An ecosystem approach to health: The integration of work and environment

Maria Luiza de Jesus Lawinsky; Frédéric Mertens; Carlos José Sousa Passo; Renata Távora

Introduction

The dissociation of humans from nature results from the hegemony of capitalism and is expressed in the way most humans interact with their environment. This dissociation has produced imbalances that are expressed in the health of both humans and the environment. They arise from the divorce between "civilization" and the environment that sustains it and are seen in the mindless and unsustainable exploitation of natural resources for the production of material goods. Both productive activities and their negative externalities (pollution, climate change, unemployment, labor exploitation, unplanned urbanization, poverty, etc.) have serious health consequences for rural and urban environments.

The concept of environmental health presented in this paper incorporates the relations between environmental and human health, aiming to foster more systematic studies of the interconnections between environmental risk factors (such as exposure to specific physical and chemical agents) and human diseases and public health. We understand health as a process determined by a complex web of biological, social, and psychological factors that develop within a defined geographical area (Tambellini & Câmara, 1998; Giraldo, 2005).

Assuming health to be a state of complete physiological and psychological wellbeing, it becomes clear that the major problems facing humanity today arise from the modern relationship between man and nature (Leff, 2000). The social welfare approach to health problems prevalent since the 19th century has not kept pace with our growing health problems. The study of occupational diseases caused by polluted workplaces has brought about a return to the old paradigm of preventing disease by promoting a healthy environment (Tambellini & Câmara, 1998).

The interest in the health consequences of environment and work led to the development of new methods appropriate for this new perspective. The ecosystem approach to human health ("Ecohealth") originated in Canada in the 1970s from the field of systems thinking and soon gained wide recognition (Lebel, 2003, Charron et al., 2012). According to Gomez and Minayo (2006), the ecosystem approach attempts to integrate health and environmental concerns by means of new knowledge and technology that are implemented by policy makers, the private sector, civil society, and affected sectors of the population. Methodologies incorporating an ecosystem perspective have been developed in many countries to explore the influence of natural environments and workplaces on health. In Brazil, this perspective has been used to the study of the relationship between ecology and human activities in an attempt to better understand the determinants of population health

Maria Luiza de Jesus Lawinsky. Center for Sustainable Development, University of Brasilia, Brazil (CDS); Community of Practice in Ecosystem Approaches to Human Health in Latin America and Caribbean (CoPEH-LAC).
Email: luizalaw@gmail.com

Frédéric Mertens. CDS and CoPEH-LAC.
Email: fmertens@unb.br

Renata Távora. CoPEH-LAC.
Email: renata.tavora@gmail.com

Carlos José Sousa Passos. CDS, Faculty UnB at Planaltina - FUP - University of Brasília, and CoPEH-LAC, Brazil.
Email: cjpassos@unb.br

and welfare (Nielsen, 2001). The Brazilian healthcare system incorporates this approach in the areas of environmental and occupational health, and despite their distinct institutional histories, these two fields have collaborated in joint activities to promote population health.

The environmental health sector seeks to identify and intervene in cases where the natural environment directly influences human health and wellbeing. This involves, for example, the monitoring of water, soil, and air quality. In turn, the occupational health sector links production processes, environment, and human health. At its beginnings in the 19th century, the main goal of occupational health was to improve the precarious living conditions of the working class in order to minimize workforce losses. The goals and methods of occupational health have evolved since that time, so that today it focuses primarily on promoting workers' health and improving working conditions (Minayo & Thedim, 1997).

Health problems are complex and raise issues that involve both fields; effective solutions require integrating components from both. This is a challenge to be tackled, and the assistance of academic research is essential to finding joint solutions. The Ecohealth approach has the potential to find points of convergence and dialogue from both sides, being a valid conceptual and methodological alternative. The foundational principles governing Ecohealth are similar in many respects to those of the Brazilian Unified Healthcare System (SUS). The SUS principles of intersectoral action, equity, and participation are echoed in the Ecohealth pillars of transdisciplinarity, equity, and community participation (Ministry of Health, 2009; Lebel, 2003). The integration of Ecohealth into the SUS could be quite useful in terms of increasing the efficiency of both environmental and occupational health.

This paper examines how the theoretical, conceptual and methodological basis of Ecohealth might be adapted to the guiding principles of SUS. The integration of the Ecohealth into SUS could overcome the theoretical and conceptual barriers that now exist in the health system between occupational and environmental health, thus integrating working conditions into the general issues of human health.

