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Radiation Decontamination in Fukushima: a critical perspective from the ground　福島における放射性物質除去––現地よりの批判的視点

Miguel Quintana

Radiation Decontamination in Fukushima: a critical perspective from the ground

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A massive decontamination effort is underway in Fukushima Prefecture to lower radiation levels in areas affected by nuclear fallout. The program, worth billions of US dollars, is presented by the government as a necessary step to allow the early return of some 160,000 residents displaced by the crisis. But authorities have yet to address a number of key issues, including the long-term storage of contaminated materials, criticism about the effectiveness of cleanup operations, and residents' concerns about their immediate future.

Cleanup projects inside evacuated areas - a total of 11 townships[1] inside the 20-km exclusion zone or in heavily contaminated sectors northwest from the plant - are under the direct responsibility of the central government. Full-scale operations are set to begin this summer.

Outside those areas, the government says 104 municipalities across 8 prefectures are affected by radiation levels above 1 millisievert per year (mSv/year), the exposure limit for civilians recommended by the International Commission on Radiological Protection.[2] Decontamination there, which typically includes the removal of 5 centimeters of top soil, asphalt, and the use of high-pressure cleaners on roofs and other surfaces, is to be performed by local authorities and financed by the government.

In early February, Fukushima Prefecture allocated 243.7 billion yen (2.9 billion dollars) for decontamination projects carried out by municipalities in fiscal 2012. After a series of trials on public parks and schools, the coastal township of Minami-Soma, one-third of which lies within the 20-km exclusion zone, is preparing to extend operations to the entire municipality. In the absence of a permanent storage facility, tainted soil, branches and water used to scrub off cesium are either buried on site between layers of tarpaulin or stored temporarily in special bags.

"Rather than 'de-contaminate,' our work is more about moving the contamination elsewhere," said the foreman of a private contractor interviewed on March 9 during the cleanup of a public park in central Minami-Soma. "As far as I know, there is no way to simply *eliminate* radioactive particles."[3]

Since December the central government has been pressing the 8 municipalities of Futaba County, home to the Fukushima Daiichi nuclear plant, to allow the construction of a "midterm storage site" for radioactive waste. Illustrative of the problem of waste disposal, so far local authorities have not accepted the proposal, in line with most prefectures' refusal to take in any debris from northeastern Japan.[4]

The comparatively low levels of radiation in Minami-Soma (around 1 microsievert per hour, well below the government threshold of 20 mSv/year beyond which residents were ordered to evacuate), has allowed local authorities to claim success in halving dose rates around trial decontamination sites. But the picture is very different in neighboring Iitate, a rural municipality outside the 30-km perimeter that was evacuated two months after the accident.[5]

On March 15, 2011, changing wind patterns brought a plume of radionuclides spewing from the crippled reactors on a northwesterly course, raining iodine and cesium on Iitate, a municipality nested among forested hills and fertile valleys of Soma between 30 and 50 kilometers from Fukushima Daiichi – well beyond the initial 20-km evacuation perimeter ordered by the government.

As a result, ambient dose levels are much higher in Iitate than neighboring Minami-Soma. They can range between 3 and 5 microsieverts per hour (µSv/hour) 1 meter above the ground in open areas to well above 100 µSv/hour near gutters draining cesium from building roofs.[6]

Ito Nobuyuki, a retired software engineer who moved in as a farmer in 2010, is one of the most outspoken critics of government policy. He refused to follow the evacuation order announced on April 11, choosing instead to measure radiation levels across Iitate and carry out experiments to observe the environmental impact of radioactive fallout.

