Health and sustainable development: challenges and opportunities of ecosystem approaches in the prevention and control of dengue and Chagas disease

Saúde e desenvolvimento sustentável: desafios e oportunidades dos enfoques ecossistêmicos na prevenção e controle do dengue e da doença de Chagas

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Abstract

A world of healthy people living in healthy ecosystems has proven to be an elusive goal of the sustainable development agenda. Numerous science-based assessments agree on the fundamental interdependence between people's health, the economy, and the environment, and on the urgency for more determined and concerted action based on multi-sector participatory approaches at the global and local levels. For knowledge to be policy-relevant and capable of contributing to healthy and sustainable development, it must take into account the dynamic and complex interactions between ecological and social systems (systems thinking), and it must be linked to development actions. This in turn requires greater interaction and exchange between decision-makers, researchers and civil society (a multi-stakeholder participatory process); and the harnessing of different disciplines and of different kinds of knowledge (a transdisciplinary approach). Ecosystem approaches to human health (ecohealth) link these elements in an adaptable framework for research and action. This paper presents an overview of ecohealth research approaches applied to vector-borne diseases, with particular attention to multi-stakeholder participation given its prominence in the sustainable development policy discourse.

Sustainable Development; Chagas Disease; Dengue

Poverty, health and environment linkages from global and local perspectives

Principle one of the Rio Declaration [1] established human health as one of the foundations of sustainable development. The close interrelationship between health and the environment, and their combined contribution to sustainable development, is unequivocally recognized by the highest levels of decision-making (national, regional and global). The World Health Organization (WHO) estimates that about a quarter of the global burden of disease and of all deaths can be attributed to environmental factors [2]. In its recent report on health in the Americas, the Pan American Health Organization (PAHO) [3] noted a socioeconomic decline in some population sectors in the region, which was accompanied by an increase in poverty and inequity, rapid unplanned urbanization, and fragmentation and disintegration of family and community structures. Similarly, other studies point to social and economic deterioration in different parts of the world which are leading to an increase in unhealthy environments, compromising ecosystem services and producing higher health risks, especially among the poor [4,5].

Indeed, degraded ecosystems affect everyone, but the poor suffer the consequences in a disproportionate manner. Poverty prevents people from achieving or fully utilizing their capability to live according to their own values [6]. It

also limits people's ability to use proper disease prevention measures, to secure adequate health care, or to act in environmentally responsible ways. Families can be trapped for several generations in a vicious circle of multiple exposures to disease agents and environmental hazards, poor nutrition, weakened immune responses, potential impairments on physical and mental development, low ability to overcome stress, disrupted family and social life, poor education, economic insecurity, violence in degraded neighbourhoods, and so forth.

Poor health and degraded ecosystems represent losses in both natural and social capital. Not surprisingly, the prevailing consensus is that sustainable development depends on reducing poverty while protecting and promoting health. A common challenge is to conciliate the objectives of development, health and environmental protection with those of social equity [3,4].

Understanding human health from the exploration of social-ecological systems

Progress towards a more sustainable form of development has proven to be much more complex and difficult than it was first hoped twenty years ago when the Brundtland Report [7] was released. Sneddon et al. [8] summarize the magnitude of the challenge we face today with the following three observations: current scientific evidence indicates that the extent of ecological destruction is greater than first foreseen; the expected gains in social equity from economic growth have not materialized (in fact global net growth in the last 20 years has been accompanied by increased inequity); and, the globalized world has increased economic and ecological interdependence without increasing national capabilities to balance economic, social and environmental options.

The last two decades have seen significant advances in global environmental governance and a greater understanding and debate regarding the interconnections between the state of the environment and social and economic development [4,5,9]. Disappointingly, however, current scientific evidence on the state of ecosystems and future trends suggests that the global human enterprise is becoming less sustainable, not more. This is even more apparent when considering patterns of production, consumption, and waste handling, and their effects on the biosphere. Most governments continue to articulate distinct, unrelated and often contradictory health, environmental, economic and social policies and practices. Linking health, environment and development in decision-making for inter-sector action remains as elusive as ever. Too many economic, geo-political or development strategies continue to ignore the need to safeguard the ecosystem services upon which long-term development goals depend. As a result, pressures on ecosystems and consequent environmental changes continue to increase, impacting human health and well-being [4,5,9].

In essence, problems of poverty, health and sustainable development are complex, interconnected, and dynamic. Our understanding of these is often partial and decision-makers are under considerable pressure to move forward without necessarily having all the relevant information that would be needed, or building the necessary social consensus and organization for the sound delivery of interventions. Present development challenges are best addressed through a more collaborative and holistic systems thinking.

These observations encapsulate some of the fundamental ideas and concerns behind development research studies that apply ecosystem approaches to human health ("ecohealth approaches" for short). Ecohealth research contributes to the generation and application of knowledge for improving people's health in ways that advance sustainable development [10,11]. This type of research is built around a systems approach that explores social and ecological interactions and their relationship with human health. It emphasizes transdisciplinarity, multi-stakeholder participation, and social and gender equity. Collectively, these interconnected elements provide a framework for designing and implementing research, and for testing interventions that link human activity, ecosystems sustainability, and improved health. Such approaches have been used in different investigations related to health and agriculture, environmental pollution, urban slums, communicable diseases, and the health implications of climate change (http://www.idrc.ca/ecohealth).

