Japan's Nuclear Imaginaries before and after Fukushima: Visions of Science, Technology, and Society

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ABSTRACT

Two recent insights regarding social imaginaries are of particular relevance in thinking about the Fukushima disaster and its aftermath. First, social imaginaries are consequential for social resilience. Second, imaginaries play a significant role in the way a society addresses science and technology. In light of these insights, the paper explores nuclear imaginaries in Japan before and after Fukushima, and presents several key historical factors that shaped such imaginaries in the lasting manner. It presents how Japan's nuclear imaginaries have persistently embraced certain ideals of science and technology, and excluded people subject to radiation risks. The paper concludes by calling for explicit engagement with our nuclear imaginaries, in terms of social resilience, and also as an arena where we can explore more democratic approaches to science and technology. Such engagement is also consequential to larger visions of society.

Key words

Social imaginaries, sociotechnical imaginaries, resilience, public engagement with science and technology, Fukushima nuclear disaster

INTRODUCTION

For decades, scholars in humanities and social sciences have explored the role of imagination in social life. After influential works by Anderson (1983),[1] Castoriadis (1975/1998), Appadurai (1990) and Taylor (2003), the concept of social imaginaries – imagined collectivities, together with shared assumptions about social relations and practices, as well as collective representations and narratives about a society's past, present, and future – has become a common analytical tool in such fields as anthropology and sociology.

Two recent insights regarding collective imaginaries are of particular relevance in thinking about the Fukushima disaster and its aftermath. First, social imaginaries are consequential for social resilience. Hall and Lamont (2013a, 2013b) argue that social imaginaries are constitutive of the collective capabilities of a community or society, as they not only bind its members with narratives of its past accomplishments and a vision of what it means to belong to it, but also indicate how its members understand what they are capable of doing together. Defining social resilience as "the capacity of groups of people bound together in organizations, classes, racial groups, communities, or nations to sustain and advance their well-being in the face of challenges," (Lamont and Hall 2013), they argue that imaginaries can provide significant resources for such a capacity. For instance, a strong group identity has been found to alleviate the impact of adverse experiences (e.g., Feliciano 2005, Oyserman et al. 2006), and members of stigmatized groups rely on their collective imaginaries to cope with discrimination (Lamont et al. 2013).

Second, imaginaries play a significant role in the way a society addresses science and technology. Jasanoff (forthcoming; also see Jasanoff and Kim 2009) argues that visions of future developments in science and technology are inevitably and intricately connected to collective visions of good and attainable futures, and posits a concept of sociotechnical imaginaries. Defined as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff forthcoming), this concept allows us to explore and understand the complex interplay between developments in science, technology, and society. Importantly, such imaginaries are variable across groups; they are durable yet changeable; and they are not only descriptive, but also prescriptive – engaging with what kinds of future should be pursued and how they should be achieved through science and technology. They also encompass shared fears of harms that might result from invention and innovation.

These recent insights call for an explicit examination of Japan's nuclear imaginaries, both before and after the 2011 disaster. What visions of society were pursued through nuclear technology? What visions do current politics and policy approaches embody? Do they facilitate resilience of communities affected by the disaster? In the following, I present a few

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[1] In his seminal account of the emergence of nation-states, Anderson defined the nation as "an imagined political community" – the product of the shared imaginations of those who perceive themselves as members.

findings from a larger ongoing project that traces such imaginaries.[2] To clarify, different groups in society might harbor and advocate different, competing imaginaries, but some can be more dominant than others. Policy is a particularly important site that presents and institutionalizes certain imaginaries as authoritative and representative.

NUCLEAR IMAGINARIES IN JAPAN: AT THE TIME OF THE 2011 DISASTER IN FUKUSHIMA

Among the most striking aspects of the way nuclear technology was imagined by the general public in Japan right before the 2011cdisaster are: (1) how decoupled and dissociated nuclear energy production was from nuclear weapons; and (2) how rarely the former was imagined at all. The public was overwhelmingly indifferent, and took it for granted that there were 17 nuclear power plants (NPPs), supplying 30 percent of the country's electricity. As former-nuclear-engineer-turned-opponent Tanaka (2008) argued, nuclear energy solicited little public attention: "what supports the national policy to promote nuclear power more than anything is the unrecognized indifference of people in big cities" (my translation). Pointing out that none of TEPCO's 17 reactors existed within the areas (including Tokyo) to which the company supplied electricity – all were located in Fukushima and Niigata Prefectures. "We have 55 reactors, but most of us live our daily life as if they don't exist" (my translation). This was the climate in which any critiques or even reservations about nuclear power would have one labeled as "unrealistic dreamer," as Murakami (2011) later described. Nuclear phase-out was unthinkable to many Japanese.

