

Fukushima's Black Bags: How Citizen Scientist Activism is framed by Cultural Contexts, Environmental Justice, and Ethical Reasoning

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Abstract

Fukushima Prefecture, on the Pacific coast north of Tokyo, Japan, is spotted with radioactive contaminated matter packed into black bags as a result of the March 11, 2011 Tohoku earthquake, tsunami, and subsequent meltdown of the Fukushima Daiichi Nuclear Power Plant run by Tokyo Electric Power Company (TEPCO). Through the lens of local culture, core ideas of human rights, and deontological ethical reasoning, I argue that a solution to Fukushima's remaining radioactive mess, symbolized and made visible by the black bags, must be created by the citizens of the affected areas and backed by TEPCO and the government. Citizen scientists—defined as any person with scientific proficiency or expertise who translates between laypeople and professionals—provide a crucial link between local and expert. The pursuit of a land-use based approach to reorganize and revitalize Fukushima must come from those who live there, because only then a feasible solution will be realized.

This essay will join the conversation of what should be done to remedy and who should have a say in what happens with the remains of the 3/11/11 Triple Disaster encapsulated in the black bags. If you were Japan's Minister of the Environment, who would you decide should have a voice in resolving

the dilemma? How can the tension between insider and outsider groups be resolved? Who should decide the fate of the black bags? How to move forward in Fukushima is a question yet unresolved.

Introduction

In a country abundant with earthquakes, it would be easy to assume that all Japanese civil engineers plan for potential damage from seismic activity. Unfortunately, it is not so. The results of the 2011 earthquake was a magnitude of 9.0 on the Richter scale; while a 2002 report estimated that it was only a 20% probability of a magnitude-8 earthquake accompanied by a powerful tsunami happening in Japan in the following 30 years.¹

Fukushima Prefecture, located approximately two hours north of Tokyo via *shinkansen* (bullet train), is the location of the March 11, 2011 Great East Japan Earthquake (GEJE), also called the Tohoku Earthquake. Followed by a tsunami and meltdown of the Fukushima Daiichi Nuclear Power Plant, the event is known as the Triple Disaster. The resulting release of radioactive steam into the atmosphere caused severe damage everywhere the wind blew. Nearly 100,000 evacuees are still living outside of Fukushima Prefecture and the exclusion zone nearest the nuclear plant.² Health and food uncertainty struck fear across the nation as the air and seas were increasingly contaminated by the Daiichi Plant's malfunction. TEPCO admitted to the contamination, of which "the attendant environmental and social impacts are believed to eclipse those of Chernobyl," the 1986 Ukrainian nuclear accident.³ Although the design of the Fukushima Daiichi Nuclear Power Plant owned by TEPCO included safeguards against the elements, the thirteen-foot cliff protecting the plant had no chance of stopping the tsunami that peaked at 127 feet.⁴ Both Fukushima and Chernobyl are classified as

1 See Bobuo Mimura, Kazuya Yasuhara, Seiki Kawagoe, Hiromune Yokoki, and So Kazama, "Damage from the Great East Japan Earthquake and Tsunami- A Quick Report," *Mitigation and Adaptation Strategies for Global Change*, vol. 16, no. 7 (October 2011) and Justin McCurry, "Japanese Government Held Liable for First Time for Negligence in Fukushima," *Guardian*, March 17, 2017, <https://www.theguardian.com/world/2017/mar/17/japanese-government-liable-negligence-fukushima-daiichi-nuclear-disaster>.

2 Alan Taylor, "5 Years since the 2011 Great East Japan Earthquake," *Atlantic* (Boston), March 10, 2016, <https://www.theatlantic.com/photo/2016/03/5-years-since-the-2011-great-east-japan-earthquake/473211/>.

3 Vlado Vivoda and Geordan Graetz, "Nuclear Policy and Regulation in Japan after Fukushima: Navigating the Crisis," *Journal of Contemporary Asia*, vol. 45, no. 3 (August 2015): 490.

4 Sara B. Pritchard, "An Envirotechnical Disaster," in *Japan at Nature's Edge: The Environmental*

level 7 major accidents, the highest level on the International Nuclear and Radiological Event Scale.⁵

In wake of the 2011 events of Fukushima, it must be decided what should be done with the remaining contaminated mess, symbolized by black bags, full of radioactive material. *Furecon* bags (フレコンバッグ)—a blend of the borrowed English words “flexible” and “container”—remain stacked everywhere, a poignant visual reminder of the ever-present, silent threat of radiation. A Google Maps search of any coastal town in Fukushima Prefecture shows multiple patches of the bags neatly lined up. Commonly used in construction work, the material is not specially designed to contain radiation.⁶

Japan’s Minister of the Environment must rectify the dilemma of who should have representation in the decision-making process concerning Fukushima’s cleanup. In this role, one must grapple with a dissonance between inside and outside groups; Fukushima evacuees and TEPCO are considered insiders, immediately involved, whereas the Japanese government and the unaffected population of Japan are considered outsiders due to their separation from the disaster. Who should decide where the black bags should go? How can the tension between groups be reconciled? These unanswered questions keep victims of the incident from resuming lives of normalcy.

