Good Health and Well-Being. Encyclopedia of the UN Sustainable Development Goals

Health education for awareness and behavioral change and influence

Rita Campos
CES-UC - Centre for Social Studies, University of Coimbra, Coimbra, Portugal, rita.ml.campos@gmail.com

Lúcia Fernandes
CES-UC - Centre for Social Studies, University of Coimbra, Coimbra, Portugal, luciaof@gmail.com

Synonyms

Health literacy, health promotion, ecosystem approach to health, education for sustainability, social mobilization

Definition

Health education comprises all experiences that can inspire changes in behavior leading to improved health and well-being and also improves health literacy, ultimately leading to a more conscious, empowered and mobilized society (adapted from Nutbeam, 2000). Health, as recognized by the World Health Organization, is "…a state of physical, mental and social well-being and not merely the absence of disease or infirmity" and well-being is a state of dynamic equilibrium between the physical, mental and social challenges faced by people and their capacity to cope with it (adapted from Dodge et al, 2012).

Health education, health literacy and empowerment

Health promotion and disease prevention have been common goals in health education programs. After almost six decades, health campaigns have moved the focus from the transmission of information based on rather simplistic assumptions related to how individuals respond to such actions, to more complex models that incorporate the social context and the development of personal skills to gain control over health and change behaviors towards health improvement (reviewed in Nutbeam, 2000).

Traditionally, health education programs have sought to bring about voluntary change in health-related behaviors. Recently, the inclusion of new dimensions embedded in concepts of active citizenship has added other objectives to health education and communication actions. These would primarily contribute to increase health literacy (Nutbeam, 2000; Sørensen et al, 2012) and promote individual and social empowerment (Wallerstein and Bernstein, 1988).

The concept of 'health literacy' is broadly used as a proxy for literacy but applied to health-related issues. In that sense, and in the absence of a reference definition, health literacy would be the ability to understand and apply health-related information, to develop skills to use that information in a given health-care scenario and to exert control over the determinants of health (Chinn, 2011; Sørensen et al, 2012; Estacio, 2013). Health education programs that aim improving health literacy should thus not only improve people's knowledge and understanding of health consequences related to lifestyle choices or how to make the best use of available health services, but also raise awareness of the social, economic and

environmental determinants of health, so that individuals and communities can act upon those determinants (Nutbeam, 2000). This change of focus has, in principle, the potential to engage the community in identifying and amending health-damaging behaviors. But the concept of 'health literacy' does not come without criticisms, as it may be ignoring important determinants and actors involved in health promotion and public health (Chinn, 2011). Some of the criticisms include viewing health literacy as a skill to gather and use health-related information only on medical settings, ignoring how everyday life activities can impact health (e.g. what individuals chose to eat, how individuals chose to spend their free time); others point to the need of consider the influence of social, political or cultural backgrounds on how individuals interpret and use information (reviewed in Chinn, 2011). Still, because social, economic and environmental factors significantly determine the health of a population, health literacy can be a powerful tool for particular groups, such as communities of lower socioeconomic status.

The "Freireian-inspired" approaches to health education programs have called attention to empowerment as a critical element in health education. This empowerment implies a rooted knowledge of the health problems and incorporates a broad process of community participation to achieve disease prevention, community cohesion, self-development, improved quality of life, and social justice (Wallerstein and Bernstein, 1988; Estacio, 2013), considering different countries and/or regions. So the concept of 'empowerment' is used as a goal of a given health education program, i.e., it implies that individuals or communities will improve their ability to critically use health information to produce changes and control their health and well-being. Ultimately, and especially when dealing at the community level, empowering transforms the way in which health education programs are designed. Community level empowerment reverses the approach from a top-down, whereby health or education professionals act as holders of knowledge and scale the topics to a bottom-up approach, letting the communities identify health-related issues and proposed solutions. In other words, using empowerment as an integral part of health education or health promotion interventions implies the acceptance that individuals have the tools to self-realization and that resulting changes can impact several dimensions, from the personal sphere to the political arena.

As in other fields of education, health education should include the two dimensions: literacy and empowerment. Nutbeam's continuum model of health literacy (2000) tries to reconcile both the 'health literacy' and 'empowerment' concepts as it conceptualizes health literacy from a stage of knowledge and understanding to a stage where these are used to act upon social, economic and environmental determinants of health leading to improved individual and/or community health. More recently, Sørensen and colleagues (2012) proposed a new model of health literacy that combines the main dimensions of existing conceptual models. This mixed model expands from a conceptual one to incorporate a logic model that identifies the proximal and distal factors that can impact health literacy and the paths between health literacy and health outcomes. The model also builds from the individual to the population, and expands health literacy beyond healthcare settings, as potentially promoting equity and sustained positive health-related behavioral changes. However, this new model was based primarily on research conducted in developed countries and thus presumably did not incorporate important aspects of health literacy.

