

## Effects of the 3/11 Earthquake and Tsunami on the Coastal Marine Ecosystem and Recovery Process in Moune Bay, Kesenuma

masaru tanaka<sup>1\*</sup>

<sup>1</sup>International Institute for Advanced Studies

Kesenuma city, one of the most important fishing ports in northeastern Pacific coast of Japan (Sanriku district), was heavily devastated by the 3/11 tsunami attack. It has been getting famous in the world because it is the birth place of a grass-root social movement catch-phrased by "The sea is longing for the forest" established in 1989. The leader, oyster culture fisherman, Mr. Shigeatsu Hatakeyama was elected as Asian representative of forest heroes by the United Nation for international year of 2011. Moune bay, a branched inlet of Kesenuma bay, is the real birth place of the movement which originally aimed to rebuild oyster and scallop culture once collapsed by highly deteriorated coastal environments due to rapid economic growth in 1970s and 1980s. Oyster and scallop culture in Moune area recovered with progress in the social movement, but it was completely destroyed again by the 3/11 tsunami. Under very serious situation of heavily damaged marine and fisheries institutes located along the Sanriku district, the author proposed organising a volunteer investigation to assess the effects of the earthquake/tsunami on the coastal marine ecosystem and its recovery process. The first survey started in May 2011 and continued every two months under cooperation of NPO "The sea is longing for the forest" and researchers. With advances in the investigation, the research team is expanding to be included more than 30 members of a large variety of experts and students came from all around Japan.

The most excited finding in this investigation is saltmarsh and tidal flat reappeared in the innermost part of Moune bay which had been utilized as housing and agricultural land before the earthquake and tsunami attack, due to 70cm sinking of the ground. Many organisms like fish juveniles, shrimp, clams and seaweeds appeared, in particular asari clam juveniles

showed the most remarkable appearance. Some of them are growing so rapidly to produce their offsprings. Local people have been largely encouraged by reviving coastal marine ecosystem with many organisms, then decided to live again with the sea. However they have a very serious problem that local government decided to make concrete "gigantic seawalls" along the Sanriku coast. If it will be realized, the coastal marine ecosystem would be highly damaged, resulting in seriously pessimistic future of coastal fisheries, aquaculture, and sightseeing industries. We claim more comprehensive strategy and tactics for protecting earthquake/tsunami disasters including more sustainable "green seawalls" which has been proposed by emeritus professor Akira Miyawaki. Based on the findings from the Kesenuma-Moune investigation we could draw a future design in Moune area that reappeared wetland, recognized as a precious "present" from the earthquake and tsunami, should be utilised for environmental education particularly for young generation and also a model research target of reviving nature once destroyed by human being.

Keywords: coastal marine ecosystem, earthquake and tsunami, Moune Bay, oyster culture, saltmarsh and tidalflat, the sea is longing for the forest