

## Guest Editorial

# Expanding the Practice of Ecosystem Health

Ecosystem Health was borne of curiosity, but not idle curiosity. It was a spirited conversation in 1977 between an environmental statistician and a vascular surgeon with later collaboration from a fisheries ecologist that sparked the interest in the merger of ecology, medicine, and health (Rapport et al., 1979). In those heady days, the quest was almost entirely intellectual; the question being raised was: “What, if anything, might the challenges of medicine have to do with those of the environment?” At a fundamental level, they were both complex systems, only partially understood. Going beyond metaphor—in efforts to understand the underlying mechanisms that confer organization, resilience, and vitality—that was the challenge. Over the ensuing decades, that challenge is being met, but as always with twists and turns in the endeavour not envisioned early on.

One of these twists was the formation of an International Society for Ecosystem Health, and its first meeting, the Symposium on Ecosystem Health and Medicine, held in Ottawa in June 1994. Participants came with no particular expectations, other than to share their belief in a systems approach to the world that was transdisciplinary. Most had been indoctrinated in one established field or another: medicine, public health, ecology, sociology, toxicology, epidemiology, or veterinary medicine. There might have even been a few from the arts and other fields among the more than 800 participants in this seminal event. What they had in common was a belief that their field alone was insufficient to tackle the problems of the day—the looming specter of earth failure, globally and regionally.

During this same period, others were questioning the way in which human health was studied in relation to complex environmental changes. The linear models used in epidemiology and the biomedical model, focusing on disease, were proving inadequate to understand and describe

the dynamic relations between ecosystem degradation and human health and well-being. Uncontrolled urbanization, global cycling of pollutants, excessive use of pesticides, transfer of hazardous technologies and processes from North to South were all taking their toll on the environment. Humans were not only the disrupters of ecosystem integrity, they were suffering the effects—but not equally! Lower- and middle-income countries were much more vulnerable to this onslaught. The International Development Research Centre (IDRC) of Canada was in the forefront of proposing an alternative and complementary model to studying the complex social, cultural, political, and economic realities of poorer countries and their impact on the environment and human health: an ecosystem approach to human health (Forget and Lebel, 2001). As of 1996, the IDRC Ecosystem and Health Program funded and intellectually supported interdisciplinary projects based on this approach and grounded in community participation, gender considerations, and intervention strategies on local and regional scales throughout the world.

The International Forum on Ecosystem Approaches to Human Health, held in Montreal, in May 2003, was a meeting of the minds. Some of the participants had attended the pioneering Symposium on Ecosystem Health and Medicine, and some of the sponsoring organizations were the same. IDRC, for example, had a prominent presence in both events, as did Environment Canada and Health Canada. In Montreal, the Quebec ministries of environment and health were present, as were international organizations, including the World Health Organization and the United Nation’s Environmental Programme, who also provided active support and input. At the Montreal Forum, the motivations of participants were not all that different—but a watershed had been crossed. This meeting took on board the philosophy of healthy ecosystems and its

relationships to healthy people, but it also went beyond that! It was a Forum that examined the community of practice of ecosystem health—in the realm of concerns for human health. Of course, ecosystem health is, in part, about the health of our own species (even if this smacks of anthropocentrism), although it is not exclusively that—see the *Ecosystem Health* editorial, “Is It All about Us?” (Rapport, 2000), and the guest editorial, “The Meaning of Health” (Nielsen, 1999). Yet this one aspect of ecosystem health may be the “tail that wags the dog,” for approaches to human health are in need of drastic restructuring and clearly will help focus attention on the more general issue of maintaining or restoring health to the world’s ecosystems.

Expanding the practice of ecosystem health to practical means of reducing human health vulnerabilities to emerging and resurging diseases is revolutionary. Traditionally, the practice of medicine is all about “fixing” the problem, where the problem is defined as the “disease” and the fix is whatever it takes to rid the patient of it. Of course, the practice of medicine has gone well beyond the biomedical model, in which the cause of disease was conceptualized in simplistic terms, often reduced to an invading pathogen and not taking into account the complex determinants of most diseases, including those in which pathogens are implicated. But the practice of medicine never really extricated itself from the focus on the individual—standing alone, detached from the environment (social, cultural, ecological) of which they are a part. Ecosystem approaches to human health provide a way out of this artificial confinement.