The existing models of health literacy and most of health education-related research discuss the medical and public perspectives of health promotion campaigns and the determinants of health using mostly a narrow definition of health - health as synonymous for the absence of

disease. However, the World Health Organization (WHO) recognizes health as "…a state of physical, mental and social well-being and not merely the absence of disease or infirmity." and thus health should also include the environment and the contributions and impacts of biodiversity on human health (Millennium Ecosystem Assessment, 2005). The critical links between biodiversity and health led WHO and the Convention on Biological Diversity (CBD) Secretariat to collaborate in the promotion of an emphatic discussion on the wider environment encompassing biodiversity and how biodiversity impacts human health (Romanelli et al, 2014). Given the importance of the health-biodiversity interface to the holistic definition of human health, several institutions and scientists defend an integration of biodiversity in health education and research programs (e.g. Romanelli et al, 2014). The following sections discuss the links between biodiversity and health and how health education can assume different formats according to the message, the underlying health-related problem and the targeted audience. With two examples of activities focusing on biodiversity and human health in schools and in communities affected by vector-borne diseases, health education is discussed as a tool for individual and social change.

An ecosystem approach to health

Biodiversity refers to all living beings, from the diversity found within each species to the relationships that species establish with each other and with the environment - the ecosystem, and is the basis of human existence (Edwards and Abivardi 1998; Balvanera et al, 2014). Although it is not easy to quantify the number of species, different estimates suggest that we know only a small fraction of the species that inhabit the planet and that they are disappearing at a rate equivalent to a sixth mass extinction event (Pimm et al, 2014; McCallum, 2015). However, unlike the great extinctions of the past, this is occurring at a much faster pace and with a direct connection to human activities (McCallum, 2015). The changes in the composition of the atmosphere measured in the last decades, especially the rising levels of CO_2 from human activities, are impacting not only biodiversity and diverse ecosystems but also human health (e.g. National Research Council, 2011). This "biodiversity crisis" and consequent ecological imbalances and loss of ecosystem services pose numerous challenges to different sectors of society (Millennium Ecosystem Assessment, 2005; Nunes and Matias, 2006; ten Brink et al, 2016).

The recognition that progresses in human societies have a strong negative impact on biodiversity and on human health has been recorded in international meetings aimed at outlining development strategies that balance development with the preservation of biodiversity. The United Nations Conference on Environment and Development (RIO-92) introduced the concept of sustainable development - a model of economic and social development that incorporates the need to maintain ecological balance - in the social and political agenda of the Convention on Biological Diversity (CBD; Convention on Biological Diversity, 1992). Alongside this concept, the CBD also introduced the notion that human health is closely related to biodiversity and ecosystem uses and services (Millennium Ecosystem Assessment, 2005; WHO, 2015).

Over the past 20 years there has been a greater recognition of the links between biodiversity and human health. New areas of work have emerged aiming at bridging the gap between scientific knowledge and political action and using an ecosystem approach to health (e.g. EcoHealth or One Health). This approach recognizes human beings as intrinsic parts of biodiversity and ecosystems and these as inseparable parts of human health and well-being (Forget and Lebel, 2001; Keune et al, 2013; Millennium Ecosystem Assessment, 2005;

WHO, 2015; Wilcox and Kueffer, 2008). The impact of biodiversity on health can be considered at four levels: quality of life, including mental health and social welfare; genetic and medicinal resources; services provided by ecosystems; and the spread of infectious diseases (that increases when ecosystems have low biodiversity rates) (Forget and Lebel, 2001; Millennium Ecosystem Assessment, 2005; Sala et al, 2012; WHO, 2015; ten Brink et al, 2016, Jennings et al, 2017). Numerous examples also explicitly show the benefits of interacting with nature on mental processes, cognitive ability and function, and on physical function and/or physical health (reviewed in Keniger et al, 2013).