The solution requires an ethical approach. I will use consequentialist and deontological reasoning to discuss what to do with this contaminated land, how it shall be done, and by whom. Through the core ideas of local culture, environmental justice, and consequentialist and deontological ethics, I argue that a solution to Fukushima’s black bags must be created by the citizens of the affected areas, led by citizen scientists, and backed by TEPCO and the government. This combination of teamwork under the leadership of affected citizens will ensure a solution acceptable to all and appropriately feasible on many accounts.

In this essay, historical issues and background surrounding the current-day decontamination problem will be examined first. Next, local cultures

Context of a Global Power, edited by Ian Jared Miller, Julia Adeney Thomas, and Brett L. Walker (Honolulu: University of Hawai’i Press, 2013), 255.

5 International Atomic Energy Agency, “International Nuclear and Radiological Event Scale (INES),” <https://www.iaea.org/topics/emergency-preparedness-and-response-epr/international-nuclear-radiological-event-scale-ines>.

6 Chie Kobayashi and Debra Goldschmidt, “Japan Recognizes First Death Related to Fukushima Cleanup,” *Cable News Network*, September 7, 2018, <https://www.cnn.com/2018/09/07/health/japan-first-fukushima-death/index.html>.

within the general Japanese culture will be discussed, and how they add layers of understanding to our dilemma, in which a significant player is the citizen scientist (able to work between experts and local people), environmental justice as a natural human right, and the ethics that determine responsibility. The paper will be concluded with forward-moving initiatives and progress that reveal complexity in finding a solution.

Japan, a nation that seems to always be one step ahead of the rest of the world in terms of large problems—whether it be an aging population, declining birth rate, lack of productive land, recycling, or nuclear meltdown disasters—is “allowing the world to learn and benefit from their stumbles, innovations and experiments” in regards to their own reactions towards these issues.⁷ Different from Chernobyl in their desire to recover the area, the Japanese people as a whole are actively pursuing solutions, and endeavor to recover and improve the land, not just entomb it. It is the author’s hope that the world can learn from Japan’s trials.

Literature Debates Related to Fukushima

Disciplines that factor into discussions surrounding the issue of Fukushima’s black bags in this essay include history, anthropology, philosophy, and science. They coincide with the main topics of historical issues, culture, human rights, ethics, and solutions featured later in the text. Also included are the fields of economics, business analytics, and political science. The interdisciplinary fields of environmental and Asian studies overarch the entire discussion. When these disciplines come together and cultivate discussion, it enables analysis and a deeper understanding of the physical disorder of Fukushima, and gives recommendations for a path forward.

Many past events inform the black bag problem, and many authors write about essential background history that explores the time leading up to the Daiichi accident. The events of Chernobyl are especially illuminating concerning Fukushima’s initial responses, but fail to educate on the return of humans living in evacuated areas due to Chernobyl’s continued designation as an exclusion zone.⁸ Old scars from the atomic bombs and newer scars

7 Iain Marlow, “Japan’s Bold Steps,” *Globe and Mail* (Toronto), November 13, 2015, <https://www.theglobeandmail.com/globe-investor/retirement/retire-planning/how-japan-is-coping-with-a-rapidly-aging-population/article27259703/>.

8 John Wendle, “Animals Rule Chernobyl Three Decades After Nuclear Disaster,” *National*

from accidents like the 1999 Tokaimura nuclear criticality accident formed a pattern of resistance to nuclear energy and receptiveness to renewable energy. With a lack of natural resources, renewables are preferable. Records and stories provide a view into the events of the past that give context to current Fukushima actions and reactions.⁹

Many cultural factors influenced the decisions and reactions immediately following the initial quakes as well as in the years after. While Mimura, et al. give statistical facts, NHK's television show 未来塾: *Lectures for the Future* considers the opinions of real individuals about Fukushima and their many fears and doubts about future nuclear energy several years after the fact.¹⁰ Beyond the general implications of culture, O'Brien considers the impact on local fishermen and offers a perspective on the humble nature of the 50 heroic workers who stayed behind when the plant was evacuated.¹¹ Both of these groups shaped the responses to and outcome of March 11, albeit in different ways. The author personally got a glimpse into this culture during travels to Fukushima in January of 2018.

Human rights as defined by international society are an essential part of this paper's argument. The United Nations' 1948 Universal Declaration of Human Rights lends the most essential, fundamental ideas of the rights of people. As more recent conversations explain, it is now widely believed that the environment needs to be included in these doctrines as a basic right.¹² His belief is due to an undeniable relationship between human lives and the natural world, a connection that is constantly shifting.¹³ Schapper argues that the current way we maintain human rights is not rigorous enough to address environmental injustice. Rinfret and Pautz introduce an American perspective of environmental justice. The 2015 Paris Agreement finally

Geographic, April 18, 2016, <https://news.nationalgeographic.com/2016/04/060418-chernobyl-wildlife-thirty-year-anniversary-science/>.

