Links between humans and ecosystems: the implications of framing for health promotion strategies

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SUMMARY

To explore potential links between ecosystems and human health, we set out three ways of seeing or frames: environmental hazards and burden of illness; ecosystem conditions and human well-being; and environmental justice and human core values. Each frame provides a basis for making connections but also poses certain challenges: expanding research methods, linking with other conditions of human well-being and clarifying value bases. We discuss actions which build on the strengths of the different frames to deal with the challenges: linking with those seeking greater ecosystem protection, focusing on clean production strategies, emphasizing environmental degradation as one aspect of social justice and building on concerns such as reproduction which are closer to human core values. Health promotion practitioners and policy makers can flexibly use the frames in arguing for the betterment of both ecosystems and humans.

Key words: determinants of health; environmental health; health education

INTRODUCTION

Over the last decade, health promotion practitioners have increasingly been asked to think about the relationships between humans and the environment in terms of ecosystems (CPHA, 1992; Brown, 1994) and to adopt an ‘ecological’ approach to health promotion (Kickbusch, 1989) with the environment an integral part of human development (Hancock, 1993a). Such exhortations are driven by an awareness of planetary changes such as stratospheric ozone depletion and global warming with the potential to exert powerful effects upon human life as we know it (Last, 1993; McMichael, 1994). At the same time, environmental scientists have moved to consider the ‘health’ of ecosystems (Rapport, 1989) and organizations responsible for environmental management have reached out to include human health as part of ‘ecosystem health’ (IJC, 1991). The Canadian Council of Ministers of the Environment (CCME, 1994) describes adopting an ecosystem approach as ‘viewing the basic components (air, land, water and biota—including humans) and functions of ecosystems in a broad context, integrating environmental, social and economic concerns.’ (p. 3) This explicit inclusion of humans in ecosystems especially with respect to the health of both, argues most forcefully for a demonstration of its relevance to healthy public policy and practice.

Yet there is not just one way to demonstrate its relevance. There are a diversity of perspectives. How then can the links between the health of humans and ecosystems best be seen or framed to influence policy? We use the term ‘frame’ (Goffman, 1974; Schon and Rein, 1994) to be understood as a way of seeing issues in terms of overarching themes in which are embedded key assumptions about the ways that the world operates and how its parts are connected. Are there consequences for the use of different
frames to link humans and ecosystem? If we uncritically adopt an ‘ecosystem’ perspective, do we subsume a mix of approaches which may have contradictory policy directions, as has occurred with ‘environmentalism’ (Tesh, 1994)?

The purpose of this paper is to examine three frames which link ecosystems and humans and comment on their significance for health promotion and public health practice. First, ecosystems can be seen as the source of potentially hazardous exposures causing adverse human health outcomes, an ‘environmental burden of illness’. Second, ecosystems can be posed as a fundamental condition for human well-being through concepts such as sustainability or broader determinants of health perspectives. Finally, ecosystems may be valued by humans similar to other life-domains and social purposes such as equity and social justice. As a metaphor (i.e. linguistic phenomenon where words normally associated with one object are applied to another), ‘ecosystem health’ has the potential to mobilize scientists, practitioners and publics by seeing relationships at the level of values. Given the metaphoric significance of the term ‘health’, it is important to recognize the particular frame being used in a particular context.

Framing the links between humans and ecosystems in any one of these ways poses challenges which must be faced. Methodological difficulties arise in demonstrating an environmental burden of illness in situations of low level exposure. Framing the relationship as a determinant of health may result in ‘competition’ with advocates of other determinants of health, especially lifestyle and socio-economic influences on health. With core values as the frame, simultaneous appeals to both altruism (‘favoring’ ecosystems) and self-interest (‘favoring’ humans) may be perceived as contradictory. Differential emphasis on one frame may have repercussions for strategic alliances and policies aimed at promoting the public’s health. We urge greater awareness of the strengths and limitations of each frame. We conclude by suggesting ways of building on all three to promote the well-being of both ecosystems and humans.

**FRAME 1—ENVIRONMENTAL BURDEN OF ILLNESS**

From the perspective of toxicology, microbiology and epidemiology, ecosystems can be viewed as sources of exposures (outside humans), which result in a measurable (e.g. via environmental epidemiology) or an estimable (e.g. via risk assessment or simulation modelling) burden of human disease or other health impairment. This frame is exemplified by the classic concern about ‘safety’. Examples of the use of this frame include the work of the WHO Commission on Health and Environment (WHO, 1992), that took a predominantly media-based approach, and ‘A Vital Link’ (Health and Welfare Canada, 1992), which was structured around various exposures and health problems.