The first three parts of the text will explore the history of occupational health in Brazil, the history of environmental health in Brazil, and the history of Ecohealth. We will then examine the prospects for integrating environmental and occupational health through Ecohealth. We carried out a literature review in which the following key terms used were: *environmental health* and *occupational health,* crossed with *ecosystem approach and challenges*. In order to stimulate discussion about the relevance of Ecohealth in the integration of environmental and occupational health, 15 publications were selected, and the concepts and demands raised by the authors will be compared with the concepts and pillars introduced by the Ecohealth.

Occupational health

Occupational health (*translator's note: saúde laboral)* is an integral part of the Brazilian healthcare system. It works to improve the health of the labor force and reduce the risk of accidents. It is derived from the fields of occupational medicine and occupational health (Mendes & Dias, 1991; Minayo & Thedim, 1997). Occupational medicine originated in England in 1830 in response to the first industrial revolution when a textile company first contracted for medical services for the exclusive care of its employees. This system quickly spread throughout Europe and then to peripheral countries and was characterized by a focus on the doctor and a curative, therapeutic approach. Occupational medicine sought to identify the etiologic agent for each disease, assuming that diseases had a single cause and focused on identifying specific risks and on treating existing diseases. Occupational health developed as a field during the Second World War when occupational injuries increased along with the intensification of industrial production (Mendes & Dias, 1991).

According to Betancourt (2009), the field of work and health requires a broader understanding that is not limited to the identification of specific risks. Work is one of the main determinants of human wellbeing and this understanding is essential to the study of work processes in which hazardous

events can damage individual health and development. To identify appropriate interventions, one must examine all parts of the labor process, and this must precede the identification of specific hazardous processes. A comprehensive approach to occupational health includes housing, food, recreation, leisure, and family relations as important variables in the analysis of health conditions at work.

Occupational health broadened the vision of occupational medicine somewhat by encompassing variables in the work environment that influence workers' health. This led to the creation of workplace regulations and safety procedures. In practice, however, regulations and standards have mainly a symbolic value since many employers do not respect them, although workers are penalized for not following rules and standards. Workers are forced to work in poor conditions and accept those limited guarantees that exist to protect their health; these are primarily palliative regulations regarding job security.

Occupational health in Brazil is emerging as an extension of earlier concepts developed by occupational medicine. Workers' health should be a subject in its own right and is not just the provision of care to the injured. We must consider the workplace as an environment that is not limited to the physical structures and facilities, but rather as an environment that includes those working conditions and work relations that produce ill health (Salim, 2003). This relationship between environment (including the work environment) and health was a central issue influencing the emergence of social movements that demanded popular participation in the creation of public health policies (Porto, 2009).

Occupational health remains marginalized within the Brazilian health sector despite the efforts of the occupational health community to have it incorporated into the overall vision of the Brazilian SUS (Vasconcellos, 2007). It faces many challenges in terms of research, political action, and the implementation of public policies. For example, how can we develop technological and organizational alternatives that respond to the concerns of the business community? The biggest challenge, however, is to make changes that do not lead into the reductionism of traditional occupational medicine. As noted by Vasconcellos (2007): "*Either deliberately – because of its implications related to economic power – or not, work remains invisible as a major determinant of the relationship between health and disease*" (p. 13).

Methods to avoid reductionism and stimulate the creation of technological and organizational alternatives can be found in three areas:

1.   Greater public participation, especially by workers, in the creation, implementation, and monitoring of public policies: participatory processes in workers' health are now well recognized in Brazil. This is partly due to the organization of three national conferences on the topic, in addition to the existence of intersectoral and intrasectoral networks at the local, state, and national levels, which serve as a forum for well-organized dialogue.

2.   Greater awareness and use of data produced by environmental health: environmental health has created an important database addressing many of the risks to which workers are exposed on a daily basis. These data may not directly address the exploitation of labor, but they can provide needed evidence on the risks and damages associated with environmental pollution. The participation of health workers in organizing Brazil's national conference on environmental health is evidence of the growing links between environmental and occupational health.

3.   Development of new theoretical models and methods that move beyond the traditional approaches to "workplace risks" involving "accidents" and "diseases": jobs are now studied in order to identify potentially dangerous procedures, allowing for smarter and healthier interventions (Betancourt, 2009).

Environmental health

The term "environmental health" is used primarily by those in public health who study how the relationship between the environment and social/production activities acts as a determinant of the health of all living beings, including humans; the impact of environment on living beings is part of environmental health and cannot be separated from it (Tambellini & Câmara, 1998; Giraldo, 2005; Palacios et al., 2004).