9 See Ibid. and International Atomic Energy Agency, "International Nuclear."

10 See NHK (日本放送協会), "Fukushima から考える「ニッポンの未来」", in 未来塾: *Lectures for the Future*, television broadcast, November 4, 2018, <https://www.nhk.or.jp/ashita/miraijuku/>.

11 See Miles O'Brien, "Return to Fukushima with Miles O'Brien," video, August 6, 2014, <https://www.youtube.com/watch?v=HtwNyUZJgw8>, 33:15 and Miles O'Brien, "The Heroes of Fukushima Dai-ichi, But Don't Call Them That," *Public Broadcasting Service*, March 13, 2016, <https://www.pbs.org/newshour/science/the-heroes-of-fukushima-daiichi-but-dont-call-them-that>.

12 See Tracey Skillington, *Climate Justice and Human Rights* (New York: Palgrave Macmillan, 2017).

13 See Brett L. Walker, Preface to *Japan at Nature's Edge: The Environmental Context of a Global Power*, edited by Ian Jared Miller, Julia Adeney Thomas, and Brett L. Walker (Honolulu: University of Hawai'i Press, 2013).

writes that states should recognize their obligations to human rights, but Schapper believes the idea needs to be further developed to fully benefit those facing environmental injustice. McCurry encourages international pressure on the Japanese government as an environmental justice violator by reporting on the plight of one woman begging for her basic rights.¹⁴ These interpretations of human rights lend to the paper's argument on a normative concept and will inform sociological and anthropological understanding of the black bags.

Ethical conversations for this research are largely informed by the Internet Encyclopedia of Philosophy's wisdom that intersects with the other disciplines in this essay.¹⁵ Global environmental responsibility is hard; Japan's desire to reduce climate impact from emissions via carbon neutral nuclear energy shows good intent, but has turned out to be an option condemned by the large majority of the nation due to the Daiichi disaster, as argued by Silverstein. TEPCO's corporate-social consequentialist responsibility and the government's innate deontological role hold major ethical stakes in the situation.¹⁶ Legal ramifications also contribute to TEPCO's responsibility for the events of 2011. Bradsher and Tabuchi introduce the 50 workers who stayed behind to take care of the highly dangerous reactors during the meltdown and how they certainly fulfilled a lifetime's worth of ethical responsibility. The exploration of the ethics behind these hard decisions leads us into a very intricate moral situation, which can apply to decisions about any nuclear energy system around the globe, as well as lend insight on major pollution events with lasting costs.¹⁷

Takao would argue that the fragile relationship between inside and outside groups consequently demands the involvement of citizen scientists.

14 Justin McCurry, "Fukushima Evacuee to Tell UN That Japan Violated Human Rights," *Guardian*, October 11, 2017, <https://www.theguardian.com/environment/2017/oct/11/fukushima-evacuee-un-japan-human-rights>.

15 James Fieser, "Ethics," in *Internet Encyclopedia of Philosophy*, <https://www.iep.utm.edu/ethics/>.

16 See Kaori Kuroda and Yu Ishida, "CSR in Japan: Toward Integration and Corporate-CSO Partnership," in *Corporate Social Responsibility and the Three Sectors in Asia: How Conscious Engagement Can't Benefit Civil Society*, edited by Samiul Hasan (New York: Springer, 2017) and McCurry, "Japanese Government."

17 The many approaches to moving forward from the disasters of 2011 are varied. Avenell discusses the cross-border interaction and collaboration between people when it comes to environmental movements, and the "translocal community"—how people interact and exchange across borders. The earth's interconnectedness calls for increased attention to local environmental issues for the sake of a possible chain reaction effect on the global environment. See Simon Avenell, *Transnational Japan in the Global Environmental Movement* (Honolulu: University of Hawai'i Press, 2017).

He stresses the “importance of public participation in the production and use of environmental science,” with citizen scientists as key players linking ordinary people with expert knowledge.¹⁸ Local experts, such as professors, STEM students, and mothers, are strategically equipped to address environmental injustices, and are essential in participating in policy through building confidence surrounding expert knowledge claims for the local people.¹⁹ Aldrich discusses the “interplay between top-down directives and grassroots activism,” which is a space inhabitable by citizen scientists.²⁰ On the one hand, citizens scientists can ‘translate’ and adapt scientific information, and thus increase local confidence in “expert knowledge claims on which policy relies,” strengthening the existing policy networks.²¹ On the other hand, they fill officials in on local knowledge and work to protect the environmental rights of locals. The impact of the individual citizen’s voice can be powerful and persuasive, as was shown by recent court cases ruling in favor of people damaged by the radiation from Daiichi.²² Silverstein shows an image of a changing Japan, with some cracks growing in the anti-nuclear wall with multiple nuclear plants put back online by the government.

