

RESEARCH ARTICLE

Food after Fukushima: Risk and Scientific Citizenship in Japan

Nicolas Sternsdorff-Cisterna

ABSTRACT In this article, I explore questions of food safety after the meltdown at the Fukushima Daiichi nuclear plant. In the aftermath of the disaster, people concerned about food safety were sometimes suspicious about the ability of the Japanese state to adequately monitor the food supply and introduce safety standards that they considered strict enough. I use the concept of scientific citizenship to explore the dynamics whereby people's relationship to state expertise was transformed as they learned about the science of radiation. Scientific citizenship was expressed in a desire to circumvent the state to protect the health and life of current and future generations. I focus on the language used to describe food safety to show the work of affective networks of trust in constituting a sense of safety in the postdisaster environment. Ethnographically, I focus on the work of mothers and food activists who banded together to share and disseminate knowledge about radiation so they could protect their own and each other's children. [*risk, disaster, food safety, Japan, Fukushima*]

概要 本稿では、福島第1原発事故によって生じた食品の安全に関する問題を検討する。災害後、食品の安全性を懸念した人々からは、日本政府が導入した食品供給工程の監視や安全性評価の基準制定の信頼性を問う声があがった。『科学的市民権』(Scientific Citizenship)という概念は、放射能に関する知識を習得していく過程で、人々が国家の専門性とどう向き合ったかを示す。『科学的市民権』は、現在と未来の世代の健康と命を守るために、国家の政策を退けねばならない使命感として浮上した。食品の安全性を指す言語を基に、人々は信頼関係を基盤としたネットワーク作りを通じて災害後の安全観をいかに納得していったのか調査をした。フィールドワークでは、我が子を、そして互いの子を守るろうと、放射能に関する情報を共有し、広める運動に共同で取り組んだ母親達と食品研究活動家に着目した。

RESUMEN En este artículo, exploro cuestiones sobre la seguridad de alimentos después de la fusión de un reactor en la planta nuclear de Fukushima Daiichi. Como consecuencias del desastre, individuos preocupados por las seguridad de los alimentos algunas veces desconfiaron de la habilidad del estado japonés para monitorear adecuadamente la oferta de alimentos e introducir estándares de seguridad que ellos consideraban suficientemente estrictos. Uso el concepto de ciudadanía científica para explorar las dinámicas por las cuales las relaciones de los individuos con el conocimiento técnico del estado fueron transformadas en la medida en que ellos aprendieron acerca de la ciencia de la radiación. La ciudadanía científica fue expresada en un deseo de eludir al estado para proteger la salud y la vida de las generaciones actuales y futuras. Me enfoco en el lenguaje usado para describir la seguridad de los alimentos a fin de mostrar el trabajo de las redes afectivas de confianza en la constitución de un sentido de seguridad en el ambiente de postdesastre. Etnográficamente, me enfoco en el trabajo de madres y activistas de alimentos quienes se unieron para compartir y diseminar conocimiento sobre la radiación de manera

que ellas podrían proteger a sus propios hijos y los de los otros. [Riesgo, desastre, seguridad de alimentos, Japón, Fukushima]

On January 24, 2012, I attended a meeting in Fukushima City where representatives of the Japanese Ministry of Health, Labor and Welfare and the Ministry of Agriculture, Forestry and Fisheries outlined to local residents and farmers the upcoming changes to permissible levels of radioactive pollutants in the food supply. Shortly after the Great East Japan Earthquake and the meltdown at the Fukushima Daiichi Nuclear Plant (henceforth, “Fukushima nuclear plant”), the government declared emergency levels that allowed food contaminated with up to 500 becquerels¹ per kilogram (Bq/kg) to circulate for consumption.² At the meeting, government representatives explained that in April of 2012—four months later—the standard would drop to 100 Bq/kg and argued that this should help farmers overcome some of the public’s mistrust in their products.

During the question-and-answer period, several farmers in the audience asked the government representatives hard questions. One said that he and his fellow farmers were doing their best to grow safe produce, and most crops were testing under the permissible limit. If the crops were safe, then why were consumers still wary of them? Another farmer said that he used a citizen testing center to ensure that his crops were within safe levels. Still, he wondered, would consumers accept the new safety standards of 100 Bq/kg? The government had made suspicious announcements on safety before, so why would the public trust them this time? A third farmer suggested that the government’s presentation was focused on food safety (*anzen* 安全), but they did not address how to generate a climate of trustworthiness (*anshin* 安心) about food from Fukushima. The government could make strict standards, but enforcing technical standards alone would do little to overcome consumer mistrust. The better way forward, he said, was to bring together food safety and the peace of mind that comes with it (*anshin* to *anzen wo tsunageru*).

In this article, I examine questions about food safety after the Fukushima nuclear accident. As the third farmer suggested, food safety is both a question of science and of affective networks of trust. Food must be safe (*anzen*) and feel safe (*anshin*). However, many people’s trust in the government expertise after the Fukushima nuclear accident was eroded. As such, I argue that the disaster motivated those in the population concerned about food safety to reconsider their relationship to the state and to assign novel meanings to their concepts of their duties as citizens. This stance centers around the feeling that the state cannot be trusted to guarantee the well-being of the population, and citizens must build alternative channels to ensure the health of future generations. It wrestles with state authority in defining the

terms of acceptable risk; furthermore, given the uncertainty about the effects of the Fukushima nuclear disaster on human health, it behooves citizens to find ways that circumvent state authority to protect their health and that of their children. I term this “scientific citizenship,” and I argue that, through its practices, farmers and consumers were able to find a sense of trustworthiness (*anshin*) in the production, consumption, and circulation of food. By *scientific citizenship*, I refer to a transformation in the relationship between citizens and the state that is catalyzed and mediated by the acquisition of scientific literacy. It involves citizens amassing enough knowledge to critically assess expert advice and deciding to circumvent the state’s expertise to protect the health and life of current and future generations. Scientific citizens know that radiation poses risks and that those risks may be mitigated by developing independent safety regulations that are distinct from those of the state. This can entail, for example, the following: opening radiation screening centers where food is tested to stricter standards than the state’s; creating networks where knowledge is disseminated so others can also learn to critically engage the state on questions about radiation; or reading radiation dispersal maps and deciding to relocate based on background radiation levels, even if the state deems those regions fit for human habitation.

