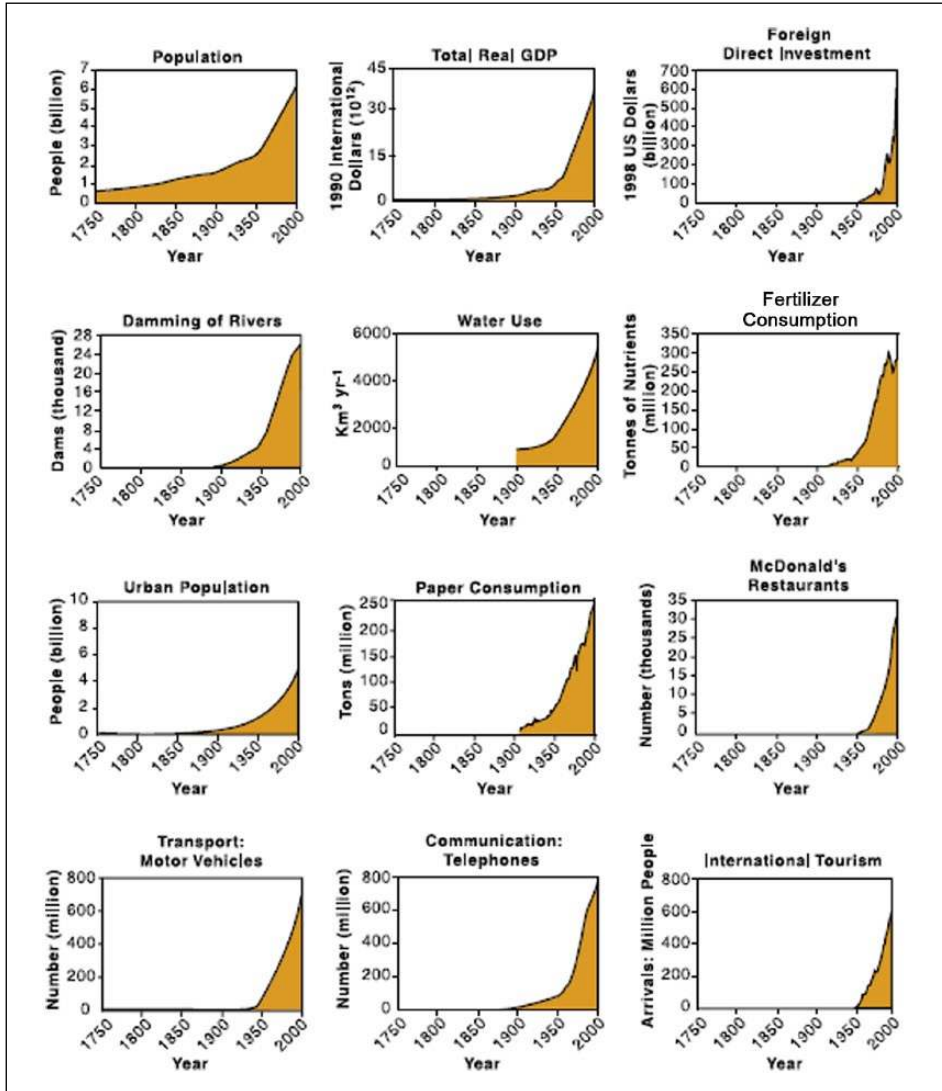


Figure I. Indicators of industrial growth and 'development'.

Source: Steffen et al. (2004).

Future (World Commission, 1987). The Brundtland Commission had been established by the UN in 1993 in response to growing awareness and concerns of the deterioration of the human environment and natural resources at the same time as developing countries were pushing for higher levels of economic growth (with the likelihood of increased damage to the environment). The Commission was to address the environmental challenge as it was intertwined with economic and social issues.³

