

## Impacts of Tsunami (March 11, 2011) on paddy field soils in Miyagi Prefecture, Japan

Masami NANZYO

Graduate School of Agricultural Science, Tohoku University, Sedai, 981-8555, Japan

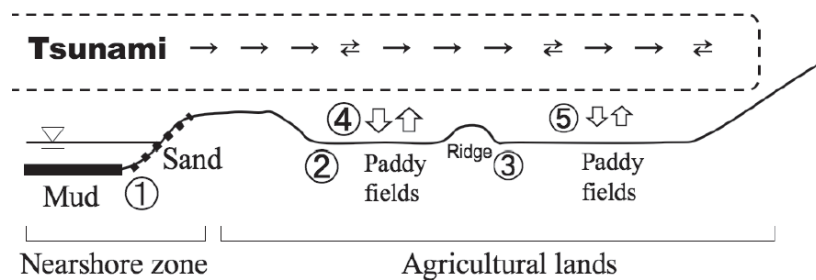
A 9.0 magnitude earthquake hit eastern Japan on March 11<sup>th</sup>, 2011. It triggered huge tsunami and the area of the damaged agricultural land by the tsunami was summarized in Table 1. The Miyagi prefecture has been damaged most extensively. The tsunami penetrated up to several kilometers inland from a coastline of the Miyagi prefecture. The damaged agricultural lands were mainly the paddy fields (Table 1).

**Table 1.** Estimated area damaged by Tsunami (March 11th, 2011).

Prefecture	Agricultural land (2010) ha	Area damaged by Tsunami			
		ha	%	Paddy field ha	Upland ha
Aomori	156,800	79	0.1	76	3
Iwate	153,900	1,838	1.2	1,172	666
<u>Miyagi</u>	136,300	15,002	11.0	12,685	2,317
Fukushima	149,900	5,923	4.0	5,588	335
Ibaraki	175,200	531	0.3	525	6
Chiba	128,800	227	0.2	105	122
Total	900,900	23,600	2.6	20,151	3,449

Ministry of Agriculture, Forestry and Fishery (March, 2011)

There are several types of interactions between tsunami and the agricultural lands not only scattering debris. They are erosion at the ①, ②, ③ sites and deposition on the agricultural lands as physical interactions (④, ⑤), and also, ion exchange and precipitation reactions as chemical interactions (④, ⑤, Fig. 1). If there was a muddy (sometimes contains sulfides) and/or sandy deposit under the shallow seawater or in the nearshore zone (①), it was transported to the agricultural land and deposited (④, ⑤). As there are small eroded sites also at the ② and ③ sites where tsunami fell down from micro-high sites like a road and a ridge. Moreover, the A<sub>p</sub> horizon soil after tilling was lost at least partly. Thus, the deposits on the agricultural lands contain the eroded A<sub>p</sub> horizon soil also. The chemical reactions of ④ and ⑤ include the exchange reaction between Na<sup>+</sup> in seawater and exchangeable Ca<sup>2+</sup> in the A<sub>p</sub> horizon soil, and precipitation of CaSO<sub>4</sub>·2H<sub>2</sub>O as well as NaCl when the soils dry.



**Fig. 1.** Schematic diagram of interactions between Tsunami and agricultural lands.