Brazil's environmental health movement developed as an offshoot of both the global environmental movement and Latin American Social Medicine. Environmental health involves two interacting spheres: social practices and science. The first is founded on the declaration of the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit or Eco '92. The second uses epidemiology as a scientific model to analyze production, environment, and health (Giraldo, 2005; Palacios et al., 2004).

Eco '92 was a milestone for both the environmental and health sectors. It placed human beings and their health as the main objective of public policy and assumed that the wellbeing of humans would be achieved by promoting a healthy environment in harmony with production. This conceptualization allowed the public health sector to intervene in all those social processes that influence human health and the environment. The integration of environmental factors within Brazilian Collective Health required an interdisciplinary approach that incorporated diverse academic fields, such as ecology, and concepts, such as sustainability (Giraldo, 2005).

Environmental monitoring (EM) was created to promote and coordinate actions between sectors with an environmental interest; the goal was to (re)integrate the public health community as a natural interlocutor in questions of human needs and quality of life. We are already benefiting from EM. Seventy-nine percent of Brazilian municipalities are currently using some elements of the "VIGIÁGUA" water monitoring program, which includes the use of water supply surveys, quality control reports, and analyses of chlorine, turbidity, and bacteria (Ministry of Health, 2008). Since 2006, about 700 of the areas enrolled in the soil monitoring program have detected contaminated soil, mainly from pesticides, petroleum products, industrial waste, and metals. Most of these contaminated areas are located in the north and northeast regions of Brazil. Air quality monitoring has allowed the identification of priority municipalities for the implementation of emission reduction programs.

EM has demonstrated that cities with high rates of hospitalization for acute respiratory infections and nebulizer use lie along the main arc of defor-estation running from Brazil's Center West to the Northern Region, showing a clear association between deforestation and health problems. The health effects of air pollution are not limited to large industrial and urban centers (Ministry of Health, 2008).

The process of institutionalizing environmental health in Brazil, from its initial recognition in 1994 through its formalization in 2000 and finally up until today, created a policy framework that clearly links health and environment (Ministry of Health, 2009). However, it has proven difficult to create an institutional body for such a complex operational structure. Problems arise from the need for a broader understanding of environment and epidemiology, which in turn requires integration mechanisms based on a comprehensive vision and rapid response capability (Filho et al., 1999).

The implementation of environmental health monitoring requires a broad knowledge base regarding models of development and their impact on social and environmental inequality as well as their role in environmental damage. This work should incorporate individuals who understand the need to combine these various components and who are conceptually open-minded enough to accept this new worldview. More time is needed for community participation and analysis of socio-environmental conflicts in order to better guide the implementation of environmental health monitoring (Porto, 2009; Freitas & Porto, 2006; Giraldo, 2003).

The scope of social participation has been more fully developed in occupational health. Attention to the demands of the workers can help produce a clear picture of the population health and environmental situation in Brazil.

The ecosystem approach to human health (Eco-health)

Traditional science, considered as external and objective, does not necessarily address the majority of the problems arising in ecology and health. One of the practical implications of working with complex systems is that developing a set of techniques and skills is not enough. One must recognize the importance of relational networks between nature and human society. These networks create a new understanding of "the normal" that integrates scien-

tific discoveries with their ethical and socioeconomic aspects (Pilon, 2006; Waltner-Toews et al., 2008). A reductionist and fragmented approach cannot be truly "objective" because different forms of understanding and knowledge, which are inherently full of subjectivity, determine these problems. Ecohealth fosters the integration of scientific research in order to analyze relationships between different components of the ecosystem, establish priorities, and evaluate the determinants of human health and welfare (Lebel, 2003; Waltner-Toews, 2001).

Ecohealth was developed and used by researchers who worked on the International Joint Commission guiding water quality for the Great Lakes, a region on the US-Canadian border surrounded by large industrial cities (Lebel, 2003). Understanding ecosystem change and population health damage required a methodology that could anticipate dramatic changes in the human environment and their consequences. Knowledge drawn from several fields was used: the ecology of ecosystems (derived from scientific ecology born in the late 19th century), the theory of complex systems (developed from biology by Von Bertalanffy circa 1950), disaster theory (drawn the mathematics of René Thom in the mid-1960s), and hierarchical theory, which was in turn derived from systems theory, initially developed by Koestler (psychology) and Simons (economics), also circa 1960 (Waltner-Toews, 2001).