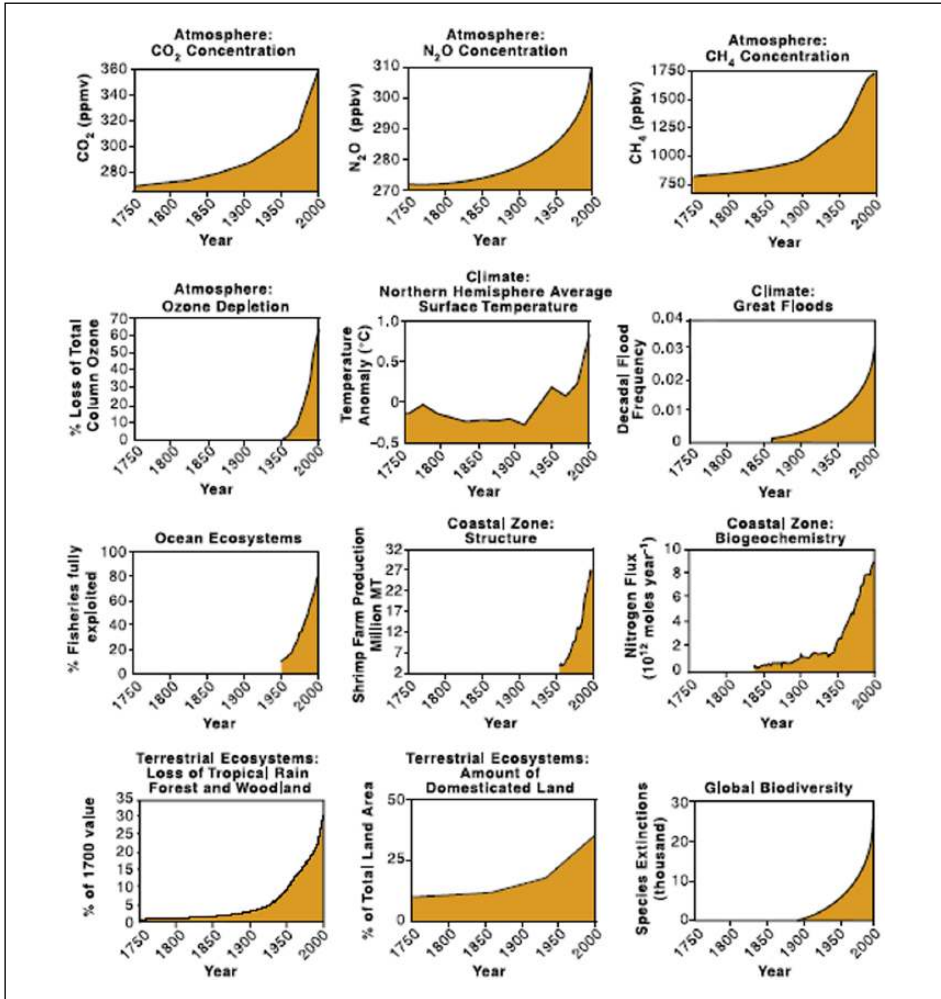


Figure 2. Indicators of changes in physical and ecological conditions (stress).

Source: Steffen et al. (2004).

The Commission concerned itself with environment and growth/development as well as a number of related issues. The term ‘sustainability development’ was intended to build bridges between the economic, ecological and social areas of concern. Above all, the concept was meant to refer to development that meets the needs of the present generation without compromising (or jeopardizing) the ability of future generations to meet their needs (World Commission, 1987). (Numerous other definitions have been proposed; among others see Drummond and Marsden, 1999; Goodland, 1995; Opschoor and Van der Straaten, 1993: 1–2; Sachs, 1997; WWF, 2002: 20.)

During the course of negotiations, the developed or industrialized countries stressed, in general, the need for societal constraints and the strict regulation of hazardous emissions

and waste management, the mitigation of resource depletion and environmental degradation generally. The developing countries, on the other hand, stressed their ambitions for economic growth and development, even if it entailed hazardous emissions and environmental degradation. The Brundtland Report (World Commission, 1987) stressed that sustainable development requires the promotion of values that define consumption standards within the bounds of the ecologically acceptable and to which all can reasonably aspire. Finally, the report argued that economic growth is a necessity in developing countries, while economic growth should be curbed in the developed parts of the world. Of particular significance, the report brought the problem of environmental deterioration and ruthless exploitation of natural resources into the global context of the relations between North and South.⁴ Thus, issues of equity and distributive justice were raised and became part and parcel of global discourse.

It is not feasible to construct a precise *definition of sustainable development*, based on entirely technical or ecological criteria; concepts such as ‘sustainable development’ and ‘sustainability’ are normative and political ones (Opschoor and Van der Straaten, 1993), much like ‘democracy’, ‘social justice’, ‘equality’, ‘liberty’, etc., rather than precise, scientific concepts; as such, they are contested and part of struggles over the direction and speed of social, economic and political initiatives and developments (Baker, 1996, 1997; Lafferty, 1995).⁵

Consequently, sustainability, as a normative and political concept, is used, among other things, to refer to a fair distribution of natural resources among different generations as well as among populations of the world today. It has also concerned values and ‘rights’ to existence of other species as well as notions about how much environmental capital one generation should bequeath to the next (Opschoor and Van der Straaten, 1993: 2). In the language of policy making, many refer to the three pillars or fields of sustainable development: economic functioning and prosperity, social welfare and justice, and environmental protection. The difficult challenge is to determine how one balances or combines these in a sustainable way, particularly since under many conditions they are contradictory: economic growth versus environmental protection and conservation, or limited growth versus increased public welfare and distributive justice.

The concept’s power and also contentiousness relates to it bringing together these apparently contradictory environmental, economic and social imperatives (Woods, 2010). Harris (2001: 3) emphasizes, ‘Its contestation arises both from the emphasis placed on these three imperatives and from the difficulties encountered in the practical application of the concept.’ Doubts have been raised about whether maintaining a given level of ‘natural capital’ is compatible with maintaining or improving welfare per capita (at least for some measures of welfare).

Responses of selected sociological theories to the sustainable development challenge

Merging development and environmental considerations

The focus here is limited to selected sociological systems approaches that have a history of considering development issues and at the same time have combined environmental and development concerns: ecological modernization theory, world systems theory and

one of the several Marxist inspired theories ('treadmill of production' theory), and modern systems theory (ASD), all of which developed considerations of materiality and the physical environment within their diverse 'development frameworks'.⁶

World systems theory, in particular, extended its past conceptualization of structural differentiation (core, semi-periphery, periphery) to argue that environmental hazards and degradation were being shifted from the core to the periphery and semi-periphery (Frey, 2006). Such exploitation is based on a type of 'unequal exchange', corresponding to the global production of inequalities in power and wealth that was argued and elaborated in world systems theory's earlier work. Just as in the case of world poverty, responsibility for the ecological degradation in developing countries lies with core countries, their multinational corporations, governments and diverse groups including labour unions that tend to align with periphery corporations and governments when it comes to many environmental issues. Rosa et al. (2010: 110) summarize world systems theory as follows:

Importantly the accumulation of wealth occurs in the core while environmental degradation occurs primarily in the periphery and semi-periphery. Thus, core nations where capital accumulation occurs are often spared local environmental impacts that occur in the periphery and semi-periphery.

