

A review of sustainable development implementation through local action from an ecosystem management perspective

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Abstract

The search for implementation strategies to achieve environmental health has been central to actualization of the concept of sustainable development. The dialogue that this search has engendered focuses on "top down" or "bottom up" approaches with particular emphasis on the need for small scale local actions. This paper examines the merits and limitations of local or small scale actions from an ecosystem perspective. While local actions enhance information gathering, build capacity for implementation, and serve as a tool for learning, challenges of scale associated with wide-scale application of policies, the restriction of property right regimes, and differences in cultural expectations are also evident. Management systems that employ concepts of environmental governance appear to overcome shortcomings of earlier approaches and ultimately contribute to improved environmental integrity.

Introduction

In 1987, the World Commission on Environment and Development (WCED) developed a "global agenda for change" in response to concerns about continued human impact on the environment (WCED 1987). The WCED defined sustainable development as "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations" (WCED 1987). Subsequently, The Brundtland Commission directed substantive attention at environmental, social, and economic dimensions pertaining to the challenges of implementing sustainable development (Simon 1989; Carley and Christie 1993; Johnston 1996; Jackson 1996; Mitchell 1997; Weaver, Rock and Kusterer 1997).

Central to sustainable development is the human relationship with the natural environment. Although the environment encompasses biotic and abiotic surroundings, traditional resource management gives additional management attention only to those components with particular utility to humankind (Mitchell 1989). Resource management stems from early conservation movements that were concerned with the closing frontier, and sought to preserve resources for national use while insuring environmental quality (O'Riordan 1971). O'Riordan offers an enduring definition of natural resource management,

... as a process of decision making whereby resources are allocated over space and time according to the needs, aspirations and desires of man within the framework of his technological inventiveness, his political and social institutions and his legal and administrative agents.

More succinctly put, natural resource management involves decision-making regarding the allocation of resources (O'Riordan 1971; Mitchell 1989).

Traditional resource management evolved into an ecosystem management approach after recognition of the value of conservation; recognition of the interconnectedness of natural systems; recognition of the complexity and uncertainties of natural resources; and the experience of creating the decision-making process had taken place (Esty and Chertow, 1997; Bussard, Reed and Tracey, 1998). An ecosystem approach to natural resource management is rooted in the concept of an ecosystem: "... plants, animals, and microorganisms which live in biological communities and which interact with each other and with the physical and chemical environment, with adjacent ecosystems, and with the atmospheres" (Costanza and Folke 1996). Accordingly, "Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework towards the general goal of protecting native ecosystem integrity over the long-term" (Grumbine 1994). Indeed, some authors suggest that "conservation biologists and practitioners of natural resource management have accepted ecosystem management as an emerging philosophy ... or paradigm... in which the overriding aim is to sustain the integrity of ecosystems" (Brunner and Clark 1997). Thus, recognition of the concept of an ecosystem introduced the concept of ecosystem management. However, an ecosystem and an ecosystem-based approach should be differentiated, since the latter focuses on larger scales founded on ecosystem principles (Slocombe 1998).

A natural resources approach to management focuses on the resource as the level at which health is sustained and on the instruments used to achieve that health. In contrast, an ecosystem management approach considers ecological factors at multiple levels and attempts to sustain the health of the whole while taking into account connections between social, economic, and ecological dimensions (Samson and Knopf 1996; Lackey 1998; Szaro, Sexto and Malone 1998; Keiter 1998). An ecosystem approach is treated as being synonymous or associated with sustainable development (Savory 1988; Grumbine 1994; Haynes, McCool, Horne and Birchfield 1996; Samson and Knopf 1996; Brunner and Clarke 1997; Mitchell 1997; Lackey 1998; Slocombe 1998). However, although the literature has arrived at a general consensus supporting an ecosystem approach to sustainable development, the manner in which sustainable development should occur is still debated.

This paper broadly explores implementation strategies for sustainable development, specifically focusing on local or small scale actions. The discussion explores both the advantages of local actions that manifest as local empowerment, capacity building, and satisfaction of information requirements as well as the limitations of the approach in terms of efficacy of individual actions at the local scale, the restrictions imposed by local property rights regimes, and differences in cultural expectations. The conclusion reflects upon a middle ground from a natural resource or ecosystem perspective, combining local action with global thinking.

Implementation of sustainable development

Implementation strategies for sustainable development generally focus on the value of a "top-down" or "bottom-up" approach (Simon 1989; Fox 1992; Canadian Round Table on the Environment and the Economy 1993; Singh and Titi 1995). Many initial actions towards sustainable development came from top-down institutions such as nations, agencies, and organizations. These initiatives generally follow a progression of steps from the establishment of sustainability as a goal, to the formation of principles and the development of indicators.