The Great East Japan Earthquake was a disaster of formidable scale.³ Often referred to as a triple disaster, it consisted of the strongest earthquake to ever hit Japan, a tsunami that wreaked havoc along the coast, and the nuclear meltdowns at the Fukushima nuclear plant. Three reactors suffered from meltdowns and released radioactive substances including iodine and cesium (Harada et al. 2014; Yoshida and Kanda 2012). Fukushima prefecture and surrounding areas received the bulk of the pollutants, but traces of radioactive cesium have been found throughout Japan (Samuels 2013). The International Atomic Energy Agency classified the accident as a level-7 incident; Chernobyl is the only other accident classified at the maximum level of 7.⁴ In the aftermath of the accident, the Japanese government reassured the public that no significant health effects should occur from the additional exposure to radiation. Leading experts associated with the government, such as Dr. Yamashita Shunichi (*The Japan Times* 2012), stated that the public could be exposed to radiation in much greater amounts than current levels with no significant adverse health effects.

The general public, however, was suspicious of the government’s assurances of safety (Hommerich 2012). Many of the people I met were skeptical because during the first few months of the crisis, products such as beef and spinach that were contaminated above government standards still reached the marketplace, casting doubt on the government’s

ability to adequately monitor the food supply. They were also skeptical because, for a brief time period after the earthquake, the government requested that drinking water not be given to infants, permissible levels of radiation exposure for the general population were temporarily raised, specific food products from the affected regions were banned from circulation, and foreign countries banned or limited food imports from Japan. The feeling was that, at best, the Japanese government was incompetent in its handling of the crisis; at worst, it was putting the health of the general population at risk to protect the powerful nuclear industry.⁵ Moreover, there is little scientific consensus about the health effects of long-term, low-level exposure to radiation. Exposure to large amounts of radiation can cause radiation sickness and even death, but experts have divergent opinions about the health effects of low-level exposure over a prolonged period of time (Morris-Suzuki 2014; Normile 2011).

Radiation exposure can happen externally, when the body is affected by radiation from its surroundings, or internally, when it is ingested. Other than relocating, there is relatively little that can be done to limit external exposure. In terms of internal exposure, choice of food was a way those concerned could exercise some level of control. Japan has a free market with a well-developed food distribution system, and people were free to source their food in ways they felt prevented their exposure to radiation. Given the lack of consensus about the health effects of long-term, low-level exposure, the people with whom I worked in Japan were suspicious of the certainty the government displayed when claiming that the situation was safe. Food, in this context, became an area in which they could challenge the government narratives of safety after the disaster.

The research for this article was conducted over a period of 27 months between 2011 and 2013 and during the summer of 2014. I was based in the greater Tokyo area and took 12 research trips to affected areas in Tohoku. I attended over 70 study sessions about radiation and food, conducted participant-observation at a food co-op, and performed numerous informal interviews and 50 in-depth interviews with farmers, activists, retailers, radiation experts, and government officials. The people with whom I worked were concerned about food safety, but their livelihoods were not disrupted to the extent of those displaced by the 20-kilometer exclusion zone around the nuclear plant or the nuclear plant workers. The perspectives of these latter groups fall outside the scope of this article.

The ethnographic examples may strike some readers as an over-reaction to the magnitude of the risks involved. To be sure, the people with whom I worked have taken an active interest in questions of food safety and are organizing to a greater extent than most consumers. At the same time, they are not alone in their mistrust of domestic food. A survey by the Food Safety Research Institute at Tokyo University found that suspicion of Fukushima-grown food has increased over time (Hosono 2013). In 2011, just over 10 percent of respondents would not eat Fukushima products even if

they were free, and this figure increased to a little over 20 percent in 2012. In addition, prices for some Fukushima products continue to be approximately 20 percent lower than comparable products from other Japanese prefectures. Moreover, by 2013, a network of numerous independent citizen testing centers was in place, and the Ministry of Agriculture, Forestry and Fisheries requested that more than 200 organizations—some for profit, others not—stop screening food to independent standards stricter than the state's, lest they cause confusion among consumers (Asahi Newspaper 2012). Finally, most of the people I met during my fieldwork had little or no experience in politics prior to the accident. Before the disaster, they may have fallen under the vague category of the “average consumer.” Overwhelmingly, they were moved to action by the nuclear meltdown. While there are people in Japan who are not particularly concerned about food safety and radiation, there is a significant group who took the issue seriously.

RISK AND SCIENTIFIC CITIZENSHIP

Anthropologists who have worked in disaster areas often note that uncertainty about the risks unleashed by the event are a key characteristic of a postdisaster environment. Uncertainty can be actively produced by liable companies seeking to limit their responsibilities (Button 2010), originate from the disruption to social life that a disaster catalyzes (Hoffman and Oliver-Smith 2002), stem from unclear science about the health effects of a disaster (Petryna 2002), or arise from the political battles to establish claims for victims who may be eligible for redress (Fortun 2001). Under these circumstances, questions of safety and livelihood become entangled in political battles over definitions of what constitutes “damage” and who is a “victim.” As Mary Douglas (1966, 1992) pointed out, risk and safety are not scientific categories alone but are also intrinsically social. Danger and safety are culturally constructed categories that can be analyzed as such. Barbara Adam and Joost van Loon (2000:2) argue “for the need to understand risk construction as a practice of manufacturing particular uncertainties that may have harmful consequences to ‘life’ in the broadest sense of the term. The essence of risk is not that it *is* happening, but that it *might be* happening.” Ulrich Beck (1992) also calls attention to the social nature of risk and the importance of the relations that define it. Risk as an *a priori* category does not exist; it emerges only from a social process whereby a phenomenon or practice is labeled as such.