The 1974 Lalonde Report to the Ottawa Conference was the first to point out that environmental problems were related to health (Gomez & Minayo, 2006). The Lalonde Report influenced the health sector by its emphasis on the need to go beyond the then prevalent (and still prevalent) vision of health as the provision of clinical services. The report included consideration of the biophysical space as well as social factors and genetic inheritance (Gomez & Minayo, 2006). In Brazil, this led to public policies that promoted healthy environments using systems approaches within sustainable development policies (Vasconcellos, 2007).

The ecosystem approach entails anticipating events and creating adaptive solutions in a participatory manner. The pillars of Ecohealth involve inter- and transdisciplinarity; questions of social, gender and ethnic equity; and community participation. Researchers must understand the needs of local stakeholders in relation to the investigation being conducted in their habitat. Local participation assures that the community is integrated into the research project (Nielsen, 2001).

Another important pillar of Ecohealth is equity. The interests of all sectors involved in the research – regardless of gender or social class – should be considered (Lebel, 2003). Ecohealth tries to balance the interests of academia, the general public, and managers. Research is designed to improve the situation of the community under study and ensure that all parties involved share the results and benefits (Lebel, 2003, Mertens et al., 2005).

Socio-environmental conflicts are increasingly visible in society; the complexity of their solution is also increasingly recognized. Scientific research has made it clear that we must move beyond the patchwork approaches that have been used previously to understand and address problems identified in work processes and the environment (Silva et al., 2009; Porto, 2009; Gomez & Minayo, 2006).

Brazil has made an attempt to implement the ecosystem model. Environmental health and occupational health are institutionally very close; the management of both areas is directed by a single department within the Ministry of Health. The 1st National Conference on Environmental Health, conducted back in December 2009, sought to develop new approaches to health that would incorporate social and environmental variables. This conference has been considered a milestone in Brazil, for both the topic itself – environmental health – and for the integrate of social participation into public policy. Ultimately, this is what constitutes the ecosystem vision: different sectors coming together to develop a deeper understanding of the problem; a concern for social participation in the formulation of policies; and in inclusion of issues of equity in the discussion.

We see a movement emerging on several fronts – popular, academic, and governmental – that seeks to implement what research studies and social movements have been demanding for the past two decades. The demand for health by all these segments has incorporated the well-known principles of Ecohealth: transdisciplinarity, participation, and equity.

Transdisciplinarity

The failure of uni-causal and uni-disciplinary approaches to understand and analyze complex issues has led to a search for ways of integrating multiple perspectives into a novel conceptualization of what it means to "fully understand" something. This new conception has been called "transdisciplinarity" (Forget & Lebel, 2001). Transdisciplinarity involves a higher level of analysis than interdisciplinarity. Despite the extensive epistemological debate in the academic world regarding interdisciplinary and its relevance to this discussion, it is generally defined as a way to unite various disciplines to address a common problem (Leff, 2000; Silva, 2000; Coimbra, 2000). Interdisciplinarity then becomes the normative model for programs that are limited to small, local ("micro-political") contexts. In order to understand the big picture, we need to talk about transdisciplinarity (Filho et al., 2005). In addition to the necessary cooperation between the disciplines, transdisciplinarity seeks a way of transcending its individual components. *"Transdisciplinarity does not eliminate or exclude other ways of interpreting the world; it only demonstrates how their methods are reductionist."* (Silva, 2000).

Transdisciplinarity implies "*a qualitative leap, a self-improvement that is scientific, technological and humanistic, a highly developed ability to incorporate into one's professional training information and understanding that is qualitatively and quantitatively new"* (Coimbra, 2000, p. 58)*.

Transdisciplinarity is a necessary approach to the study of ecosystems. Researchers see their work as contributing to novel concepts that would foster new fields for further research (Silva, 2000). Transdisciplinary involves the integration of scientific and traditional knowledge; the involvement of researchers, civil society and other stakeholders; and the development of new tools for the implementation of ecosystem approach. These new tools should permit the simultaneous visualization of data in both space and time. Geographic information systems (GIS), for example, are one means of visualizing and manipulating complex exposure scenarios. They have been used in studies of the link between the emission of pollutants by industrial plants and the health of workers and the surrounding community (Forget & Lebel, 2001; Meliker et al., 2005).

For this particular type of study, it is important to recognize the human aspects of production, health, and the environment. This recognition facilitates conceptual understandings that lead in turn to new theoretical and conceptual formulations and new methodologies that further legitimize transdisciplinarity (Tambellini & Câmara, 1998). Working from this perspective requires researchers to have a great capacity for synthesis within their own discipline, as well as the sensitivity to accept the strengths and limitations of their and others' fields of expertise (Lebel, 2003).

