Communicating environmental risks as a long-term policy

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Abstract

Risk communication is an emerging area of social sciences aimed to produce the means for society to actively participate of any process of prevention or attenuation of hazardous situations for living beings. It provides guidelines and strategic tools for scientists to deal with the media and to build up a confident atmosphere with other social actors in the risk management arena. A case study was carried out in the Ribeira Valley, southeastern Brazil, where environmental and human contamination for lead originated from a metal smelter had been previously investigated. Following the divulgation of these facts by the media in 2001, several negative effects such as;

press sensationalism, stigmatization of residents, devaluation of local production, discontinuation of assistance by institutions and authorities and considerable delay of environmental intervention actions were observed. The present study that included the analysis of articles published at that time and interviews of local residents, authorities, scientists and journalists, clearly indicated that the lack of a risk communication plan made the relationships between scientists and community uncomfortable and discouraged public participation in the subsequent phases of risk management. For comparison, another event of lead contamination originated from a battery factory in the Bauru city, in 2002, was examined. In this case, a constructive involvement of the media and a better perception of the risk by local residents were found to be due to a successful risk communication strategy. These case studies highlight problems and solutions commonly faced by scientists in other contexts, e.g. natural disasters, environmental and climate hazards and major catastrophes, where a dialogue between society and government is crucial to attenuate risk situations. Risk communication should be incorporated as a long-term policy of governmental institutions to assure a positive relationship with the media and communities when dealing with environmental and public health issues.

Introduction

The vulnerability of societies concerning the risks in their daily lives requires a new approach of managing such risks. According to this new concept, scientists need to improve the means of public communication of their research results, particularly, when dealing with a situation of hazard. More than this, scientists and authorities/governments need to recognize that a good communication strategy is necessary to promote public participation in the decision-making processes, which is even more relevant in a democratic system. This process of divulgation is called ‘risk communication’, and includes strategies that ensure that information is divulged in a clear and explanatory manner, so that the local population can understand the communicated data and their implications as well as is encouraged to actively participate in the solution or mitigation of these risk situations.

The United States National Research Council (NRC) defines risk communication as the exchange of information about the nature, magnitude, interpretation, acceptability, and management of risk. Risk communication is an emerging area of social sciences aimed to produce the means for society to actively participate in any process of prevention or attenuation

of hazardous situations for living beings. It provides guidelines and strategic tools for scientists and public officials to deal with the media and to build up a confident atmosphere with other social actors in the risk management arena.

The concept of risk communication has been developing and gaining popularity since the Chernobyl nuclear accident that occurred in Ukraine in 1986. The accident illustrated the communication problems that researchers were faced with in order to adequately disseminate information to the public about the risk and the uncertainty in the estimation of risk. Since then, scientists, communicators, and public administrators, mainly from developed countries, have come to discuss the need to put an interactive communication process into practice that could embrace the exchange of opinions among the various social actors involved, and their reactions to messages about risk or about the legal and institutional measures related to risk management. Today, more than twenty years after the Chernobyl incident, the discussion about risk communication has gained ground in the public agenda, since people live with risk situations that range from natural disasters, environmental changes (such as global warming), cases of infectious diseases, the threat of bombs, bioterrorism, and epidemics of chronic diseases.

To illustrate and to discuss the importance of risk communication, especially to promote the public participation in risk management, two interesting case studies related to environmental risks in Brazil are presented. Both are related to environmental and human contamination of lead originated from industrial activities.

Problem outline

The first case study was carried out in the Ribeira Valley, southeastern Brazil, where contamination of lead originating from a metal smelter had been previously discovered. This valley is nationally known for its intense mining activity during the 20^{th} century, focusing on the production of lead, zinc, and silver. The Ribeira Valley encompasses 32 municipalities from São Paulo and Paraná States (Southeastern and Southern regions of Brazil) with an estimated population of 400,000 inhabitants. The municipality of Adrianópolis, located in the Upper Ribeira Valley, was the host of the Plumbum Company where lead ore was processed in the period from 1945 to 1995. During most of this period, a large quantity of gases and lead-rich particulate matter must have been released into the atmosphere, which was deposited on the soil

surfaces near the refinery, particularly in the Capelinha and Vila Mota neighborhoods, in the rural area of Adrianópolis (Cunha et al. 2005; Figueiredo 2005 and 2007).

