DOI: 10.1590/1413-81232015213.26852015

Environmental Education as a social mobilization strategy to face water scarcity

Andrezza de Souza Piccoli [1]
Débora Cynamon Kligerman [1]
Simone Cynamon Cohen [1]
Rafaela Facchetti Assumpção [1]

Abstract *Article 225 of the Brazilian Constitution establishes that all citizens have the right to an ecologically balanced environment, as a common good that is essential for a healthy life, and that the government and society have the duty to protect and preserve the environment for present and future generations. This article outlines a methodology for promoting social mobilization to address water scarcity developed under the National Environmental Education and Social Mobilization for Sanitation Program (PEAMSS, acronym in Portuguese). The main aim of this article is to show the importance of education as a driving force for empowerment for water resources management. It outlines the main concepts of emancipatory environmental education and then goes on to describe the elaboration of a PEAMMS action plan. It concludes that the universalization of the right to safe and clean drinking water and access to sanitation is only possible through democratic and participatory water resources management. Actions are necessary to evaluate the reach of the PEAMSS and define the way ahead for the program.*

Key words *Environmental education, Public participation, Water resources, Sanitation, Public Health*

[1] Escola Nacional de Saúde Pública Sérgio Arouca, Departamento de Saneamento e Saúde Ambiental, Fiocruz. Rua Leopoldo Bulhões, 1480, Manguinhos. 21041-210. Rio de Janeiro RJ Brasil. andrezzapiccoli@yahoo.com.br

Introduction

Water is an essential element, without which life as we know it would not exist. On our planet, known as "Planet Water", approximately 97% of water is salt water, 2.493% is in glaciers or underground regions that are difficult to access, and only 0.007% is fresh and available in rivers, lakes and the atmosphere[1].

However, 900 million people on "Planet Water" do not have access to safe drinking water and 2.6 billion people - 40% of the world's population - do not have access to basic sanitation facilities. This situation led the United Nations (UN) to recognize access to clean water and sanitation as a human right that crucial for achieving the Millennium Development Goals[2].

On 30 September 2010, the UN approved two important resolutions: Resolution 15/9[3], which recognizes the right to safe and clean drinking water; and Resolution 64/292[4], which affirms the right of access to sanitation. Both resolutions stress that this right is inextricably linked to the right to health and a dignified life. Freshwater resources are therefore regarded as common heritage. The right to clean and safe water depends on access to adequate sanitation facilities.

The UN report titled, Water for a Sustainable World[5], suggests that the following factors affect the quality and availability of water resources: (1) population growth, (2) urbanization, (3) food and energy security policies, and (4) macro-economic processes such as trade globalization, changing diets and increasing consumption. The report also highlights that persistent poverty, inequitable access to water and sanitation services, inadequate financing, and deficient information about the state of water resources, their use and management impose further constraints on water resources management and its ability to help achieve sustainable development objectives[5].

Based on the above aspects, the water resource situation in Brazil is not optimistic. The national distribution of water resources is immensely unequal: 70% of Brazil's water resources are located in the North Region, which accounts for only 7% the country's population, while 6% are located in the Southwest Region and 3.3% in the Northeast Region, which contain 42.63% and 28.91% of the country's population, respectively. In other words, 93% of the population has access to only 30% of the country's water resources. Between 40 and 60% of treated water is wasted on its way to homes due to old pipes, leaks, illegal diversions and obsolete technology[6]. The current state of environmental degradation and scarcity is due to the relationship between societal actors and water resources throughout the Brazilian territory. To overcome this situation, it is necessary to promote decentralization and enhance public participation in the political-administrative arena and decision-making to ensure that policies reflect local concerns[7].

Environmental management processes require a participatory approach. Water should not be seen only as a strategic natural resource for capitalist production, where the private sector is favored over the public sector and community. It is crucially important to ensure effective public participation in water resource management[8].

With this in mind, a number of regulatory instruments have been have been developed by the Brazilian government. The National Water Resources Policy (Law 9.433/97[9]) created national and state water plans to promote integrated water resources management, providing for the collective management of the country's watersheds by Watershed Committees[1], where collective interests are favored over private interests.

