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Risk Communication Programs after the Fukushima Nuclear Accident: A Comparison of Epistemic Cultures

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ABSTRACT

Management of risk perception, in addition to risk itself, is an important pillar of risk governance. This paper explores the citizen radiation measuring organizations as an example of risk communication and contrasts their 'epistemic culture' with that of the nuclear industry's risk communication programs. Two policy recommendations are made in the paper. First, risk communication needs to be firmly decoupled with public relations. Second, the cost (including remunerating citizens for their participation) of open, participatory, and sustained dialogue about radiation risks needs to be factored in any cost estimate of nuclear power.

抄録

リスク認知の管理は、リスク自体の管理に加えて、リスク・ガバナンスの重要な柱である。本ペーパーは、放射能測定に取り組む市民団体をリスクコミュニケーションの一つの事例として取り上げ、その「認識文化」と原子力産業のリスクコミュニケーションの取組みを比較した。本ペーパーより2つの政策提言が導き出された。1つは、リスクコミュニケーションは広報活動としっかりと分けて行われる必要があるということ。そして、放射線リスクに関連した、公開・参加型かつ継続的な対話にかかるコスト（市民への参加報酬も含む）は原子力産業の見積もり経費に組み込まれる必要があることである。

Introduction

The nuclear accident that followed the strong earthquake and tsunami in March 2011 brought tremendous uncertainty regarding the extent of contamination and its health impacts. As the crisis unfolded, information disclosure by the operator of the reactors, Tokyo Electric Power Company (TEPCO), and the government regulatory authorities was painfully slow and limited. It was in this context that many citizen groups started to organize what I call citizen radiation measuring organizations (CRMOs), where citizens could measure foods' contamination levels themselves, as they felt that necessary information was not forthcoming from the authorities.

CRMOs are grass-roots organizations that provide measurement data on contamination levels of foods and beverages brought in by regular citizens. They are usually not understood to be risk communication programs; rather, they are seen as an example of citizen science: lay people practicing science and collecting data. Critics have sometimes portrayed them as pseudo-scientific groups of lay people without proper expertise, which fan fears of contamination even though the dominant government and industry views are that the problem of food contamination was minimal and under control. This paper contextualizes CRMOs as an example of risk communication and argues that their activities actually align well with the current consensus in the risk literature that defines risk communication as a participatory process of talking about and interpreting hazards that involves not only experts but also lay people.

This paper compares CRMOs with the risk communication undertaken by the nuclear industry. The focus of the paper is on epistemological contrasts; drawing on the science and technology studies (STS) literature on 'epistemic cultures,' this paper teases out key assumptions about risk, risk interpretation and communication in the CRMOs and in the nuclear industry. Epistemic culture, a concept that took hold in STS in the 1990s, refers to the idea that scientific disciplines have cultures of their own, which lead practitioners to orient toward certain things as relevant or irrelevant,

important or tangential (Knorr-Cetina, 1999). The concept clarifies that different expert systems are diverse in their ways of knowing, in what they consider proper knowledge, and in who can be a knower. This paper's comparison between the CRMOs' and the nuclear industry's risk communication shows that they are embedded in starkly different epistemic cultures.

Discussion

The participatory turn in risk communication literature

The main goal of risk communication can be defined as the provision to the general public of "information about the expected type and magnitude of an outcome from a behaviour or exposure" (Gable, Hoisinger, Neuberger, & Christoffel, 2014, p. 7). Departing from the previously dominant model that focused on the provision of information by experts to lay people in a top-down manner, risk communication is now increasingly defined as "a two-way process" (Pidgeon, Kasperson, & Slovic, 2003, p. 39) in which both 'expert' and 'lay' perspectives should inform each other, rather than simply trying to impose experts' viewpoints (Bennett, Calman, Curtis, & Fischbacher-Smith, 2010, p. 7).

CRMOs can be seen as an instance of risk communication that is in line with the current consensus in the literature. CRMOs are organizations that are typically run by lay people who, although they have little prior training in radiation measurement, are engaged with technical and scientific aspects of the nuclear accident; most notably, they have learned to operate detectors and to interpret results. They have played a significant role in deepening the conversation about the nuclear disaster's impacts among citizens. The next section briefly describes the CRMOs and highlights their contributions to risk communication.