Background and Pre-Daiichi Issues

Many of the black bags sit on former sites of production, such as abandoned rice fields, leaking radiation back into the environment. We cannot “throw away” radiation. The interconnectedness of nature will bring it back to us.²³ The black bags in Fukushima represent a lot of things: contaminated items, continued radiation leakage into the ground and ocean near Daiichi, destroyed hopes, demolished towns, interrupted lives, and a

18 Yasuo Takao, “Making Environmental Policy Work with Civic Science: The Intermediary Role of Expert Citizens at the Japanese Local Level,” *Local Environment*, vol. 21, no. 9 (2016): 1101.

19 Many women and mothers involved in environmental-protection groups have been vocal protesters and successful policy changers, especially when the safety of children is at stake. See Nicole Freiner, “Mobilizing Mothers: The Fukushima Daiichi Nuclear Catastrophe and Environmental Activism in Japan,” *ASIANetwork Exchange*, vol. 21, no. 1 (Fall 2013) and Takao, “Making Environmental,” 1101.

20 Daniel P. Aldrich, “Postcrisis Japanese Nuclear Policy,” in *Japan at Nature’s Edge: The Environmental Context of a Global Power*, edited by Ian Jared Miller, Julia Adeney Thomas, and Brett L. Walker (Honolulu: University of Hawai’i Press, 2013), 280.

21 Takao, “Making Environmental,” 1102.

22 See Kobayashi and Goldschmidt, “Japan Recognizes” and McCurry, “Japanese Government.”

23 Walker, Preface, xi-xiv.

general lack of vitality. Fukushima's radiated soil, water, sludge, rubble, greenery, debris, and equipment scraped off the earth and collected into black bags, tanks, and containers can be found all over the prefecture. The decontamination process is still ongoing, but the space to store these items is becoming increasingly scarce.²⁴ What should be done with these bags is an inescapable problem and the prevailing ethical dilemma.

A fear of radiation permeates the Fukushima discussion, hailing back to the Second World War. A history of bad experiences from the atomic bombs dropped by American forces in August, 1945 in Hiroshima and Nagasaki, respectively, resulted in three generations of anti-nuclear sentiments. Closer to the core of the issue, immediately south of Fukushima in Ibaraki Prefecture, two injurious events happened in 1997 and 1999. The 1997 and 1999 JCO (formerly Japan Nuclear Fuel Conversion Co.) Plant's Tokaimura nuclear accidents, an explosion and a serious criticality accident, marred the reputation of nuclear. This long history of disasters cultivated a distaste for nuclear power, even when officials and experts promised safety first—and still do.²⁵

The disaster of 2011 brought back the fear of nuclear power in full force. Immediately following the Daiichi accident, all 54 of Japan's nuclear plants were idled; now, four are back online.²⁶ Even if other options for energy are scarce or environmentally unsustainable, a history of deadly nuclear events does nothing to support the push for nuclear plants. Additionally, the majority of energy produced at Daiichi was used to power the electricity-gluttonous Tokyo.²⁷ Tension between Tokyo's electricity users (outsiders) and the people of Fukushima (insiders) became visible when they came into contact with each other post-Fukushima. A remedy must be found since the radiation will not disappear for many decades.

Radioactive decay is what harms the cells in human and animal bodies. Unfortunately, radioactive cesium-137 takes 300 years to completely

24 Motoko Rich, "Struggling with Japan's Nuclear Waste, Six Years After Disaster," *New York Times*, March 11, 2017, <https://www.nytimes.com/2017/03/11/world/asia/struggling-with-japans-nuclear-waste-six-years-after-disaster.html>.

25 Starting in the mid-1950s, numerous cases of toxic pollution caused great harm, and "people in isolated villages, regional cities, and crowded metropolises mobilized in protracted struggles against the corporations that poisoned their bodies and the government officials who obstructed protest and accused victims of local egoism." This storyline runs parallel to the situation in Fukushima. See Avenell, *Transnational Japan*, 7.

26 Ken Silverstein, "Japan Circling Back To Nuclear Power after Fukushima Disaster," *Forbes*, September 8, 2017, <https://www.forbes.com/sites/kensilverstein/2017/09/08/japan-may-be-becoming-full-circle-after-its-fukushima-nuclear-energy-disaster/#73190ad130e8>.

27 O'Brien, "Return to Fukushima," 25:30.

decay (due to the chemical's half-life). It takes 20 years for cesium-134 to disappear. Japan can only imagine what terribly long road they face in Fukushima if Chernobyl has been shuttered and buried for the past 30 years, still uninhabited. Even so, Chernobyl removed the human element from the equation shortly after the accident; using it as an example for Fukushima is beneficial until human inhabitants return.

In terms of both aging population and environmental disasters, Japan stands as a “futuristic” example for the rest of the world, experiencing first what many other countries are projected to soon follow, such as declining birth rates. The lessons coming out of Fukushima are many and valuable, and substantial for the prevention of major future accidents and avoidance of poor planning.