Furthermore, Resolution Nº 98 of 2009 of the National Water Resources Council (*Conselho Nacional de Recursos Hídricos* - CNRH)[10], established the principles, foundations and guidelines for education, capacity building, social mobilization and dissemination of information related to integrated water resources management under the National Water Resources Management System (*Sistema Nacional de Gerenciamento de Recursos Hídricos* - SINGREH). The resolution outlines the basic pillars and principles of the system, guided by reflection on values, habits and attitudes, mediated through dialogue between the entities that make up the SINGREH and civil society, thus enhancing public participation in water resources management[10].

In this context, the notion of integrated management takes on new dimensions that range from respect and comprehensive knowledge of the water cycle, water conservation and the interrelationship between water and ecosystems, to the joint management of water by government, users and the local population[11].

Effective public participation is only possible by empowering civil society and mobilizing citizens around the importance of water and sanitation. Education is a powerful mechanism for promoting this process and a driving force for social mobilization and enhancing public participation in water resource management: a civil society that is informed, and actively demands its

Ciência & Saúde Coletiva, 21(3):797-808, 2016

rights, and has the ability to reflect critically and observe and fulfill its duty to promote sustainability and not to degrade the environment and waste natural resources.

The National Environmental Education and Social Mobilization for Sanitation Program (*o Programa Nacional de Educação Ambiental e Mobilização Social em Saneamento* -PEAMSS)[12] and the PEAMSS methodological handbook[12] are powerful instruments for ensuring the practical application of the legal requirements outlined above and fulfillment of human rights recognized by the UN. Environmental education is an instrument for promoting and enhancing citizen participation, through stimulating critical awareness in the search to safeguard everybody's rights.

This article outlines a methodology for promoting social mobilization to address the issue of water scarcity developed under the PEAMSS[12]. It is important to note that three of the authors of this article participated in the PEAMSS elaboration process. Therefore this article is not a simple summary of the application of the PEAMSS methodological handbook, but also suggests actions that may be adopted to promote social mobilization to produce a strategic plan for coping with water scarcity, drawing on main themes contained in the framework of the PEAMSS, and using environmental education for sanitation as the central pillar of the process. This article is therefore particularly relevant since it outlines a practical social mobilization tool that demonstrates the linkages between environmental sanitation and health, public participation and water quality.

With this in mind, this article is structured as follows: the first section outlines the main concepts of emancipatory environmental education for promoting collective critical reflection; the following section provides a summary of the PEAMSS elaboration process[12]; the third section describes the process involved in producing a social mobilization action plan for coping with water scarcity; and conclusions and final considerations.

Environmental education and the debate between emancipation and participation

Education is much more than the mere transfer of knowledge. It is socialization within different spaces, diverse contexts, considering the culture and specificities of each social group. Education can be understood as a set of actions, processes, influences, and structures that intervene in the human development of individuals and groups in their active relationship with the natural and social environment in a given context of relationships between groups and social classes[13].

The National Environmental Education Policy (*Política Nacional de Educação Ambiental* - PNEA), created by Law 9.795/99[14], describes environmental education as the process through which individuals and society build social values, knowledge, skills, attitudes and abilities directed towards the conservation of the environment, a common good that is essential to quality of life and sustainability. It is an essential element of the national education system, and should be promoted in a coordinated and integrated manner, at all levels and modalities of the formal and informal educational systems.

A strictly naturalistic approach, consisting of individualized activities and actions and awareness raising, is not in line with the concept of environmental education adopted by the PNEA. For a long time it was believed that raising awareness among people, restoring the relationship between man and nature, and encouraging its protection[15] was enough to promote effective environmental decision-making. The depletion of the natural resources, degradation of environment and rampant consumerism require educational approaches that seek to change the relationship between society and Nature, grounded in Paulo Freire's progressive liberating pedagogy (*pedagogia progressista libertadora*), where education is a political act through which the learner intervenes in the world, and which involves not only knowledge of subjects that are well or badly taught/learnt, but also the reproduction of the dominant ideology and its unmasking[16].

Emancipatory, transformative, critical and popular environmental education seeks to create linkages between all levels and modalities of the formal and informal environmental education process, and promote the discussion, understanding, *problemization*, and incorporation of worldviews into the social fabric and its symbolic and material manifestations[17], placing man and nature on an equal footing and recognizing the interrelationships that need to be created to establish a balance between these two dimensions.

Within this approach, knowledge building is a collective and political process involving the problematization of reality through actions that seek to reverse the logic of capital and commodification of everything. The individual develops the capacity to build decision-making skills, always *with* the other, when he/she takes a dialogical approach, understanding that he/she can-

not think for others or without others, nor can others think for him/her. Education occurs with the *other*, who is also a subject with his/her own identity and individuality who should be respected during the process of questioning behaviors and reality[18].