These areas are home to around 100 families at an average distance of 1,500 meters from the processing plant, along an unpaved road that passes in front of the facility. Elevated lead concentrations in blood, exceeding 10 micrograms per deciliter, were found in 60% of those families (Paoliello et al. 2002 and 2003). Besides clear indications of high lead concentrations in soil, most of the greens and vegetables produced from residential gardens near Plumbum, and consumed by residents, exceeded the lead concentration limits recommended by the Brazilian regulations (Lammoglia et al., 2006).

In 2001, the media had access to part of the research findings and extensively covered the subject. The first story was broadcast on the Brazilian most watched news program (TV Globo) on February 28 and served as a catalyst for other media outlets, which published several articles and broadcast news about the case very intensively over the next month. As a result, Adrianópolis, albeit inadvertently, came to be known as “lead town”.

In this context, the lack of a risk communication plan was interpreted as the main cause that made the relationships between scientists and community uncomfortable and contributed to the problems related to the release of information by the media. The media’s work on this case was characterized by the divulgation of contradictory information and collaborated for a panic situation among local residents and the stigmatization of the town.

The second case study focuses on an episode of lead contamination that originated from a battery factory (Ajax Industry) in the city of Bauru, São Paulo State, in 2002. The problem of contamination was announced when the Company of Technology of Environmental Sanitation (CETESB) decided to step in the industry based on the excessive concentrations of lead found in the atmosphere (Freitas, 2004). The factory had been active since 1974, and most of the time without environmental license that was required by governmental regulations since 1976.

Studies carried out by CETESB and universities were then oriented to assess the quality of the environment and the human contamination in the property and surrounding area (within 1,000 m) where 500 families lived. By the time the media divulged this case, the intervention actions were implemented faster and more efficiently than in the Ribeira Valley.

In Bauru, a constructive involvement of the media and a better perception of the risk by local residents were found to be due to a successful application of a risk communication strategy.

Based on both experiences, the present study is an attempt to understand the process of divulgation of these cases by the media, to analyze the contrasting practices of risk communication and the social actors behaviors in each case to highlight the relevance of all these factors in the promotion of public participation in attenuating risk situations.

Methods

Two different methodological approaches were used in the present study as following: (i) document research; and (ii) empirical research based on interviews. The data were compared to available information from existing literature about risk communication and risk perception, scientific and media publications, the role of the media in the popularization of science, and about subjects related to environmental risk and public health.

In the Ribeira Valley, the investigation took place in 2005 and 2006 (Di Giulio, 2006). For this study the document research consisted of the analysis of all news published in February and March, 2001, a period in which the lead contamination problem in Adrianópolis was extensively communicated through the media. The analyses covered three articles from three prominent national news outlets and 21 articles published in two prominent regional newspapers from Paraná State.

The empirical research consisted of visits to Adrianópolis and collection of statements from important actors in the case. The interviewed people belong to five social categories or groups: local residents, government officials (local and provincial), former employees of Plumbum, journalists and environmental and health researchers. The interviews with the local residents, government officials and Plumbum ex-employees highlighted, for example, their perception of risk, the relationship with the researchers during and after the studies, how they analyzed the media's influence on communicating the issue, and the impacts of this communication. The interviews with the journalist group that covered the subject in 2001 allowed reflection on how the case was communicated and its impacts, and on possible journalistic failures and successes during their work. On the other hand, statements collected from researchers in order to understand what happened in Adrianópolis in 2001 concentrated on how this group perceived the role of the media in risk communication, the consequent amplification of risk perception and, on how they evaluated the involvement of the residents of Adrianópolis in the previous studies carried out in the area.

In the Bauru city, information was obtained from four published reports and papers and from interviews with two researchers who participated in the risk assessment project in 2002. Statements collected from these researchers showed some differences between the experience in Ribeira Valley and in Bauru, especially during the process of communication to the public and to the media.

Results

The Ribeira Valley case

The analysis of the news on the Adrianópolis case in February-March, 2001 revealed the media's work evolved at different levels of interests.