In other words, substantial ecological improvements may occur in the most developed parts of the global system (the centre) at the expense of accomplishments in the periphery and semi-periphery (Roberts and Grimes, 2002). Such unequal development will continue as long as the global capitalist system is maintained. The political forces supporting maintenance and reproduction of the system are formidable. At the same time, *the global system is not, according to world systems theory, ecologically sustainable over the long run.*

The theory remains an important approach to issues of sustainable development because it is attentive to factors of power and contradiction. It has, however, been somewhat rigid in its structural distinctions between core, periphery and semi-periphery. Sustainability advances are arguably not just taking place in the core; many successful initiatives occur in 'periphery' and 'semi-periphery' countries to protect the environment, to resist attempts by core multinationals and governments to extract resources from, and to export wastes to, the periphery. Also, there have been relatively successful initiatives and innovations in regulating the use of resources such as forests, water and land (de Man and Burns, 2006; Nikoloyuk et al., 2010; Ostrom, 2005).

Several neo-Marxists extended their legacy of societal development and transformation research to address issues of sustainability. Of particular prominence in this regard are Schnaiberg (1980) and Gould et al. (2008) – with their 'treadmill of production' theory.⁷ They single out the capitalist system as the driver not only of increased production, technological development and the accumulation of wealth but also systematic environmental degradation. The system exploits environmental resources at such a rate that it is undermining its natural resource base. Capitalist agents are driven to do this by the competitive spirit engendered in capitalism and the supporting (aligned) interests of governments and other societal agents who adhere to (or, at least, support a highly expansive, wealth-producing capitalism). In addition to producing goods and services, capitalist

enterprises along with household consumers and government agencies produce and deposit waste, much of it hazardous and destructive, in the environment. The immense pressures toward growth and capital accumulation tend to countervail or even negate efforts and programmes aimed at protecting or recovering environmental health and achieving sustainability. Like world systems theorists, Schnaiberg sees an alignment in modern capitalism of business interests, organized labour and governments as well as the multitudes of people participating in consumerism; they are aligned to *externalizing costs of production and consumption and resisting many of the attempts at environmental protection and regulation*. In this perspective the integration of working classes and the formation of the welfare state and consumerism in developed industrial states have gone hand in hand with sustained economic growth as well as environmental degradation. At the same time, an unequal distribution of environmental problems and risks is generated globally (world systems theory has stressed such externalization in the ‘exports of hazards and costs’ to peripheral parts of the world, therefore enabling the accomplishment of some degrees of sustainability within developed countries [see earlier]).

This sustained and systematic exploitation of the environment constitutes the ‘second contradiction’ of capitalism (O’Connor, 1994; Rosa et al., 2010: 103). For Schnaiberg, *capitalism is not sustainable*, eventually it will undermine its natural resource base, which has been taken for granted for so long. Reform efforts driven by the environmental movement serve to countervail to some extent the juggernaut of ‘treadmill production’ and manage to force some limitations and improvements (Gould et al., 2008).⁸ But in this perspective, the only solution, ultimately, will be to transform capitalism into another kind of institutional arrangement – in a certain sense, eliminating capitalist economics with its endless pursuit of monetary growth, excessive production and wanton environmental destruction.

Another influential sociological theory in the area of sustainability – *ecological modernization* theory – was developed in the early 1980s; in a certain sense, it continued the earlier modernization ideas but with several significant differences (see earlier discussion on development research in the first part of the article). The theory challenged conventional wisdom of some environmental moments that a fundamental reorganization of the core institutions of modern society, rather, the industrial production system, the capitalist organization of the economy and the centralized state, is seen as essential to achieving long-term sustainable development. According to ecological modernization theory, adjustments and reforms, yes, but, there is no need to do away with or transform major institutions of modern society.

As socioeconomic development advances and society becomes maturely developed (‘late industrial society’), cultural patterns, institutional arrangements and organizations become increasingly ‘environmentally rational’ and decision-makers take into account environmental criteria and try to minimize human environmental impacts (Cohen, 1999; Huber, 1985; Janicke and Weidner, 1995; Mol and Sonnenfeld, 2000; Mol et al., 2009; Rosa et al., 2010: 104–105; Spaargaren and Mol, 1991, 2006; Spaargaren et al., 2000; York and Rosa, 2003). According to their perspective on advanced modernized society, ‘externalities’ become internalized, and *social production and consumption* become cleaner, and the production of goods and services becomes environmentally compatible. Thus, the theory implies that late capitalism is environmentally competitive, and both at

home and abroad there is compatibility and convergence between the aims of capital and the environmental goals of society – as a new societal environmental logic.