The interface between environmental education, public health and water resources management occurs within this context, given that education is one of the structural elements of health promotion and should be guided by actions that condition, determine and positively influence quality of life and based on a participatory approach.

Experiences of participatory management of natural resources in Brazil, such as Advisory Councils and Watershed Committees, and even the requirement of effective participation in the elaboration of Local Basic Sanitation Plans, may be cited as examples. However, it is urgent to reflect on how much these spaces really facilitate the effective participation and joint action of actors – managers, experts and societal – to address sanitation issues, particularly water resources management.

Public participation must be built collectively, defining and reaffirming its political role, and oriented towards mobilization and actions carried out by different social forces[19]. It is essentially a process of empowerment, whereby people and groups seize power for themselves and are driven to improve their living conditions, increasing their autonomy and enabling themselves to effectively participate in decision making[20]. Education becomes part of this process when it questions *how* to achieve this, and *how* to make empowerment possible and strengthen subjects in spaces and/or sectors where participation is urgent and necessary.

The methodology designed for the PEAMSS[12] is participative in that it enables empowerment and increased individual autonomy and group autonomy in interpersonal and institutional relations, principally among individuals and social groups subjected to oppression, discrimination and social domination in a context of social change and political development. It promotes equity and quality of life through mutual support, cooperation, self-management and participation in autonomous social movements and participation in autonomous social movements, using nontraditional learning and teaching practices to develop critical awareness[12].

The National Environmental Education and Social Mobilization for Sanitation Program: proposal and main products

This section provides a synthesis of the PEAMSS elaboration process[12] and outlines its main products, weaknesses and opportunities from the authors' point of view to aid understanding.

The program is the fruit of joint efforts of the Ministry of Cities, Environment Ministry, Education Ministry, Ministry of National Integration, the National Health Foundation (*Fundação Nacional de Health* – Funasa) of the Health Ministry, the Osvaldo Cruz Foundation (Fiocruz) and the government-owned bank *Caixa Econômica Federal*[12].

The National Secretariat of Environmental Sanitation of the Ministry of Cities created the Environmental Education for Sanitation Working Group in 2006, made up of representatives and activists of all sectors concerned with environmental education and social mobilization for sanitation, to promote the collective development of the PEAMSS guidelines. A call for proposals for best practices in environmental education for sanitation was launched, which resulted in the selection of 25 practices – five from each region of the country. These practices were presented and debated in workshops, called "Environmental Education and Social Mobilization for Sanitation Observatories"[21], held in each region to promote the collective development of the PEAMSS guidelines. After this stage, face-to-face and virtual forums were held to consolidate, disseminate and validate the documents elaborated during the debates and focus group discussions. The process culminated in a National Seminar held in Brasília to collectively elaborate the PEAMSS guidelines in the form of a preliminary document.

The program, structured over a period of three years, is implemented using the "Methodological Handbook of Environmental Education and Social Mobilization for Sanitation"[12]. This handbook explains how to collectively undertake a participatory appraisal for decision making in a given region to orient the participatory decision -making process. The action plan is structured around five pillars: (1) the importance of public participation and community organization; (2) participatory appraisal planning; (3) a participatory intervention plan; (4) the monitoring and evaluation process; and (5) systematization.

The program therefore inverts the logic of one-off, isolated actions, tackling strategic issues

by enabling a systemic understanding of environmental sanitation and the development of educational actions based on effective participation[12]. The guidelines established by the PEAMSS centre around community engagement and public participation, the possibility of articulation, emphasis on the local level, the dimensions of sustainability, respect to local culture and the use of sustainable social technologies[12].

Other products of the process apart from the Methodological Handbook include the Environmental Education and Social Mobilization for Sanitation Manual[22], which explains the proposal of the Methodological Handbook and the different forms of community participation, and an interinstitutional video[23], which outlines the PEAMSS elaboration process.

It is important to note that the Methodological Handbook was published in 2009. However, the integration between ministries that occurred during the PEAMSS elaboration process lacked continuity, and integrated actions are currently restricted to the Watershed Committees, Local Sanitation Plan elaboration groups, and Local Master Plan Committees. It is therefore necessary to understand how the program structuring process contributed towards the development of participatory actions and social mobilization. A brief search of the internet reveals examples of social mobilization for sanitation in various cities in Brazil where the focus is public participation. However, these actions do not formally mention the use of the PEAMSS as a conceptual framework.