An event like Fukushima has the potential to disrupt previous conceptions of food safety and give rise to novel reconfigurations of the parameters of risk (Johnston 2011). Safety in food items includes more than laboratory tests and scientific certainty about the dangers involved; it is also a social relationship. Food safety can only exist insofar as people trust that the products they are selling, producing, and eating are indeed safe. Food also has the transmutable power of connecting the body with the social world. It acts

as a medium between the circuits wherein food becomes symbolically charged and finally becomes an intimate experience of embodiment. The transmutable power of food in connecting the body to the world can be frightening if the world to which one is connected is fraught with risk.

In Japanese, safe food is often described as having both *anzen* (安全) and *anshin* (安心). While *anzen* and *anshin* are often used together, the two words refer to different dynamics. *Anzen* points to the world of science and precision. *Shoku no anzen*—food safety—refers to the technical and measurable ways of thinking about food safety. It is the domain in which products are tested and categorized by scientifically established criteria. While there can be arguments about how food safety is measured and degrees of acceptable risk, *anzen* speaks to a system based on rationality and consistency in its standards. This is underscored by the fact that *anzen* works as an adjective to describe a condition of being. *Anshin*, however, speaks to questions of the heart—as many people put it to me—and, indeed, the second character in this word means heart. If *anzen* points to measurable magnitudes of safety, *anshin* refers to the positive emotional reactions people have about food. It is a subjective and personal way of understanding food safety that emphasizes the peace of mind one feels about the products. Furthermore, *anshin* can be conjugated into a verb, denoting the possibility of generating *anshin* feelings. Both words are often used in conjunction to promote foods, such as in “safe and trustworthy food” [*anzen, anshin na shokuhin*] or “Please eat our foods that are safe and trustworthy” [*anshin de, anzen na shokuhin wo tabete kudasai*].

When I asked about the relationship between the two terms—and I asked this question of almost everyone I met—I was told that if a product is deemed safe (*anzen*), then one could eat it with peace of mind (*anshin*). I attended several food safety seminars after the meltdown where the speaker told the audience that they certainly must feel uneasy (*fuan*) about food and radiation and that the speaker would teach them how to choose and prepare food that is safe (*anzen*) and trustworthy (*anshin*). This framing of food safety echoes Marion Nestle’s (2010) distinction between “science-based” and “value-based” approaches to food safety risks. She argues that scientists’ understanding of food risk responds to different variables than that of the general public, and it is this gap that often leads the public to mistrust the food industry and its regulators. Heather Paxson (2008) also looks at a similar dynamic whereby the microbes in raw-milk cheeses are eaten with confidence by some while others see them as risky. The *anzen*–*anshin* formulation allows these two interrelated aspects of food safety to coexist in the same moment. It brings together the rational and the affective as integral aspects of what food safety means. This is not to suggest that the two poles exist as discrete categories but, rather, that it is in the space created by this formulation that understandings and practices of food safety emerge. At the same time, changes in the relationship between the scientific and the affective can precipitate a breakdown of trust in

food safety. The radiation releases from Fukushima brought forth doubts about the science of radiation and its effects on human health. On the one hand, there is no scientific consensus about the safety of long-term, low-level exposure to radiation (*anzen*); on the other hand, trust in government and experts was eroded, leading to mistrust and difficulty in feeling *anshin*, or confident, about the information being circulated.

Consumers concerned about radiation became savvy shoppers, learning to identify products and keeping mental notes about which foods were more likely than others to be contaminated. Similarly, consumers in other parts of the world concerned about food safety and the ecological impact of modern foodways have developed alternative modes of consumption. The United States and Europe have seen a resurgence in farmers’ markets (Okura Gagné 2011), support for place-based food commodities (Trubek 2008), the growth of the organic industry (Guthman 2004), and the fair trade movement (Lyon 2011). While some see these as the potential for moral economies that bring consumers and producers together in alternative food networks (Wilkins 2005), critics have cautioned against using enlightened consumerism as a tool for addressing food safety and inequality (Guthman 2007; Moberg 2014). It is not always viable to expect consumers to have sufficient resources and knowledge to navigate the marketplace in search of food that they consider safe. Beck (2006) has argued that, in the context of the risk society, consumers have been left to their own devices without recourse to sources of expertise in managing new hazards. He calls it a “tragic individualization of risk,” whereby individuals must confront risks by themselves while simultaneously being alienated from expert systems. The decision to consume products that are potentially hazardous, such as genetically modified organisms, falls to a “responsible consumer” who must weigh the options without the aid of expert advice. The post-Fukushima moment has been characterized by a lack of trust in government expertise, but for many of the people I met in Japan, group activities and networks were salient in how they came to understand and deal with the risks of radioactive pollution. The final act of consumption may appear to be an individual choice, but there was considerable deliberation and sharing of information during the journey to that action. Crucially, the search for *anshin* in the post-Fukushima moment has engendered a reconfiguration of people’s relationship to state authority.

Aihwa Ong (1999) has argued that citizenship is being transformed in the context of neoliberal globalization. Professional managers and a global middle class strategically cultivate a flexible citizenship that allows them to be selective in where they work, invest, and live. Their professional skills enable them to transcend the traditional constraints of the nation-state and cultivate a more flexible approach in their relationships to one or more states. I draw from Ong the notion that citizens can alter their relationship to the state via a set of skills. Individuals can acquire new skills—for example, professional skills attractive in the global marketplace

or the ability to better scrutinize the law and the workings of the bureaucracy—that have the potential to transform the relationship between citizens and the state. In particular, I suggest that the triple disaster was a catalyst that encouraged some people in Japan to acquire scientific literacy with which they could critically evaluate the state’s handling of the crisis. The acquisition of scientific literacy allowed for the emergence of a political subject whose relationship to the state was transformed by those skills and who used new knowledge to conclude that the state could not be relied on to protect the population from the risks of radioactive pollution in the food supply.