Already from the beginning, the media divulged contradictory information about the seriousness of contamination of the local population and of the environment. For example, in one of the stories the headline focused people's attention on the lead contamination of children – "70% of Adrianópolis' children are contaminated". The article noted that 70% of the children in the town had levels of lead in their bodies, which were three times higher than the level considered safe by the World Health Organization (WHO). It also explained that a study had shown that the soil, animals and river water near Adrianópolis were all contaminated. The article was factually inaccurate in two points: the contamination of the river water was not verified by the studies (Cunha et al., 2005) and, actually, the contaminated children were found to be restricted to two villages in the municipality. The human exposure assessment (Paoliello et al, 2002; Paoliello et al., 2003) showed that 60% of the blood samples (children and adults) from two villages near the smelter presented lead levels above 10 micrograms per deciliter (10 μg/dL) – the internationally accepted value considered as the maximum limit for good health - and only 13% of the samples yielded lead concentrations above 20 μg /dl.

In their reports the media used an ominous tone to divulge the case. In those stories, expressions such as "contaminated inhabitants", "extremely serious", "warning state", "leaded", "lead-hunt", and "Adrianópolis savages" were used, showing the sensationalism in the description of the subject.

Another important aspect of the news occurred when the media divulged the political involvement that characterized the Adrianópolis case, for example, when backing the proposal of an inquiry to investigate the matter at the Brazilian parliament. Headlines such as "The

Adrianópolis case may lead to a parliamentary inquiry" and "Adrianópolis lead contamination case to be examined by the Senate", and phrases such as "The senator is sure that the Adrianópolis case will get repercussion in the Congress" illustrated that the case had reached the political arena. The media also divulged the actions of the State Health Secretary and of the Environmental Institute of Paraná (IAP), and the involvement of the Deputy-Mayor and other politicians.

The last phase of the media's work, at almost one month after the first story was published, was an attempt to minimize the subject. The news changed their focus and start to criticize the way the research was conducted in the region. Sentences such as "the revelations from the preliminary studies by São Paulo State universities fell into a black hole. They didn't reach the doctors from the State Secretary of Health". "Jealousy from the professional world and academic competition obstructed information exchange" and "it was all a scare", and "the story that lead poisoning affected Adrianópolis' seven thousand inhabitants appears to be the product of fertile imaginations and an excess of zeal on the part of the Deputy-Mayor" and other similar statements are examples that marked the media retreat from the scene.

The analysis of opinions collected during the interviews, on the other hand, revealed other important aspects of this case. It was found that the lack of a risk communication plan associated with disoriented actions of the media influenced rather negatively the perceptions and attitudes of the residents.

The group of authorities, especially people from the State Health Secretary, commented that it is necessary that research institutions and official organizations work together upon risk situations. "We believe that if a researcher wants to do a study in some area, he has to contact the State Health Secretary, because we have an Ethical Committee that may approve or not any project... The universities go to these regions and do their studies. But they do not give answers to the problems; this is done by the official organizations. To maintain a link between public services and academic is a perpetual difficulty".

The group of residents pointed out the need of communication about the studies' results. A resident called attention to the importance of this: "I think that is necessary that the researchers make public their work. Because many things we learn just through the media... I think that there is a lack of dialogue... I think that these research groups should have a pre-season in the cities, they should divulge their work before starting a study".

The journalists recognized that the subject gained wide public interest just after the first story was broadcast on the evening news of TV Globo, the most watched channel in Brazil. They pointed out that the main information was obtained from residents, authorities, and some of it was obtained from the researchers. According to a journalist, in the beginning the researchers did not show to have problems to talk about the subject when they were contacted by the media: “I felt that they were a bit worried about the divulgation of information and where the news was going. But after the first news was published, I felt that the relationship with the researchers becomes more difficult”.

The group of researchers acknowledged the problem related to the lack of a risk communication plan, and pointed out that the information needed to be communicated carefully, within a pre-established communication plan (including communication with the media). They also recognized that the communication practice is very difficult, and for this reason it is necessary to include specialized people on risk communication in the research team.

One of the health care researchers pointed out that public information has to be carefully communicated: “… the care concerning which information is released is also important because the mention of intoxication tends to alarm people. The language related to toxicology is always alarming, often assumes negative connotation and, sometimes, even pejorative or stigmatizing meanings”.