Data that shows the continuity of actions after the implementation of the program and what initiatives were taken by ministries to effectively consolidate the proposal through public participation and social mobilization, and whether these initiatives were intersectoral, is not available. The Department of Sanitation and Environmental Health of the National School of Public Health (*Escola Nacional de Saúde Pública* – ENSP) is conducting research to highlight such weaknesses and provide recommendations for retaking this process. Its post graduation courses also include a module on the use of the PEAMSS Methodological Handbook[12] to develop potential Local Sanitation Plans.

The article *A política federal de sanitation básico e as iniciativas de participation, mobilização, controle social, education em health e ambiental nos programas governamentais de sanitation* (National Basic Sanitation Policy and Participation, Mobilization, and Health and Environmental Education in Government Sanitation Programs), produced by Moises et al., has disseminated the PEAMSS elaboration process both nationally and internationally[24]. This work describes the obstacles faced during the PEAMSS elaboration process as recounted by managers, technicians, educators, communities and other representatives, including lack of capacity to participate in projects that foster broad participation due to lack of familiarity with the approach, and the lack and/or inefficient use of financial resources for social mobilization projects. Many of the practitioners had misconceptions of environmental education and social mobilization, and certain challenges must be overcome to ensure effective public participation in water resource management[24].

The action plan

This section outlines an action plan for addressing water scarcity. It is important to highlight that this proposal is founded on the PEAMSS and the system's main methodological tool, the Methodological Handbook of Environmental Education and Social Mobilization for Sanitation[12]. The suggestions and opportunities highlighted here are not a simple recipe for addressing this issue, and the way they are implemented will depend upon the dynamics and reality of the region and its strengths and weaknesses.

To start work, it is important that the community meets and organizes itself to identify the social actors in the region and create a working group made up of intersectoral committees and their community leaders, organized civil society, formal and informal public and private organizations, social movements, and practitioners who develop activities in the region. The process is structured around three stages: a) information gathering and scenario identification; b) systematization of information; and c) information sharing.

Information gathering and scenario identification is based on main themes related to water scarcity and other related issues. The PEAMSS methodological handbook[12] suggests that these main themes should be chosen based on their relevance to environmental education and sanitation issues. Here, seven main themes are suggested considering the determinants of water scarcity[5]; however, these themes may be reconstructed depending on, and to adapt to, the specific needs of each region.

To obtain more in-depth knowledge during this stage, it is necessary to make collective field visits to understand the local reality and observe and note the aspects related to water scarcity. Figure 1 shows possible themes related to this issue:

These themes are then developed through informal conversations in the field, formal and informal meetings, and conversation circles, thus promoting community debate. The process aims to foster reflection upon "what needs to be known" by using guiding questions elaborated by the working group based on local reality and the focus of the appraisal.

The following are suggested guiding questions related to water scarcity for each main theme presented in Figure 1 that could be considered part of the guiding thread of the PEAMSS.

The guiding questions suggested for the first main theme – *the current status of households in the community in relation to water infrastructure* – include: What is the type of water source? (public water supply network, well, source or spring); What is the frequency of water supply (every day, once a week, once every 15 days, etc)? How often does it rain? Is rainwater harvested? Is there a water course close to the community (river, lake, pond)? How much water do you use?

This exercise provides an idea as to whether the water supply meets the demands of the community. In regions with permanent water scarcity, such as semi-arid regions, it is necessary to outline the main weaknesses and identify coping strategies.

Lack of infrastructure for water supply and treatment for human consumption is directly related to social impacts and directly affects local ecosystems and the health of the local population. When these issues are observed in the field within a dialogic relationship with local residents it is possible to obtain a more accurate picture of the dimensions of the problem.

The second main theme is *the current status of households in the community in relation to public policy and social programs*. It is important to determine whether the community is included in a social program or contemplated by a public policy. Questions may include: What knowledge does the community have of the Local Sanitation Plan? And of Agenda 21? Are programs such as *Com-Vidas, Coletivo Jovem de Meio Ambiente and Sala-verde* present in the region? Is there a university close by? Does it hold extension courses? Are there any NGOs working in their community? Are there any government programs in the community, such as *Prowater and ProSanear*?

Based on the initial appraisal and the observations of local residents and/or the working group, it is possible to determine whether there is any integration between current programs and policies in the community.