Culture as Influence and Lens

In this dilemma, the people considered residents of Fukushima are those who currently live in the affected areas, those who previously did and desire to return, or those who still cannot return. Whatever their motivation, many people of Fukushima wish for the earth to be clean and healthy, especially for the children. The challenge comes with finding a way for citizens to feel like they can safely return to their homes and enjoy the right to live life the way they wish. The Minister of the Environment must decide who to entrust to participate in decisions regarding decontamination and cleanup of Fukushima.

The Japanese culture is important in our analysis of the black bags. The fact that the disaster happened in Japan to Japanese people impacts the continual response to the disaster. A culture of commitment to one's job, self-sacrifice, and the significance of family honor inform individual decisions. Career commitment can be seen in the 50 plant workers who stayed at the impaired plant to control damage immediately following the earthquake.²⁸ In this example, if the ship sinks, not only does the captain go down, but so does the entire crew, which is true of TEPCO. According to O'Brien, each employee “feels individual responsibility for the collective action or inaction of the company” as a culturally normal self-disciplined reaction.²⁹ Blamed for the incident, the families of the plant workers would

28 O'Brien, “The Heroes.”

29 Ibid.

also be dishonored if they did not stay and try to remedy the situation. Nevertheless, the 50 workers who risked their lives for the greater good understood that a great number of people would become exposed to radiation if the reactors were not controlled. They sacrificed for the sake of those who lived around the plant and beyond.

When discussing the cultural complexities that factor into this dilemma, it is necessary to consider specific, local culture: Fukushima Prefecture's local culture.³⁰ The fishing and farming families who lived in the same big, old houses for multiple generations lost their place-based traditions and way of life in a single day. TEPCO's current cleanup of the Daiichi plant includes attempting to stop the endless radiation of groundwater that flows into the ocean and contaminates seafood, rendering it inedible. Continued contamination was proved by Woods Hole scientists who identified a sustained concentration of cesium-134.³¹ Farmers, unable to work and sell their crops due to consumers' fear of radiation, lost their livelihood and traditions.³² Hikers unable to return to the mountain, bird-watchers unable to enter the forest, kids unable to run around in rural freedom; how can the residents of Fukushima return to a culturally significant lush environment which is now deadly? Many feel stuck in an "open-air prison."³³ Many local cultural factors influenced actions immediately following the first tremble of the earthquake, as well as in the years after.

As a result of the 2011 disaster, the Japanese population is consistently and overwhelmingly against nuclear energy.³⁴ The horrors of a possible

30 Engle Merry's definition of culture encapsulates the complexities and layered character of Japan's nuclear issue: Culture is not ubiquitous or unanimous, nor is it contained or unchangeable. Culture is very much alive. See Sally Engle Merry, *Human Rights and Gender Violence: Translating International Law into Local Justice* (Chicago: The University of Chicago Press, 2006), 12.

31 O'Brien, "Return to Fukushima."

32 In order to consider the situation of Fukushima's evacuees, it is imperative to understand the cultural history and situational resources of Japan. As an archipelago, ecological resources often and historically come from the sea, and when current practices of rice-growing became prevalent, the landscape was altered and created *sato-yama* and *sato-umi*, unique habitats formed within mountains and oceans, respectively, from the land-use modification patterns of humans. For example, habitats of creatures who find a new home in the paddies of wet rice cultivation are lost if humans abandon that field and it dries up, also potentially damaging human lives. Likewise, the effect humans have on the earth in general might affect humans later. The landscape of houses and streets on the eastern coast only served to intensify the effect of surging water on landscape. See Aldrich, "Postcrisis Japanese Nuclear Policy."

33 McCurry, "Fukushima Evacuee."

34 Silverstein, "Japan Circling."

future accident are not worth the apparent benefits. This gives us a complex situation in which citizens, those most damaged by nuclear accidents, should have an especially prominent voice in the conversation with the Ministry of the Environment. The people who can best create a methodology of moving forward in Fukushima are those who understand the local culture as well as the larger culture of Japan.

Citizen scientists have the ability to work between local people and experts, engaging both in conversation through their mix of professional science skills and local expertise, and ensuring solutions remain rooted to local needs as appropriate to the local culture.³⁵ Citizen scientists could be anyone: professors, retired scientists, politicians, or motivated mothers. Those who can comprehend and analyze scientific jargon and make it accessible to the masses prove invaluable. Via a consequentialist perspective, these are reasons why citizen scientists are best suited to take a leading role in the effort of forward movement in Fukushima.

Reorganization and revitalization of Fukushima must come mainly from the locals, for they understand their own culture best. The Ministry of the Environment should prioritize culture because it rationalizes past and future responses of the people of Fukushima, and puts their actions into context. If the events of Fukushima are not put into the setting of cultures specific to Fukushima, and the greater culture of Japan, inside groups will clash against outside groups. Furthermore, the world will be unable to understand the complexities in the response to and recovery from the event. Moving forward, decision makers will lack the knowledge of cultural background necessary to understand human rights violations and environmental injustices when decisions are made.