This problem with stigma of people and the town occurred, in fact, and according to statements collected from residents and authorities it was a consequence of the media’s work. One school director stated: “For the residents, the actions of the media were damaging. They defiled the town”.

According to the statements collected, the inhabitants themselves were stigmatized and had problems regarding their social acceptance. The stigma was noticed in the daily routine of the residents, and in addition to incurring harmful feelings such as shame, it also resulted in economic losses, including unemployment, devaluation of private properties and local land, and the rejection of local products sold in the free markets.

All these elements collaborated to create a panic and alarm situation among the residents. Moreover, the problems related to communication influenced the perceptions and people’s attitudes when facing the risk of lead contamination.

It was possible to verify through the analysis of the statements that the local community (local residents, authorities and Plumbum ex-employees) perceived the risk of metal contamination in different ways. Some inhabitants and authorities pointed out that part of the community believed that to live with this daily risk could mean a chance of receiving a court awarded settlement. This quote from one resident teacher is an example: “Many people think that if they are actually contaminated, they will go to court and request monetary compensation. This is the general thought of the people around here. If you die, you’ll pass it on to your kids.”

The group made up of Plumbum ex-employees associated the risk exclusively to occupational activity, which came from the idea that the former workers of the mining company were expected to suffer from contamination problems, whereas the current inhabitants (now, years after the company was closed), would not have any problem simply because they lived nearby.

Some residents and local authorities associated the risk only with the presence of spoil heaps that were left in the open as a result of mining activities. These respondents suggested that if waste were removed, the contamination problem would cease to exist (ignoring the results from studies regarding contamination of soil and food planted in the backyards of houses next to Plumbum).

Some residents also did not accept the risk. One of the statements showed this: “I think that few residents perceive the risk situation. The people that have a problem in their families are ashamed and scared to talk about it. They always think about some people from their families that work in the City Hall. It is a problem, because this is a little town...”

The Bauru city case

When the preliminary results pointed out that there was a problem of lead contamination around the battery factory, a team of professionals was created to take care of this case. This group was made of researchers from the Medical School and Psychology Faculty from the State University of São Paulo, from the Hospital of the University of São Paulo, and from Municipal and State Secretary of Health. The objective of this group was to develop actions to investigate and treat children probably affected by lead contamination.

Decentralization of the policy and administration, equity of assistance, local participation and the use of epidemiological studies to establish priorities characterized this investigation and the process of solving the problem (Freitas, 2004). Thus, the work carried out in Bauru was based on a proposal that originated from different sectors and social actors such as governmental

institutions, Public Ministry, industry and local authorities, and assumed a multidisciplinary character involving researchers from different universities and hospitals.

The information obtained from the published reports and papers revealed several characteristics of the media's work. The first was that the media had a commitment with public services and helped them to divulge information to the population. The analysis of stories published in two national news outlets and one prominent regional newspaper from Bauru, in February and March 2002, showed that the media, in fact, aimed to release the subject but also amplified the voice of the population that was getting fidgety (Tomita and Padula, 2005).

In spite of helping the public services, a second aspect of the media' coverage was that the news, for the most part of the time, tried to associate the health problem of the children with the emission of the pollutant, but this was done by just quoting figures of blood lead levels obtained during the on going human exposure assessment. This really reduced the understanding of the problem to a numerical question rather obscure to common people.

Another point emphasized by the media was the obligation of industry to act in accordance with the "social responsibility" principle. Until the divulgation of the case, social responsibility was an unknown concept for the battery factory in Bauru (AJAX) and also for the media (Salomão, 2006). After the first news stories, the local press tried to demonstrate that the problem in Bauru had not been an accident of heavy metal pollution, but a consequence of the irresponsibility of the industry by releasing a large amount of gases and lead-rich particulate matter into the atmosphere, without paying attention to the environmental law.

A final remark about the media's work is that, although the first suspicion of environmental crime occurred in 1999, the media focused on the subject only three years later, when the intervention of the CETESB Company occurred. It is possible to verify that several reports were published only when the journalists accessed the CETESB's findings. However, after this phase when the subject was extensively covered, the media tried to minimize the problem and only a few articles were published after March 2002 (Salomão, 2006).