The third theme is *what is the current status of the community in relation to effective public participation in water resource management?* This should be analyzed in terms of the elaboration, implementation and monitoring and evaluation of public policies and social programs in the community. Is there a public participation committee or forum in the community? How are the members of these groups elected? Does the government consider community demands

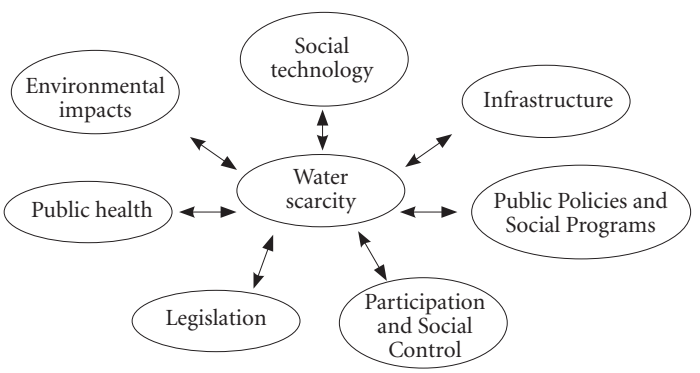

Figure 1. Main themes associated with water scarcity.

Source: the authors.

before implementing public policies? Does the community participate in a Watershed Committee? What are the main communication channels in the community (radio, newspapers, etc)? Is the community involved in the control and monitoring of the local government budget?

These types of questions help to empower the community, and lead to increased awareness of the importance of access to clean water and contributes towards decreasing the incidence of waterborne diseases. The foundation of public participation and access to clean water is the product of addressing water access issues and the right of every citizen.

The fourth main theme – *the current status of the community in relation to legislation* – is the foundation of effective public participation in water resource management. The National Sanitation Policy (Law 11.445/2007[25]) is a milestone for society; however, there is a distinct lack of knowledge of this policy among the majority of the Brazilian population. Questions include: does the community have any knowledge of sanitation legislation? Is the community aware of its rights and duties in relation to water? How does Law 11.445 address the water issue? Are the provisions of Law 11.445 concerning water implemented in the community? Has the Local Sanitation Plan elaboration process been initiated? Has the local community been informed of environmental laws? Effective public participation depends on each citizen meeting their duty to understand these and other laws and know their rights so that they can make demands of the government.

The fifth main theme – *the current status of the community in relation to public health* – is guided by the following questions: Has some kind of survey of the main diseases in the community been undertaken? Are these diseases associated with poor water quality and/or insufficient water supply? Are there health centers close to the community? What are the most frequently registered diseases in the health centers that provide care to the community? Do health agents visit households? Is there a special health program to address water-related diseases?

Health promotion in the community should involve the identification of risk factors associated with poor water quality and/or insufficient water supply to mobilize the community to demand that the government fulfills the right to safe and clean drinking water by developing adequate sanitation infrastructure.

The sixth theme – *current status of households in the community in relation to environmental impacts* – addresses adverse environmental and health impacts: Does the water supply come from a well? Is the quality of the water used by the community monitored? Is the water contaminated by sewage? Does it rain a lot in the region? Are there droughts in the region? What are the main impacts of droughts in the region?

Raising community awareness of existing water supply infrastructure and whether minimum standards for water quality are met is key to the social mobilization process. Knowing whether the source of the water supply in the community is a well and whether there are septic tanks built close to this source which could potentially contaminate the water is a key step. On the other hand, a number of communities are located in areas that are legally protected and do not benefit from adequate sanitation infrastructure and thus can potentially contaminate the water resources.

The seventh theme is *the current status of households in the community in relation to social technology*. Questions should include: is there any record of sanitation infrastructure solutions developed by within the community? Are technical solutions discussed? Are there any education institutions in the community? Is there any research on appropriate technical solutions in the community? Is the community interested in seeking more appropriate sanitation solutions?

Acknowledging, understanding and disseminating the use of traditional knowledge in addressing environmental problems is a key part of the social mobilization process. When we think of sanitation infrastructure we often imagine large-scale projects; however, many local problems can be resolved through the implementation of decentralized and technically, culturally and socially appropriate solutions.

After information gathering and scenario identification, it is necessary to systemize the information to facilitate understanding and define priority issues and necessary solutions. The methodology suggested for this stage of the process is the elaboration of a Problem Tree (*Rede de Desafios*). This stage may comprise debates, meetings and workshops with local residents held in the community, drawing on the observations made in the field by the working group.