Human Rights with Environmental Justice

Environmental justice makes visible the separation between inside and outside groups. The victims of environmental injustices, part of the inside group of the issue, may feel forgotten and isolated. The frustration of never receiving justice from the government for the Daiichi meltdown exacerbates the separation between people from Fukushima and the “outside.” This situation often causes local-level action by groups who desire environmental justice. The Ministry of the Environment then must attempt to reconcile

35 Takao, “Making Environmental.”

these groups in an ethical analysis of responsibility and duty.

In 2018, the Japanese government assigned a victim's death as related to the cleanup effort in Fukushima for the first time.³⁶ The United Nations' Universal Declaration of Human Rights written in 1948 proclaims the fundamental freedoms and rights of every human on the planet. Article 25, which declares adequate health for all, asserts that a safe and healthy environment is a basic human right, but the threat of environmental harm prevents attainment of safety and physiological needs.³⁷ Accordingly, protection of the environment protects human rights, and vice versa. The UN's Special Rapporteur on Human Rights and the Environment asserts this relationship: "Without a healthy environment, we are unable to fulfill our aspirations or even live at a level commensurate with minimum standards of human dignity."³⁸ Subsequent UN reports focused on specific issues call for greater attention to issues of environmental justice, but have not changed the dialogue much. Schapper claims that existing doctrines of human rights do not provide for climate health as it relates to humans, nor do climate agreements include human rights, which further damages those facing injustices.³⁹ Thus, there needs to be consideration of the relationship between human rights and environmental justice.

People experience radiation damages in more than one way. Physical harm may be immediate, but emotional, economic, social and physiological harms can last much longer. These conditions are comparable to the atomic bomb *hibakusha* survivors. Even though *hibakusha* were victims, they faced extreme discrimination because they were "contagious," an entirely baseless fear. Similarly, the tough situation the Triple Disaster put many families in became too much to bear with too little support; in 2017, a mother backed by Greenpeace Japan asked the UN to pressure the Japanese government into increasing help for evacuees.⁴⁰ Lack of a healthy environment precludes all essential human rights, and the damage from environmental injustice

36 Kobayashi and Goldschmidt, "Japan Recognizes."

37 United Nations General Assembly, "Resolution 217 A, Universal Declaration of Human Rights, A/RES/217," Dec. 10, 1948, <https://www.un.org/en/universal-declaration-human-rights/>.

38 United Nations Human Rights Office of the High Commissioner, "Special Rapporteur on Human Rights and the Environment," last modified July 2017, <https://www.ohchr.org/en/Issues/environment/SREnvironment/Pages/SREnvironmentIndex.aspx>.

39 See Andrea Schapper, "Climate Justice and Human Rights," *International Relations*, vol. 32, no. 3 (Sept 2018).

40 McCurry, "Fukushima Evacuee."

can last for a lifetime.

The people of Fukushima face environmental damage that degrades their overall physical and social well-being due to a lack of justice—environmental justice. The U.S. Environmental Protection Agency defines environmental justice as “the fair treatment and meaningful involvement of all people” no matter their socioeconomic differences “with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”⁴¹ However, environmental justice is very difficult to implement in the evaluation of policy and to measure in outputs. The authors assert that environmental justice is more likely to occur when local communities act, rather than through the efforts of large government. What this means for Fukushima is that it may be up to the local citizens to solve their own problem.

Ethical Analysis of Responsibility

An environmental disaster can be very difficult to reverse, as is true in Fukushima. The lasting environmental problem with Japan’s radiation, as opposed to Chernobyl, is the myriad black bags still stacked everywhere, seven years post-disaster. The government pledged to clean up Fukushima, but government support for nuclear power in a natural resource-poor, energy-hungry and climate change-conscious society brings the possibility of continued operation of nuclear plants and future accidents.⁴² More recently, green and blue tarps were laid over the tidy mountains of black bags in an attempt to protect them (and brighten the grim appearance). Schapper argues that an increase in accountability and enforcement is one way to ensure just environmental practices in a world where the link between environmental justice and human rights has not yet been recognized.⁴³

For this ethical dilemma, I group the government with TEPCO due to the amount of control the government has taken over the company. The moral dilemma of the Triple Disaster, a likely preventable meltdown under the jurisdiction of TEPCO and the Japanese government, is a complex situation in which ethical accountability strongly factors into the solution and plan to move forward. From a legal perspective, TEPCO has every responsibility

41 Sara R. Rinfret and Michelle C. Pautz, *US Environmental Policy in Action* (New York: Palgrave Macmillan, 2014), 188.

42 O’Brien, “Return to Fukushima.”

43 Schapper, “Climate Justice.”

to remedy their Daiichi Plant issues. As is true in many countries around the globe, companies who make major mistakes are expected to clean up after themselves (at whatever cost). However, those who are responsible do not always provide the best solution due to time and financial burdens, and may choose a resolution that unequally benefits their company.