The analysis of papers and reports about the Bauru case allows observing that there was a risk communication plan aimed to encourage the public participation in the solution of the problem. Local residents, for example, insisted on measures of control and searched for clarification about the health effects and about the assistance from the health public system. According to Freitas (2004), these actions from the public could be translated as political pressure. The public claims

echoed by the Public Ministry that forced a comprehensive investigation of the case that could be judged as exaggerated in the light of final results.

The analysis of statements collected during the interviews is also important to clarify on how risk communication was promoted in this case and how this process collaborated positively with perceptions and attitudes of the residents.

According to the interviews, the team in charge of the case was very worried about the communication to the media and to the public. For this reason, one person was chosen to take care of all information and this initiative worked very well. This person helped to centralize the information about the case and, as a consequence, the media was able to work together with public services in the area.

In Bauru, the local residents did not experience a situation of alarm and panic, and either the families that faced health problems. This was seen by the interviewed researchers as a positive aspect given due to a successful implementation of a risk communication strategy.

Discussion

These two case studies illustrate that strategies for risk communication are essential to avoid unnecessary alarm among people (that otherwise could be created by the media), and to develop a positive atmosphere among the social actors involved in a risk situation.

In the Ribeira Valley, the interviews with researchers demonstrated the lack of a risk communication plan. Such plan must be anticipated to facilitate the communication with media, authorities, governments and residents.

For the media, this lack of a communication plan might have led to a difficult relationship between researchers and journalists and, to a disastrous anticipation of the results to the public in Adrianópolis. In this context, the lack of a communications plan facilitated the unnecessary interference of politics in the case and made difficult to sort among different social actors with different interests in the case.

It is important to emphasize that the subject only reached the media thanks to the initiative of the Deputy-Mayor who trusted in the amplification effect of the press. The real dimension of the problem and the first actions to solve it began to be debated only after the media’s divulgation. Furthermore, the interviews prove that the problem only got the attention, especially from authorities and governmental institutions, through the media.

So, based on these considerations it is possible to verify that the lack of a risk communication plan in Adrianópolis collaborated to: i) the sensationalism in the description of the subject by the media; ii) the divulgation of contradictory information; iii) facilitate the political involvement in the case; iv) compromise public trust in public agencies; v) develop a feeling of panic and non trust among the residents; vi) compromise the ongoing studies in the region.

All these factors associated with the social and cultural values of people influenced their perception about the risk and their attitudes. Since the risk only can be seen and measured within a social context, it is unavoidable to understand risks as social constructions that interact with psychological, social, institutional and cultural processes. This interaction is responsible for the amplification or attenuation of the answers to a risk situation (Slovic, 1987).

Thus, acceptance or non-acceptance of the existence of a risk is determined by individual's familiarity, control, the media coverage, beliefs, personal feelings, and the level of knowledge (Duncam, 2004; Smith, 1992; Weyman & Kelly, 1992; Sturloni, 2006). The lack of direct participation of people involved in a risk situation during the decision-making processes and the legitimacy of the institutions involved in the management of risks also influences the level of people's concern about risks.

In the Ribeira Valley, the risk perceptions of people were very different. Some of them did not recognize the problem of contamination or when acknowledging the risk, associated it with the occupational activities. Other people recognized and accepted the risk without reservations whereas some had that feeling of fear about it, and others also felt unable to act and to participate in the solution of the problem.

In the Bauru study case, there is evidence from the analysis of reports, publications and interviews that the media acted as a partner of the public institutions. This was facilitated by the good relationship between journalists, researchers and authorities and, especially, by the existence of a risk communication plan that also took into account the peculiarities of the media work.

The interviews revealed that the concept of risk communication was present during the whole process of risk management. For this reason, researchers and authorities were more prepared to face the media and to dialogue with the public. By centralizing all information to one person, oriented to establish a partnership with the media and to communicate to the interested audience

each step of the process, all this collaborated to build up a confident atmosphere among the social actors in the risk management arena.

Moreno (2003) argued that risk communication planning requires the participation of specialized professionals because, since the goal is to transmit information that will model the public opinion, attitudes and behaviors trigged by the messages will encourage or not the involvement of citizens in the risk management process.