Setting the goal of sustainable development occurred initially through the efforts of international organizations such as the WCED and events such as the Earth Summit in Rio. At a national level, the Canadian government took similar measures with the release of The Green Plan in 1990. The Plan states, "Sustainable development is what we want to achieve" and "sets out how we are going to achieve it together in the years to come" (Government of Canada 1990).

Principles or strategies have since been developed. In Canada, federal government departments have forwarded a second generation of strategies to pursue sustainable development (Government of Canada 2001). Other non-governmental organizations, such as the Canadian Water Resources Association (CWRA), have also developed principles.

Subsequent to principle formation is the establishment of indicators for sustainable development in sectors such as forestry, tourism, mining, fisheries, and water. However, questions arise concerning the measure and value of these sector indicators in terms of scope, equity, linkages, and uncertainty (Ruitenbeek 1991). Some researchers question the development of physical indicators in terms of knowledge requirements and associated time frame (Dovers and Handmer 1992; Carley and Christie 1993; Worster 1995; Mitchell 1997).

Commentaries from reviewers find these top-down approaches to be mediocre to weak. The Commissioner of the Environment and Sustainable Development, reflecting on three years of sustainable development strategies by federal government departments in Canada, observed that departments must direct effort in the areas of assessing initial efforts, planning future approaches, and developing management systems with a concerted view to action (Emmett 1999). An assessment of second generation sustainable development strategies found that they contained many vague commitments, with unclear connections between departmental responsibilities and sustainable development, and few links to core business plans (Runnalls and Bregha 2002). Other top-down directions are almost non-existent in Canada, and only one province has undertaken such initiatives towards sustainable development (Runnalls and Bregha 2002).

As a complement to the top-down approach, other scholars advocate the bottom-up approach as another means to sustainability. Pioneering environmentalist Rene Dubos conceptualized the idea in 1972 (Grillon 1994). His concern regarding the human impact upon the environment gave rise to the credo "think globally, act locally". Given Dubos' position as an advisor to the United Nations Conference on the Human Environment (1972), it is unsurprising that "thinking globally, acting locally" became a dominant international theme, the credo of world wide relief organizations such as OXFAM, and the purpose of the First Global Conference on the Future (Harman 1982).

More recently, the importance of community empowerment, capacity building, and local decision-making to sustainability are highlighted (Singh and Titi 1995; Grubb, Kock, Munson, Sullivan and Thompson 1993; Maser, Beaton and Smith 1999). The integral role of indigenous and local communities was formally acknowledged in Principle 22 of the Rio Declaration of Environment and Development (United Nations 1992). Indeed, some authors argue that the most promising actions towards sustainable development are local initiatives, developed at the community and/or city scale (Wenner 1997; Yanarella 1999; de Beer and Marais 2005). The following excerpt captures the spirit of the bottom-up approach:

"It is at the community level that most is being done to protect the environment. We can all too easily get caught up in global negotiation whilst forgetting that people need to be free to pursue sustainable development for them. The reconciliation of environmental protection with economic advance essentially comes down to a mass of local problems" (Carley and Christie 1993).

Yanarella (1999) affirms the local (city) level as appropriate for achieving sustainability, asserting the criticism that "the Achilles heel of most blueprints of sustainable development is that they are couched at the scale of the nation or globe".

Merits of local actions

From an ecosystem perspective local level actions are fundamental to sustainable development implementation. Local actions influence three specific areas:

- Information and feedback
- Community empowerment and capacity building in orientation to decentralization
- Local action as an educational tool for global thinking

Information and feedback

Both the environmental management literature and resource management institutions recognize that successful sustainable development programs must engage local people in information exchange and monitoring. Information acquired through local actions typically emerges from environmental management institutions. For example, Friends of the Grand River, a group of individuals interested in a 15 kilometer reach of the Grand River, routinely monitor the stretch of river for angling as well as for other inappropriate uses. In the summer of 1998, they discovered warm water temperatures and strained fish stocks and alerted management authorities. As a result of information rooted in local level actions, a higher-level agency put measures in place to reduce the stress on the resource.

Indeed, scholars recognize different types of information and the need for broader information (Endter-Wanda, Blahna, Krannichi and Brunson 1998). Local knowledge systems, indigenous knowledge systems, and social science information all make valid contributions to successful management programs (Freeman 1989; Reigier, Manson and Berkes 1989; Carley and Christie 1993; Safa Dei 1995; Mitchell 1997). Governing agencies concur, as the recent sustainability strategy from the Canadian Department of Fisheries and Oceans (1998) illustrates: "We have learned that the Fishery for the Future must have a reliable base of scientific, traditional and local knowledge to ensure accurate assessment of fish and stocks."