The readily ascertainable human health impacts of exposures are currently most apparent in areas of the former Soviet Union. Although not documented with the precision customarily expected among Western health scientists, numerous health service, municipal and press reports in the 1980s cited gross exceedances of air pollution standards with widespread effects on respiratory health, particularly among children (Feshbach and Friendly, 1992). Massive reductions in available water along with increased water and soil contamination in entire ecological regions such as the Aral Sea have been implicated in excessive morbidity and rising infant mortality (Glazovsky, 1995). In such ‘regions at risk’, a full range of environmental, social, demographic and medical care factors are likely important but within them, physical environmental factors remain as one important set of contributors to overall morbidity and mortality (Hertzman, 1995).

In the low level exposure situations more common in western Europe, Australia and North America, documenting environmental burden of illness is more challenging. For sites contaminated with toxic chemicals, the wide variety of exposures and the multifactorial causes of human illness make the usual epidemiological tools exceedingly difficult to apply (Frank et al., 1988). Techniques beyond those adopted in classical epidemiology are required. Sophisticated statistical modelling based on large populations has been used to demonstrate the impacts of current levels of ambient air pollution to respiratory health outcomes (Burnett et al., 1994). A synthesis report out of a State of the [Great] Lakes Ecosystem Conference, includes an extensive discussion of contaminant exposure trends, the use of biomarkers of exposure and biological effect, and an array of adverse health effects which have been linked in a broad variety of
ways to exposures in the Great Lakes Basin (e.g. neurotoxicity of methyl mercury) (Tremblay and Riedel, 1996).

Risk assessment is one method that has been developed to estimate burden of illness in such situations. The United States Environmental Protection Agency’s Great Lakes Basin Risk Characterization Study (US EPA, 1992) used environmental data on loadings to various media, contaminant levels in those media and dose–response relationships from toxicological studies as inputs to risk assessments. For example, it calculated the likely excess cancer risk due to ingestion of fish contaminated by persistent organochlorines (PCBs and DDT). Similarly, for the Mediterranean basin, estimates have been made of the number of cases of gastrointestinal infections attributed to microbiological pollution of bathing water (Bertollini et al., 1996). The use of this frame argues for a careful collection of appraised evidence by established scientific procedures so that attribution may be determined. Health promotion practices based on such a frame follow the guidelines set for establishing proof—a cautious, incremental, but evidentiary approach.

Yet for global changes in climate systems, such narrowly defined exposure health–outcome relationships must be placed within the context of global changes occurring in weather systems, ecology of disease vectors and human population movements (Epstein, 1995). The struggle to adapt methods to the complex task of determining the likely environmental burden of human illness where multiple levels and facets of ecosystems must be considered has been noted by leading epidemiologists (Last, 1993). Groundbreaking work on effects of climate change has drawn on epidemiology of known specific relationships (e.g. heat waves and mortality) as well as interfacing with meteorological models still under development (McMichael, 1996). Such syntheses argue for determination of environmental hazards and an environmental burden of illness in a fashion which draws on a range of disciplinary, quantitative approaches which permit handling of uncertainty in a systematic way without paralyzing decision making. At the same time, they open the way to being concerned about shifts in the environmental conditions for human well-being.

**FRAME 2—CONDITIONS FOR HUMAN WELL-BEING**

Insofar as ecological systems or human activities in such systems enhance or degrade human well-being, they may affect human health. To quote the Ottawa Charter: ‘the fundamental conditions and resources for health are peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity’ (WHO, 1986). Difficulties abound in defining a stable or ‘healthy’ ecosystem (Haskell et al., 1992; Rapport, 1995). An examination of critical regions throughout the world indicated a range of factors which may cause degradation of the physical environment, social systems and human well-being (Kasperson, 1995). Interactions between fundamental conditions for human well-being—income, education, lifestyle, place of residence—also take place. Witness the role of inequities in resource access, decreases in the quality and quantity of renewable resources and population growth in bringing about increasing conflict in different parts of the world (Homer-Dixon, 1993).

A ‘stable ecosystem’ is thus a condition and resource for human health and well-being. Well-being is primarily a social notion which has been utilized in health promotion to promote positive conceptions of health and living. Such ideas have been incorporated in Evans and Stoddart’s work (1990) where social and physical environments are deemed important in producing health. ‘Environments’ become one of the determinants of health within a broad framework of ‘healthy public policy’, as exemplified by the work of the Ontario Premier’s Council on Health, Well-Being and Social Justice (1993) in its report *Our Environment Our Health: Healthy Ecosystems, Healthy Communities, Healthy Workplaces*. This orientation is in keeping with the general thrust of health promotion practitioners who argue for the similarity between the goals aiming at health and at sustainability (Labonte, 1991a; Brown, 1994).