The links and effects of biodiversity and of the services provided by the ecosystems are vast (reviewed in Bernstein, 2014). For example, at the disease treatment level, humans make use of natural products for medicinal purposes for millions of years; most of the antibiotics and anti-cancer drugs derive from biodiversity, especially plant parts. Still, the pharmacological potential of biodiversity is greatly unknown, as only a small fraction of plant species and even less of other groups of organisms were studied so far (Bernstein, 2014; David et al, 2015). A main contribution of biodiversity to human health is at the nutrition level, as the majority of food products are provided through the use of natural resources. Human societies have depended mostly on domesticated species as food sources but the success of animal and plant farming might be threatened by human-derived climate changes. Preserving high levels of biodiversity at the three levels - gene, species and ecosystem - will be crucial to overcome environmental instabilities and guarantee food production and security. However, past and current patterns of production and consumption still pose risks to the environment and human health and well-being (e.g. Pradhan et al, 2017).

The health risks posed by the products we consume are, in terms of characteristics and magnitude, different from those found in the past. Such products form an intrinsic part of people's daily lives, being present in the places where they live, work and enjoy themselves, in the food and water they consume, in the soil they step on and in the air they breathe. These risks can be called ‘technological risks’ (e.g. Freitas et al, 2001) or ‘new risks’ (e.g. Gonçalves, 2007), and are characterized by having traits that are invisible to humans, their global extent, the difficulty of delimiting them in time and space and predicting their consequences, and their expansion in time, thus reaching future generations.

The presence of different types of uncertainties in health impacts is also a central aspect related to:

- The limit of existing data on the toxicity of different substances, which is the result of complex interaction between them, the reaction of different living organisms to exposure, the indirect and variable routes of exposure (food chain, water and air), and the historical differences of the clinical state of individuals and populations.
- The limit of scientific knowledge to elaborate a description of complexity, using models and not assuming their limitations in a transparent way.
- The influence of the individual options of scientists and technicians by certain methodologies in the course of identifying and choosing solutions to a problem.
- The amplification of uncertainty by its concealment of the public and private institutions responsible for decision-making processes (Fernandes et al, 2016).

Some of the health impacts of what is identified as progress in different areas in human societies are rather alarming. Cases of chemicals and their applications have shown signs of having negative health ramifications on the society (Harremoes et al, 2001). For example, the problems resulting from exposure to benzene led to a decrease in the exposure limit in the

workplace from 100 parts per million (ppm) in 1946 to 1 ppm in 1987. Another example is the polychlorinated biphenyl type compounds (PCBs), which came into production in 1929 and 37 years later were considered toxic and persistent in the food chain: in 1972 they were banned in Sweden and in 2010 from the European Union. Other examples of how chemicals and products have gone from solution to problem include asbestos, chlorofluorocarbons CFCs, diethyl-stilbestrol (DES; applied to abortion prevention), and methyl tert-Butyl ether (MTBE; used to replace lead as an additive to gasoline) (Harremoes et al., 2001). These examples show how public policies change following developments in scientific knowledge but some uncertainties will never be eliminated from existing knowledge.

Other episodes of acute pollution of the soil, water, air, diseases and health risks have occurred in the form of industrial accidents in the last 40 years. Seveso was the first big disaster that occurred in Europe, in 1976, and there are still uncertainties about health problems considered to be direct consequences of this episode (Centemeri, 2008). In Bophal, India, in 1984, more than 20,000 people died and more than 100,000 suffer from chronic and degenerative diseases (Fortun, 2001). The Chernobyl accident, in 1987, originated by radioactive chemicals used in a nuclear power plant, has originated devastating environmental and health consequences and more than 3.5 million people are still at risk (Petryna, 2002). In Brazil, a radioactive accident also occurred in the same year, caused by the abandonment of a radiotherapy device of a private hospital containing radioactive substances inside, exposing more than 110,000 people and causing the death of four (Barbosa, 2010). The contamination of Minamata Bay in Japan by residues from a mercury-containing fertilizer industry has caused the intoxication of thousands of people and pollution of the local ecosystem (Allchin, 2009). Many other accidents involving the transport of petroleum products also occurred, such as the oil tankers Exxon Valdez in 1989 and the Prestige in 2002, and the oil spill in the Gulf of Mexico in 2010.

Given the intricate but vital links between biodiversity and human health and well-being, health education programs should include the component "biodiversity" to raise citizens who are able to recognize and understand public health-related issues, to be willing for behavioral change, to get involved in the decision-making process and to think of individual and community benefits.