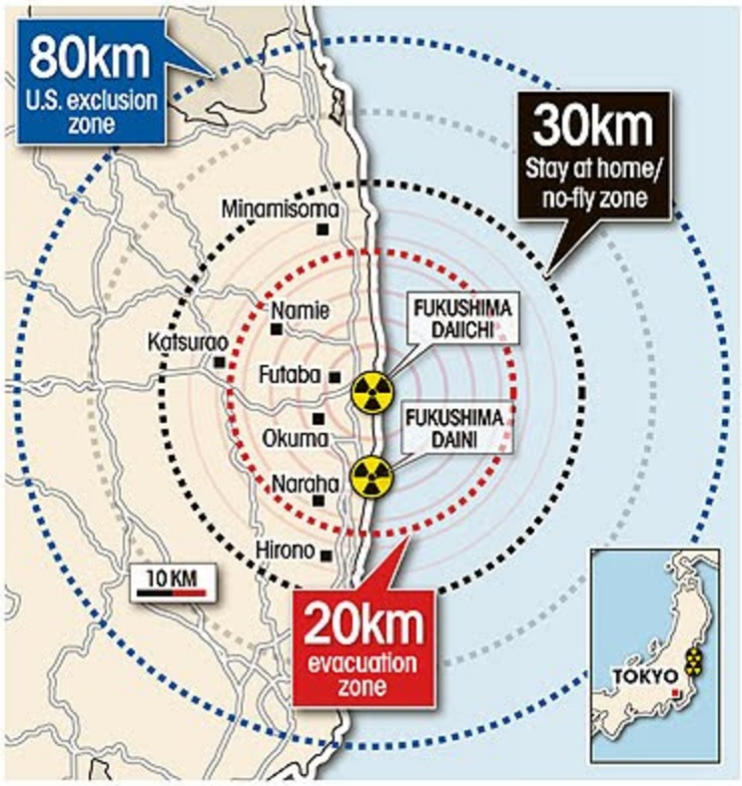
"75 percent of the land is covered by forests, where average readings top 10 µSv/hour," he says. "If you dig 20 centimeters under the humus you still find a level of 1.8 µSv/hour. It doesn't make any sense to remove the top 5 centimeters of soil and expect radiation levels to go down. It would only cause an environmental disaster. And where would they put all that soil anyway?"

In relocation camps across the prefecture, residents living in the cramped conditions of prefab units are waiting to learn when - or if - they will be allowed to return. In Temporary Housing Settlement 2, a barracks-like camp in Matsukawa, some 30 kilometers west of Iitate, 80 percent of the 200 occupants are above the age of retirement. Many families with young children have decided to relocate further away, often outside the prefecture, to shield their offspring from dangerous radiation levels and live closer to schools.

After one year of setbacks, resentment and distrust run deep towards the government, the prefecture and the municipality. Last year, the citizens of Iitate learned that they had been exposed without warning to radioactive fallout between March 15th - the day unit 2 was shaken by an explosion - and March 20th, when the first reports about contamination began to surface. "We didn't have any information, so we continued living as usual," recalls Owada Takashi, a 73-year-old farmer born and raised in Iitate who now lives in the Matsukawa settlement. "But soon, among the refugees from the coastal areas hit by the tsunami, were people who lived near the plant. They told us about the radiation."[7]

Throughout this period, official statements relayed by the media underlined the absence of "immediate concerns for human health." One of the leading proponents of this reassuring message was Prof. Yamashita Shunichi, who on March 19 was appointed Adviser to Fukushima Prefecture on Health-risk Management from Nuclear Radiation.[8] In line with his comments to the Japanese press, Yamashita spoke at the Foreign Correspondents Club of Japan on March 22 to "correct misconceptions" in Japan and abroad about radiation exposure.

The written statement he distributed at the FCCJ compared the Fukushima accident with Chernobyl, saying the latter's effects had "spread across the entire



world" while the former "only affected a small area." The text went on to address the public's concerns: "People seem to be worried that radiation exposure will lead to cancer later on in life. But if we exposed 100 people to a 100mSv dose of radiation, only one or two people would have a chance of getting cancer (one in three Japanese people die from cancer). Thus, it's unlikely more people will get cancer as a result of these events."

Yamashita maintained that "there is no difference between several micro-SV and 100 mSV in terms of their effect in causing cancer." Instead, he wrote, "the people we should worry about (...) are those working at the site of Fukushima Daiichi nuclear power plant. We need to think how to secure their health. Otherwise people do not need to worry about radiation exposure." Although specific cases of illness related to radiation exposure have yet to emerge outside of emergency workers at the nuclear plant, the sole mention of Yamashita's name among residents in Iitate is often met with expressions of scorn and disgust.

The 40 kilometers separating central Iitate from the nuclear plant also led many residents to believe that they were relatively safe. “For five days we continued distributing water to the residents and the refugees,” says Aizawa Takumi, a school administrator who helped coordinate relief operations. “It was only later that we discovered we had unknowingly poisoned them, as well as our own children.”

