

# **Preface to Symposium Papers on “Soil and Environment”, 9th International Symposium on Integrated Field Sciences**

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Sustainable food production is indispensable to meet the demand by the increasing human population on earth. Natural resources (soil, water, biodiversity, vegetation cover, renewable energy sources, climate, and ecosystem services) are fundamental capital in support of the food production. In other words, natural resource is environment. Our food production, agriculture, is blessed with the grace of environment.

However, the power of nature is far beyond the wisdom of human being. We realize this with 2011 Tohoku Earthquake followed by Tsunami. The tsunami seriously devastated not only the cities and villages but also a huge area of arable lands in the Pacific coastal areas of Tohoku region. The fertile arable soils were seriously devastated with saline water, thick mud deposition and so on.

Furthermore, the critical damage of Fukushima Daiichi nuclear power plant by the tsunami resulted in severe radiation leaks which extensively contaminated the environment. As a result, agriculture depending on the environment is also in danger of radioactive contamination. Nuclear power station has been believed to be one of the countermeasures against global warming, because CO<sub>2</sub> emission derived from nuclear power plant is lower than that from thermal power plants using fossil fuels. Global warming is the one of the most urgent environment issues. It is ironical that the nuclear power plant which was expected to contribute to mitigation of CO<sub>2</sub> emission deteriorated the environment, which is a basis for food production as well as life in this region.

Global warming is also the important issue in agriculture sector. Climate change due to global warming affects agriculture and may result in danger of food security. However, it should be noted that the relationship between climate change and agriculture (crops, livestock and forestry) is not a one-way street. Agriculture contributes to climate change in several major ways including emission of green house gasses (GHG) through land conversion, deforestation, use of fossil fuels for machinery and agro-chemicals, CH<sub>4</sub> from rice fields, N<sub>2</sub>O from nitrogen fertilization, and so on.

We, Field Science Center of Tohoku University, hold the international symposium for “Integrated Field Sciences” every year. In 2011 we had planned to organize the symposium which shed light on the relationship between soil and environment in terms of global warming. However, we are now in the face of the disaster by earthquake, tsunami and radioactive contamination. Therefore, we changed the program of the 9th symposium to discuss the current urgent issues under the conditions as stated above.

In the first part of symposium “Environmental Disaster caused by Earthquake”, the problems in terms of Tsunami affected soil and the Fukushima nuclear power accident were discussed. In the second part of the symposium “Nitrogen, Green House Gasses and Agriculture -Global Warming and Soil-“, the environmental issues caused by agricultural activities, such as water pollution with nitrogen and GHG emission, were discussed. In the poster session of the symposium, various papers relating to agro-environmental issues were presented.

The Symposium was held on 3 September, 2011, at the Kawauchi-Kita Campus, Tohoku University. On 4 September, to observe the damage by Tsunami, the field tour to the coastal arable area in Sendai city was conducted. Representative presentations are now included in this issue of Journal of Integrated Field Science. Abstracts of all papers including poster presentations are also included in this issue.

I hope that various scientific works presented in this issue will contribute to finding solutions for these agro-environmental problems not only in the region affected by the Tsunami and the Nuclear Power accident but globally as well.

Finally, I would like to express our sincere thanks for the following agencies to support the symposium: Strategic Japanese-Chinese Cooperative Program “Comparative study of nitrogen cycling and its impact on water quality in agricultural watersheds in Japan and China” (JST-NSFC), Tohoku University Global COE “Ecosystem Adaptability”, National Institute for Agro-Environmental Sciences, and Project of Integrated Compost Science (PICS) of Tohoku University.

