INSTITUTIONAL AND INFRASTRUCTURE RESOURCES: NATIONAL AND REGIONAL INSTITUTIONS AND INFRASTRUCTURES

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Contents

Summary: Institutions in Sub-National Sustainable Development

This article reviews the state of knowledge on sustainable development in sub-national political units and uses an agent-based paradigm of social systems to demonstrate that local institution building is the heart of sustainable development. Institutions and activities at other levels of social aggregation – regional, national, and international – are necessary, but not sufficient for global sustainability. Only appropriate local institutions can transform the many significant efforts by intergovernmental

organizations, private foundations, and non-governmental aid agencies into real change. Global sustainability is made community by community, not by international mandate. This article summarizes the agent-based paradigm and from it develops key sustainable development strategies that may be adapted for use by communities and regional and national governments everywhere.

1. Introduction

Sustainable development is a popular idea that is poorly defined. That is its strength. The lack of a clear definition makes it sufficiently elastic to include whatever a particular interest group may want. Understood in terms of efficiency, it talks to the needs of business. Interpreted as equity in development, it speaks to the poor and their advocates. Defined as ecological preservation, it is embraced by "green" philosophers and environmental activists. But sustainable development – or sustainability as it now often termed – can be kept broad and inclusive, and still be a guide to effective policy. The trick is to avoid the narrow definitions proffered by disciplinary scholars and embrace a new conception of sustainable development as a problem of social processes within complex systems.

This article shows why and how institutions – the glue of society that defines community – are critical to sustainability. Without them sustainable development would remain the stuff of rhetoric. It is only in myriad communities that the abstractions of sustainable development take on a meaning related to the practicalities of life. But global human and natural systems also must be taken into account. Institutions that guide local decision-making operate within national and global contexts. This article shows that sustainable development comes from a process of social adaptation designed to permit the greatest possible local adaptability and flexibility within flexible national and international institutions. It then shows how communities of all sizes can increase their adaptive capacity by increasing technological innovation and ecological efficiency, by changing the commonly accepted beliefs about the value and uses of natural goods, and by increasing social equity and political participation. This article shows how sustainable development is a matter of changing many processes simultaneously, which requires continuous institutional development. Finally, this article outlines the types of the institutional strategies that must be adapted to local conditions in a process of sustainable development.

For two reasons this article does not analyze in detail the state of knowledge about national and regional institutions. First, the variety of institutional forms and social and cultural contexts would make any formal analysis impractical and, as far as this author is aware, none has been successfully attempted. Second, it is more important to think about the nature of the concept of sustainable development and how institutions are central to its achievement. As sustainable development is an abstraction that describes no current community form or process, it is important to realize that sustainable development will be a process of trial and error, continuous re-evaluation and adjustment that is quite unlike present society. But life under sustainable development will be unlike living in the rapidly evolving modern city. In place of anomie in a hectic social evolution driven by technology, media, and financial and product markets, sustainable development is a conscious process that involves individuals, communities,

and local, regional, and national government organizations. This process, however, will be driven by uncertainty and evolving ideas and beliefs about the nature of development, and the appropriate use of and relations to environment.

2. Sustainability Is Social

The value of the concept of sustainable development lies in its inclusiveness. It is a process, a bundle of strategies for feeling a way forward with uncertain knowledge in an unpredictable environment. It is not a goal because science cannot define it, because essential ecosystems are dynamic, because social systems are dynamic, and because ideas about what constitutes development are dynamic.

2.1. The Sustainability Paradox

The term "sustainable development" has been borrowed by many interest groups to cover their self-interest in an ecological cloak. It has become so broad that it has become "a bundle of neat fixes," preferably technological, that allow business to continue much as usual. As Lélé (1991) observes, it is a "metafix" that unites "the profit-minded industrialist and the risk-minimizing subsistence farmer to the equity-seeking social worker, the pollution-concerned or wildlife-loving First Worlder, the growth-maximizing policy-maker, the goal-oriented bureaucrat, and therefore, the vote-counting politician." It is a concept to which almost any pet policy may be attached, from public transportation to debt relief, from animal rights to increased government research, from energy investment to forest protection. This is the "catch-22," the paradox at the heart of the idea that prevents it from being an effective guide to individual or collective behavior.

Sustainable development is useful as long as it is not narrowly defined. However, when broadly defined, its inclusiveness provides no criteria for discriminating between alternate strategies and policies. Saving the environment draws money from increasing economic growth that will produce the technologies to save the environment. Building dams reduces greenhouse gas emissions, but drowns ecosystems and dislocates human populations. If many actions can be justified in the name of sustainable development, the concept can be no guide to strategies and actual policy in specific situations.

To make the concept more useful many scholars attempt to define it, inevitably in exclusive terms that reflect policy preferences or theoretical biases. For example, for many economists sustainable development is a matter of increasing efficiency. For environmental philosophers, sustainable development is about the ethical human treatment of non-humans, including insects. Animal rights activists and vegetarians see sustainable development as restriction on the use of animals, usually larger, domesticated species. For some environmental NGOs sustainable development becomes a whale hunt here and a logging company there: single issues with media appeal. Sustainable development then becomes a "big tent" that welcomes everyone, but draws narrow conceptions into a contentious debate from which no universal criteria for its achievement can emerge.