Adriana Petryna (2002) identified a similar phenomenon at Chernobyl, where citizens learned to understand their bodies’ reactions and articulate their symptoms as connected to radiation exposure. She termed this “biological citizenship.” Those who are able to make successful claims are then entitled to assistance from the state. The politics I describe differ from Petryna’s conceptualization in that the people with whom I worked in Japan were not seeking to make claims from the state.⁶ On the contrary, they were busy building alternatives to state expertise. Accepting the state-led consensus was akin to acquiescing to have one’s body and one’s children poisoned with radioactive materials, which in the long run could lead to cancer and possibly death. Scientific citizenship was not a path toward state protection; it was an alternative route. Scientific citizenship means one has the skills to critically examine the state’s response to questions such as those concerning food safety and make decisions to dealign from that system. It is a mode of engagement in which citizenship is inscribed in the decision to circumvent the state and find alternative modes of ensuring basic rights to life and health. The political community is considered to be at risk, and the state cannot be trusted to protect it. Scientific citizenship and the relationships and practices it engenders are paths toward finding a feeling of safety (*anshin*) in the aftermath of Fukushima.

Gender is a key component of scientific citizenship as a form of politics in the post-Fukushima moment.⁷ The groups I introduce are composed almost entirely of women who positioned themselves as nurturers and protectors of future generations. On the one hand, this has echoes of Robin LeBlanc’s (1999) argument in *Bicycle Citizens*, in which she studies the political world of Japanese housewives. She argues that, contrary to popular perception, housewives were political but moved on a different plane than the “official” world of politics. She calls these housewives “bicycle citizens.” On the other hand, the rhetoric used by many of the groups I met was to present themselves as mothers rather than housewives. The figure of the mother is one of a nurturer and protector of future generations, and it presents a powerful symbol that is harder to dismiss by an overwhelmingly male political system (Slater 2011; cf. Malin 1994). Anne Allison (1991) argues that the figure of the Japanese mother is manipulated by the state to create specific kinds of mothers and mothering. In what could be seen as a challenge

to this relationship, mothers concerned about food safety are using their image of caregivers to challenge the state and its position on food safety. If the state expected women in Japan to fulfill a domestic role and nurture children, the women are turning this narrative back onto the state to argue that their politics are indeed for the children, in spite of the state. Furthermore, surveys have shown that women in Japan perceive radiation to be more dangerous than men do by approximately twenty percent (Morioka 2014), and my fieldwork experience corroborates that finding. The attendees at most of the food safety events I witnessed were overwhelmingly women. The emcees often referred to the group as *mama-tachi* (moms) and sometimes remembered to add that, of course, fathers and grandparents were welcome. But the real focus was on women. The figure of the mother was the unifier.

FOOD SAFETY IN JAPAN

The nuclear meltdown brought about one of the biggest challenges to food safety in postwar Japan. This incident follows several food safety scandals during the last decade as well as a longer history of industrial pollution that sometimes contaminated the food supply. When I began my research, I expected to find that the aftermath of the nuclear bombings of Hiroshima and Nagasaki played a large role in how people interpreted the current moment. Instead, I encountered more parallels drawn between the victims of the nuclear meltdown and sufferers of Minamata Disease (Hirano 2012). The disease was discovered in the late 1950s and was caused by the Chisso Corporation’s discharges of mercury effluent into Minamata Bay. As mercury was concentrated higher in the food chain, it contaminated the local seafood, which in turn affected animals and ultimately humans (including babies), who began to suffer from severe mercury poisoning (Walker 2010). Similar to the plight of the innocent children of Minamata Bay, humans are again at the top of a food chain accumulating radiation absorbed by organisms further down that chain. Furthermore, like the residents of Minamata who were poisoned by the Chisso Corporation and won a landmark judicial case for redress, people in Fukushima were victims of an industrial disaster caused by the Tokyo Electric Power Company (TEPCO), and there are numerous lawsuits seeking reparations.

For the decade prior to the earthquake, there was a strong sense that Japanese food products were safer and of higher quality than imported counterparts. Especially after an incident of imported poisoned dumplings from China in 2008, many consumers turned to domestic products as a safer and more reliable alternative than food imports (cf. Caldwell 2002). Imported foods were treated with suspicion, and domestic products were seen as safe and reliable in contrast (Bestor 2004; Kimura and Nishiyama 2008; Rosenberger 2009). The distinction between safe (domestic) and unsafe (imported) required overlooking several food scandals caused by Japanese companies. Nonetheless, consumer surveys showed that the Japanese

public considered domestic food to be a safer alternative (Hall 2010) and were often willing to pay a premium for it. However, after the earthquake, the division between foreign and domestic became more difficult to uphold, and domestic food could not signify safety as easily as before.

On a broader level, the Great East Japan Earthquake came on the heels of a slow decline in Japan, which, in the 1980s, was thought to be possibly overtaking the United States as the world's largest economy. Since the economic bubble burst at the beginning of the 1990s, Japan has been described as being in a long economic recession and slowly moving in the wrong direction. A declining birthrate combined with limited immigration has turned Japan's population into an aging society, poised to have more retirees than working people to support them. This is certainly the case in the rural areas of Tohoku, where the young were already leaving for the cities, and the earthquake accelerated emigration from the region.

In light of these societal changes, Allison (2013) proposes to see Japan through the prism of precarity. Based on fieldwork with an expanding pool of the precariat, she tells a story of a society and sociality coming apart at the seams. Allison acknowledges the potential of the disaster to bring hope and forge new bonds of solidarity, but her main narrative is one of a greater sense of instability. The triple disaster simply expanded the number of people living in uncertainty, danger, and precariousness. Whereas prior to the earthquake those most at risk were disaffected youth, immigrants, minorities, and the elderly, radioactive pollution was a turn toward a precarious existence that encompasses a much larger swath of the population. Middle-class mothers, the affluent, the poor, and those whose livelihoods and homes were destroyed by the accident now all coexist in precarity. This precariousness of everyday life also permeated my fieldwork. But I also focus in the next sections on the places that bring people together and where Allison sees hope, where sociality is formed even among unlikely partners, and where relief and peace of mind (*anshin*) can be found.[^]

THE VEGETABLE SHOP

On a hot and humid summer day in 2012, I joined Sawada-san at her once-a-week *yaoya* (vegetable shop). The *yaoya* is located in a middle- to upper-middle-class Tokyo suburb at the end of a small shopping alley. Sawada-san's *yaoya* looks like a stall at a farmers' market. It consists of two folding tables and is run out of a residential house's garage, facing the street. To attract customers, she hangs a banner that reads, "Vegetables and Rice from Western Japan—Chosen by a Mom."[^]

The vegetable shop advertises that it sells safe and reliable food that has as close to zero radiation as possible. Sawada-san sources organic products grown exclusively in Western Japan, far away from the stricken Fukushima nuclear plant. She has some of the products, especially rice,

tested at a citizen radiation-testing center to ensure it does not show signs of radioactive pollution. In addition to the fruits and vegetables of the day, Sawada-san carries processed organic products like ketchup, soy sauce, and salad dressing. She also offers a small pile of flyers with information about the local citizen radiation-testing center, upcoming food safety events, and copies of the radiation-focused magazine *Mama Rebo—Mom's Revolution*.