“The government spent 10 billion yen [120 million USD] in taxpayer’s money on a system called SPEEDI, meant to forecast the spread of radioactive particles,” writes farmer Hasegawa Kenichi in a book entitled *The Nuclear Plant Stole Our Land*,[9] in which he describes his experience as head of one of Iitate’s wards. “The system probably calculated that the fallout would extend as far as our municipality,” he writes, “but of course we learned about it only after we had already been exposed.”[10]

The case of Iitate

Official figures about current radiation levels are met with considerable doubt. Several Iitate residents claim to have witnessed workers scrubbing off the area surrounding a government monitoring station whose readings are published in the media. Such actions, they say, are meant to demonstrate that decontamination work is effectively reducing dose levels.

Inspired by studies from Chernobyl, Ito Nobuyuki grew sunflowers in violation of a ban on farming to test their ability to capture cesium from the soil.[11] After sending them to a specialized lab for analysis, he found that their roots could absorb some 7,000 becquerels of cesium per kilo. A parallel experiment conducted by the Agriculture Ministry yielded the opposite conclusion, he says, because only the flowers and stems were analyzed while the roots were left in the ground - an assertion backed by photographs he took from the government site.

Meanwhile, television viewers could watch upbeat reports about the progress of decontamination efforts across Fukushima Prefecture. On September 7, for example, national broadcaster NHK covered a visit to Iitate by Agriculture Minister Kano Michihiko to observe experiments on rice paddies and other fields. “One experiment involved scraping topsoil from paddies, resulting in a 75-percent cut in radioactive cesium” from 10,000 to 2,600 becquerels per kilo, said the report, “low enough for farmers to plant rice.” The minister told Iitate's deputy mayor that the government would "go ahead with its decontamination plan as the experiments have proved successful.”

Recent news coverage of the decontamination issue has been more nuanced. Among other factors, it underlines the difficulty of storing radioactive waste and the absence of a date by which residents would be allowed back into the evacuated areas. But most reports fail to question the effectiveness of cleanup operations, leading viewers to believe that ultimate success is just a matter of time and resources.[12]

On March 11, 2012, Reconstruction Minister Hirano Tatsuo appeared on NHK’s Sunday morning political debate *Nichiyo-Toron* to speak about the situation in disaster-hit areas. Asked about decontamination efforts, he explained that the "cold shutdown" at Fukushima Daiichi meant it was not longer necessary to keep evacuation areas based on distance from the plant. Instead, he said, the government would focus on ambient radiation exposure to determine whether evacuation was appropriate.

The government has proposed a new classification into three categories. In the first, where levels top 50 mSv/year, residents will be forbidden from moving back on a long-term basis that has yet to be defined; in the second, areas with between 20 and 50 mSv/year, residents are to remain evacuated "for the time being"; and in the third, where levels are below 20 mSv/year, the government will aim for the "earliest possible return" of residents.

Environment and Nuclear Disaster Minister Hosono Goshi, who appeared alongside Hirano, said about the third category that residents would be allowed to move back at an early stage in parallel with decontamination projects, as it was "possible to live without problems" in those areas. Asked specifically about the issue of distrust towards official information, Hosono replied: "The government needs to continue explaining its policy. Why 20 mSv? Because under 100 mSv/year, current knowledge shows that there is no epidemiological impact on health. But even in that context, the government works on the assumption it’s best to keep exposure to a minimum, and that is why it kept the limit to 20mSv/year as defined by the IPRC."

Ito and a small group of residents around him accuse the mayor of Iitate, Kanno Norio, of pushing forward with decontamination plans without consulting the population. Before the nuclear accident Kanno, currently in his fourth term, had gained the respect of his constituents by successfully promoting a model of sustainable development, which earned Iitate a spot on the list of “Japan’s most beautiful villages” in 2010. Now Kanno is seen by many as a lone crusader no longer in touch with his people.