A particular use of this frame may be seen in the healthy communities movement. Among the 11 parameters of a ‘healthy city’, the first is a clean, safe, high quality physical environment (relating as much to frame 1) and the second is explicitly stated as a stable ecosystem, sustainable in the long term (more related to frame 2) (Hancock, 1993b). The healthy communities movement has worked towards the development
of indicators of sustainability which include measures of ecosystems and the environment (McPhedran and Salsberg, 1993). ‘Healthy’ cities, ‘healthy’ public policy and ‘healthy’ ecosystems all share a similar use of language based on the root metaphor of ‘health’, which transcends traditional notions of causal linkage and encompasses so much of what we feel about ourselves in the world. Such metaphorical use of ‘health’ has been successful in expanding the range of determinants of health to include ‘ecosystem’.

Yet disentangling the role of ‘ecosystem’ effects from those of dysfunctional social and economic systems coexistent with them may be difficult. Indeed the use of this frame points to the complex questions posed by a determinants of health approach and the complex policy solutions required as good health is seen as the products of industrial behaviours and health, social, economic and environmental policy. For example, unemployment may be difficult to link to ecosystem changes in the minds of those who allocate resources between different social purposes, including ‘restoring’ ecosystems. A potential danger is that too dramatic an emphasis on ‘ecosystem health’ may rebound as people, who are preoccupied with more direct human needs of jobs and shelter, ignore or eventually become desensitized to apocalyptic versions of ecological catastrophe. ‘Eco-alarmism’ creates great uncertainty but few policy solutions (Mol and Spaargen, 1993), so that people become certain about uncertainty and get on with their lives, irrespective of ecosystem resilience (Roe, 1994).

More constructive is the increasing movement towards pollution prevention and clean production, a fundamental strategy for health protection and promotion practitioners. The goal of the clean production is essentially ‘the same as the goal of sustainable development: production processes, product cycles and consumption patterns which allow for human development, and the provision of basic needs, without degrading and disrupting the ecosystems within which that development must occur’ (Jackson, 1993). Jobs and environment should not be antagonistic in the long term according to clean production strategists and an increasing number of popular writers who seek to explore, creatively, alternative ways of living (Roberts, 1995). Such changed ways of meeting the range of conditions for human well-being, including ecological, necessarily leads us into a discussion of values.

FRAME 3—HUMAN CORE VALUES

Environmentalism—valuing the environment in its own right—became an important value in the mid- to late 1980s in Canada. Using Gallup Canada polls (Bakvis and Nevitte, 1992) note its rise from nowhere to great significance in 1988 and 1989, such that over two-thirds of polled Canadians were very concerned about the environment. The values expressed in environmental concern have been attributed to a variety of sources. Some build on ecological notions and include ‘the land ethic’, which emphasizes the welfare of non-human species (Heberlein, 1972) or of the biosphere itself, as in deep ecology (Devall and Sessions, 1985). Historic campaigns to protect species such as seals advance a biocentric perspective based on cross-species altruism (Bell, 1994). Philosophers have used notions of ‘altruism’ to explain intentions to ameliorate environmental problems (Black, 1985). As Stern et al. (1993) explain, ‘altruism suggests that pro-environmental behaviour becomes more probable when an individual is aware of harmful consequences to others from a state of the environment and when that person ascribes responsibility to her/himself for changing the offending environmental condition’.

Inherent in appeals to values are problems of competing values and priorities. For example, environment dropped behind six other issues (education, debt and deficit, child poverty, unemployment, job creation and crime and justice) as priorities for federal government action by the mid-1990s among Canadians (Globe and Mail, 1995). Those prioritizing jobs and employment strategies in their values may not favour the environment, while those emphasizing care and personal safety may see the ecosystem as irrelevant to them. Emphasis on other aspects of human life more likely to be valued by people may be important to link with the environment. For example, despite warnings by biological scientists for many years of ongoing decline in fish populations on Canada’s east coast, the resulting widespread unemployment and mental suffering in coastal fishing communities was likely the trigger to implementation of control measures which protected fish, the ecosystems of which they are a part, and the people who depend on both.

The last decades have seen examples of individuals and communities deeply engaged in struggles over the environment or ecosystem,
often when they feel threatened. Edelstein (1988) in his work on contaminated communities—in which feelings of being stigmatized (as an outsider to the general pursuit of life in a society) dominate—makes the useful distinction between lifestyle and lifescape. Lifestyle refers to people’s way of living, lifescape to our fundamental understandings about what to expect from the world around us—our social paradigm. When lifescape is threatened, core values are threatened. Core values can be understood as those closest to our sense of ourselves and the way we would like the world to be (Sabatier, 1987). They are what we protect and promote. If this frame is adapted, as in the healthy communities movement, healthy public policy must resonate with hopes and aspirations often couched in terms of health and well-being. Other research suggests that threats to core values include those things that indicate threats to one’s future—children’s health, property values, fear of unknown, latent health effects (Eyles et al., 1993). In democratic societies, maldistribution of access to secure ways of life for protecting and promoting core values raises ethical concerns. These relate to notions of environmental justice, where disadvantaged communities differentially experience a range of threats (Bullard, 1990) and a fundamental lack of security, often leading to poorer health. The use of this frame thus raises ethical issues concerning resource distributions, allocations of power and the nature of the social order. It is the most explicitly political of all the frames in its drawing on social justice roots and applying to healthy public policies.

