# Towards the Sustainable Management of Decontaminated Soil and Waste in Fukushima - What Factors to be Considered for Our Future?

Tetsuo Yasutaka[1,*]

[1] *National Institute of Advanced Industrial Science and Technology (AIST), AIST Tsukuba Central 7 1-1-1 Higashi, Tsukuba 305-8567, Japan*
*Corresponding author's e-mail: t.yasutaka@aist.go.jp

Decontamination of radioactive materials dispersed by the accident at Fukushima Daiichi Nuclear Power Plant in 2011 is almost finished, except within the difficult-to-return zone. Consequently, the focus of environmental remediation has shifted to transporting and storing the soil and waste removed during decontamination to interim storage facilities. The amount of decontaminated soil and waste to be stored in the interim storage facility is approximately 14 million tons. By law, these materials must be disposed of by 2045.

However, the selection of final disposal sites outside Fukushima is expected to be an extremely difficult process. Therefore, to reduce the volume of decontaminated soil to be relocated to the final disposal site, the Ministry of Environment has discussed reusing low-level contaminated soil, ensuring environmental safety by applying volume reduction technologies, such as soil washing and incineration.

To comply with sustainable management of the decontaminated soil and waste, direct environmental aspects, such as management of human and ecological risks, need to be considered, as well as external environmental aspects, such as CO2 emissions; economic aspects, such as direct costs (already amounting to 3.6 trillion yen) and indirect cost; and social aspects, such as stakeholder-wide consensus and procedural fairness. Given the time frame for disposal, it is necessary to involve the next generation as well as the current generation in this decision-making process.

In this presentation, important factors of the future management of the removed soil and waste will be discussed from the perspective of sustainability, considering environmental, societal and economic aspects, while the process of post-accident decontamination will be reviewed from the time of the accident to the present.

***Keywords**: Decontamination, Sustainable soil management*

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**REFERENCES**
[1] T. Yasutaka, and W. Naito, (2016). Assessing cost and effectiveness of radiation decontamination in Fukushima Prefecture, Japan, *J. Environ. Radioact*, 151, 512-520.
[2] Ministry of the Environment (2018), Current states of decontamination. https://www.env.go.jp/jishin/rmp/conf/law-jokyo06/lj06_mat02.pdf, *(in Japanese).*
[3] T. Yasutaka, (2019). Awareness and Issues surrounding Stakeholder Consensus for Limited Reuse and Final Disposal of Radiocesium-contaminated Soil, Material cycles and waste management research, 30(1), 49-55 *(in Japanese).*