The Problem Tree is elaborated by identifying the linkages between the problems raised during the process. Figure 2 illustrates the process using

the following example: "water scarcity in the semi-arid region creates the need to travel further from home to fetch water in ponds or pools which may be contaminated due to lack of sewage infrastructure, thus increasing the incidence of diarrhea in the community".

It can be noted in this example that the sequence of problems generates the answer to the main themes: infrastructure (lack of a water supply network), public policy and social program (lack of government programs in the community), public participation (lack of a committee in the community to demand improvements in the water supply), legislation (lack of knowledge regarding Law 11.445/2007[25] and the right to a sufficient supply of safe and clean drinking water, and the lack of a Local Sanitation Plan), public health (increase in the incidence of diarrhea or other waterborne diseases), environmental impacts (contamination of water resources with sewage), and social technology (lack of the use of rainwater harvesting tanks, water filters and knowledge that water should be boiled in the community). It is also important to note that each "problem" can generate other trees.

The cause and possible solutions of the problem raised are discussed with the community in order to define possible actions. The information generated should be shared through existing communication channels in the community and meetings should be organized to plan community-based interventions.

Community-based interventions should be planned using workshops, meetings and/or conversation circles attended by organized civil society, government, schools, universities, watershed committees, the private sector and other local organizations, to discuss the priorities and problems raised by the appraisal and the measures that should be taken in the region to address the problems such as: social mobilization; communication; training and social technologies. It important to remember that there is no exhaustive list of possible actions. The reality of each region and local knowledge will inform and determine the local action plan. Based on the above example, Chart 1 shows a Plan for Community Intervention in Environmental Education Actions.

After the elaboration of the intervention plan together with the community, it is necessary to select and/or elaborate indicators to evaluate the appraisal process and/or the implementation of the plan. If this evaluation shows that performance is weak, it will be necessary to review the actions.

The final stage is the systematization of the whole process. In this stage, mechanisms such as websites, social networks, newspaper, local radio and periodical meetings should be used to make the material produced during the process available to the community so that it can provide feedback. At the end of the process, the main legacy of the do PEAMSS is the independence and self-sufficiency of the community in demanding its rights and evaluating to what extent these rights are met.

Final considerations

Historically, water scarcity in Brazil has been most prominent in inland areas, particularly in the semi-arid region in the Northeast Region of the country. However, the inefficient management of water resources has meant that regions such as the Southeast, in high-income states, are suffering from water scarcity. This problem requires a change in approach to the management of water resources and economic investment in the most affected municipalities that meets the demands of society.

It is necessary to acknowledge natural resources as common heritage in a pluralistic and culturally diverse society, and it is therefore fun-

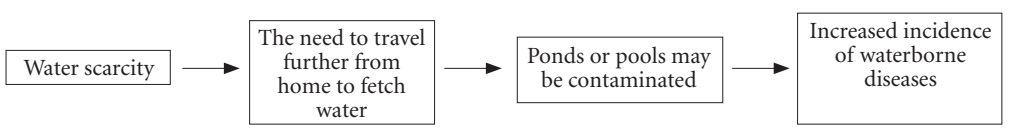

Figure 2. Illustration of the problem tree process in relation to coping with water scarcity.

Source: the authors.

Ciência & Saúde Coletiva, 21(3):797-808, 2016

Chart 1. Plan for Community Intervention in Environmental Education Actions.

Problem	Actions			
	Social mobilization	**Communication**	**Training**	**Social technology**
The need to travel further from home to fetch water	Organize a community committee to negotiate water supply interventions with the government.	Produce pamphlets and adverts in newspapers and on community radios inviting the community to participate in meetings and to organize the community to pressure the government to develop water supply infrastructure. Produce videos in the community showing people making statements about the lack of water to present in the workshops and publish in social networks.	Identify teachers and professors from local education institutions who can give workshops about water-related issues. Identify people in the community who can participate and help in activities related to water supply (builders, plumbers, etc.)	Map relevant technologies in the region together with local universities, NGOs, technical colleges, and researchers. Rainwater harvesting tanks, use of reclaimed water, etc.
Ponds or pools may be contaminated	Create a committee to visit relevant education institutions and/ or water treatment plants to research techniques for purifying water.	Produce pamphlets and other material about safe techniques for purifying water.	Hold workshops and practical activities in the region related to water quality. Hand washing techniques, cleaning of water tanks, techniques for washing and disinfecting food products, etc.	Map water filters and other water purification tools in the region together with local universities, NGOs, technical colleges, and researchers.
Increased incidence of waterborne diseases	Organize a working group and committee to visit relevant education institutions to discuss the causes of waterborne diseases and prevention measures.	Produce pamphlets and other material showing waterborne disease infection cycles prevention measures.	Identify teachers and researchers who work with water quality monitoring and who can give talks in the community.	Map ways of reducing the transmission of waterborne diseases (such as boiling water, disinfecting food products with chlorine, etc) in the region together with local universities, NGOs, etc.