The key recognition is rather straightforward: Increasingly, imbalances in ecosystems are producing situations of increasing human vulnerability to disease, such as the resurgence of malaria, cholera, and dengue fever, or the emergence of hanta-virus and AIDS, among many others. Even more widespread, is the slow alteration of physiological and psychological functions associated with the build up of toxic substances from obvious sources, such as pesticide spraying for insect-borne diseases and for agriculture, or environmental contamination from industrial and mining sites or vehicle use, or the less obvious sources, like mercury release from deforestation and global cycling of organic pollutants. These toxic substances, transmitted via complex pathways through soil, air, water, consumer goods and food, passed from mother to fetus and often accumulated in breast milk, are undermining collective health and well-being. Consider, for example, the

effects of the exposure to metals and organic pollutants, directly, in utero or through breast milk, on children’s intellectual and behavioral development (for review, see Mendola et al., 2002). These deficits, often referred to as “subtle” since they are rarely detectable on an individual basis, have far-reaching effects on societies since more children have learning problems, fewer will finish school, and there is more social unrest due to hyperactivity and increased delinquency. Coupled through poor social and economic conditions, the impact of these pollutants is magnified. Although in industrialized countries there are major programs to monitor these pollutants, relatively little is known about their sources and transmission through the environment to humans and their impact on health throughout the life span, particularly in Southern countries. In another vein, we are just beginning to understand the widespread health problems stemming from highly polluted, overpopulated urban areas. And, in many regions of the world, water, essential to human health and life itself, is diminishing in quantity and quality through poor use of the soil, extractive processes requiring large quantities of water, and increasing population density.

All of these are fundamentally issues of degradation of ecosystems, as are the human health consequences of many so-called natural disasters such as the recent mudslides in the Dominican Republic and Haiti—triggered not only by torrential rains, but also by the deforestation that rendered the hillsides vulnerable to slipping away in the downpour. This recognition has opened an entirely new window within the fields of environmental health, public health, and medicine. Namely, it suggests that the strategy for maintaining healthy human populations lies in rehabilitation of ecosystems, and where that is not possible (as sadly in many cases it is not, at least not immediately), then in designing ecosystems that are more benign to human health—ecosystems that anticipate and prevent catastrophic loss of life and human misery, by establishing conditions that reduce the vulnerabilities.

Thus, the focus shifts from emphasis on “fix-the-problem” at the level of the individual (after the fact), to anticipating and preventing problems by reestablishing healthy ecosystems, which have their full capacity to be resilient and adaptive to changing conditions. Thus, out of general philosophical underpinnings has emerged some hardheaded practical approaches to human health, focusing on the nature of the ecosystems in which lives are lived, as well the social and political forces that influence them. The present supplement to *EcoHealth* provides poignant

examples of work that is being done in the area of ecosystem approaches to human health.

The contributions to this issue reflect the diversity of experiences in this emerging field, in both the North and the South. Some contributions focus on the value of integration of knowledge from many fields, e.g., toxicology, public health, biogeochemistry, economics, and sociology, in order to properly assess change in regional environments (as in the case of the impacts of mining in Goa, India, or deforestation in the Andean Amazon). Some examine the challenges and rewards of building a capacity within communities that would enable them to modify their behaviors and thus reduce threats from ecological imbalance to public health (as in Central Havana, Cuba, or in communities along the St. Lawrence River, Canada). Others report the expression of loss to the community from deteriorating environments (as in the Upper Hunter Valley, New South Wales, Australia). Here, the description of the emotional and psychological anguish experienced by a community caught up in the midst of a devastating open-pit coal mine operation in the Upper Hunter Valley provides a heartrending account from members of the community of the substantive havoc that destruction of an ecosystem can bring. Conner et al. describe the loss of place, in place, in terms of Solastalgia—a new concept defined by Glenn Albrecht as the “melancholia or pain experienced when there is recognition that the place where one resides and that one loves is under assault.” Other contributions focus on the ways of coping with deteriorating food supplies owing to contamination, drought, and other stresses, and how through education and community participation, the restructuring of agriculture and the environment can take place to provide for a more viable future.