In the ecological modernization perspective, this type of development trend is the result of broad and effective coalitions (group alignments) emerging in advanced industrial society to concern themselves with, and to try to protect, the environment. This presumably leads not only to reduced environmental degradation but to continuation of further economic growth: that is, the quantity of resources used per unit of output is minimized, and the wastes emitted per unit are *also* reduced. The underlying *principle of environmental rationality* becomes incorporated into corporate, government and organizational policies and strategies. Ultimately, these ideas and policies drive technological innovation, market dynamics and government regulation.

The theory purports to offer a general explanation of the current transformations of institutions, practices and discourses in advanced phases of modernization. Major changes can already be observed currently in the organization of production and consumption in ways that bring about some environmental improvements (see Concluding remarks). The theory focuses on those institutions, in particular economy and technology, most important to bringing about a transition to more sustainable production and consumption. It points out, however, that environmental questions do not enjoy undisputed authority but share authority with other societal objectives and considerations.

Sustainable development will be the next phase of modernization, following the phase of advanced industrialization. Spaargaren and Mol (1991) argue that environmental problems can best be solved through further advancement of technology and industrialization.

Productive use of natural resources and environmental media (air, energy, water, soil, ecosystems) – that is, ‘environmental productivity’ – can be a source of future growth and development in the same way as labour and capital productivity had been for industrial development. Research becomes particularly focused on eco-innovations, and the interplay of various societal factors (scientific, economic, institutional, legal, political, cultural) which foster or hamper such innovations as ‘green’ technologies and consumables, etc. (Klemmer et al., 1999; Olsthoorn and Wieczorek, 2006). The approach assumes ‘sustainable development’ growth – but fails to problematize that such growth, as currently envisioned, entails the consumption of natural and human capital at substantial cost to ecosystems and society, respectively (Fisher and Freudenburg, 2001).

In the ecological modernization perspective, capitalism is neither an essential precondition nor an obstruction to, stringent or radical environmental reform. It becomes redirected so that it causes less and less environmental harm and increasingly contributes to sustainability (and society’s sustenance). While there continue to be ‘environmental issues’, fundamental conflicts about environmental reform programmes in industrialized countries have in the ecological modernization view been decreasing since the late 1980s – although this certainly does not apply to the USA and several of the newer members of the EU (in which conflicts are very observable in relation to, for instance, climate change and energy issues and Intergovernmental Panel on Climate Change Conference of the Parties [IPCC/COP] meetings) nor does it apply to, for example, Brazil, China, India and other developing countries in their struggles with established industrialized countries.

In sum, ecological modernization assumes then a more or less linear development – a further phase of modernization largely with minimal conflict and struggle – assumptions that it shares with the original modernization theory. However, it is much more sophisticated and conceptually rich than the earlier modernization theory – for instance, it gives greater attention to concrete innovation processes and developments.

Ecological modernization theory can be criticized for its overemphasis on and optimism about technological innovation – and for ignoring the fact that many of the technological efforts to save the environment and humanity are likely to lead to negative unintended consequences. One cannot have blind faith in technological breakthroughs and progress in that they may not come on stream quick enough (see later) and inevitably will generate unintended risky consequences.

Ecological modernization theory, while representing a type of systems theory, suffers from some of the same failings as the earlier modernization theory: insufficient attention to human agency, conflict and power, and to the many unintended consequences of system change; its linearity; its optimism about the course of societal development (in particular, a high level of technological optimism), boosted by using relative, intensity-based environmental indicators (e.g. per unit) rather than using measures of increases in absolute levels, for instance the increase in absolute levels of carbon in the atmosphere and heavy metals in water, air and earth, and the decline in overall biodiversity, etc.⁹

The fourth type of systems theory – applied to sustainable development issues – has been developed by Buckley, Burns and their associates in the form of a dynamic social systems analysis, actor system dialectics (ASD). In ASD, there is no one factor explaining environmental degradation – or that guarantees a sustainable development, for instance, by simply controlling or eliminating capitalism or the world system. The global environmental problem complex are systemic phenomena – in particular, associated with industrial systems and their functioning and evolution. The systems are institutional arrangements and cultural formations powerful in relation to their human populations but also in relation to the material/ecological environment (Burns and Hall, 2012). Established institutional arrangements and cultural formations associated with industrial systems with mass consumption and possibly mass exports not only include advanced capitalism but socialism (as practised in the former Soviet Union and its satellites) and kingdoms such as Saudi Arabia. These all have proved their capability to contribute to ecological degradation. Change toward sustainability is difficult – there are powerful institutional and cultural barriers – inertia inherent in the industrial institutions and cultural formations. At the same time, vested interests are able to mobilize and exercise power – and block or derail many sustainability initiatives.

Industrial/modernized systems are historic constructions – and in part operate as they were designed, but in part they operate in unintended ways, for instance in degrading the planet. Established institutional arrangements and practices – an industrial paradigm of values, power arrangements, governance structures, technologies, infrastructures – make up a complex of destructive factors, degrading the environment beyond sustainable limits and threatening to undermine societal resource bases. At the same time there are counter-movements and tendencies toward accomplishing some aspects of sustainable development – on the basis of change agents mobilizing power and expertise, and in some areas

overcoming institutional constraints and/or the opposition from vested interests. *There is then a micro-, meso- and macro-politics of sustainability.*

ASD teams have worked on three types of studies/investigations relating to particular ways in which sustainability initiatives take place, succeed or fail and, thus, the ways more sustainable technological, institutional and policy transformations succeed or have failed to take place:

1. *Sustainable technological innovations.*¹⁰ ASD research about technological innovations and development has been conducted in the analysis of numerous case studies of innovations relating to sustainability (wind, solar, geothermal, wood and hay heating systems, garbage burning for heating, reclaiming of gas byproduct for district heating, among others) (Baumgartner and Burns, 1984; Woodward et al., 1994).¹¹ Also, constraining factors and blockages have been investigated, e.g. in the case of solar heating in California, heat pumps in Germany, geothermal in California.
2. *Sustainable policy and programme initiatives.* A second major area of relevant theoretical and empirical research has concerned policy and programme initiatives, public as well as private (Burns and Stohr, 2011a, 2011b; Carson et al., 2009; de Man and Burns, 2006; Nikoloyuk et al., 2010). One study concerned an investigation of arguably the most radical regulatory framework for chemicals ever instituted, the European Union REACH scheme,¹² passed in 2006, and resulting in the establishment of a major regulatory agency, the European Chemical Agency (ECHA) located in Helsinki. This regime shift took almost 10 years to accomplish, engaged thousands of actors and involved the mobilization of sector, national, EU and global powers (for instance, the opposition of the European, American and Japanese chemical industries as well as the top political leadership of Germany, France and the UK member-states as well as the USA [lobbying directed at the member-state and EU levels]). Another major EU initiative was the establishment of the Baltic Fisheries regulatory regime, which was successfully established but failed to function properly in effectively regulating fish catches and securing fish stocks. Another EU failure was a consequence of its inability to pass a carbon or energy tax, although this was a priority for the Commission, several member-states and the EU Parliament; the initiatives were blocked by powerful economic interests and a few key member-states (in particular, the UK and Ireland). Ultimately, the EU successfully established an emission trading system (which, however, failed initially because of design but continues to function but its future is uncertain). Several ASD investigations concerned private meso-level initiatives (Carson et al., 2009; de Man and Burns, 2006; Nikoloyuk et al., 2010): BP set up an emissions trading programme within its global organization; WWF and Unilever launched a regime to regulate palm oil plantations and to protect rain forests in South East Asia (Indonesia and Malaysia); Greenpeace and Springer Publishing took initiatives to make Nordic paper and pulp production more sustainable and to protect Russian forests and forest workers. All in all, these initiatives have been partially successful, but, in general, there is no easy 'march', contrary to the optimism of ecological modernization theory. ASD studies were

also conducted during 1980–1985 of municipality initiatives to save energy and/or to develop renewable energy sources to replace oil (Woodward et al., 1994). The studies showed that change toward greater sustainability could be initiated by diverse actors and emerge from differing institutional spheres: politicians, bureaucrats, public utilities, grassroots engaged citizens, consultants. Conflicts and struggles were common. Not only did new paradigmatic concepts emerge but also the initiators often improved their capacities to mobilize resources – or to convince others to do so – and to exercise to a greater or lesser extent effective transformative powers; there were, nonetheless, stalemates and failures.

3. *Major transformations of social orders.* ASD researchers have conducted a number of studies of social transformation, with a focus on identifying the key mechanisms of paradigm shifts and restructuring of social order (complexes of institutional arrangements) (Burns and DeVille, 2006; Burns and Hall, 2012; Carson et al., 2009). The studies relate to, for instance, such transition paths as the following: (a) Autocratic power is combined with paradigm shift in elite cognitive-normative frameworks for governance and policy making.¹³ (b) Under conditions of pluralist distribution of powers, multi-agent negotiations lead to a new paradigm and key sustainability shifts, for instance¹⁴ the Kyoto agreement, EU fisheries and REACH. But there are also cases of blocked or a stalemated state of affairs so status quo and business-as-usual continues (this was the case in the EU multi-agent negotiations about an EU energy and carbon taxation (Burns and Hall, 2012; Carson et al., 2009). (c) Polyarchy, where major changes takes place through the diffusion of ideas, techniques, technologies, cultural forms and values. Material and social structural conditions make up a ‘selective environment’ which favours one institutional arrangement, or makes obsolete or defunct an existing arrangement (Burns and Dietz, 2001; Dietz and Burns, 1992). These organic change mechanisms are characterized by processes of diffusion and emulation (mimetic function) where a multitude of actors make autonomous yet similar decisions to bring about a transition to a new order (Burns, 2012; see Concluding remarks). ‘Organic’ is a more encompassing notion than ‘grassroots’, since the innovation and transformation processes may be launched and developed at multiple levels by collective agents that in some cases are very large and globally active and would not be understood simply as ‘grassroots’ actors.