Before the earthquake, Sawada-san had a successful career in finance. When news from Fukushima first emerged, she worried about her toddler and decided that it was best to leave Tokyo temporarily until the situation became clearer. She took the bullet train and relocated to Kyoto, 800 kilometers southwest, for two weeks. Eventually she had to go back to work, but before returning her son to school, she visited the kindergarten to find out whether the grounds were safe. Her son's teacher told her that the government said it was safe, so she should not worry. Sawada-san was suspicious of the teacher's trust in the government, especially because stories of contaminated crops and faulty management of the crisis were in the news with some regularity. She bought a Geiger counter on an auction website for several times its original value (they had sold out in Japan after the accident) and went to test the kindergarten herself.

She did not anticipate, however, that the school would not let her onto the grounds to test for radiation. Frustrated, she went to the city ward, where she was told that the school was government property and that she was not allowed to bring in her measuring devices. Instead, she found help from a teacher who belonged to the communist party, which had long opposed nuclear power. He put her in touch with other activists who suggested she collect signatures to pressure the school to allow her to test the site. Sawada-san took to Twitter and Facebook and in five days collected over 3,000 signatures that she presented to the city ward and the school. This, she told me, was the beginning of her post-Fukushima activism. Before the earthquake, Sawada-san did not consider herself to be a politically active individual. If pressed, she would declare her misgivings about nuclear power but did not engage further in the issue. After returning from Kyoto, she worked in finance during the day, came home to see her son for a couple of hours before bed time, and then spent her nights on the Internet soliciting signatures and studying about radiation. In spite of her efforts, the school did not let her measure the grounds for radiation. In the end, the government measured kindergartens, and she told me that the readings for her son's kindergarten were indeed higher than the expected background radiation level in the area.

The experience of trying to test the school grounds made Sawada-san mistrustful of the government and its assurances that everything was under control. She first asked the kindergarten to stop giving her son milk, because she did not trust that it was radiation free.⁸ As news spread of crops testing above government limits, her suspicions about food safety increased, and she asked that her son be discontinued

from the school lunch program. Instead, she began preparing boxed-lunches (*bento*) for him with ingredients of her own choosing. When I asked how she chose the ingredients, she pulled from her purse a detailed map of the spread of radiation in Japan. She explained that she did not buy any products from an area that may have received radiation. The area included Aomori prefecture in the north to Shizuoka south of Tokyo, and to the east up to Nagano prefecture, effectively drawing a large circle around Fukushima. Even if the amount of radiation was low, such as in areas of Nagano prefecture, she still would not take the risk of consuming food from that area. In addition, she stopped eating mushrooms (which absorb radiation more easily than other vegetables), cooked rice with imported water, and ordered ingredients from a mail-order company with an in-house radiation lab. Even when buying from the mail-order company with tested products, she still chose produce from within her safety map and avoided products grown in northern Japan.

During this frenzy of postmeltdown activity, Sawada-san fell sick with a mild form of appendicitis. She attributed her sickness to the overactivity she experienced and decided to make a choice between caring for her son and continuing her job. Her husband earned enough money to support the family, so she quit her job. Once Sawada-san became a full-time mom, she decided that she wanted further control over the foods she purchased and started to consider opening a vegetable shop. She posed the idea to the many Twitter followers she retained after her petition drive, and some friends put her in touch with an organic farmer in Hiroshima who could supply her produce. In December of 2011, she opened the *yaoya*. She announced the list of vegetables for sale on Twitter and her blog and eventually acquired two large accounts that helped keep her business afloat—a kindergarten serving school lunches and a restaurant.

As I chatted with Sawada-san, customers came and went throughout the afternoon to check the day's offerings. Some were older women from the neighborhood. Sawada-san explained that they were not particularly interested in the radiation aspect of her business; they came mostly to chat and because her prices were reasonable. Other customers were moms who came on bicycles with their children strapped into seats on the front. Some of these moms were friends Sawada-san had made when she collected signatures for the kindergarten petition, and it was clear that they followed the *yaoya*'s announcements and came specifically to shop there. Some had e-mailed Sawada-san in advance, and she had grocery bags ready with their orders.

When I asked Sawada-san what she thought of the government and its assurances that their radiation standards were safe, she said that she did not consider them useful. Before the earthquake, she said, *anzen* and *anshin* could be used interchangeably, but now no one knows where the line between safe and unsafe exists. The consequences of long-term, low-level exposure to radiation are still poorly understood, and therefore it is difficult to feel confident. Thus, her goal is to eat foods containing as close to zero

radiation as possible, regardless of the government's safety standards. On the *yaoya*'s website, she described her ethos as "aiming for zero radiation" [*bekureru zero wo mezasu*]. Moreover, she conceived of her business as one driven by care; her husband's salary allowed her not to worry about making a profit from the vegetable shop. She explained that she barely broke even and that it was difficult to make money with the low margins on vegetables. If she did not sell something, she ate it. The vegetable shop was a resource for moms like her, a place about which they could feel *anshin*. Sawada-san worked to create relationships of trust with her customers by presenting herself as a mom who also ran a vegetable shop. Shoppers could trust her vegetables because she was feeding them to her child; therefore, other moms could also feel confident about the ingredients. Sawada-san read about radiation, consulted radiation distribution maps, and volunteered at a citizen testing center in addition to managing the *yaoya*. She assessed the information available to her and concluded that she could not trust government assurances of safety to keep her son healthy as well as keep her own body healthy for a future pregnancy. Instead, she reasoned that she needed to circumvent the established markets to source foods that she could trust and that contained as close to zero radiation as possible. It was through these activities that her relationship to state authority had shifted, and she was able to find a path toward a sense of ease (*anshin*) in feeding her son and caring for her body in anticipation of her attempts to become pregnant again.