Participation

At its core, Ecohealth research tries to help communities to achieve their goals in a sustainable way and to empower them through knowledge. Since the perception of problems varies greatly among different segments of society, participatory processes are essential if we are to characterize the research question as accurately as possible (Nielsen, 2001). Projects that include participatory methods to both understand local problems and to design programs for change can produce better research, and this favors real improvement in the health of humans and the environment. Decisions that affect human health require a broad-based response; the ecosystem approach acts as an important tool to engage researchers, community members, and civil servants (Lebel, 2003; Gomez & Minayo, 2006; Mertens et al., 2011).

This approach is most successful when the key stakeholders are able to integrate their differing knowledge bases. An appreciation for the learning opportunities provided by this exchange is essential for the application of the ecosystem approach, demonstrating that the practical, social, and institutional dimensions of the issue are valued as much as the scientific ones (Waltner-Toews, 2001).

Equity

The principle of equity comes into play with the recognition that there are differences among citizens and that minority groups have rights. This recognition of differences conflicts with classical legal

thought in which citizenship is something equally shared and undifferentiated. Equity, however, demands attention to the following questions: social stratification, differential risk exposure, and the vulnerabilities created by specific living conditions (Escorel, 2009).

Equity is defined as equal access for equal needs, equal use of services for equal needs, and equal quality of care for all people independent of their social class (Almeida, 2002). Inequity occurs when groups defined by social and demographic characteristics (such as income, education, ethnicity, and gender) have differential access to rights – in this case, the right to health. Policies need to address the best ways to achieve equity when different groups require special services because of their particular needs (Lucchese, 2003). Any intervention must involve the participation of representatives from all interested parties. Each party must be fully informed of the nature of the problem, and their proposals on how to solve them should be respected and taken into account (Mertens et al., 2005, Mertens et al., 2006). Conflicts of interest that can interfere with the research process should be resolved. The early stages of community involvement are often laborious, yet they are also key to achieving results. This approach can be formalized in public policy. For example, the incorporation of labor and environmental issues in public health policies in Brazil grew out of extensive experience in participatory management (Giraldo, 2003).

Brazil has followed the two Ecohealth principles of participation and equity for quite some time. The birth and subsequent institutionalization of the SUS involved community/social participation in national health conferences and the creation of health committees to ensure democratic participation in the planning, management, implementation, and evaluation of policies (Cortês, 2009). This tradition is also seen in the development of occupational health, e.g., in the 3rd National Conference of Health Workers that took place in 2005. In environmental health, the interest in participation and equity increased after the 1st Conference on Environmental Health in 2009, which was a milestone in social participation in health and environmental issues.

Ecohealth and the integration of environmental and occupational health into the Brazilian health system

Environment and occupational health face many challenges in Brazil. The development of a participatory culture in environmental health is still in its infancy, while the health care sector could make better use of environmental health data in program development. The environmental health sector can, for example, provide measurements of water, air, and soil quality to demonstrate the health damage associated with industrial development and unplanned urbanization. The occupational health sector has developed a closer relationship with the population and the application of participatory methodologies to prioritize action. Combining the hard data of environmental health with the demands raised by workers has a synergistic effect that promotes worker health as well as that of the entire population.

The environmental crisis is driven by our current models of production and consumption. Their negative effects on human and ecosystems health has spurred debate and sensitized the public to these issues (Porto, 2005). The health of workers has been greatly impacted since work lies at the heart of the transformation of the natural world into commodities for modern society. The relationship of nature to both work environments and human health is continuously reaffirmed by the numerous examples of damage to human health caused by environmental pollutants such as dioxins, pesticides, and radiation (Giraldo, 2003). The profile of the worst environmental toxins is changing little by little, and environmental pollutants, mostly generated by the transformation of natural resources through work, have now become a problem in health care comparable in importance to infectious diseases (Harrison, 2000).

The study of environmental impacts on population health highlights the role of productive activities. Health changes are first seen in the physical entities involved in act of production: the worker, his/her family, and the environment. This is most immediately seen in the thoughtless and irresponsible dumping of waste products. We must not see labor and environmental issues as two separate fields, but instead we must accept the obvious connections between the two so that we can work for

the defense of democracy, social justice, and sustainability (Porto, 2005).