TEPCO and the Japanese government are morally and ethically responsible for the Fukushima disaster and cleanup.⁴⁴ Deontological theory plays strongly into the conversation of what should be done with Fukushima's remaining mess, as symbolized by the black bags. Argued from the perspective of 17th century German philosopher Samuel Pufendorf's ethical duty towards oneself and towards others, as the creators of the black bags, TEPCO has a deontological responsibility to provide significant assistance by shouldering financial and social burdens in remedy of Fukushima.⁴⁵ This makes TEPCO an essential member of the conversation organized by the Ministry. Additionally, the government, a unitary state and democracy, has a duty to protect the wellbeing of the citizens of Japan and the right of individuals to live in a healthy environment through the duty-based rights theory.⁴⁶ This duty extrapolates to TEPCO as owners of Daiichi, as they have a duty to both protect themselves and others from harm, according to Pufendorf's theory. Therefore, following this theory would be the prevention of a level 7 nuclear disaster.

Likewise, consequentialism promotes favorable actions for all people; by this logic, TEPCO has an ethical responsibility to clean up the mess for everyone that is impacted: "Revelations that TEPCO had covered up numerous accidents, leaks, and cracks since the 1980s...at least thirty serious incidents had been hidden by company management... These events further undermined the industry's credibility. The recent (and ongoing) accident at the Fukushima nuclear complex may be the straw that breaks the camel's back."⁴⁷ The 20th-century British philosopher W.D. Ross' consequentialist reparation and beneficence duties support reasons for those who have power

44 In this essay, the author did not include arguments from the perspective of virtue ethics (parents made to decide for their children what is a good life versus what is feasible, perhaps economically) and female morality (a branch of virtue ethics that "argues that more feminine traits, such as caring and nurturing" are important in analysis of Fukushima) that also have a place in the ethical reasoning of this topic. See Fieser, "Ethics."

45 Ibid.

46 Ibid.

47 Aldrich, "Postcrisis Japanese Nuclear Policy," 285.

to compensate those who are harmed and to improve the conditions of others, respectively.⁴⁸ TEPCO has a clear obligation to remedy an accident of their making, and Ross' theory mandates the need for monetary support from the government to aid evacuees amidst continuing decontamination efforts.

Furthermore, it is questionable whether or not the existence of the Daiichi Plant is in itself considered ethical. Tokyo people elected to indulge in a high-technology lifestyle, which necessitates the use of nuclear energy due to a lack of natural resources. Yet, nuclear power and its waste is also ethically questionable. This ethical question is supported by Kant's duty theory, which mandates that any action must always treat people with dignity; the use of people as tools in achieving something must be avoided, a wrong that Daiichi's construction and operation commits.⁴⁹ Before 2011, nuclear reactors generated a third of Japan's energy, now approximately only two percent.⁵⁰ Since Tokyo's dense population consumes a significant proportion of the nation's energy, a large portion of the energy produced by the Daiichi Plant (prior to the accident) was used to power Tokyo. Daiichi did bring income and vitality into the communities surrounding the plant. However, as a large portion of the Japanese population understands, nuclear energy brings more risk than benefit when the horrific destruction of a potential accident is considered. According to Kantian deontology, the construction of the Daiichi Plant in Fukushima was innately unethical due to its use of Fukushima Prefecture and its people as a means to an end. In a sense, Tokyo was deemed more valuable by those deciding where to locate a nuclear power plant. Furthermore, Fukushima was unethically used to generate electricity for the capital without putting the capital at risk. TEPCO must acknowledge their mistakes for conflict between inside and outside groups to subside.

The interaction between built environment and a force of nature caused the nuclear accident, not the actions of select parties. However, any good intention to prevent such accidents from ever happening were human, and failed to fulfill their purpose. Putting nuclear reactors at the top of a 13-foot cliff only stops 13-foot tsunami waves, the probability of which, as well as much taller waves, can be statistically predicted. TEPCO had a duty to learn about the possibility for tsunami damage. Although TEPCO

48 Fieser, "Ethics."

49 Ibid.

50 Silverstein, "Japan Circling."

holds logical responsibility for the incident as owner of the Daiichi Plant, there is no legal enforcement mechanism for consumer protection from the environment in Japan.⁵¹ This predicament must be changed if Japan will act as an example to the rest of the world, as they claim they wish to do in a video by the Ministry of the Environment.⁵²