Biodiversity and health in schools[1]

Assuming health education as a tool for individual and social change means it can be used in numerous different ways and settings. In schools, for example, health education is a powerful mean to raise awareness about the intricate relationships between human health and ecosystem health and to influence societal changes (Hancke and Suárez, 2014; Howard, 2006; Davis and Cooke, 2007). Working with schools allows amplifying the message through the dynamics established between the student's family circle and the wider school community. This is a way of sharing and explaining different positions, opening the debate and seeking more collaborative solutions to problems. However, as with the scientific literature on health education and health promotion, most school programs address the issues

1 Work developed within the framework of the program "CES vai à Escola" ("CES goes to School"); https://www.ces.uc.pt/extensao/cesvaiaescola/?id_lingua=2).

of health and the natural environment separately, ignoring its complexity and not contemplating the links between biodiversity and health and well-being. Still, there are some examples of educational programs focusing on these links, namely the proposal of a new concept of health literacy, Environmental Health Literacy (Finn and O'Fallon, 2017), and the framing of climate change teaching in a human health context (Adlong and Dietsch, 2015).

To overcome the disconnections between the impacts on ecosystem and the impacts on human health, a series of interventions were designed for schools, the Biodiversity Workshops (Campos and Fernandes, unpublished). The workshops were motivated by target 9 of the Sustainable Development Goal 3 (SDG 3, good health and well-being) that states that "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.", and aimed at raising awareness and influence individual, community and political actions to reduce the negative impacts of current production and consumption models on ecosystem and human health. Some emphasis was placed on recent environmental conflicts that took place mostly in Portugal but some worldwide concerns were also brought about during the presentations and debates. One of the most cited of such examples was the massive use of plastic materials, both at the individual level and by companies that pack all kinds of products that are consumed by citizens. The relationship between environmental problems and human health is complex and still to be fully understood. It can be approached by looking at the impacts of human activities over the environment, and related consequences, or by considering the effects of the environment on human health and well-being. This later case can be considered as an approach that integrates the determinants of human and ecosystem health. Viewing human health through this perspective includes debating issues underlying sustainable development, such as pollution, poverty, natural resources exploitation, food production, consumption habits or social justice.

The Biodiversity Workshops designed for this biodiversity and health education program consisted of a two-part session: a presentation and debate of the links between ecosystem disturbances (ecological risks) and human health risks, followed by a free reinterpretation of the concepts and examples discussed by students. These reinterpretations were made through stating behaviors that have negative impacts on ecosystems, from individual behaviors to complex and unsustainable production and consumptions patterns. In some cases students drew awareness posters. In others, they wrote small texts to illustrate particular cases of ecological and health risks. Other students worked on lists of negative actions or behaviors, which were further used to conduct small group discussion on how individuals and societies can exert active citizenship to foster individual and political changes and engage in social mobilization actions (Figure 1).

Figure 1: Examples of students' works produced during the Biodiversity Workshops.

Building on the concepts of "health literacy", "health empowerment", "social mobilization" and "education for sustainability" the sessions aimed at promoting critical thinking and awareness towards several hierarchies of behaviors leading to negative biodiversity and health consequences. These hierarchies went from individual, day-to-day, actions to corporate activities thus assuming different levels of public participation. As school students, they can become aware of biodiversity and health related issues and inspired to change lifestyle choices. But they can also serve as influential actors, by understanding problems and getting the familiar and social communities involved. Accordingly, after the initial presentation and debate, students were free to reinterpret and express their knowledge and understanding about - and also sensitivity towards - biodiversity-related problems by identifying specific actions, incidents and actors involved in biodiversity damages with potential and/or real impacts on human health and well-being.

In their reinterpretations of the topics discussed during the presentation and debate part of the workshops, many students chose to depict a healthy and an unhealthy environment side-by-

side, illustrating examples of biodiversity-related problems with potential impacts to human health. Younger students made posters and the eldest wrote down personal attitudes or corporative activities with potential negative consequences for biodiversity and human health (Figure 1). As expected due to a long term tradition of educational programs focused on recycling, namely in schools from the Eco-schools network, many students identified correct separation of waste for recycling as an important aspect to minimize any negative impact on the environment. Reducing the use of single-use plastic, preferring walking, biking or using public transportation instead of cars, especially in short commutes and eating vegetables from pesticide-free farms were among the most cited actions students could undertake. On a different level, the industrial pollution of air and water, the high dependency of petroleum-based fuel and forest fires were frequently cited examples of activities that induce environmental disturbances with potential health consequences.

Air pollution is a major factor negatively influencing the perceived sensation of well-being across Europe (European Social Survey, 2015). Accordingly, when asked to explain their drawings, students often highlighted the harmful consequences of industrial pollution and the benefits of moving for alternative sources of energy:

"If a factory does not have filters it will release a lot of smoke, which will harm the air, and will also harm the human being."