Key transformation factors concern then not only power factors (and agents exercising power) but their values and interests and the formulation and development of models or paradigms concerning the design and functioning of societal governance and development in new areas such as those relating to sustainability.¹⁵ In general, the focus on agency (for instance, entrepreneurs and movements) and on structures (institutional arrangements, rule regimes, infrastructures and the material/ecological environment) in relation to processes of social constructions and transformation has been a hallmark of ASD.¹⁶

In sum, the four systems approaches, ecological modernization theory, world systems theory, treadmill of production theory and ASD offer substantially different perspectives, although there are several overlaps. World systems theory, treadmill of production theory and ASD pay particular attention to social structure, power, class and global

relationships, although the structures and stratifications they consider differ. Ecological modernization theory contends that capitalism is, in general, not a deterrent to the accomplishment of sustainable development, whereas treadmill of production theory and world systems theory stress that sustainable development will require the elimination of capitalism; for world systems theory, this means the elimination of capitalism at the global level. ASD is more ambiguous in this regard in that from an institutional perspective, the shift to a substantially different capitalist paradigm – along with other systemic changes, for instance in governance and in education and research – *might* make a path to sustainability achievable retaining some features of capitalism (Burns and Witoszek, 2012). However, although substantial changes are already taking place, it is doubtful whether the movement to another paradigm will be rapid and encompassing enough (see Concluding remarks). Both ecological modernization theory and ASD emphasize eco-innovation on multiple levels, but ASD also takes notice of the mobilization of change initiatives as well as opposition to these, the significance of established as well as mobilized powers. While new ecological development is ‘a march’ according to the former, it is often a struggle according to ASD. There is an assuredness and optimism about a sustainable future in the ecological modernization perspective that is not found in the social structural and power-oriented theories of world systems theory, treadmill of production theory and ASD.

Concluding remarks

To sum up, the sociology of development was in large part separated initially from environment research in sociology. For much of its history, the sociology of development had little to say about the environment, and, at the same time, most environmental sociologists neglected issues of development. Until recently, there were quite simply, two distinct epistemic and paradigmatic communities in sociology, each with its own concepts, discourses, research designs, analyses and publications. The emergence of the concept of sustainable development has contributed to bringing these research traditions closer together. In the past several decades, there has been growing focus on environmental concerns, globalization and (alternative) development issues. As suggested in this article, conceptualization and research programmes concerning ‘environment *and* development’ have emerged, and the notion of ‘sustainable development’ is being given increasing sociological attention worldwide.¹⁷ This has also given new life to system theorizing since arguably such approaches are oriented particularly to societal and global functioning and transformation.

Research on contemporary societal development suggests that there has emerged an ongoing ‘sustainability revolution’ comparable in several ways to the Industrial Revolution. Numerous case studies and observations indicate some of its features (Ayers, 2011; Burns, 2012; Burns and Hall, 2012; Edwards, 2005; Neeman, 2011). Sustainable development in thinking, planning and constructing is spreading and elaborating what is likely to turn into a major societal paradigm shift, eventually matching the Industrial Revolution in the transformation of technical and economic, sociopolitical and cultural conditions.

From the 1960s, processes of defining threatening environmental realities and mobilizing agencies, enterprises and citizens, etc. have been taking place. The UN, international

and national environmental agencies, many enterprises, public ‘intellectuals’, researchers, NGOs, environmental movements, media and civil society groups have succeeded to a greater or lesser extent in recognizing and convincing multitudes of others that the environment and human life as well as life generally are threatened on planet earth; action is deemed necessary – and multiple movements are launching plans and actions and, in some instances, bringing about new developments (Berkhout et al., 2009).¹⁸ Another way of thinking about this shift is that a ‘green’ or sustainabilization order is emerging – a new ethos and cognitive-normative discursive framework – just as an industrial order emerged in and through the industrializing process. Sustainability ideas, norms and values permeate an ever-increasing part of modern life and have a significant impact on everyday thinking and practices in substantial parts of the world. This is occurring not only in developed countries but also in developing ones such as China, India and Brazil.

Some of the drivers and facilitators of the sustainability revolution are: (1) continued environmental crises compelling institutional and sociopolitical responses; (2) expanding outpouring of critical analyses and prognoses about current environmental damages, threats and hazards as well as opportunities for change – contributing to a powerful normative ethos and mobilizing collective pressures; (3) opportunities for creative engagements – the excitement of innovating, experiencing change as well as exhilarating risks and uncertainties; the paradigm shifts themselves entail new ways to frame, think, judge and act that are challenges to be addressed, mastered and developed; (4) opportunities to make gains in fame and fortune; (5) new sectors are opening to quick development on green dimensions utilizing innovative ideas, models, methods, technologies and techniques – at the same time there is often less resistance from, or resilience of established actors and institutions in these new sectors; (6) diffusion and imitation mechanisms operating through diverse social networks, many now global; (7) some strategic powerful sectors – such as energy, autos and chemicals – are subject to particular attention and pressures to transform themselves, because major sources of energy such as fossil fuels are becoming increasingly scarce and also because they contribute significantly to pollution, GHGs and climate change.

The ‘green revolution’ represents multiple paradigm shifts, not only in production, technologies, consumables and lifestyles, etc. but in governance, science and education, and practical ethics and related normative developments. Gradually, blueprints will emerge specifying standardized designs and strategies. Industrialization was also characterized first by a highly ‘organic phase’ and then later by more blueprint-like modalities: where Germany, Japan, the Soviet Union and others adopted and imposed designs (Burns, 2012).

While ‘sustainability’ initiatives grow and spread by the many tens of thousands, the ongoing transformation will be no walkover. This is not a case of ecological modernization; rather, it is a development taking place in the context of established social structures and power configurations (whether capitalist, socialist, or Saudi Arabian and other Middle East oil producing kingdoms, etc.) and the elaborated institutional arrangements of what in many ways has been an historically successful industrialization/modernization paradigm. There is formidable opposition (including deniers of climate change and other environmental hazards as well as believers in technical fixes) among the powerful, for instance, many in the established industrial-commercial-banking complexes and their allies. The struggle will be long and difficult. Particularly troublesome are efforts to deal with climate

change, GHG emissions, the mammoth auto and related industries (Dietz and Burns, 1992), the continuing use and sustained extraction (including new forms of extraction) of fossil fuels. Whether the sustainability revolution will take place fast enough or be comprehensive enough to save the planet remains to be seen. History provides numerous examples of great societies that collapsed, and visions that failed or were never realized.