THE READING CLUB

In February of 2012, I joined a group of seven women ranging in age from their thirties to their sixties at the inaugural meeting of the "Independent Life" reading club. We were all members of the local Seikatsu Club supermarket in the greater Tokyo area. The Seikatsu Club is a co-op whose mission is to bring producers and consumers together in a virtuous cycle. The co-op favors long-term relationships with producers to provide them with stability and requests that they adhere to strict safety and quality standards. They eschew GMOs and additives and favor domestic products with few or no chemical additives. I became a member in September of 2011 when I arrived in Japan and started volunteering on a weekly basis to stock the shelves at the supermarket near my house.

Nakamura-san, a long-time member of the Seikatsu Club, felt that there were not enough people reading the co-op's monthly magazine, which ran several articles on food safety and radiation. Therefore, she organized the reading club. Our meetings were held in the community room located in the back of the supermarket—a space cramped with fliers waiting to be distributed. A small kitchen filled the room with the aromas of food samples being prepared. For the inaugural meeting, we pushed four tables together, brewed a pot of tea, and ate the homemade cookies that one member brought for the occasion. Nakamura-san sat at the head of the table and called the meeting to order. She had

decided on radiation and food as the theme and prepared a handout based on all the relevant articles she had found in the co-op's magazine during the previous eight months. She took her task so seriously that other members jokingly called her "Professor Nakamura" (Nakamura *sensei*). In her handout, she included a primer on radiation, taught us about the many types of units used to measure it, and explained the difference between external and internal exposure.

After reading through the handout, we began exchanging experiences about food and radiation since the meltdown. One member said that we had entered a "new era" (*jidai ga kawatta*). She explained that immediately after World War II, people suffered immensely, but that was followed by a lulling prosperity, which allowed the Japanese to live carefree lives. That era was now gone, replaced by a new world where we had to be vigilant about food safety and radiation. The easy era was gone, replaced by a more menacing future. Another member echoed those feelings and said that Pandora's box had been opened. Our food practices (*shoku seikatsu*) had to change. Even small actions, such as feeding vegetable scraps to a cat, were no longer viable. (Some vegetables accumulate radiation in their skins, making them potentially unsafe for pets.) Things have changed indeed, she said. We exchanged practical tips gleaned from books and websites on how to decrease radiation levels in food: boiling produce and throwing out the water, peeling vegetables or soaking foods in a saline solution. Some members said that they no longer ate products such as shiitake mushrooms that regularly registered higher levels of radiation. Nakamura-san started bringing printouts of an online citizen radiation digest service, which summarized government test data and highlighted the products testing positive for radioactive cesium so that we could know to be careful with those foods.

The members complained that the government could not be trusted and that the mass media did not carry enough stories about the dangers of radiation (Tollefson 2014). We shared tips on where to find good information. One member recommended that we subscribe to the *Tokyo Shimbun* newspaper, which was critical of the official government position. Another person brought a small book collection about food and radiation, which we passed around the group. In the aftermath of the disaster, there were numerous books published on how to protect oneself from radiation; I saw an entire section of a bookstore in Fukushima prefecture devoted to this topic. By coincidence, a few months earlier I had attended a lecture by the author of one of the books being circulated. Vladamir Babenko is a Belarusian scientist who conducted public health research after Chernobyl. His book, translated into Japanese, teaches people in simple terms how to protect themselves and their families from radiation (Babenko 2011). The reading club members asked me about the lecture, and I recounted that the room was crowded with over 200 people, many carrying babies and toddlers, hoping to get answers to their questions about food safety. During the question-and-answer period, a mother broke down in tears when she asked if her children—

aged one and four years old—were at risk for leukemia. A few weeks after the earthquake, she had fed them spinach, parsley, and other leafy vegetables from an untested area in northern Japan. To this day, she does not know whether the vegetables were contaminated, but crops from the same area later registered 3,000 bq/kg—six times the maximum allowed under the emergency levels and 30 times the current standards. Implicit in her question was an urgent desire to rehabilitate herself and undo the damage she may have caused because of a lack of better information at the time. Through his translator, Babenko tried to reassure her but was vague about the magnitude of the risks. In fact, almost every questioner asked Babenko what he thought was a safe (*anzen*) standard for food. In spite of the many requests, Babenko refused to give a numerical value and insisted that people decide for themselves by what standards they aspired to live. In an ideal world, he said, zero radiation would be the standard, but he would not comment further. Babenko's answer refused to settle the question of *anzen* and shifted the responsibility over to the attendees to choose a level that would let them feel *anshin* about their food consumption.

When I finished my recap of the lecture, Nakamura-san said that it was so difficult to know the proper course of action. We reflected that asking laypeople to know an acceptable level of risk is a challenging proposition and that it was unfair to require us to shoulder such a burden. Though as a group we exchanged knowledge to the best of our abilities, it was also clear that none of us were experts on the subject. Many times we raised questions such as the wisdom of eating at restaurants where they might be taking advantage of the cheaper prices for Fukushima products, but no one had a good answer for what we should do. We tried to the best of our abilities to interpret the available information and reassure each other that we were being conscientious about the moment, but the magnitude of the monumental task of managing risk after Fukushima always hovered in the background, never completely resolved.

The reading club met once a month, timed to coincide with the publication of the next issue of the co-op's magazine. Nakamura-san led the first few meetings, and later we began rotating the role of convener. The person in charge would select a few articles from the magazine that were of interest to her and highlight passages of special note. The topic of conversation changed depending on the articles in the magazine, but food safety and radiation featured prominently. Aside from food safety considerations, we sometimes talked about politics (especially in the lead up to the 2012 general election in Japan). Another favorite topic was childrearing, especially after two members delivered babies. Older members gave suggestions on how to get the babies to sleep or the merits of having more children, while also discussing appropriate diets and reminding the moms that they should be careful about radiation.