Source: the authors.

damental that environmental management is based on a participatory approach which ensures effective public participation in water resource management. Water must be at the top of the public policy and social agenda to ensure effective, democratic and participatory water governance.

Experiences of participatory management in Brazil, in the form of Advisory Councils, Water-

shed Committees, participatory budgeting, and the requirement of effective participation in the elaboration of Local Basic Sanitation Plans, are important spaces for the effective coordination of joint actions involving a broad range of actors. Societal actors must be able to effectively express themselves and be equipped with the necessary tools to claim their rights, while traditional knowledge should be integrated with other types of knowledge to strengthen local knowledge networks and guide government decision making. The National Water Resources Council Resolution 98/2009[10] provides that education and social mobilization should promote reflection and raise awareness of sustainability issues, equity and respect for life, with a humanistic and dialogical focus, thus enhancing participation in the democratic management of water[10].

This resolution is therefore in line with the basic principles of the PEAMSS[12], which proposes a methodology for environmental education for sanitation whose main tool is social mobilization. Collective construction processes involving strategic actors ensure that collective interests are favored over private interests and are essential to improving water and sanitation services in ways that meet specific local needs and improve the health of the local population.

The universalization of the right to safe and clean drinking water and access to sanitation is only possible through social mobilization and environmental education mediated by an organized and informed civil society that actively demands its rights and has the ability to reflect critically in order to observe, control, monitor and fulfill its duty not to degrade the environment and waste natural resources.

Recommendations

It is suggested that the Ministry of Cities should ensure the continuity of this work by, for example, increasing the frequency of calls for proposals for the dissemination of successful experiences in education and social mobilization for sanitation. Furthermore, it is important to hold a workshop in 2016 to reactivate the working group that participated in the PEAMSS elaboration process and evaluate the reach of the PEAMSS, the extent to which it is being incorporated into interministerial actions, and define the way ahead for the program.

Collaborations

AS Piccoli, DC Kligerman, SC Cohen e RF Assumpção participated equally in the conception and revision of this article.

Aknowledgments

The financial support of the Academic Excellence Program of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior 2015 / 2016 (PROEX - CAPES) of the Programa de Pós Graduação em Saúde Pública da ENSP.