This paradigm was to continue: A month before the March 11 disaster, the Japanese government decided to extend the operation of existing nuclear power plants, partly as a measure to reduce greenhouse gas emission. At the time of the disaster, TEPCO had plans to start constructing two additional reactors at the Daiichi (1F, from now on) site the following year. In general, the predominant policy discourse about nuclear energy centered on the following ideas: (a) it is a source of stable supply; (b) it is economically efficient; (c) it produces zero carbon emission; and (d) by ensuring safety and gaining public understanding, we need to expand it. For instance, in the 2010 Basic Energy Plan, long-term energy plans announced every several years, nuclear energy was categorized as "non-fossil" and "zero-emission sources" together with "renewable energy," and it was proposed that the ratio of these two types of energy be raised from the then 34% to more than 50% by 2020, and about 70% by 2030.[3] The Plan stipulated that more nuclear power stations ("at least 14 reactors") be built and the operating rate of the facilities be increased (to "about 90%") by 2030, while gaining public understanding and trust, especially of local residents, and on the condition of ensuring safety.

At the time, for the government and other proponents of nuclear power production, it was linked to the nationhood both as an indispensable technology that allowed the country with scarce natural resources to prosper and as a technological domain in which Japan excelled. This is evident in the 2006 "Nuclear Power Nation-Building Plan," a report submitted by the Nuclear Energy Subcommittee in the Advisory Committee for Natural Resources and Energy.[4] The plan urges Japan to increase the share of nuclear power, spread its nuclear technology globally, and contribute to nuclear non-proliferation. Similarly, in his ill-timed book, writer-critic Toyota (2010) argued that Japan's nuclear technology was the safest in the world and that the country should promote it both for the economic gains and for the good of humanity, such as a solution to climate challenges.

Organized opponents existed throughout Japan, though marginalized as Luddites, hippies, or "unrealistic dreamers." They had called attention to various issues of concern, such as unfounded "safety myth," the insularity of the nuclear community as "village," and the industry "capture" of policy processes (e.g., Study Group on the Problems of Aging Nuclear Power Stations 2008; Kamata 2001) — many of these have become accepted and shared understandings after the 2011 accident, even presented by major investigative reports put out in 2012 by the Diet, the Cabinet, and a private foundation.

Notably, not only the general public, but also many activists against nuclear power and weapons did not necessarily consider the two applications tightly connected. Even a number of *hibakusha* and anti-nuclear weapons activists were uncritical of nuclear energy production.[5] In July 2011, Terumi Tanaka, Secretary General of *Nihon Hidankyo* (Japan Confederation of A- and H-Bomb Sufferers Organizations) organization, said: "I have been thinking since the nuclear

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[2] I currently work with Lamont and Jasanoff on a multi-year project, funded with an STS grant from the National Science Foundation (Award No. SES 1257117), that traces the development of dominant nuclear imaginaries in Japan and the United States. Our data include media coverage, policy documents, organizational documents, interviews, and ethnographic data.

[3] http://www.enecho.meti.go.jp/topics/kihonkeikaku/100618honbun.pdf

[4] http://www.enecho.meti.go.jp/topics/images/060901-keikaku.pdf Based on the Framework for Nuclear Energy Policy, approved by the Cabinet in October 2005.

[5] One of them, *Gensuikin* (Japan Congress against A- and H-Bombs), has long been calling for nuclear phase-out in energy production,; it held its annual meeting in Fukushima in July 2013, clearly signaling its opposition to the two related applications of nuclear technology. Another group, The other group, *Gensuikyo* (Japan Council against Atomic and Hydrogen Bombs), has been cautiously against certain aspects of nuclear power production, but has not opposed to the idea itself completely.

accident, perhaps we *hibakusha* may not have thought very much about nuclear power. These days I think that we need to revisit and more thoroughly study the background of the technology, the system of management, how the industry and government addressed it, etc., and continue to debate about what we can say and do as *hibakusha*."