Capacity building and community empowerment

Engaging local citizens in local action is a valuable strategy for enhancing capacity to implement management systems. Organizing a sustainable development program into a structure consisting of lower (local) level subsidiary components allows decision-making to be delegated to the most appropriate level (Carley and Christie 1993; Mitchell and Shrubsole 1997), fostering local accountability and generating a sense of community empowerment (Korten 1986).

Community empowerment is central to notion of sustainable development. Empowerment contributes to the success of natural resource or ecosystem management programs because it involves principles of good government, collective decision making, and popular participation (Singh and Titi 1995). These principles reinforce the capacity of community effort to achieve management goals and highlight the notion of local "buy in" (Korten 1989; Martin 1995; Maser, Beaton and Smith 1999). As Selman (1991) describes the concept:

"... because local authorities are local, they have authority, they can provide and promote civic pride and leadership and they are guarantors of local democracy".

The value of community contributions has been increasingly recognized because of the limited efficiency, effectiveness, and capacity of the traditional agencies responsible for natural resource management (Regier, Mason and Berkes 1989; Mitchell 1989; Carley and Christie 1993; Maser 1997; Hukkinen 1999). Reductions in environmental government agency funding exacerbate this situation (Runnalls and Bregha 2002).

Natural resource management capacity enhancement attributable to the activity of local level organizations has real world examples. For instance, The Miramichi River Environmental Assessment Committee (MREAC), a community-based volunteer group, promotes and facilitates a Riverwatch program for the Miramichi River in New Brunswick. The program provides a telephone number that volunteers may call if they suspect environmental problems or witness violations of regulations, laws, and/or statutes. In 1997, the Riverwatch program received approximately 80 telephone calls. Such volunteer efforts demonstrate empowerment and mobilization, thus increasing the overall capacity of the resource management program through local level participation.

Education

Local actions educate and enhance the awareness of both the participants and the local community. According to Hemple (1996),

"the point of the community restoration argument is not that it guarantees ecological improvement; but rather that it permits rooted engagement and face-to face deliberation of a type and scale that may foster ecological learning and, under the right conditions, adoption of more sustainable lifestyles".

Rene Dubos agrees that "ecological consciousness should begin at home" (Grillon 1994). The importance of education, awareness and training is identified as a key concept to the implementation of sustainable development (Korten 1989; Grubb, Kock, Munson, Sullivan and Thompson 1993; Titi and Singh 1995; Drissen 1998, Yanarella 1999). Education is a consistent theme in documents such as the Rio Declaration of Environment and Development (United Nations 1992)

Limitations of local actions

Although approaching sustainable development through local action has many identifiable benefits, limitations of such an approach are also evident. These may be generally grouped into limitations of scale, property right regimes, and culture.

Scale

It is clear that that the environment is a global concern and that environmental problems must have a global response (WCED 1987; Grubb, Kock, Munson, Sullivan and Thompson 1993; Johnston 1996; Hemple 1996; Hanna and Jentoft 1996; Goldman 1998). Unfortunately, environmental management failures are having serious global effects. These include climate change, acid rain, and water scarcity. Although local actions and individual choices make positive contributions to global solutions, their collective contributions are insufficient in the face of globalization (Fox 1992).

Four particular issues present specific limitations to the efficacy of local actions:

1. The ecosystem approach acknowledges a need for more knowledge and understanding (Grumbine 1994; Samson and Knopf 1996). Despite recognizing the need for multiple types of information, expertise regarding ecological knowledge has traditionally resided in agencies and academic institutions (Kaplan, Kaplan and Ryan 1998). Because of costs, the level of expertise required, and demands for management services, it may be unreasonable to expect successful ecosystem management at the local level.
2. The ecosystem approach acknowledges a systems perspective (Savory 1988; Grumbine 1994; Bussard, Reed and Tracy 1998). By definition, local action presents a limitation to ecosystem management because it concentrates on parts of a system within a boundary (ecosystem vs. ecosystem-based). The scope of an ecosystem approach is inherently broad, examining interactions and linkages within systems. Local limitations preclude the scope necessary for "world watching" - studies of biosphere and atmosphere interactions crucial to understanding issues such as climate change (Johnston 1996; Costanza and Folke 1996; Goldman 1998).
3. Ecologically appropriate local actions may have detrimental cumulative effects (Fox 1992).