CRMOs as risk communication programs

CRMOs were established to provide radiation measurement data for citizens by citizens. When the nuclear

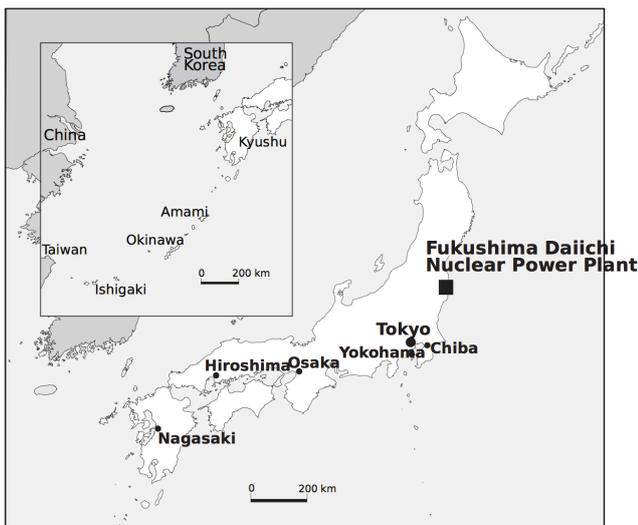


Figure 1: Locations of CRMOs

accident took place in March 2011, there were very few places where citizens could bring their own food to have its contamination level measured. Most detectors at academic laboratories were not open to citizens. There were some commercial laboratories, but their measurement fees were rather expensive. It was in this context that citizens organized CRMOs across Japan (Figure 1).

Citizens cobbled together resources (donations, personal funds, and sometimes gifts from philanthropic organizations) to purchase detectors, and they learned how to operate the detectors by going to workshops offered by non-profit organizations, or from books, websites, and consultation with the detector manufacturers and other CRMOs. There were some university-affiliated researchers who gave advice to CRMOs as well.

The central objective of CRMOs is to measure the concentration of radioactive materials in food brought to them by citizens. I analyze this aspect of their contribution elsewhere (Kimura, forthcoming). In this paper, I focus more on other functions including the creation of space for the discussion of radiation-related issues among citizens. Many CRMOs envision their role to include not only measuring food contamination, but also making a space for citizens to share their worries and concerns. Mutual exchange of opinions and sentiments—one of the key aspects of risk communication—is a central feature of CRMOs. While it is possible for citizens to simply drop off a food sample and leave, some CRMOs designed their spaces to encourage people to spend time talking with the staff and other citizens. Some have a children's corner, which lets parents more easily stay for awhile. And even though some CRMOs might simply measure the samples and report the results back to clients, their spirits are often communal—CRMOs often use social media, websites and meetings to share information with others.

The provision of space to be able to talk about issues is deemed important because, as one of my interviewees put it, “people cannot do it outside” because of the hegemonic view that portrays even raising a concern about radiation as tantamount to spreading false rumors. Kataoka Terumi, a woman who established a CRMO in Fukushima, wrote that one of its important functions was to provide *shaberiba* (a place to chat), saying, “The people who come are people who could not say what they felt. They felt that they were strange because of worrying too much. But they can come [to the CRMO] and share their feelings, and they can confirm that, ah, I am not a strange person, my feeling is not wrong” (Kataoka, 2012, p. 44). She herself felt the pressure not to talk about food contamination. She recalled how she had asked herself: “Is my worry only an overreaction? Am I a crazy person who is too concerned with radiation? My individual concern was growing but I could not talk about it. If I talked about it, I was told, you are strange, overly cautious, or I felt like I was going to be told something like that” (Kataoka, 2012, pp. 35–6).

CRMOs also try to learn and teach others about radiation dangers. When I asked CRMO staff people in interviews how long they took to explain the results, many said that it could take a long time, and that they often engaged in extended conversation with the clients. Many of them had a folder that contained information to be shown to the client to explain how the detector worked, how to read the spectrum, and recent measurement results to show trends in food contamination. In addition, CRMOs utilize various means such as workshops, email exchanges and listservs to share information. For instance, six CRMOs that formed a network in the western region meet every two months to discuss measuring skills and what they feel to be *kininaru dēta* (data that is worrisome) from recent months.

Many CRMO leaders, staff, and members are women, reflecting a broader trend of higher radiation concerns among women than men (Morioka, 2014). Many of these women expressed their motivation for establishing CRMOs in terms of their roles as mothers and grandmothers but such identities also pushed them to go beyond the protection of their biological children and families and to include other children and community members. The CRMOs' provision of spaces to be able to talk about radiation issues has been particularly important for women, as they are culturally marked as irrational and emotionally-driven and often pathologized for being concerned about radiation (Slater, Morioka, & Danzuka, 2014).