In August 2013, before I left Japan after my longest period of fieldwork, the members asked me to make a brief presentation about my research findings. In my presentation,

I explained the low levels of trust in government I found throughout my research and the challenges of measuring radiation. I closed the presentation with a discussion of the difference between *anzen* and *anshin*; I told them that as a foreign speaker of Japanese, I was surprised to learn that these two aspects of food safety are joined in the language and opened the floor to discuss the difference between the two terms. Musagi-san noted that it was true that the two come together but that as a native speaker she had barely noticed that this was a unique characteristic. If pressed, she said that *anzen* refers to the measurable while *anshin* is a subjective feeling, but it was not something to which she paid much attention. The co-joined nature of the terms was so commonplace for her that the relationship between the two seemed obvious.

Nakamura-san, however, noted that her experience with the terms was different. She said that, in the 1970s, when she first became interested in food safety and a member of the Seikatsu Club, the terms *anzen* and *anshin* were not as widely used. At the time, *anzen* was the main category used to describe what the Seikatsu Club offered their members. She explained that there were some serious questions about the safety of the food supply in general: widespread use of chemical additives such as coloring agents, pesticide residue, and other issues. In the beginning, the Seikatsu Club offered an alternative to the mainstream food supply. That was a time when certified organic foods were difficult to come by and when consumers did not have readily accessible channels to connect with producers and demand stricter safety standards. The Seikatsu Club, as well as a few similar co-ops in Japan, positioned themselves to fill that need. These were places where producers and consumers came together to design, produce, distribute, and consume safe (*anzen*) food. Nakamura-san offered that, during this time, the Seikatsu Club was in the business of offering safety (*anzen*); *anshin* came later. In the 1990s, mainstream venues began to offer many of the things that made the Seikatsu Club unique: assurances of safety, certified organic products, traceability measures, and so forth. Along with these developments, the Seikatsu Club began emphasizing the personal connections between producers and consumers more prominently. What made the Seikatsu Club distinct was the virtuous relationship between all parties. The Seikatsu Club offered more than just safety; it also offered the peace of mind that follows from a transparent commodity chain and affective connections between producers and consumers. *Anshin* in the network became a more salient feature for the co-op. Tomiko Yamaguchi (2014) found a similar pattern in a study of parliamentary records: very little use of the *anzen*–*anshin* coupling in the 1970s and 1980s. Instead, Diet members used the term *zettai ni anzen* (absolutely safe) with more frequency. The term fell into disuse in the 1990s to be replaced by *anzen*–*anshin*; its usage became especially pronounced in the 2000s after an incident of Mad Cow Disease.

During our meetings, the members said that, prior to the earthquake, they could reasonably trust the products

available to them—the system that underscored the *anzen*–*anshin* relationship was clearer—but this was no longer the case. Radiation and its indeterminacies—both the lack of sensorial cues about whether it is present and the ill-defined health consequences—destabilized understandings of safety (*anzen*), and as a result, it was more difficult to feel *anshin* for the available products. The reading club members needed to inform themselves so they could navigate a risk that was invisible and diffuse. The co-op was being careful about radiation and developed independent standards that were, on average, one-fifth of the government levels. However, it did not carry enough products, and we always had to purchase supplemental foods elsewhere. The members shared their knowledge and loaned each other the books they had purchased. They also acknowledged how difficult it was to implement all these changes in their daily life. Even if boiling removes radiation, who wants to eat boiled food every day? asked one of them rhetorically. One of the main uses for shiitake mushrooms is to make a broth (*dashi*). What would the point be of boiling the mushrooms to leech out the radiation if you then have to throw away the broth? Nakamura-san said that she sometimes wondered how much one should worry and if the associated stress of worrying too much would have a worse affect on health than the radiation.

I discuss the reading club to show the ways in which knowledge circulated in the aftermath of Fukushima and how these networks become sources of support for mothers concerned about radiation. There never was a clear conclusion to a meeting, and we never fully resolved the question of what was safe or not. But we supported one another and enjoyed a forum in which to share ideas and concerns. The Seikatsu Club offered an alternative to mainstream food retailers that abided by government standards, and we informed ourselves about the ways that the co-op was being careful about radiation, but we also reminded each other that the co-op was not big enough to completely protect us. We would still eat at restaurants, children would be fed school lunches, and the background radiation would remain the same, no matter our efforts. We identified practical measures that we could implement in our lives to lower our exposure. No one in the room was an expert, but that did not prevent us from sharing our findings and concerns. It was in these networks that the members encouraged each other to lead lives that would better ensure their health and that of their children. The government was not to be trusted, so we needed to band together, teach one another, and find alternative forms of living. These meetings were a place where scientific citizenship was in the making.

ANSHIN AND FOOD SAFETY

Safety is more than laboratory tests; safety is also a social relationship. It can only exist insofar as people trust that the products they are eating are indeed safe. I use the vocabulary of *anzen* and *anshin* because it compels us to think of food safety as inexorably tied to the social sphere. *Anshin* is a relational force without which a strong sense of safety cannot

emerge. One young mother I met was particularly incensed by government experts who told her to “eat with anshin” [anshin shite tabete kudasai]. “What does that mean?” she asked. “They do not know whether it is safe, but they still tell us to eat it” (conversation with author, November 2, 2011). Anshin by itself cannot provide reassurance of safety, which poses a difficult challenge for those claiming to offer safe food in post-Fukushima Japan. The government states that there should be no significant adverse health effects from ingesting food with radiation levels below 100 bq/kg. For producers and retailers working with these standards in the affected areas, it has become difficult to convince skeptical consumers that their products are safe, given the public’s mistrust of the official position. One staff member from the Fukushima prefectural government’s radiation testing center told me that almost all of the products they were monitoring test below the government standards and are safe. “What we have,” she said “is an anshin problem.”