Challenges and opportunities of ecohealth research – transdisciplinarity and multi-stakeholder knowledge production and action

Sustainable development is a complex enterprise that requires the combined contributions from many forms and areas of knowledge to guide practical actions on the ground, a major role for research on development. Transdisciplinarity strives to create a common vision and language to overcome differences in perspective and priorities between empirical (eg. ecology, entomology), normative (eg. politics, law) and technical

disciplines through which knowledge is applied (eg. engineering). The articles presented in this special issue highlight project applications of concepts and practices of transdisciplinarity and multi-stakeholder participation and how they are inextricably linked.

Implementing transdisciplinarity

Transdisciplinarity aims to integrate multiple types of disciplinary knowledge together with the experience-based understanding of local actors in joint problem identification, in the exploration of associations between relevant factors and outcomes, and in the development and assessment of solutions. This requires the engagement of a range of actors (those contributing to the problem, those suffering the consequences, and those that should be part of the solution) in addition to academic researchers. The teams presenting their work in this issue successfully integrated different disciplines (ecology, entomology, social sciences, epidemiology, pedagogy and engineering). Achieving a common understanding of roles, responsibilities and functions within the teams and between scientists and other actors, required extra effort.

Beyond a greater understanding of the social and ecological interactions that may determine disease transmission in a particular location, a transdisciplinary approach can also lead to the building of practical bridges for action between scientific communities that otherwise seldom interact with each other. Collaborations between academic institutions and the education and health sectors are exemplified in some of these ecohealth research articles.

Multi-stakeholder participation

Participatory research and intervention methods have gained wide acceptance over the last 20 years in the context of sustainable development as applied by UN institutions, governments, academics, non-governmental organizations, and grassroots organizations. Participatory approaches try to make research and development processes more empowering, democratic, equitable and potentially more effective. A key aim is to promote power-sharing in the conceptualization and planning phases of research and development projects, through the incorporation of the perspectives from local actors, and integration of multi-disciplinary knowledge. The experience so far has been mixed. Christens et al. [12] provide a good synthesis of critiques and responses surrounding the application of participatory methods in development. They note how, in many instances, participation of local actors simply lends credibility to decisions that have already been made (without participation) by agencies and organizations outside the community. If institutional self-interest prevails or if the aim is to exert control and exploit others for institutional or personal gain, the repercussions can be very negative.

The level of power distribution through multi-stakeholder approaches can vary widely with key actors playing different roles, depending on the mode of participation. This ranges from co-option with token representation of communities, to collective action in which local people set their own agenda and carry it out with no outsiders. Intermediate levels found in vector control programs include: compliance with specific tasks assigned or recommended by program personnel; consultation (voicing opinion); cooperation on certain decisions; and co-learning and joint decision-making [13].

Sustainability of vector control programs and their contribution to development

Some vector control programs for dengue and Chagas disease have experimented with participatory processes that retain in essence a biomedical paradigm, relying on the application of chemicals for vector control delivered through governmental agencies, and allopathic treatment delivered by health care personnel. Other approaches embracing a broader involvement of actors from different sectors have been more recently promoted. One example is the Communication for Behavioural Impact Program (COMBI) [14] based on the healthy behaviour paradigm supported by WHO and partner organizations. This approach calls for social mobilization, changes in urban planning and environmental services, and inter-sector collaboration, going in principle beyond household and community levels. Yet, since a large proportion of breeding sites lies within households, behavioural changes promoted tend to be predominantly targeted at the private domain and individuals, and often neglect public service improvements. These programs are often implemented with limited efforts to strengthen local organization and participatory processes. One potential pitfall is that vector control responsibilities can be seen to be transferred from public services authorities to people at the household level.

Ecohealth approaches, on the other hand, conceptualize these diseases as a problem linked to the environment and not as an ailment of individuals to be primarily addressed by behaviour change or technical inputs. The emphasis is put

on understanding how a degraded ecosystem, vector ecology, social, economic and cultural conditions interact to favour disease transmission. The aim is to modify the environmental conditions, social contexts and other factors that favour the proliferation of vectors to diminish health risks, using participatory multi-stakeholder approaches for longer-term sustainability and impact. This contrasts with the more classical vector control programs organized as emergency responses delivered against vectors, with limited consideration given to the ecosystem or why disease emergence is occurring in the first place [15].

Some final remarks on multi-stakeholder participation and gender analysis

Disease prevention and control interventions that link health to environmental problems and to local development tend to be the exception more than the rule. Program vision, goals and project objectives are usually approved and implemented before a socially and culturally accepted multi-stakeholder structure can be established. This mismatch is often created or perpetuated by the government or donor's prescribed agendas, and the frequently disconnected resource allocations for health and development programs [16]. The resulting points of contention can be numerous. Gender analysis and the promotion of gender equity, for example, are typical requirements of donors which are often difficult to implement at the local project level [17].