4. Limitations are realized when no local entity exists. Space, for example, represents a common resource devoid of "local" but may hold tremendous potential in terms of environmental management (O'Neil and Bryant 1982).

Property rights

An additional limitation of local action finds expression in the well-established tragedy of the commons argument (Hardin 1968). In summary, the tragedy model depicts "an independent system that is unorganized, completely decentralized, devoid of guidelines for social behaviour" (Hanna and Jentoft 1996). Such a system will ultimately lead to ruin for all individuals. Literature supports, refutes, and expands on Hardin's original parable and continues to grow (Berkes and Farvar 1989; Anderson 1991; Hanna, Folke, and Maler 1996; Hanna and Jentoft 1996; Goldman 1998).

Central to this debate is the formation of property regimes which are

"... the structure of rights to resources and the rules under which those are exercised - are mechanisms people use to control their environment and their behavior towards each other" (Hanna, Folke and Maler 1996).

Although many different types of these property-right regimes exist in the spectrum between common and private property, they are generally classified the categories of private property, common property, state property, or open access property (Hanna, Folke and Maler 1996).

Considering property-right regimes yields the following limitations to acting locally.

1. Hardin's (1968) original argument for the establishment of common property institutions appears to hold. Without some property-right regime, local action may take any direction and therefore collective action at a higher level may be required (Johnston 1996).
2. Established property-right regimes, such as institutions for natural resource management, are difficult to alter. Relinquishing part of the management responsibility for a resource to local communities is a difficult thing for entrenched agencies to do (Hanna and Jentoft 1996).
3. It is difficult to assign property-right regimes to transboundary resources such as rivers, air and underground water (Costanza and Folke 1996). Although local actions may be able to exert some influence of stock resources, the management of flow resources and the interactions between the two require a broader perspective.
4. Many users of ecosystem function are not fixed in locality (Hanna and Jentoft 1996).

Culture

The final limitation of local action focuses on the development context. Evidence suggests thinking globally is incompatible with some established systems of local resource management (Bailey 1989). An example is the increasing tension surrounding property right changes in Africa (Ensminger 1996). Furthermore, the culture of global thinking is difficult to apply in situations where basic needs must be met prior to exercising global thinking (Simmons 1995; Henderson 1996). For example, Indonesian small-scale fishermen may "act locally" but outside influences on fisheries stocks, such as offshore fishing, may deplete the resource. Thus, local environmental management in many situations is insufficient (Redcliff 1987).

A co-operative approach to implementing sustainable development

The preceding discussion demonstrates both the importance of local level actions and the need for transboundary or global coordination in the effort to achieve sustainable development. Many authors agree (Berkes 1995; Hemple 1996; Fox 1992; Bruce and Mitchell 1995; Mitchell and Shrubsole 1997) and reaffirm the idea that sustainable development requires an approach that is simultaneously top-down and bottom-up (Simon 1989). The term "glocal" conveys the idea of a middle ground between local action and global thinking, where

"Both global and local ends of the political spectrum must be strengthened in order to achieve effective environmental governance" (Hemple 1996).

Changes by governments in the 1990's (institutional arrangements, policy directions, and funding) have resulted in downsizing, deregulation, and the devolution of responsibilities (Meadowcroft 1998). This is a manifestation of an era of change in which governments are interested in "governing in terms of 'co' such as co-steering, co-managing, co-producing and co-allocating" (Kooiman 1993). The rationale for this change is based on increased organizational effectiveness, greater organizational efficiency,

and engagement of civil society (Ernste 1998). Co-operative management requires attention because it encompasses both government and communities:

“A co-operative management regime is a form of social regulation in which groups originating in different spheres of social life, and reflecting distinct perspectives and interests, participate in debate and negotiate to achieve a common understanding of a specific problem, and then implement a collective plan for its resolution” (Meadowcroft 1998).

Policy directions for sustainable development in Canada illustrate the shift towards a cooperative approach. In reviewing the approach to sustainable development, the Government of Canada (2001) stated,

"The transition to a more sustainable society in the 21st Century will not be achieved by one department of one level of government alone. Moving toward more sustainable development will require commitment and attention of decision makers at all levels of society."

Specific departments are even more explicit in their action plans for sustainable development. Fisheries and Oceans Canada, for example, calls the first theme in their 2001-2003 strategy 'New Forms of Governance and Shared Stewardship'.

The search for strategies to implement sustainable development continues. From an ecosystem management perspective local actions are not a panacea; however, they make contributions which are fundamentally important. Policy directions within the co-operative genre are appealing because they conceptually emphasize the benefits of local actions while minimizing the challenges identified in this assessment. The manner in which these policy directions are translated into actions represents a future inquiry need.

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