Intervention in work and environmental processes that affect human health is a complex matter that requires new approaches. To expect the traditional methods of scientific knowledge to address this urgent and serious situation is, at the very least, irresponsible. Our work must be guided by the *precautionary principle*. The encounter between occupational and environmental health offers promising space for solving our current health problems (Rigotto, 2003).

Work is a variable that simply cannot be ignored in the process of population health/disease. The proposed addition of labor issues to the theoretical, conceptual, and methodological approaches of Ecohealth broadens researchers' horizons. The participation of various interest groups (actors) would also be facilitated; peoples' attention and commitment are generally greater when it is a matter of their own livelihood.

The Table summarizes the main concerns raised by environmental and occupational health and shows how Ecohealth may contribute to their understanding. It illustrates how the claims of environmental health are similar and complementary to those of occupational health. Transdisciplinarity, a pillar of Ecohealth, requires that environmental health understand phenomena in an open and democratic manner so as to promote a healthy environment that is in harmony with other sectors of the society. A similar situation exists in the field of occupational health, where a rich understanding of phenomena is needed in order to promote the health of workers and their families.

In Brazil, occupational and environmental health currently play complementary roles with respect to social participation. Occupational health can provide environmental health with its rich experience in participatory processes and questions of equity, and Ecohealth offers its theoretical, conceptual, and methodological tools. Ecohealth's three pillars should be respected; they permit a rich analysis of the current relationship in Brazil between the fields of environmental and occupational health

Some authors argue that interactions between people and ecosystems have an "emergent complex-ity" that cannot be understood by any model. Even if this were true, the tools developed by Ecohealth help to solve practical problems, and their development and implementation should continue (Waltner-Toews, 2001). However, the question of work deserves to be integrated within Ecohealth approaches; indeed the study of production processes was not directly addressed in any of the Ecohealth studies reviewed for this article.

Final thoughts

Conducting research within the framework of an ecosystem approach presents an interesting alternative for the study of health, environment, and labor problems. Community participation in areas such as the formulation of research problems, the implementation of research protocols, and the interpretation of results offers many advantages. For managers, community participation reduces conflicts of interest, whereas for researchers, it increases the chance of successfully completing projects. Fieldwork should only take place when the community understands the project, supports its implementation, and benefits from the new knowledge generated. Research should leave the community both empowered and with tangible benefits.

Efforts to integrate the areas of environmental and occupational health through Ecohealth constitute a two-way street: first, the two sectors become better integrated; and second, they contribute to the theoretical, conceptual, and methodological approach of Ecohealth, which is still a field in development. The similarities between the guiding principles of Ecohealth and those of the health system in Brazil creates this possibility and points to an eventual integration of the work done in occupational health and environmental health.

Principles or Pillars	Ecohealth	Environmental Health	Occupational Health
Transdisciplinarity	- Involves disciplines associated with a complex question and transcends them, creating an emergent understanding. (1-3)	- Preserve the environment in a sustainable fashion to promote human health. - Understand phenomena within a dynamic and democratic approach. - Effective integration with other sections (still incipient in Brazil). (6-9)	- Produce in a way that is sustainable and does not injure the health of the worker, his/her family and the environment. - Integration with other sectors (difficult because of the Brazilian political and institutional context). (12-14)
Participation	- Active participation of all involved parties through workshops, seminars, and other diverse participatory methods. - Empower individuals so as to increase social consciousness. (1,2,4)	- Recognizes the need to incorporate qualitative aspects that respond to psycho-social and environmental needs. - Seen in the 1st National Congress on Environmental Health (but still incipient in Brazil). (6-8, 11)	- Participative processes are seen as relevant to worker health and allow for influence on democratic institutions. - Increasing use of participative research. (12,15)
Equity	- All groups involved in the process are given equal voice. - All participants should share in the benefits of the research. (1,2,5)	- Effective integration of respect for all involved parties. (8-11)	- Respect for the opinions and needs of the workers (although the practical implications of this respect are scant). - Parity between managers, health workers, social movements, and academic institutions. -Difficulty with the "power of the market." (12,13)

Sources: 1: Lebel (2003); 2: Forget & Lebel (2001); 3: Waltner-Toews et al. (2008); 4: Mertens et al. (2005, 2006); 5: Nielsen (2001); 6: Freitas et al. (2006); 7: Ministry of Health (2008); 8: Giraldo (2003); 9: Filho et al. (1999); 10: Tambellini & Câmara (1998); 11: Ministry of Health (2009); 12: Minayo & Thedim (1997), 13: Rigotto (2003); 14: Porto (2005); 15: Vasconcellos (2007).

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