In the pre-Fukushima dominant imaginaries, future Japan is ecological, efficient, and equipped with clean energy and strong science and technology, and these objectives are facilitated by nuclear technology. In this vision, technological prowess is an important part of the country's national identity (see Hecht 1998 for the French case), and major social problems are solved by advances in science and technology.

Also implied in these imaginaries is so-called the "deficit model," in which the public's skepticism toward and/or rejection of a specific scientific or technological development is attributed to its ignorance and incomprehension. In this model, knowledge is monopolized by experts, and solutions to the public objection consist of educating them with more and better information about science and engineering and raising their "literacy." STS scholars have presented various critiques to this model, showing how sophisticated and productive "lay" knowledge can be (Wynne 1982, 1996; Epstein 1996), how "local" and parochial – as opposed to "universal" – expert knowledge can be (Wynne 1996), and how increased scientific "literacy" does not always lead to acceptance and appreciation of science and technology (Bucchi and F. Neresini 2008). Critics of the deficit model have called for public engagement in various aspects of science and engineering: not only final assessment of a given for policymaking objectives (e.g., public hearings, consensus conferences, deliberative polls), but also early stages of scientific research and technological development (Rowe et al., 2005; Wilsdon, 2005; Jasanoff 2003; Stirling 2008; see Delgado et al. 2011 for a review of current issues regarding public engagement).

Furthermore, lacking conspicuously in these imaginaries surrounding nuclear technology are certain actors, practices, and phenomena: workers at nuclear power plants (NPPs), local residents, day-to-day operations at NPPs, and risks of radiation for workers and residents. After the 2011 accident, it was a significant surprise for many Japanese to learn about the precarious conditions of labor at the plants (Higuchi 1981; Asakawa 2011; Jobin 2011), as well as how "manual" and low-tech some of the workings and physical realities of NPPs are, as opposed to the images of a clean control room, which was a typical representation of an NPP, and how much uncertainty surrounded a control and effects of radiation. Urban Japanese were also largely oblivious to the risks that local residents bore as NPPs supplied energy to their cities. Moreover, decoupling from bombs prevented *hibakusha*'s postwar social, political, and physical struggles from being relevant to discussion of life with NPPs.

Historical Factors behind the pre-Fukushima Nuclear Imaginaries

While nuclear imaginaries described above are obviously a product of long-term, complex historical processes involving numerous actors, events, and cultural, political, and economic resources, below I highlight several key factors that have significantly shaped them in early postwar years in the way that have persisted since then.

First, in postwar Japan, the public discussion of nuclear technology – and the war experience in general – was significantly shaped by the systematic censorship, carried out by the Allied Occupation from September 1945 to October 1949. Under this censorship, discussion or expression of the experience of the bombings was prohibited. For instance, a 1946 documentary film made by the Japanese government, experts and filmmakers, which depicted the aftermath of the bombs in black and white, was confiscated by the Occupation, and kept in the United States, only to be returned to Japan in 1967 and shown in 1996. Not only did the Occupation censorship forbid criticism of the United States or other Allied nations, and references to experience of the atomic bombs, but also no indication of censorship itself was allowed. The insidious nature of this censorship had a profound impact on the way the Japanese talked about and thought about the atomic bombings. Kawamura (2011) argues that this kind of manipulation contributed to the way the issue of atomic bombings became meaningless, hidden, and invisible to most Japanese in plain sight.

After the end of the Allied Occupation in 1952, many Japanese saw visual representation of victims of atomic bombs for the first time when *Asahi Graph* – a *Life*-like general interest photo magazine – published a series of photos in its August 6th 1952 issue. While the photos certainly were shocking by most standards, with charred bodies and badly injured children, what was strikingly missing was any critiques of the act of bombings themselves. The brutality and inhumanity of the bombs were emphasized without an agent, and also portrayed as a deterrent of another war, or a purveyor of peace. Notably, an organized movement against nuclear bombs did not emerge until after the Bikini Atoll incident in 1954, when the crew of a Japanese fishing boat was exposed to nuclear fallout from the American testing of thermonuclear bomb.