CRMOs were not established to engage in what is traditionally understood as risk communication. But in light of the newer direction of research in risk studies about how risk communication needs to be a mutual exchange of thought that informs their understanding of radiation hazards by citizens, CRMOs could well be considered exemplary of such efforts.

Risk communication by the nuclear industry

Turning to the nuclear industry, this section discusses risk communication by the Nuclear Reform Monitoring Committee (NRMC). According to its website, the NRMC was established by TEPCO to be “an independent committee that conducts external monitoring and supervising” of TEPCO’s reform efforts after the Fukushima nuclear accident (Nuclear Reform Monitoring Committee, N.D.).¹ The case of the NRMC is instructive as it clearly sees one of its missions as the improvement of risk communication by the nuclear industry and TEPCO in particular. The NRMC’s missions include diverse goals, from risk management to emergency preparedness, but one of the areas that the NRMC has emphasized as needing improvement is risk communication.

The NRMC acts as an advisory body to TEPCO to help “communicate information and engage in dialogue with the public regarding nuclear safety” (Nuclear Reform Monitoring Committee, 2013, p. 3). Not only does it advise TEPCO’s newly established Social Communication Office but the NRMC itself is also engaged in risk communication, holding press conferences and providing information on the status quo of the troubled reactors and TEPCO’s responses to the public through various outlets.

The NRMC emphasizes the need to make information about the accident easy to understand to lay people by making their risk communication “audience conscious” (*kikitewo ishikishita*) (Nuclear Reform Monitoring Committee, 2014). This emphasis on making their message simple and easy is rooted in their understanding of the failure of TEPCO’s earlier risk communication, which was perceived as slow and complicated. In 2014, NRMC chair Dale Klein commented, “I have been very impressed with TEPCO’s progress...in the area of communication. Communication is extremely important particularly in an area that is complicated as in the nuclear issues. I think this is an area where Japan needed to make improvements in general, and TEPCO specifically” (Nuclear Reform Monitoring Committee, 2014).

Another issue that the NRMC’s risk communication has emphasized is engagement with the public. The NRMC has advised TEPCO’s Social Communication Office to “engage with local people...and hear what they have to say” (Nuclear Reform Monitoring Committee, 2015). NRMC itself has also coordinated visits by nuclear experts where they meet with local residents (“particularly local women,” as the NRMC website puts it) in the affected areas. For instance, a biology professor from a UK university was invited to visit the affected areas to lecture on health impacts from nuclear accidents. The visit’s goal, according to the NRMC, was to communicate “with the residents to relieve their anxiety by giving them correct information” (Nuclear Reform Monitoring Committee, N.D.).

The NRMC particularly emphasizes the importance of talking to women. Deputy chair Barbara Judge, who is in charge of risk communication for the NRMC, has repeatedly emphasized the need for gender consciousness in risk communication. Her position can be understood from, for instance, a video posted on the NRMC website in which Judge says, “they [TEPCO] need to talk to the women—very important. We all know nuclear is an emotive subject. It is the women in the population that are the most vocal—particularly vocally against it. Need to engage women who are not necessarily related to the energy industry...teachers, doctors, mothers, librarian...lots of different women... those people need to understand what is happening in the nuclear industry, what’s happening around Fukushima, what’s happening around all power plants, and they have to understand what the benefits of nuclear energy are and how the two relate—risk and benefits. And those women need to talk to other women...if they understand what’s happening in the energy industry and what Japan needs in order to continue its economy, they will talk to their children, their friends” (Nuclear Reform Monitoring Committee, 2015).

Clear from this and other pronouncements of the NRMC is its idea that improving risk communication critically hinges upon improving its lay-friendliness and the interactions of its experts with the general public, especially women.

Comparison of epistemic cultures

The role of risk communication

As these descriptions of CRMOs and the NRMC suggest, the two have quite different epistemic cultures, and the difference can be seen, for instance, in their divergent understandings of the role of communication. The NRMC takes the job of risk communication to be convincing lay people. Notice that in the NRMC’s description of meetings with local residents above, the goal is defined as conveying expert knowledge: “correct information” that is to be delivered by scientists to people in the affected areas. The goal is thus that local residents will ultimately think in line with the experts. The underlying assumption is that science is unambiguous and the role of risk communication is to educate lay people who are acting as if science is instead ambiguous.