Solutions and Methods of Moving Forward

Black bags represent the remaining mess after the Triple Disaster: physical, social, and emotional. There are many parties interested in re-establishing Fukushima: restoring it to the way it used to be, transforming it, or establishing some new operational status. Without the nuclear disaster, and only with an earthquake and tsunami, a town could clean up and rebuild in a relatively short period of time, but it is not so easy nor quick to deal with radiation. Elderly populations returned first, but now some schools have been rebuilt with the hope that young families will also return.⁵³ During the author's class trip to Fukushima, a gleaming community center in Iitate that welcomes visitors with a new, clean building even though the surrounding area has many shuttered houses and empty streets was observed. As reported by de Freytas-Tamura in a news report years after the disaster, a majority of the population is still displaced and radioactive boars roam wild through Fukushima neighborhoods.⁵⁴ Although the government lifted the evacuation order in 2015, many are wary to return due to radiation exposure levels equal to that of a nuclear power plant worker. According to a government survey from 2016, "more than half of Fukushima's former residents said they wouldn't return, citing fears over radiation and the safety of the nuclear plant, which will take 40 years to dismantle."⁵⁵ Meanwhile,

51 Kuroda and Ishida, "CSR in Japan," 45.

52 Jyosen (除染) MOE, "Living in Fukushima: Stories of Decontamination and Reconstruction," video, October 23, 2013, <https://www.youtube.com/watch?v=2oTReOjdN3M>, 24:17.

53 Motoko Rich, "The Children of Fukushima Return, Six Years After the Nuclear Disaster," *New York Times*, April 21, 2017, <https://www.nytimes.com/2017/04/21/world/asia/japan-fukushima-nuclear-disaster-children.html?action=click&module=RelatedCoverage&pgtype=Article®ion=Footer>.

54 Kimiko de Freytas-Tamura, "Radioactive Boars in Fukushima Thwart Residents' Plans to Return Home," *New York Times*, March 9, 2017, <https://www.nytimes.com/2017/03/09/world/asia/radioactive-boars-in-fukushima-thwart-residents-plans-to-return-home.html?module=inline>.

55 Ibid.

decontamination workers continue their cleanup operation.

There are many problems for the Ministry's decision-making members to solve. What should be done with the contaminated materials? Should the black bags be buried in the ground? Should contaminated land be used for renewable energy? Is this issue something that should be fixed with zoning? The answers to these questions and many more set the group of problem-solvers on their way to moving forward in Fukushima. The government needs to be transparent and take action; TEPCO needs to confess their mistakes and make corrections, and Fukushima's citizens need to raise their voices, with citizen scientists guiding the solutions. Conversation must be frank, open and vulnerable.

The challenge of finding a solution for Fukushima is deciding who should have representation in the conversation. To create a way to move forward, I argue that local citizens should be included in discussions for the cultural knowledge and community understanding they bring. Additionally, citizen scientists prove to have a definitive role in the communication, analysis, and solution-formation of Fukushima's symbolic black bags. Both proficient in scientific jargon and local experts, they serve as mediators between laypeople and professional experts.⁵⁶ Yes, Daiichi brought jobs to the area, but the responsibility of Fukushima's critically damaged plant lies with the people who own and run the plant. This year, the Maebashi court ruled that "the government should have used its regulatory powers to force [TEPCO]...to take adequate preventive measures" after a death was attributed to the effects of radioactive fallout from the Daiichi Plant.⁵⁷ TEPCO and the government, both responsible for the accident, should be held liable by law to cleanup.⁵⁸ To reach a fair solution, these groups must all be present at the conversation concerning the moral dilemma, and further dialogue between groups on their differing opinions is necessary to remedy the tension between inside and outside groups.

This accident could have happened anywhere—either in Japan or internationally. Japan is still sorting through the problem of the black bags and forming solutions, but only reflection and remedy of the Fukushima

56 Takao, "Making Environmental," 1101.

57 McCurry, "Japanese Government."

58 Nothing can be done to stop earthquakes and tsunamis. However, catastrophic events will continue to happen, so it is better to prepare and design for them as best as possible with heavy attention to the threat to future generations in mind. Risk-reducing mechanisms like a 50-foot-tall tsunami wall show progress. See O'Brien, "Return to Fukushima."

Daiichi accident will enable Japanese society to recognize mistakes, fortify existing situations to protect against future harm, and create the foundation for an improved life for all citizens. Accordingly, all nuclear power stations around the world would do well to prepare their plants for the worst kinds of disaster and outline ethical reasoning procedures to increase sustainability, durability, and preparedness for the future. Through the knowledge of Japan's experiences cleaning up Fukushima's black bags, an understanding of how the Japanese continue to respond to the Daiichi disaster within their cultural contexts, and the means by which locals seek to obtain environmental justice for their communities, the rest of the world will avoid similar mistakes and can build methods for dealing with the extreme difficulties resulting from a catastrophic nuclear meltdown.

Images of Black Bags



Image of black bags (フレコンバッグ) in Iitate, Japan. Drop into any Google Maps Street View image along the coast for a high probability of finding a collection of black bags. Image is from Taylor, "5 Years After the Great East Japan Earthquake."



Google Maps image of the Fukushima Daiichi Plant in 2018. Orderly patterns of circular and rectangular shapes indicate large containers holding contaminated liquid and solid material.

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