In total, the contributions to the Forum covered the whole spectrum of concept, practice, and institutional and policy reform. In sum, they provide a wealth of perspectives and approaches to one of the most critical issues facing humankind: namely, in the wake of massive deterioration of the global commons, can humanity, at the grassroots community level, find a viable future? The case studies in this issue suggest that there is ground for hope, but that it will require radical changes in human values as well as innovative integrative science in order to achieve it. These contributions are but a beginning.

**Résumé:** Le concept de la Santé écosystémique est né de la fusion de l'écologie, de la médecine et de la santé. Au cours des dernières décennies et suite à l'établissement d'une Société

internationale pour la santé écosystémique, certains ont commencé à questionner la façon dont la santé humaine a été étudiée à la lumière de changements environnementaux complexes. Le Centre de recherches pour le développement international (CRDI) a proposé le concept d'approches écosystémiques de la santé humaine en étudiant comment les conditions sociales, culturelles, politiques et économiques dans les pays les plus pauvres influent sur l'environnement et la santé humaine. En mai 2003, le Forum international sur les approches écosystémiques de la santé humaine a offert aux adeptes l'occasion d'étudier comment la communauté de pratique en matière de santé écosystémique aborde les questions de santé humaine. Des déséquilibres dans les écosystèmes provoquent des situations qui accroissent la vulnérabilité des êtres humains à la maladie. De plus, nous commençons à peine à comprendre les problèmes de santé propres aux centres urbains surpeuplés et sévèrement pollués. L'impact de ces problèmes est amplifié par des conditions sociales et économiques défavorables. Ces problèmes relèvent de la dégradation des écosystèmes, ce qui suggère que la stratégie pour assurer la santé des populations repose sur la restauration des écosystèmes ou l'établissement de conditions qui réduisent leur vulnérabilité. Par conséquent, des approches pratiques de la santé humaine axées sur la nature des écosystèmes dans lesquels les êtres vivent, de même que sur les forces sociales et politiques qui les affectent, ont pris forme. Ce supplément d'*Ecohealth* présente des exemples touchants du travail accompli dans le domaine des approches écosystémiques de la santé humaine. Les études de cas permettent d'espérer une amélioration mais indiquent que pour y parvenir, il faudra modifier de façon radicale les valeurs humaines et créer une science intégrée novatrice. Ces projets ne sont qu'un premier pas.

**Resumen:** El concepto de “Salud y Ecosistema” nació de la unión de la ecología, medicina y salud. A lo largo de las décadas siguientes, y con el establecimiento de una Sociedad Internacional para Salud y Ecosistema, otros comenzaron a cuestionar la forma en que la salud humana era estudiada en relación a los complejos cambios del ambiente. El Centro Internacional para el Desarrollo de Investigaciones de Canadá (IDRC) propuso el concepto de enfoques ecosistémicos para la salud humana, estudiando el impacto de las realidades sociales, culturales, políticas y económicas de los países más pobres en el ambiente y la salud humana. En mayo 2003, el Foro Internacional sobre Enfoques Ecosistémicos para la Salud Humana condujo a una reunión de especialistas que examinaron como la comunidad de prácticas de salud y ecosistema abordaba las cuestiones sobre la salud humana. Los desequilibrios en los ecosistemas están produciendo situaciones de aumento de la vulnerabilidad humana a enfermedades. Adicionalmente, estamos justamente comenzando a entender los problemas de salud provenientes de áreas urbanas con altos niveles de contaminación ambiental y exceso de población. El impacto de estos problemas es amplificado por las condiciones sociales y económicas desfavorables. Esos problemas, relacionados con la degradación de los eco-

sistemas, sugieren que la estrategia para mantener poblaciones humanas saludables descansa en la rehabilitación de los ecosistemas o en el establecimiento de condiciones que reduzcan estas vulnerabilidades. En consecuencia, han surgido enfoques prácticos a la salud humana que se concentran en la naturaleza de los ecosistemas habitados, así como en las fuerzas sociales y políticas que influyen en ellos. Este suplemento de *Ecohealth* proporciona ejemplos vividos de trabajos en el área de enfoques ecosistémicos de la salud humana. Los estudios de caso sugieren que hay espacio para la esperanza, pero que se requerirán cambios radicales en los valores humanos, así como en una ciencia innovadora e integrada para conseguirlo. Estas contribuciones son solo un comienzo.

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