In contrast, CRMOs are more about creating a space than delivering particular information. No CRMO that I am aware of assigns authority to an expert; rather than privileging the viewpoint of experts, CRMOs are more interested in ensuring a space for regular citizens—as in the aforementioned idea of *shaberiba* by and for citizens—to express their sentiments and thoughts about the nuclear disaster and its impacts.

The role of lay people (and women) in risk communication

As attested by the example of the NRMCM's workshops with local residents in the affected areas, the NRMCM emphasizes participation by lay people as important in risk communication. Yet their view of lay knowledge and expert knowledge is that they are complementary but mutually exclusive; science is off-limits to lay people, who are ultimately only good for providing 'local' perspectives. In contrast, CRMCMs invest in building the scientific/technical capacity of lay people with the belief that they can also create and interpret scientific information.

It is noteworthy that women figure strongly in both cases examined in the paper. Risk communication by the NRMCM is headed by a woman and has emphasized the need to talk to more women. But it tends to see regular female citizens as in need of more information and literacy, and problematizes the fact that women are more likely to be opposed to nuclear power and are more concerned about the impacts of the accident. For instance, Judge, the chief architect of risk communication in the NRMCM, has often referred to a 'gender gap' (that women are more concerned than men about nuclear power) and emphasized it as the reason for the need for better risk communication targeted at women. The presumption here is that the right way to be concerned is already known and that women's concerns about nuclear safety are rooted in their deficient knowledge.

Many CRMCM leaders and members are women, but their view of women diverges from the NRMCM's. The NRMCM sees women as more susceptible to information deficiency and emotional thinking, and that drives them to call for more women-friendly risk communication. In contrast, CRMCMs tend to consider women as more in tune with the health of children and family members and less constrained by the dominant culture's privileging of control and economic expansion. Women's concerns about radiation are not understood as a sign of ignorance but rather as a sign of their agency (Kimura, forthcoming).

Analyses

Despite the emergent consensus in risk communication literature that advocates for participatory and open exchange of opinions, the older deficiency model persists in the nuclear industry despite its rhetoric of inclusion and lay-friendliness. There are two issues that are worthy of further discussion.

As scholars have pointed out, people's understanding of safety is closely linked to trust and relationships. Food safety concerns are a particularly suitable example here. After the accident, people became highly concerned with radiation contamination. Many consumers have avoided the purchase of foods from affected areas. For instance,

a survey by the Federation of Consumer Cooperatives in July 2011 found a large percentage of consumers (42%) trying to avoid food from the affected areas (Seko, 2012). Similarly, in a government consumer survey in 2013, more than 60% of the respondents said they cared about the place of origin of the food they buy, and of that group, 41% attributed their concern to fears about radiation (Consumer Affairs Agency, 2013).² The consumer avoidance took place despite the government's and established scientists' insistence that the products were safe.

As these examples indicate, the feeling of safety is not a simple result of having scientific information; it is nurtured through social networks. The Japanese conceptual differentiation of *anshin* (trustworthiness) and *anzen* (safety) captures this affective nature of risk (Sternsdorff-Cisterna, 2015). CRMCMs seem to have provided a place for creating a social context in which scientific information is understood. Ultimately, for *anshin* to emerge, people need to understand hazards within a web of meaning and relationships. CRMCMs provide affective space for citizens to face the issue of radiation together, against the dominant trend of individualization (Beck, 1992) and responsabilization of risk (Burchell, 1996).

Second, it is important to further consider the difference between the cases in this paper from the vantage point of environmental justice and to note diverse models of justice (Harrison, 2011; Schlosberg, 2007). The differences between NRMCM and CRMCMs seem to be ultimately about how justice is conceptualized. As in the NRMCM's risk communication, contemporary risk communication seems to be rooted in a libertarian theory of justice which takes individual maximization of utility as the ultimate state of justice. The goal of risk communication is to deliver information to individual citizens so that each one can make an informed choice based on individual calculations of costs and benefits.

This idea of justice can be contrasted with a capabilities theory of justice, which takes the development of 'capabilities,' rather than a simple maximization of personal utility, as the hallmark of justice. There is a rich literature on the capabilities approach, which was proposed by scholars like Amartya Sen and Martha Nussbaum, and this paper does not aim to provide a comprehensive review of it (see for instance, Robeyns, 2005). Rather, my goal here is to simply note how different types of risk communication imply different models of justice.