To retain its breadth and yet make it an effective principle of policy, sustainable development must first be understood as a social process. Notwithstanding the greater

funding for the natural sciences and the cultural preferences in the developed countries for scientifically-driven policy and technological solutions, sustainable development questions the very foundation of societies and usually finds them wanting. It is commonly believed that sustainable development is about conservation of ecosystems or the relationship between social and ecological systems. This conventional wisdom is mistaken.

Sustainable development is not a synonym for environmental preservation. Although it is often hijacked by activists promoting a narrow agenda, sustainable development is about society and social processes. The literal definition of sustainable development is clearly anthropocentric, development is a social issue, unsustainability is primarily an artifact of social changes, and scientific uncertainty prevents effective management of the environment. Only tangentially is sustainable development about ecosystems. Its central concern is to arrange social processes to provide an increasingly human experience of life for an increasing number of people without damaging essential ecological systems.

2.2. Social Unsustainability

Although there is some evidence that even prehistoric humans hunted a few species to extinction before moving on to other species that were harder to catch, the problem of sustainability is primarily a result of industrialization and the technical and social changes with which it is linked. Global population growth has rapidly accelerated since the eighteenth century. The population of the world was three times larger at the end of the twentieth century than at the beginning, but prior to industrialization the global population had only doubled in nearly a thousand years. The rapidly growing population has greatly increased the consumption of natural goods.

Industrialization has been a two-edged sword. At high levels of development it rapidly increases comfort and security, and demand for environmental protection and eco-efficient technology. But as growing populations acquire industrial technology – which because of a lack of capital is usually less than optimally eco-efficient – consumption of both natural sources and natural sinks increases fast. Demand for minerals and fossil fuel energy, and levels of pollution may grow exponentially. There is some evidence that peak eco-inefficiency is reached at middle levels of development, but the environmental footprint of the very rich is larger than for poorer consumers. This apparent paradox is explained by richer consumers expanding their wants faster than the rate of increase in eco-efficiency.

Three principal factors explain why eco-efficiency is greater in highly-developed countries. First, these countries have the wealth to create and use the most eco-efficient technology. Second, some consumers, sated with material goods, demand a cleaner environment and more spiritual self-actualization. Non-market uses of ecosystems such as their aesthetic values become increasingly prized. Finally, they have the economic power to export through trade much of the environmental destruction they create.

Aside from the technical and structural changes connected with industrialization, cultural changes occur that affect the reliance of human systems on depleted eco-systems, and the stability and social health of communities. As markets become more

pervasive, community ties are eroded: individualism is inherently incompatible with a dominant community. Self-interest learned in economic activity leaks into social interaction where familial and fraternal bonds and trust are diminished. Early industrialization demanded centralization, creating large cities and denuding small agricultural communities. Post-industrial society (as it has been called) with its decentralized work is only nascent, even in the most developed countries. Large-scale production aided by urban concentrations of workers is still the rule. In developing countries rapid urban growth continues unabated while some core cities in North America have de-industrialized.

2.3. Anthropocentrism

Sustainable development is an anthropocentric concept. It places the emphasis on "development." Taken literally, sustainable development is not about conserving ecosystems except in so far as they are necessary to support the continuing development of human society. It is about adapting and improving human systems to increase the life chances of the greatest number of people in the context of a "natural" environment that provides essential services. Thus, sustainable development is sometimes thought of as so managing ecosystems that human societies may continue to develop long into the future. Unfortunately, this simple conception is unclear because development is itself a contested word and because our knowledge of ecosystems is insufficient to allow effective management of them.

2.4. Development process

The term "development" is used to mean variously economic growth, increasing human rights, more education, better quality of life, and much more. As one critic of a narrow economic interpretation has suggested it is about making life "more human" for as many as possible. Development is about social change with a strong implication of improvement. Thus, development may be understood as the process of making collective life more human. Economic wealth may help, as will political participation. Technology plays a part and the rule of law has it uses. But if we have learned anything from more than fifty years' study and practice of development it is that development is a complex process that we do not understand, that occurs for myriad reasons and fails for as many reasons; it is fragile and unpredictable. We also know that it involves change in social institutions from religion to education to economy.

Ultimately, development is a matter of changing minds, how people think and what they expect, changing legal and political systems, and replacing cultural shibboleths with new social practices. Where once it was believed that increasing domestic savings rates would lead to developmental "take-off," now we realize that land tenure systems, property rights, ideas about individualism and collective behavior, enforcement of contractual obligations, beliefs about spiritual salvation, among many other factors, influence whether development occurs and what effect it has.