Exploring and acting on gender analysis are key in the context of Chagas disease, dengue and other health problems of developing countries. At the household level, for example, the socialization of roles and responsibilities in terms of health care, productive and reproductive tasks, and community life is largely determined by cultural, educational and socioeconomic factors. For instance, women tend to be responsible for the tidiness and cleanliness of houses, and the household storage of water for drinking and washing purposes. Conventional approaches to disease prevention and control place the responsibility (or blame) on individuals and households (e.g., for water containers as breeding sites for mosquitoes, or household clutter as hiding places for triatomines) while ecohealth approaches aim to develop a relationship of shared responsibility among all actors concerned (government, the private sector and civil society). A related challenge concerns the selective engagement of institutional actors and private industry, especially in the case of dengue. It is interesting to note that projects presented in this special issue tended to target household level surveillance and intervention, as opposed to other factors affecting dengue vector breeding sites, such as intermittent water supply, appropriate solid waste management, or management of breeding sites in public areas. Deficient and intermittent water supply can often occur but further investigation is needed to better understand how inter-sector structures can better articulate the provision of municipal environmental services that affect vector control.

In spite of these shortcomings, all the ecohealth projects presented in this special issue were able to expand the range of stakeholders usually involved in research, going beyond the participation of researchers (the scientists) and the researched (the communities), incorporating other relevant actors in the search for solutions (eg. schools, and different levels of government, from local, to municipal, state and national levels). These projects were able to establish new spaces of negotiation and communication and developed informal networks between the different actors. This allowed, in turn, setting up improved forms of joint learning, building a common understanding of disease transmission in the project communities and of the responsibilities of each actor in prevention and control. Very likely, the different stakeholders obtained a clearer grasp of conceptual linkages between health and its social and environmental determinants, and became better acquainted with the different priorities and interests of each other. Finally, the researchers learned a great deal about how to link up with communities and of the decision-makers, engaging in the translation of knowledge into action, while civil society and government officials saw first-hand the value of applied research [15,18].

In conclusion, the different papers in this issue illustrate how ecohealth approaches can respond to the call by different groups [3,7,19] for a more pluralistic and transdisciplinary exploration of sustainable development alternatives based on multi-stakeholder participation approaches. More than ever, research for development is needed to encourage new debates about human aspirations and plausible achievements in an ecologically finite world – limited in its capacity to provide services and products to satisfy human consumption, process human wastes, and allow for healthy people in healthy ecosystems. Continued research is needed to produce new knowledge and the ability to integrate economic, health, equity and ecosystem considerations in development. It is also needed to inform disease control programs, new policies and practices, new alliances, and new political spaces to negotiate advancement towards fulfilling human goals and sustainability.

Resumo

Um mundo de pessoas saudáveis em ecossistemas saudáveis tem sido uma meta elusiva da agenda de desenvolvimento sustentável. Inúmeras avaliações de bases científicas concordam com a interdependência fundamental entre saúde, economia e ambiente e, com a urgência de melhores determinações e orquestração de ações baseadas em enfoques participativos multissetoriais em níveis local e global. Para tornar o conhecimento relevante para fundamentar políticas públicas direcionadas para o desenvolvimento sustentável e saudável é necessário considerar as interações complexas e dinâmicas entre sistemas ecológicos e sociais (enfoque sistêmico), que devem estar ligadas às ações de desenvolvimento. Isso requer maior interação entre tomadores(as) de decisões, pesquisadores(as) e representantes da sociedade civil – um processo participativo com múltiplos atores, e a integração de diferentes disciplinas e de diferentes tipos de conhecimento em um enfoque transdisciplinar. Enfoques ecossistêmicos para saúde humana (ecossaúde) conecta esses elementos em um esquema adaptável para pesquisa e ação. Este artigo apresenta exemplos de pesquisas com enfoque em ecossaúde aplicadas às enfermidades transmitidas por vetores, com atenção particular à participação de múltiplos atores, considerando a proeminência desta prerrogativa no discurso político de desenvolvimento sustentável.

Desenvolvimento Sustentável; Doença de Chagas; Dengue

Contributors

This paper evolved from discussions among A. Boischio, A. Sánchez, Z. Orosz and D. Charron about their experience in working with the Ecohealth Program Initiative of IDRC, which has involved their participation in program planning, development and monitoring of research projects, and review and analysis of projects' outcomes and lessons. All the authors contributed jointly to the revisions, commentaries, and discussions of the article.

Acknowledgments

The authors gratefully acknowledge the comments and suggestions provided by Bruce Currie-Alder. Also acknowledged are the insights and expert observations and conclusions by Héctor Gómez-Dantés and Roberto Briceño-León who carried out careful assessments of outputs, outcomes and lessons for several of the studies that are included in this special issue, and which are referenced in this paper as 15 and 18, respectively.

Conflicts of interest statement

The views expressed in this article are those of the authors and do not necessarily reflect the views or policies of IDRC.

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Submitted on 12/May/2008
Final version resubmitted on 18/Jul/2008
Approved on 14/Aug/2008