“The mayor treats us a bit like an elementary school teacher,” said an evacuee who now lives in Fukushima City. "He thinks we don't really understand the situation. That’s why he would rather speak in New York[13] or meet with government heavyweights in Tokyo, and let us learn about his decisions through the newspaper.”[14]

Ito believes that too many special interests are involved in the decontamination business to take a serious look at natural alternatives. As time goes by, he says, the natural decay of radioactive isotopes will allow authorities to claim some degree of success. But Ito believes that the immediate fate of Iitate’s elderly farmers is a much more pressing issue. “Instead of wasting millions of taxpayers’ money on an attempt to decontaminate, why don’t we allow the community to relocate and resume farming elsewhere?” he says. “These farmers need to stay active, otherwise their health will decline.”

Many residents are pessimistic, including the evacuees at Temporary Housing Settlement Number 2. “Even if they clean our homes and backyards, the

radiation will prevent us from doing what we've done all our lives," says Owada Takashi. "Nobody would buy our produce anyway."

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•Peter Hayes,

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•Koide Hiroaki (interview), Japan's Nightmare Fight Against Radiation in the Wake of the 3.11 Meltdown

•Gayle Greene, Science with a Skew: The Nuclear Power Industry After Chernobyl and Fukushima

Notes

[1] The municipalities are: Futaba, Iitate, Katsurao, Kawamata, Kawauchi, Minami-Soma, Namie, Naraha, Okuma, Tomioka and Tamura.

[2] A.D. Wrixon, New ICRP Recommendations, in *Journal of Radiological Protection*, 28 (2008) 161–168, available here. The table for planned exposure specifies that "exceptionally, a higher value of effective dose could be allowed in a year provided that the average over 5 years does not exceed 1 mSv in a year."

[3] The Japanese term for decontamination, *josen*, is a compound of characters meaning 'eliminate' (除) and 'taint' (染).

[4] Relations between some municipalities and the central government have remained very tense since the early stages of the nuclear crisis, when local officials struggling to cope with the quake and tsunami's aftermath learned about government evacuation orders through television. A recent incident that illustrates local sensitivities was reported by Kyodo News on February 27 (available here). A detailed account of the situation in one municipality during the first days of the crisis was aired on March 3rd, 2012 in an NHK Special documentary entitled Nuclear accident: records from the [first] 100 hours (*Genpatsu Jiko Hyaku Jikan no Kiroku*).

[5] On April 11, 2011, the government announced that the populations of Iitate and 4 other municipalities outside the 20-km exclusion zone would have to evacuate within one month. In practice, some farmers interviewed in early March explained that it took up to 2 months to evacuate because of logistical difficulties such as the disposal of cattle.

[6] Using an industrial Geiger counter, this reporter measured 176µSv/hour below the mouth of a gutter in the Iitate district of Komiya on March 10, 2012.

[7] This information is consistent with the account of evacuees featured in the NHK Special documentary (see note 4 above). In the absence of information about radioactive fallout, they were unknowingly directed in the path of the radioactive plume.

[8] Yamashita was presented at the time as Dean of the Graduate School of Biomedical Sciences, Nagasaki University; Chairman of the Department of Molecular Medicine and Department of International Health and Radiation Research, Atomic Bomb Disease Institute, Nagasaki School of Medicine; and Director of the WHO Collaboration Center for Research on Radiation Emergency Medicine.

[9] Hasegawa Kenichi, *Genpatsu ni "furusato" wo ubawarete*, Takarajimasha, March 2012.

[10] New information concerning the Speedi debacle surfaced on March 21, when Fukushima Prefecture admitted it had deleted five days' worth of radiation dispersion data (Mainichi article available here).

[11] More information on this technique, known as phytoremediation, is available here.

[12] From a media analysis perspective, it is worth noting that the Emperor's speech during the March 11 commemoration ceremony in Tokyo included one paragraph about the consequences of the nuclear accident. The speech was broadcast live to the nation, but NHK's evening news did not report his words on the subject. The paragraph in question was: *"As this earthquake and tsunami caused the nuclear power plant accident, those living in areas designated as the danger zone lost their homes and livelihoods and had to leave the places they used to live. In order for them to live there again safely, we have to overcome the problem of radioactive contamination, which is a formidable task."* A full translation in English is available here on the website of the Imperial Household Agency.

[13] See a Kyodo News report in The Japan Times, Feb. 20, 2012, available here.

[14] Several attempts were made in early March to reach the mayor for comment. A formal request in writing and repeated phone inquiries were left unanswered for days, until the head of the General Affairs Section said that the mayor's busy schedule prevented him from accepting interviews.

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