**DIRECTIONS FOR ACTION**

So how can the three frames or ways of seeing assist practitioners and policy makers in promoting human health in supportive ecosystems? The first frame seems most closely associated with a range of risk management and health protection approaches (see Table 1). The second is exemplified in the movement towards supportive environments and sustainable collective lifestyles conducive to health. The third leads to discussions of healthy public policies and public health ethics.

Those most involved in legislative and health protection activities would be wise to make strategic alliances with those seeking greater environmental or ecosystem protection. While in North America, those arguing for toxics use reduction may find themselves in uphill battles; conditions in the former Soviet Union are sufficiently severe that greater energy efficiency and reductions in emissions are being incorporated into economic development plans at the behest of large donors such as the World Bank, which see restoration of ecosystems and human health as essential to economic revival (Hertzman, 1995). Given the global dispersion of both air and water pollutants, any reductions in emissions achieved should result in improvements throughout the world (McMicheal et al., 1996).

For those working to promote sustainable collective lifestyles, the fact that other more easily studied determinants of health and well-being (e.g. cigarette smoking, poverty) continue to attract greater attention from public health

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**Table 1:** Links between ecosystem health and human health

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<thead>
<tr>
<th>Frames</th>
<th>Core disciplines</th>
<th>Health promotion applications</th>
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</thead>
<tbody>
<tr>
<td>1. Environmental hazards and environmental burden of illness</td>
<td>Toxicology, microbiology, epidemiology, occupational hygiene, environmental engineering, environmental psychology, environmental law, policy sciences</td>
<td>Risk management, risk communication, public health legislation and standard setting, health protection activities</td>
</tr>
<tr>
<td>2. Ecosystem conditions and human well-being</td>
<td>Ecology, economics, sociology, architecture, geography, environmental planning, community health planning</td>
<td>Creating supportive environments, sustainable cities, clean production</td>
</tr>
<tr>
<td>3. Environmental justice and human core values</td>
<td>Sociology, law, philosophy, political science, policy sciences</td>
<td>Healthy public policies and public health ethics</td>
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policy makers than ‘ecosystem’ factors (Schabas, 1994), is not necessarily inappropriate. Increasing awareness of the links between social justice and environmental degradation (Bullard, 1990; Goldman, 1993) mean that dealing with inequity is fundamental to reducing impacts on both ecosystems and humans. The coexistence of a range of detrimental determinants of health is a frequent experience for health promotion practitioners working with inner-city communities. The range of activities seen as improving health in communities also points to the significance and utility of a determinants of health framework (Hancock, 1993b).

If respect for ecosystems is not yet a widely held core value, then additional policy-relevant information may work first to change secondary ‘beliefs’ about the relationships between ecosystems and human health (Sabatier, 1987; Colborn et al., 1996). At the very least, it is important to recognize the value orientation present in health promotion practice (Labonte, 1991b). Core values act as filters for the incorporation of any new knowledge, so we must also advance the creation and dissemination of information on those areas most closely linked to core values. An example might be the area of human reproduction, for which empirical links between human health and ecosystem contaminants are as yet limited but over which there exists considerable public concern. Such concern has already fuelled the organization of environmental campaigns and the funding of more toxicological and epidemiological research in this area. It could also provide the impetus for further cleanups of ecosystems and toxics use reduction backed up by weight of the evidence arguments (Colborn et al., 1996).

As in many areas of health promotion, practitioners may draw on all three frames. Involvement in health promotion processes such as Healthy Community initiatives, participation in networks which include natural scientists and joint advocacy for improving the status of ecosystems and humans are all options (CPHA, 1992). When we argue for the appreciation of different ways of seeing, we must remain sensitive to areas of uncertainty due to limitations of quantitative methods, to perceived trade-offs between promotion of short-term goals for human well-being versus long-term restoration of ecosystems and to the inevitable diversity of values we may encounter. We can continue to be inspired by a range of visions for a future with sustainable ecosystems and ways of human life compatible with such sustainability (Marien, 1996). Drawing on all three frames we should be able to influence both publics and decision makers to make social and political choices which ultimately promote both ecosystem and human well-being.

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