"Our drawing is based on a healthy environment where we drew trees, clouds, wind turbines, sheep and birds because we would like to have this environment and it is good for health."

Some students directly acknowledged the health impacts of environmental degradation:

"(…) because we continue to harm the environment, our health will deteriorate"

Interestingly, many students associated the environment to their mental health and well-being, emphasizing their sense of happiness when present in clean places and with high levels of biodiversity:

"We drew the lake because it has clean water and living beings. Roses because they live in a healthy environment. (…) the swing because children like to have fun. (…) Thus people are happier and having fun."

"Do not pollute and help the environment to be happy, because it also makes us happy."

"(…) a clean environment, to remind us that without Nature and the pleasant places we would be sick and without life. In a healthy environment we can play and feel happy at ease."

"The words Environment and Health to us mean that the healthy environment gives us health. This drawing contains a vegetable farm, flowers, a country house, a tree and a sun, because they are elements that make life healthier (…) and make us all happier."

As a side note, some students also used their drawings to acknowledge the importance of school on their education and their role as amplifiers of the new knowledge:

"(…) the school, a place where we learn not to pollute, to save and reuse water."

"We should all help the environment and spread the word."

This is a positive signal that schools can indeed help transform the public perception of the links between biodiversity health and human health, which ultimately may lead to informed and conscious actions towards sustainability. Indeed, a recent series of workshops directed to public school teachers in Brazil that dealt with consumption patterns (inspired in SDG 12,

responsible consumption and production) revealed that teachers are still not fully aware of the relevance of an integrated biodiversity and health approach framed on the 17 SDGs (Campos et al., in press; Campos et al., submitted). Thus, as defended by other authors (e.g. Adlong and Dietsch, 2015), these workshops illustrate that framing environmental degradation caused by human activities as a health problem can improve awareness to help inducing individual behavioral change (reviewed in Gray, 2018) and possibly lead to higher levels of social mobilization.

Behavioral change to vector-borne disease control and prevention

A successful health promotion program should contribute to engage and empower individuals and communities to use health knowledge to recognize health-related problems, and seek to contribute to a socially just world, considering countries and regions. This is of particular relevance with vulnerable groups or in cases where behavioral changes are essential to overcome critical health problems. One such case are rapidly spreading diseases, such as emerging infectious diseases, most of all vector-borne diseases, that need the commitment of the affected populations to implement successful eradication actions.

The impacts of global climate change on human health have been a major concern among scientists in the last years (e.g. Kim et al, 2014; Campbell-Lendrum et al, 2015; Ewing et al, 2016). There is now abundant information linking climate change with environmental disturbances that may disrupt the ecologic equilibria established between and among organisms and populations. Environmental disturbances can also have a great impact in the emergence and spread of infectious diseases (Sala et al, 2012; Kim et al, 2014). Even though non-climate factors such as worldwide travels and trades are also involved as drivers of disease, vector-borne diseases in particular are greatly influenced by climate change. Data from the World Health Organization (WHO, 2017) indicates that "vector-borne diseases account for more than 17% of all infection diseases and cause more than 700 000 deaths annually". Zika is an example of a recent vector-borne infectious disease that spread out of Africa and Asia to the Americas and Europe causing an outbreak with extended harmful consequences, particularly in newborns (WHO, 2016). The large outbreak of 2015 led WHO to declare Zika as a Public Health Emergency of International Concern in February of 2016. This newly reported infection probably originated through migratory movements of people between South America and the rest of the world, in particular Africa. One of the regions most affected by the 2015 outbreak was the Northeast part of Brazil.

Aedes spp. mosquitoes cause three diseases with high prevalence rate in Brazil: dengue, zika and chikungunya (Cardoso et al, 2015). All three diseases are considered global public health threats (Cardoso et al, 2015). Northeastern Brazil is an endemic region for both dengue and chikungunya and it was also the first region where a Zika outbreak was reported, in 2015 (Zanluca et al, 2015). The scientific and medical communities agree on the need to control the spread of the mosquitoes to eradicate *Aedes* spp.-borne infections. Even though long-term sustainable mosquito control programs are hard to implement, a basic step to prevent these diseases is to eliminate the access of the mosquito to water (Morrison et al, 2008). Since access to water is essential to the completion of the mosquito' life cycle, this step can lead to a successful elimination of the vector mosquitoes and thus eradicate the diseases in the affected areas. In fact, recent estimates of the relative contribution of different risk factors in the spread and local transmission of Zika virus suggest that local vector control is likely to be the most effective measure to reduce Zika virus transmission (Gardner et al, 2018). But this simple step is only effective if all member of the community take part in it. Thus, well-

organized health education and communication campaigns can play a fundamental role in promoting attitudinal changes in the population leading to sustained mosquito-control behaviors.