References

1. Machado CJS. Recursos Hídricos e Cidadania no Brasil: Recursos Hídricos e Cidadania no Brasil: Recursos Hídricos e Cidadania no Brasil: Limites, Alternativas e Desafio. *Ambient Soc* 2003; 6(2):121-136.
2. Organização das Nações Unidas. Programa da Década da Água da ONU-Água sobre Advocacia e Comunicação (UNW-DPAC). *O Direito Humano à Água e Saneamento: Comunicado aos Media.* [acessado 2015 jul 12]: [8 p]. Disponível em: http://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_media_brief_por.pdf
3. United Nations (UN). Human Rights Council. UN Resolution 15/9. *Human rights and access to safe drinking water and sanitation*. Washington: UN; 2010.
4. United Nations (UN). UN Resolution 64/292. *The human right to water and sanitation*; 2010. Washington: UN; 2010.
5. United Nations. United Nations World Water Assessment Programme. The United Nations World Water Development Report 2015. *Water for a sustainable world.* [acessado 2015 dez 07]: [122 p]. Disponível em: http://unesdoc.unesco.org/images/0023/002318/231823E.pdf
6. Machado CJS. Descrição e análise das relações entre gestão de água doce e exercício da cidadania no Brasil contemporâneo. In: Minayo MCS, Coimbra Júnior CEA, organizadores. *Críticas e atuantes: ciências sociais e humanas em saúde na América Latina*. Rio de Janeiro: Editora Fiocruz; 2005. p. 551-566.
7. Machado CJS, organizador. *Gestão de Água Doce: Usos Múltiplos, Políticas Públicas e Exercício da Cidadania no Brasil.* Rio de Janeiro: EdUERJ; 2002.
8. Wolkmer AC, Augustin S, Wolkmer MFS. O "Novo" Direito à Água no Constitucionalismo da América Latina. *Rev Int Interdisc INTERthesis* 2012; 9(1):51-69.
9. Brasil. Ministério do Meio Ambiente, dos Recursos Hídricos e da Amazônia Legal (MMA). Secretaria dos Recursos Hídricos. *Política Nacional de Recursos Hídricos.* Brasília: MMA; 1997.
10. Brasil. Resolução CNRH nº 98, de 26 de março de 2009. Estabelece princípios, fundamentos e diretrizes para a educação, o desenvolvimento de capacidades, a mobilização social e a informação para a Gestão Integrada de Recursos Hídricos no Sistema Nacional de Gerenciamento de Recursos Hídricos. *Diário Oficial da União* 2005; 30 jul.
11. Brasil. Ministério da Saúde (MS). Fundação Nacional de Saúde. *Manual de Saneamento.* Brasília: MS; 1998.
12. Brasil. Ministério das Cidades. Secretaria Nacional de Saneamento Ambiental. Programa de Educação Ambiental e Mobilização Social em Saneamento. *Caderno metodológico para ações de educação ambiental e mobilização social em saneamento.* Brasília: Ministério das Cidades; 2009.
13. Libâneo JC. *Pedagogia e pedagogos, para quê?* São Paulo: Cortez; 2000.
14. Brasil. Lei nº 9.795, de 27 de abril de1999. Dispõe sobre a Educação Ambiental, institui a Política Nacional de Educação Ambiental e dá outras providências. *Diário Oficial da União* 1999; 28 abr.

15. Saito CH. Política Nacional de Educação Ambiental e Construção da Cidadania: Desafios Contemporâneos. In: Rusheinsky A, organizador. *Educação ambiental: abordagens múltiplas.* Porto Alegre: Artmed; 2002. p. 47-72.
16. Freire P. *Pedagogia da Autonomia: Saberes necessários à prática educativa.* Rio de Janeiro: Paz e Terra; 2013.
17. Barcelos V. *Educação Ambiental: Sobre Princípios, Metodologias e Atitudes.* Petrópolis: Vozes; 2012.
18. Loureiro CF. *Trajetórias e Fundamentos em Educação Ambiental.* São Paulo: Cortez; 2012.
19. Valla VV. Sobre participação popular: Uma questão de perspectiva. *Cad Saude Publica* 1998b; 14(Sup. 2):7-18.
20. Kleba ME, Wendausen A. Empoderamento: processo de fortalecimento dos sujeitos nos espaços de participação social e democratização política. *Saude Soc* 2009; 18(4):733-743.
21. Brasil. Ministério das Cidades. *Relatório Final das Oficinas: Observatórios de Educação Ambiental e Mobilização Social para o Saneamento com vistas à construção coletiva das diretrizes do PEAMSS.* Brasília: Ministério das Cidades; 2006.
22. Brasil. Ministério das Cidades. Secretaria nacional de Saneamento Ambiental. Programa de Educação Ambiental e Mobilização Social em Saneamento. *Cartilha Educação ambiental e mobilização social em saneamento.* Brasília: Ministério das Cidades; 2009.
23. Brasil. Ministério das Cidades. Secretaria nacional de Saneamento Ambiental. Programa de Educação Ambiental e Mobilização Social em Saneamento. *Vídeo interinstitucional do Programa de Educação Ambiental e Mobilização Social em Saneamento.* [acessado 2015 dez 7]. Disponível em: https://www.youtube.com/watch?-v=TysTvLko8zw
24. Moises M, Kligerman DC, Cohen SC, Monteiro, SCF. A política federal de saneamento básico e as iniciativas de participação, mobilização, controle social, educação em saúde e ambiental nos programas governamentais de saneamento. *Cien Saude Colet* 2010; 15(5):2581-2591.
25. Brasil. Lei nº 11.445, de 5 de janeiro de 2007. Estabelece diretrizes nacionais para o saneamento básico e para a política federal de saneamento básico. *Diário Oficial da União* 2007; 8 jan.

Article submitted 15/08/2015
Approved 04/12/2015
Final version submitted 16/12/2015