In the case of Bauru, having a person to take care of risk communication, to listen to the community involved in the risk situation, and to attend the media also collaborated to the further stages of risk management. If this relationship of trust and commitment among different actors is not established early in the process, the entire risk management process will be compromised, because the community and local authorities will neither understand nor support it.

This case also shows that risk communication is an important element in the promotion of public participation in risk management. Of course, there are many factors that influence this process, such as cultural and social values, and effective policies. But both experiences examined here show that the practice of risk communication is a necessary condition to inform and integrate the public into the process of solution or mitigation of hazard events.

Finally, it is noted that the level of the involvement of the local residents in Bauru was probably not as extensive as it could have been. But, the analysis of these two contrasting experiences illustrates very well how relevant the construction of positive and creative relations involving the public, governmental institutions, industry, and the media can be. Risk communication as an emerging field of social sciences aims to enhance the efficacy of such process.

Concluding remarks

The present investigation led to the conclusion that an adequate planning regarding communication of research results about the environment and human exposure to hazardous substances is a requirement to build up positive relationships between researchers, the community, authorities and the media.

Problems and solutions highlighted in the present study are commonly faced by scientists in other contexts, such as natural disasters, environmental and climate hazards and major catastrophes where a dialogue between society and governments is crucial to attenuate risk situations.

It is suggested that risk communication should be incorporate as a long-term policy of governmental institutions to assure a positive relationship with the media and communities when dealing with environmental and public health issues.

To achieve that, it is necessary to call the attention of governments and societies to the efficiency of risk communication in avoiding great mistakes related to communication and to integrate all the social actors involved in risk situations in risk management processes. This is especially important for developing countries like Brazil where subjects like risk perception and communication, public participation and related matters are still poorly debated.

The first challenging step is to solve the problem of the scarce human resources active in this area. It is noted that regular courses in Engineering, Earth Sciences, and even Social Sciences and Communication, in Brazil, do not embrace these subjects in the curricula. Actually, new disciplines with focus on how to communicate risk to people, how to deal with the media, how to dialogue with public and private sectors during an environmental or health crises and, how to integrate people in the risk management process are not known in Brazil.

Fortunately, professionals from the health sector are more used to dealing with these concepts. But, there is still not an effective practice about how to proceed before social groups instead of individuals and families only. So, the idea of forming human resources specialized in risk communication and offering disciplines on this subject in the universities and governmental training centers seems to be an urgent task in Brazil.

A second point is related to the importance of introducing some kind of regulation about the practice of risk communication. The use of some routine procedures should be encouraged through legislation for all professionals when dealing with risk situations. The current ethical codes in use within the health care sector should be taken as a starting point to generalize applications of risk communication strategies. The research projects related to environmental heath risks should be required to include a risk communication plan and how to proceed during the process of risk management.

Information about risk communication is available not only in literature but in websites of international health organizations. Some remarks that originated from the present study have been already discussed elsewhere. The experiences investigated here suggest that procedures should include public meetings with different social actors. On such occasions, people are encouraged to express their emotions and concerns and to participate in an open dialog and negotiation process.

To centralize in one person to take care of information and to develop a system that promptly answers the concerns of local residents has been shown to work in Bauru. This person acts as spokesperson and can plan how and what information will be released. In addition, he or she anticipates possible questions and answers from inhabitants and local authorities, as well as from the media.

It is also important to understand the cultural, social, and economic customs of the community being studied. In order to do that, it is necessary to perform an evaluation to identify the different public interests, expectations, and existing cultural agendas in that community.

It is also a wise decision to maintain constant contact with some community representatives, such as neighborhood leaders, teachers and health care workers, to explain step-by-step the studies performed, as well as to detail the results obtained. These representatives may work as volunteers and help with communication, since the local population trusts them. This is also one step directed to facilitate public participation in the risk management stage.

It is easy to identify within the field of risk communication several guidelines that may help to enhance participation of all social actors involved in the process of solving problems e.g. taking into consideration the social dimension and subjectivity inherent to the perceptions and attitudes of people that experience a risk situation. For this reason, risk communication should be incorporated as an important topic in governance when dealing with environmental crisis and public health issues.

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