Strategies to reduce the proliferation of the disease focus greatly on health education interventions leading to improving health literacy and empowering affected communities to avoid and control the vector (WHO, 2017). In a broader definition of health literacy, being "health literate" also means being able to understand and communicate symptoms to health providers. This could potentially lead to early detection and treatment of the disease with minor future health problems; recognizing symptoms is also relevant to keep records of Zika virus cases updated which can also contribute to a better understanding of the infection and the dynamics of the virus distribution and transmission routes (Gardner et al, 2018). These were the premises to set a traditional puppet theatre (mamulengo theatre; Figure 2) script and an associated naive poetry narrative (cordel book): which diseases are associated with *Aedes* mosquitos, and what is their origin, symptoms, prevention and treatment (Campos and Araújo, 2017). Mamulengo and cordel are very popular in Northeast Brazil and both take advantage of a very informal and humoristic approach to create a dialogue with the audience based on attitudinal changes towards mosquito control actions.

To promote awareness that lead to behavioral change, the puppet theatre with the scientific content about *Aedes* spp.-borne infections was delivered in localities affected by these diseases, in the semiarid part of Northeast Brazil, and the activities took place preferentially in a public space, targeting the entire community (Campos and Araújo, 2017). Being used as an educational and communication resource, the scientific contents play a secondary role since the audience focus on the movements of the puppets. The puppets thus serve as role models and the audience expresses their empathy towards both the puppets and their behaviors. The accompanying poetry in the cordel book reinforces the theatre narrative.

Figure 2: A mamulengo puppet used in a health education program.

The potential interest and effectiveness of the puppet theatre and the book was evaluated through observation and the preliminary results are very promising: the audience spontaneously participated in the activities, in the sense that several members of the public engaged in a parallel discussion about the topics addressed. They expressed their agreement or disagreement to the attitudes of the puppets and shared their own personal experiences of dealing with Zika control and prevention and infection events (Campos and Araújo, 2017).

These results illustrate how health education can assume somewhat unexpected formats with promising results for social mobilization towards a common goal (in this case, to control mosquitoes, prevent new infections and identify early symptoms of the disease). However, as in other examples of health and environmental education, the real effectiveness of these activities can only be measured on the long-term (reviewed in Gray, 2018); in this case, using measures of mosquito demographics and of new Zika infections cases.

Conclusions and future directions

Health education has a long-term tradition of ambitioning the promotion of health and the prevention of disease. While historically organized to communicate information to the public, health education campaigns are now committed to hear the individuals and communities on their health related concerns and habits, and promote their skills to take control over health, ultimately leading to increased health literacy and individual and social empowerment and change (Wallerstein and Bernstein, 1988; Nutbeam, 2000; Sørensen et al, 2012). But in a decade of profound environmental changes that directly and indirectly impact human health and well-being, health education programs should also include the biodiversity dimension when addressing health. Such ecosystem approach to human health has been used on the construction of a relatively new discipline, or sub discipline, named Environmental Health Literacy (Finn and O'Fallon, 2017).

Building on key aspects of the link between biodiversity and the health of the environment and human health and well-being, Environmental Health Literacy merges different sources of knowledge to promote education for sustainability for individuals and communities and social mobilization regarding health. Thus, working with different actors using such an ecosystem approach to health can have important outcomes, from individual awareness for behavioral change to social mobilization around health-related problems.

As human populations continue to grow and environmental threats continue to increase, there will be an increased pressure to promote social mobilization and involve the community in the discussion around topics traditionally not associated to human health, such as the biodiversity crisis, land use, soil, water and air pollution, food production and/or waste disposal, risks and uncertainties regarding technological risks, hazardous chemicals production and consumption. This is a way for individuals and societies exert active citizenship to foster individual and political changes and engage in social mobilization actions.

These new approaches to address human health and health education are gaining interest but need the contribution of researchers and professionals from different fields, such as the natural and life sciences, social sciences and humanities, and narrowing the gap between the different actors and stakeholders involved (Stone-Jovicich et al, 2018).

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Climate Change and Health
Hazardous Chemicals and Air, Water and Soil Pollution and Contamination
One health

Public health
Health promotion

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