Every January, the Japanese Kanji Proficiency Society chooses, by popular vote, the Chinese character (*kanji*) that best encapsulates the mood for the previous year. The character for 2011 was *kizuna*, meaning bonds.[^] It signaled the importance of solidarity after the triple disaster and the new bonds people formed to assist one another. While the selection of *kizuna* as character of the year can be seen as an attempt to lift the morale of the country, those bonds were in fact sprouting in the aftermath of the accident. People who had never taken an active interest in politics were moved by the accident to become involved. Some took to the streets to protest in ways that had not been seen in Tokyo for decades. Others formed new networks. Moms came together to ask their school boards to test school lunches. Scientists scaled back their research and wrote on Twitter to explain the science behind the catastrophe. Countless people volunteered in northern Japan, shoveling mud and helping to restart the fishing industry. Others planned “refresh” holidays for Fukushima children, hosting them for a week in unaffected areas to give them a chance to play freely outdoors. Neighbors lent each other books about radiation, moms started reading groups, and people started relief and radiation-education NGOs. These are the people who independently studied about radiation and concluded that something needed to be done. The state could not be counted on to protect the population, so they asserted their scientific citizenship to create alternative, healthy spaces where life would prosper.

Intimate acts such as eating can be constitutive of politics, and in the environment of post-Fukushima politics, it became a particularly charged activity. Its mundane quality gives eating the appearance of being a private sphere removed from the world of formal politics. Yet it is the everydayness of the act that makes it a particularly powerful source of politics. Eating is sustenance—nurturing and taking care of self and others. It is an intimate act of ingestion, which connects the body to the outside world and connects givers and recipients of sustenance in affective relationships. Eating

became one of the few arenas where citizens could exercise autonomy from governing structures and delimit for themselves their acceptable levels of risk exposure. Shopping for ingredients and preparing them in ways that minimize exposure to radiation are political acts that for the people I met became ways of circumventing the government and finding a sense of safety (anshin).

Scholars who have studied disasters have found that science is often unable to provide scientific certainty about a disaster’s effects (Button 2010) and that risk communication over complex issues can erode trust in government and expertise (Luoma and Löfstedt 2007). My findings revealed a similar pattern. The meaning of safety after Fukushima can be construed at a macro level in terms of population-wide projections and arguments that the effects of radiation exposure will be negligible. But these projections do little to assuage the worries of parents who may interpret the slight increase in odds as the possibility that their child may become sick and that they could have been more proactive to prevent illness. As Sharon Kaufman (2010) notes, there are limits to the ability of individuals to assess risks and trust the information provided by science, business, and politics.

The people I met in Japan developed practices and social networks that enabled them to minimize their radiation exposure. These involved relocating away from Fukushima, avoiding food grown near the affected areas, organizing into study groups in which they could learn about radiation and cooking techniques to minimize risk, joining organizations such as the Seikatsu Club that developed private safety standards that were stricter than the state’s, having food tested at a citizen testing center, and opening a vegetable store like Sawada-san’s to supply oneself and other mothers with trustworthy food and more. They educated themselves in the science of radiation and came to the conclusion that state assurances of safety were not to be trusted. They found anshin along independent channels that allowed them to eat with peace of mind. These are the practices of scientific citizenship. People like Sawada-san informed themselves, decided that the state was not doing enough to safeguard the health of the population—children in particular—and found alternative routes to do so. These practices, I argue, go beyond market choice and informed consumerism. Similar to movements that have cast doubt on the certainty with which some governments and experts have declared genetically modified organisms safe for human consumption (Wynne 2001), the impulse behind these activities comes from a desire to circumvent the state’s safety regulations and, as such, constitutes a reconfiguration of the relationship between citizens and the regulatory bureaucracies.

One mother who left Fukushima prefecture told me that the line between being a proactive parent and turning into an obsessive mom whom the child disregards is difficult to negotiate. She said she did not want to turn into a “crazy mom” but also wanted to make sure she was doing everything in her power to protect her children from the risks of radiation. Eating, shopping for food, and cooking

are daily activities; constantly worrying about them can be tiresome, even debilitating. The practices that scientific citizenship engendered turn this uncertainty gap into something manageable that can be integrated into one's daily life.

Nicolas Sternsdorff-Cisterna *Anthropology Department, Southern Methodist University, Dallas, TX 75275; nsternsdorff@smu.edu*

NOTES

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- Radiation in food items is usually measured in becquerels per kilogram. A becquerel is the amount of radioactive activity where one nucleus decays per second.
- On March 17, 2011, the government issued emergency standards to monitor radiation in the food supply. The standards were derived from the International Commission on Radiological Protection guidelines, which state that the general population should not be exposed to more than five millisievert per year. On this basis, the Japanese government created standards for the radioactive substances emitted from the nuclear meltdown. The maximum allowable standard became 500 bq/kg for cesium and 2000 bq/kg for iodine (Michino 2012). The standards for cesium were later revised in April 2012 to a maximum of 100 bq/kg for general food products while iodine had by that time decayed and so was no longer a concern.
- There are numerous scholars working on the Great East Japan Earthquake on topics such as recovery (Adachi et al. 2012), nuclear power (Hasegawa 2012), the ethnography of the disaster (Gill et al. 2013; Slater 2011), and archiving projects such as the Reischauer Institute's Digital Archive (2013).
- The Fukushima nuclear accident is not the first accident in Japan's nuclear industry. See Dusinberre and Aldrich 2011 and Samuels 2013.
- The public was also suspicious of the government and associated institutions. The government, utility operators, certain universities, and the media were part of what is known as Japan's "nuclear village" (*genshiryoku mura*), an alliance of institutions that promoted the use of nuclear power in Japan and reassured the public by stating that the technology was absolutely safe (Kingston 2012).
- This interpretation stems from my positioning during the early stage of the disaster that I studied. There are numerous lawsuits against TEPCO and the Japanese state for the accident, and people displaced by the exclusion zone are indeed seeking redress (though not on the basis of biological damage but, rather, lost livelihoods). Furthermore, cancer rates may take years to reveal themselves; therefore, few people, if any, could at this point make radiation-related cancer claims from the state.
- Prior to March 11, 2011, the date of the disaster, women also participated strongly in food safety activism (Kimura and Nishiyama 2008). For a history of civil activism, see Avenell 2010.
- Milk was a major concern for mothers. Japan's dairy farmers tend to pool their milk in distribution centers before it is processed and shipped to consumers. Mothers worried that if a farmer was producing contaminated milk, it could be diluted through this consolidation and the radiation would be hidden yet still present in the milk.

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