One might envision sociology developing a major scientific and policy analysis role in relation to the emerging revolution of sustainable development similar to its role vis-a-vis the Industrial Revolution, through data collection and monitoring, analysing, explaining, identifying and providing assessments of the mobilization processes, struggles and social impacts and related developments in what are already highly complex social transformations.

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Notes

1. There are a number of anthologies and textbooks covering the general area, for instance, Benton and Redclift (1994), Dunlap et al. (2002), Gross and Heinrichs (2010), Pretty et al. (2007), Redclift and Woodgate (1997). Also see Lidskog et al. (2015) for a critical overview of US and European developments in environmental sociology.
2. One of the issues – and challenges raised by contemporary research – concerns what possible forms of modern society are sustainable and how they might be accomplished (see later discussion).
3. The Commission consisted of 21 different developed and developing countries including Canada, Germany, Hungary, Japan and the USA as well as Brazil, China, India, Indonesia and Sudan. The 900-day international exercise in discussion and negotiation dealt with written submissions and expert testimonies from a wide range of global stakeholders, industrialists, government representatives, NGOs, researchers, etc.
4. The 1992 and 2012 UN Earth Summits in Rio de Janeiro engaging thousands of participants from all over the globe were, in part, derivatives of the Brundtland Commission and its influential report.
5. Baker (1996, 1997) emphasizes that they become particularly meaningful and effective in concrete settings where they are to be operationalized; put into practice they serve constructive purposes. Their definition and implementation entails political processes, in which diverse agents and institutions with varying conceptual and value orientations are engaged.
6. Other relevant approaches to sustainable development include such diverse scholars as Susan Baker (1996, 1997), Ulrich Beck (1992; Beck et al., 1994), Catton and Dunlap (1978),

- Kasperson et al. (2010), Lafferty (1999, 2006), Lafferty and Meadowcroft (2001), Redclift (1987), Opschoor (1996), Opschoor and Van der Straaten (1993), Rosa et al. (2010), Sachs (1997) and Stern et al. (1992).
7. For other neo-Marxist approaches, see Benton (1989), Dickens (1992, 1997, 2002), Foster (1999, 2000), O'Connor (1994), Wehling (2002), among others.
 8. Buttel (2002: 45), however, is highly critical of the strong assumption in much sociology of the decisive role of environmental movement mobilization in bringing about state policy change as a master process. He justifies his critique in a conception that there are multiple mechanisms of change that have operated in the past and operate now in the 'sustainability transformation' (see later).
 9. It is important to mention that there are differences in perspective within the ecological modernization research programme, namely between those who are techno-corporatist in orientation claiming that the market and technological development will solve sustainability problems more or less spontaneously, on the one hand, as opposed to those who have a more institutional and democratic political orientation which considers state governance in steering through, for instance, environmental policies, taxation, subsidies, caps on pollution, etc., markets and innovation processes, on the other. But this discussion would take us beyond this overview.
 10. It needs to be emphasized that at the time a number of the studies referred to below were conducted, sustainability was not part and parcel of the language and discourses of the times.
 11. Also the use of peat was investigated; peat was at the time considered renewable. More recent research has indicated it takes a very long time for peat to renew itself. The EU has banned the practice, and the programmes established in Ireland, Finland and Sweden are being phased out.
 12. REACH = Registration, Evaluation, Authorisation, and Restriction of Chemicals.
 13. If hegemonic power remains committed to the old order, then change, especially a paradigm shift, is unlikely to take place, except due to external forces, for instance major change in material and social structural conditions.
 14. Another transition mechanism entails a power shift taking place in such a way that a group with a paradigm differing from the established or hegemonic paradigm emerges to participate in or to take power (Green Parties entering into coalition governments have made a difference in sustainability policies in several European countries, Germany and Sweden, among others).
 15. Stinchcombe (1968) stresses the structural factors (including the power positions of actors in social structures) enabling them to initiate developments of new organizational arrangements *within* existing social structures.
 16. Along somewhat similar lines, Ostrom and associates (1990, 2005, 2007, among others) developed and applied an institutional and systemic approach, the 'Institutional analysis and development' (IAD) framework. And on the basis of their global empirical work, they constructed a massive archive of commons governance and its relation to the conservation of water, forest, grazing resources and fish stocks, among other areas.
 17. This overview does not do justice to substantial and expanding work being conducted by sociologists in all parts of the world. Hundreds of sociologists from Africa, Latin America, Asia, the Middle East, Europe and North America are investigating sustainable development issues on macro, meso and micro levels: studies of consumption, production, energy, renewable energy, water, forests, land, pollution, GHG emissions, climate change, etc., among others: Amanor and Moyo (2008), Ballet et al. (2011), Gardetti and Torres (2012), Barthes et al. (2013), Béal (2011), Béal and Pinson (2014), Betancur (2005), Biwoule Fouda (2013), Chaudhury (2006), Dunlap and Brulle (Gross and Heinrichs (2010), Yang (2005), Guzmán

- Casado et al. (2000), Kemple (2013), Lévesque (2007), Li et al. (2009), Maljean-Dubois et al. (2014), Peng (2006), Pérez Rubio (2007), Taymer et al. (2007).
18. Some instances of radical action have been accomplished as well, such as the EU chemical directive REACH (2006) (see earlier).