The capabilities theory of justice raises important questions that merit further discussion in terms of policy implications. For instance, the capabilities approach is concerned not only with the availability of information but the social contexts that influence choices people make based on given information. What does it mean to have an 'informed

decision' in relation to broader economic, cultural, political and sexual orders? Are people free from intimidation and humiliation when they gain information about radiation risks and discuss their feelings? How do social norms such as those related to gender, citizenship and science influence people's decisions? Moreover, the capabilities approach suggests a more layered understanding of justice that includes not only material utility but also self-respect, emotional connections, attachments to people and places, and participation in political processes (Nussbaum, 2003). We might ask: does risk communication go beyond the provision of scientific information to enhance sets of opportunities and capabilities? Risk communication needs to be evaluated not only in terms of the provision of information to individuals but also in terms of its impacts on people's overall capabilities.

Policy recommendations

The paper points to how risk communication in actual practice might come close to the practice of public relations. It is worthwhile to consider why the industry's risk communication has taken this peculiar form. Given the broad appeal of public involvement and direct participation, it is not surprising if the authorities in charge of risk governance consider lay involvement in risk communication as a fertile public relations opportunity. As political scientists and media studies literatures have pointed out, the last several decades have seen an increase in what is called political marketing and political public relations (Lilleker & Jackson, 2011). The nuclear industry has been an important benefactor of advertising and public relations enterprises in Japan (Nakano, 2012). The industry's need to persuade the public in a particular direction has become pressing, given the necessity of restoring nuclear power's position as part of the national energy mix. The prolonged shut-down of nuclear reactors has proven costly to the industry. Asahi Shinbun newspaper reported that the electric power industry was paying close to 10 billion dollars annually just to maintain the reactors (Asahi Shinbun Newspaper, 2013).

Risk communication is also crucial for the industry to encourage people from the evacuated areas to return to

their homes in the affected areas. As the evacuation has been prolonged, compensation for evacuees and the cost of decontamination have severely hurt the bottom line of TEPCO. The estimated cost of damages keeps increasing, and had reached 57 billion dollars by 2015 (Nikkei Shinbun Newspaper, 2015). At the same time, minimizing the problems of evacuation and decontamination is also beneficial for the nuclear industry as a whole, because it wants to continue promoting nuclear power. The nuclear industry has billed nuclear power as the cheapest of energy sources; an oft-cited cost comparison is that nuclear power costs 10.3 yen per kilowatt per hour, in contrast to 12 yen for coal and 11 yen for hydropower. This argument has been critical in promoting nuclear power but critics have pointed out how it depends upon arbitrarily low estimates of potential costs of decontamination, compensation and decommissioning in case of accidents (Otsu, Shino, Kotsubo, Koga, & Hirabayashi, 2015). These factors seem to have contributed to the blurred line between risk communication and public relations. However, given that distrust of the industry is already high in the context of Fukushima accident, risk communication and public relations need to be clearly distinguished.

Second, the paper suggests that there is much more to be improved if the nuclear industry is to take seriously the idea of interactive, open, participatory risk communication. Such processes will undoubtedly take time, commitment and resources. Nuclear industry and the related regulatory authorities, and the government need to take the cost of such risk communication in calculating the cost of nuclear power. This kind of risk communication should not assume free labor from citizens and this is particularly important from women's viewpoints—as women are often poor in terms of financial resources as well as available time. One of the most important lessons from Chernobyl and Fukushima accidents is that any nuclear accident will result in significant disagreements about risks. Participatory, open, and sustained dialogue needs to be a part of any planning for nuclear disaster response. Utility industry and the government should factor in and build in this kind of costs into their calculation of nuclear power.

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Notes

- 1 The NRMC is positioned as an outside advising organization but is constituted largely of industry insiders. It is chaired by Dale Klein, former chairman of the US Nuclear Regulatory Commission, and the deputy chair is Barbara Judge, a UK/US lawyer who has served as chairperson of the UK Atomic Energy Authority. Four other members are Japanese, one of whom is the chairman of TEPCO; at least two others have previous experience in the nuclear industry.
- 2 Even in 2014, three years after the accident, a survey by the Fukushima Chamber of Commerce of consumers in the Tokyo metropolitan area found that about 30% of the respondents did not buy Fukushima food (Fukushima Minyu Newspaper, 2014).

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