Second, in the Cold War context, Japan came to thoroughly embrace the concept of "peaceful" use of nuclear technology, which was aggressively promoted by the United States. With the 1953 "Atoms for Peace" speech, Eisenhower sought to recast nuclear technology for world redemption and incorporate it into the emerging Cold War order by promising to share it with non-communists countries. Japan's nuclear energy industry came about in this context, coinciding with the rise of anti-nuclear weapons movement. Here, the rejection of weapons not only did not contradict the excitement about "peaceful" use, but also served as a driving force of the latter (Yamamoto 2012). In the name of turning a tragedy into

inspiration, the US government even launched a campaign to build an NPP in Hiroshima in 1955 (Tanaka and Kuznick 2011). The US found Japanese allies including young politician Yasuhiro Nakasone (later Prime Minister) and Matsutaro Shoriki, who ran the *Yomiuri Shimbun* and was known as the father of Japanese baseball (and later member of the parliament and the father of nuclear power). For instance, Shoriki worked with the US government to organize the traveling exhibition on "the peaceful use of atomic power." The exhibition started in Tokyo and visited nine other cities including Hiroshima, where it was co-sponsored by the Hiroshima City Council, Hiroshima Prefectural Government, Hiroshima University, and the *Chugoku Shimbun*, and received enthusiastically in spring 1956. While many *hibakusha* were initially cautious about this "peaceful" application of the technology, arguing that no solution had been found to the problem of managing radioactive materials, by summer 1956, even Moritaki Ichiro, an intellectual leader of survivors and nuclear weapons abolitionist, came to embrace the idea of "peaceful" use (Tanaka and Kuznick 2011). Importantly, this dichotomous view in which the tragedy of military use is contrasted to the prosperity of "peaceful" use, as well as decoupling of the two, resulted from concerted efforts by the US government and Japanese supporters of nuclear energy. In the late 1950s, very little opposition existed to the ideas of nuclear power production or plans of building NPPs. Narratives of nation-building through nuclear energy were not hindered by the memories of the bombs or the growing anti-nuclear weapons movement; rather, they were supported by the idea that, as the "sole victim" of the bombs, Japan should lead the world in this technology.

Third, as some scholars argue, behind the de-politicized nature of nuclear energy production was the long-standing history of internal colonization in Japan, whereby Tokyo and the power that be there have exploited and colonized the periphery such as the Tohoku region, of which Fukushima Pref. is part of. As Hopson (2013) points out, Tohoku-born intellectuals have long described the region a domestic colony of the center, whose subjugated and "backward" status resulted from official policy decisions during the Meiji period (1868-1912) of rapid modernization. These intellectuals were aware – some as early as in the 1890s – that the region's often essentialized "backwardness" was a product of the exploitation of its resources and domination (Hopson 2013). As the region turned into a significant provider of rice and labor for the growing Tokyo Metropolitan area, the narrative that the backward region needed to be developed also became common, and local support for projects such as NPPs became strong. In this context, Tohoku became the primary provider of electric power for Tokyo, and the constructions of NPPs in Fukushima was an extension of this historical trend.[6] (For more studies of exploitation of the periphery by the center, see Kainuma 2011, Takahashi 2012, Kawanishi 2011). With this unequal relationship as a backdrop, a sociotechnical system that isolates NPPs, their workers, and local residents from urban areas came about, corroborated by narratives of nation-building as a noble goal.

Fourth, Japan's science and technology nationalism preceded World War II (Mizuno 2010), but after the defeat by the atomic bombs, narratives of nation-building through science and technology became a constitutive element of government policy in various areas. Despite a number of debates about the relationships between science, technology and society in the 1950s and 1960s, often carried out by prominent scientists and engineers such as Hideki Yukawa and Mitsuo Taketani (e.g., Doi 2012), the ideas that science and technology belong to the elite and experts prevailed and survived various challenges, including pollution diseases, anti-NPP movements, and various NPP accidents, both at home and abroad. While this deficit model has been prevalent globally, in Japan it had an elective affinity with the country's technocratic tradition and scientific nationalism, leading to the rise of safety myth and nuclear village and the systematic exclusion of lay voices.