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Author biography

Tom R Burns (Professor Emeritus at Uppsala University; Senior Researcher, LUI/ISCTE, Lisbon) received a BS in Physics and an MA and PhD in Sociology, all from Stanford University. He has published more than 15 books and 150 articles in the areas of governance and politics, environment and technology, administration and policy making. He has also published extensively on social theory and methodology, with a focus on the new institutional theory, a sociologically based game theory, theories of social systems dynamics and sociocultural evolution. He has been Jean Monnet Visiting Professor at the European University, Florence (2002), Fellow at the Swedish Collegium for Advanced Study (SCAS) (1992, 1998), Visiting Professor in Lisbon, Lund and Stockholm (Sweden), Ås (Norway), Stanford, Wissenschaftszentrum Berlin, among other institutions. Recent works include *The Meta-power Paradigm: Structuring Social Systems, Institutional Powers, and Global Contexts* (2012; with Peter Hall) and *Public Policy Paradigms: The Theory and Practice of Paradigm Shifts in the EU* (2009; with Marcus Carson and Dolores Gomez Calvo). Other books include: *Societal Decision-making* (1992; with Svein Andersen), *Creative Democracy* (1988; with Reinhard Ueberhorst), *The Shaping of Social Organization: Social Rule System Theory with Applications* (1987; with Helena Flam), *Man, Decisions, Society* (1985; with Thomas Baumgartner and Philippe DeVille), *The Shaping of Socio-economic Systems* (1986, 2014; also with Baumgartner and DeVille), *Municipal Entrepreneurship and Energy Policy: A Five Nation Study* (1994), *Transitions to Alternative Energy Systems: Entrepreneurs, New Technologies, and Social Change* (1984; with Baumgartner).

Résumé

Cet article propose un aperçu et une analyse du développement durable dans une perspective sociologique. Il est divisé en trois parties. La première partie présente un certain nombre de recherches sociologiques abordant ce thème, avant même l'apparition du concept de « développement durable ». L'accent est mis sur les recherches en sociologie environnementale et en sociologie du développement. La deuxième partie examine le contexte et le processus ayant mené à la conceptualisation du « développement durable ». La troisième partie examine plusieurs représentations sociologiques de la question du développement durable en privilégiant quatre approches systémiques : la théorie du système-monde, la théorie néomarxiste du treadmill of production, la théorie de la modernisation écologique et la théorie des systèmes modernes. Ces quatre approches se sont penchées sur les questions de développement et, plus récemment, de durabilité. Cet article poursuit en mettant en évidence un mouvement social, à l'échelle mondiale, celui de la révolution du développement durable que l'on pourrait comparer à celui de la révolution industrielle en matière de transformation des conditions sociales, économiques et culturelles. Il reste à voir si cette nouvelle révolution s'opérera avec la rapidité et la portée suffisantes pour sauver notre planète des nombreuses catastrophes qui la menacent. Cet article conclut en suggérant que la sociologie peut et doit jouer un rôle dans la révolution du développement durable, comparable à celui assumé lors de la révolution industrielle, c'est-à-dire le suivi, la collection de données, l'analyse, l'explication et l'évaluation des conséquences et des évolutions de ce phénomène.

Mots-clés

Environnement, sociologie de l'environnement, sociologie du développement, développement durable, théorie systémique, révolution du développement durable

Resumen

El artículo ofrece una visión general y un análisis del desarrollo sostenible desde una perspectiva sociológica. Está dividido en tres partes. La primera parte presenta la investigación sociológica relevante antes de que hubiera siquiera un concepto de "desarrollo sostenible". El enfoque seleccionado se centra en las rúbricas de sociología ambiental y la sociología del desarrollo. La parte II analiza brevemente el contexto y el proceso que llevó a la conceptualización de "desarrollo sostenible". La Parte III considera la respuesta de varias teorías de la sociología a temas de desarrollo sostenible, con foco en una selección de cuatro grandes teorías del sistema: la Teoría Mundial del sistema, la teoría neo-marxista de la "rueda de producción", la teoría de la modernización ecológica y la teoría de los sistemas modernos, todos han abordado cuestiones de desarrollo y, más recientemente, las cuestiones de sostenibilidad. El artículo identifica un movimiento continuo social global, la revolución de la sostenibilidad, que puede ser comparada con la revolución industrial, en función de la transformación de las condiciones sociales, económicas y culturales. Si esta revolución emergente se llevará a cabo con la suficiente

rapidez y extensión para salvar el planeta tierra de múltiples desastres, aún está por verse. El artículo concluye sugiriendo que la sociología puede y debe jugar un papel en relación con la revolución del desarrollo sostenible similar a su papel vis-à-vis la revolución industrial, esto es, el seguimiento y la recopilación de datos, el análisis, la explicación, y la evaluación de impactos y desarrollos relacionados.

Palabras clave

Medio ambiente, sociología ambiental, sociología del desarrollo, desarrollo sostenible, teorías de sistemas, revolución de sostenibilidad