Development may be conceived of as the adaptation of institutions in response to changes 1) in ideas about what is possible and desirable in human existence, and 2) in ecological and socio-economic environments that are changing in often unpredictable

ways. Institutional changes produce physical, financial, and human capital resulting in greater social adaptation.

2.5. Scientific uncertainty

Sustainability is a social issue because science has failed to demonstrate how ecological systems could be managed to sustain society and because modern science is unsuited to the task of understanding – and, thus, managing – ecological systems. Science cannot predict with useful precision the climate of 2020, the rate of loss of species or the effect of that loss, or whether food production will continue to increase. Even the global population can only be estimated and the sufficiency of common industrial minerals is debated. Science fails to provide any useful guide to ecological management because it does not comprehend ecosystems and because social changes, that affect natural goods consumption, are unpredictable.

Ecosystems management implies a sufficient understanding of the system to predict the effect of actions. Corporations invest heavily in technology yet frequently are unable to "manage" their inventories showing that management of large corporations directing behavior throughout the system with hierarchical power structures is more art than a science. It should be no surprise that lacking comparable coercion and control, "management" of all but the smallest ecological systems is impossible and will probably remain impractical. It may be practical if future social demand for natural goods could be predicted with reasonable accuracy and the effect of human consumption on the productivity of sources and sinks were well understood. By refusing to delay mitigative policy, the precautionary principle is a tacit admission that scientific knowledge is an inadequate guide to collective management of ecosystems.

Orthodox science overlooks the complexity of social and ecological systems. The methodology of orthodoxy often produces impressive knowledge gains. Newtonian mechanics was an adequate system for explaining motion for four centuries. Edison "invented" technological marvels, such as the light bulb, by systematically testing thousands of materials for the filament. Pharmaceutical companies religiously test every molecule they can acquire from nature for their medical uses. But the methods of modern science are inadequate to comprehend and explain the interactions within ecological systems and to predict their response to external stressors, such as human incursions. Similarly, it is becoming apparent that the mechanical science methods borrowed from the physical sciences by the social sciences are inadequate to the task of comprehending development and understanding how social systems respond to ecological and socio-economic stresses.

As explained more fully in section 3 below, the behaviors of complex systems result from a very large number of interactions between a very large number of diverse and self-seeking agents. The "simple" or reductionist models of orthodox science are designed for mechanical systems in which the system structure defines the hierarchical relationships between parts and their place in the overall structure. Ecological and social systems are "complex" systems in which structure and behavior emerge from the interactions among self-seeking agents. Relationships between agents are dynamic, and the structure and the system behavior change continuously. The structural changes

influence agent interactions. Such systems are stable, able to adapt to variations in their environment, and have to be modeled from the "bottom-up."

2.6. Changing ideas

In addition to the complexity of dynamic interaction between dynamic ecological and social systems, the subjective collective understanding of "development" and "environment" continue to change. The concept of development reflects the evolution of collective ideas. An acceptable level of economic inequality at one time may be unacceptable a few years later. Economic growth has become less important and human rights have become more important aspects of development. Similarly, ideas about environment have rapidly evolved, even in the poorest countries, in the last thirty years. In the United States and Europe voluntary recycling, unknown in the 1950s, is growing, even when not stimulated by policies of selective incentives. As scientific knowledge about the sensitivity of ecosystems to human incursions accumulates, individual and collective ideas about their uses will change. It was once acceptable to dump urban waste untreated into seas and rivers. Now that the effects are better understood, waste treatment is considered the standard to be achieved by every community.

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Biographical Sketch

Neil E. Harrison was born and educated in England. He studied in the United States, where he has earned a doctorate in International Studies from the University of Denver. In his graduate work he concentrated on development and technology studies, and his dissertation compared the formation of national policies on climate change in ten countries and the effect of those positions on the international negotiations.

Dr Harrison researches local and national strategies and policies for sustainable development, and the formation and effect of international institutions for environmental conservation. In his book *Constructing Sustainable Development* (2000) he showed how current thinking about sustainable development is, at best, incomplete and often dangerously misguided, and how effective integrated strategies for sustainable development can only be developed out of agent-based models of social systems. He has published many technical papers, articles, and chapters on sustainable development, the uses of technological innovation in sustainable development, and the interplay of science and politics in the formation of international institutions for climate change mitigation.

He has several research projects in progress. He is preparing a book that uses agent-based models to define corporate strategies and government policies to allow firms to be profitable in competitive markets, while aiding the process of sustainable development. He also is co-editing a book of case studies on the interaction of science and politics in international environmental issues, and editing a book on how agent-based theories can improve understanding in international relations and global studies. Both edited texts are scheduled for publication in 2003. Several articles and invited chapters on environment and development, and the international politics of climate change, are in various stages in the publication process. Future research plans include further investigation into the uses of technological innovation in sustainable development.

He has taught at three universities, most recently at the University of Wyoming. He also is the Executive Director of the Sustainable Development Institute, a non-profit institution that researches and advises on strategies and policies for sustainable development. Dr Harrison has consulted on many issues in Europe and North America and has traveled or worked in nearly forty countries on four continents.