NUCLEAR IMAGINARIES IN JAPAN: AFTER FUKUSHIMA

The 2011 nuclear disaster was a colossal event in Japanese history that has prompted unprecedented efforts to review and discuss what happened, how and why, as well as where we should go as society. Issues of nuclear power, long marginalized and depoliticized, have come into the spotlight in the Japanese public discourse. Numerous TV programs, magazine and newspaper articles, blogs, films, and books have explored a variety of issues, from historical backgrounds of Japan's NPPs to causes of the disaster to the effects of radiation on human health to the energy future of Japan. Furthermore, there have been multiple large-scale efforts to investigate the accident, and new regulatory framework was introduced.

However, despite these efforts at reflection and momentary openness to change that followed, much of the older imaginaries remain today, dictating policy and political debates, as well as the way the pubic can engage with decision processes. In particular, the deficit model, the way the polity is imagined as centralized, and the way radiation risk bearers are hidden all persist.

For instance, despite the consistent majority opposition to restarting of reactors (all the 48 of them are currently offline) in opinion polls, the 2014 Strategic Energy Plan has paved ways to restarting of NPPs whose safety has been confirmed by the Nuclear Regulation Authority (NRA) under "the new regulatory requirements, which are of the most

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[6] As an effort to unearth the region's rich culture and history and understand what its reality says about Japan's past and present, noted folklorist Norio Akasaka has been advocating "Tohoku-gaku," or Tohoku Studies.

stringent level in the world."[7] The Plan presented nuclear power still as a primary, "base-load" source for the country's energy supply, emphasizing the same rationales as earlier (e.g., efficiency, stability, Japan's scarce natural resources, less greenhouse gas emission than fossil fuel-based energy), and in case of restarting a reactor, the government will "make best efforts to obtain the understanding and cooperation of the host municipalities and other relevant parties."

On one hand, the Plan shows some new approaches, emphasizing the significance of opening up the regulatory processes, increasing transparency over the energy policy planning process, and obtaining public trust. It even calls for an end to the national government's monopoly over many decision-making processes, as well as more open engagement with various stakeholders. On the other hand, the idea that the issue is communication with the public, rather than the public's democratic participation, still prevails. In this line of thinking, safety is presented as a domain exclusively for elite efforts, whether scientific or managerial, and the public's concerns and anxiety as something to be resolved with explanation and communication. Such ideas of unproblematized expertise and the deficit model still predominate, despite much soul-searching that took place.

In this context, young mothers who show concerns about the effects of low-dose radiation exposure are portrayed as irrational and pressured to be silent; uninformed workers are mobilized to participate in decontamination efforts in a precarious, exploitative manner; evacuees from some areas with decreased radiation are nudged to return, with financial support about to be reduced or cut; and municipalities within 30kim of a NPP, although now part of emergency evacuation plans, do not have a say in its restarting (Jobin 2013; Williamson 2014).[8] These are consistent with the earlier visions of nuclear technology, even though Japan's nuclear imaginaries have forever been changed by the accident.

CONCLUSIONS: TOWARD DEMOCRATIC IMAGINARIES

If new nuclear imaginaries are to serve as resources for social resilience, they need to allow those affected by its negative consequences to feel that their experience matters, that they are part of this social enterprise that explores new relationship to nuclear technology, that they have a say. Japan's dominant nuclear imaginaries have consistently excluded their voice, before and after Fukushima, and we need to reexamine whether that is the direction we want. It is also an opportunity to reflect further on our relationship to science and technology. While many countries in the West have incorporated public engagement in their policy processes, Japan lagged behind, although some provisionary attempts have been made since the disaster (Tanaka 2013). Nonetheless, the deficit model still prevails, and what kinds of public engagement would be productive in Japan need to be explored. And if, in addressing nuclear technology, we are signaling and performing where we are going as society, we should reexamine our approaches carefully and explicitly. After all, the key issue is not simply whether we want nuclear energy or not and how; it is also about whether we want a society that exploits and abuses the vulnerable (Takeda 2011).

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