



[Tsunami in Japan]

## East Japan Earthquake & Tsunami - Responses, Relief and Restructuring Yukio Himiyama

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Japan is infamous for frequent visits of natural disasters, such as earthquakes, tsunamis, volcanic eruptions, typhoons and floods. Even for Japan, however, the East Japan Earthquake & Tsunami of 11 March 2011 was extraordinary. The M 9.0 earthquake hit the eastern half of Honshu Island and part of Hokkaido, and more than one thousand kilometres of coastline in Eastern Japan was washed by the gigantic tsunami it generated. Aftershocks still continue, and so does the disaster. Casualties as of 7th June 2011 are 15,382 dead, 8,191 missing and 93,270 evacuees. The accident of Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Company adds further complexity and difficulty to the Disaster. This paper reviews this on-going and unprecedented disaster from the viewpoint of a geographer, and discusses ways to restructure the society.

## 1. Situation before 11 March

The political situation of Japan was chaotic when the M 9.0 earthquake hit because of the struggle within the ruling Democrat Party, uneasy relation between politicians and bureaucrats, and the Prime Minister's personal scandal. Japanese economy was also in serious difficulty with deteriorating national budget and increasing rate of unemployment.

Tokyo Electric Company, which owns Fukushima Daiichi Nuclear Power Plant, was widely known as a promoter of "environment & energy education" in Japan, thanks to its strong financial power which enabled it to guide, if not mislead, public opinion, scientists, politicians, and primary and secondary education to its own benefit. The company, together with other electric companies, acted fiercely to reject anything against its unquestionable belief in nuclear safety. This powerful pro-nuclear energy community is known as a "nuclear power village", which may be characterized by self-righteousness, secrecy, and lack of ethics. The village took advantage of the world-wide effort against global warming in recent years for its pro-nuclear energy campaign.

The "Niigata Prefecture Chuetsu-Okai Earthquake" of 16th July 2007, which recorded M 6.8 gave serious lessons to the society concerning danger of nuclear power plant accident and vulnerability of the existing transportation and industrial systems, land use, and buildings in the coastal areas. Some people, particularly car companies, learned a bitter lesson because they had to stop all their assembly lines for the lack of engine parts supplied by a factory damaged by this earthquake. Despite the enormous damage to its world-largest nuclear power plant, however, Tokyo Electric Company failed to realize their faults and instead consolidated its belief in the "safety myth" of nuclear energy, as it managed to maintain control of the nuclear reactor even in that strong earthquake.

A year after the Chuetsu-Okai Earthquake, the Science Council of Japan issued a proposal entitled "Towards Sustainable Co-existence of Nature and Human on the Land and the Coastal Waters" as a result of a year-long discussion at Human Geoscience Committee on the increasing natural disasters and global environmental problems. The proposal to the Government included the followings:

- 1) Consolidation of geospatial information on the land and the coastal waters.
- 2) Promotion of interdisciplinary comprehensive research on the land and the coastal waters for fact-finding and problem-solving in order to realize conservation and sustainable use of them.
- 3) Implementation of new-type of policies towards sustainable and safe use and development of the land and the coastal waters.

The proposal was drafted by the present writer, but it was not implemented in time, regrettably.

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## 2. Responses

Responses to the East Japan Earthquake & Tsunami reflected the situations of the immediate past strongly. Well-prepared school children and teachers survived even a ten-metre high tsunami, while less-prepared ones lost their lives. Among the well-prepared were the rescue and relief teams from the many countries, U.S. forces and Japanese self-defence army. The Government and Tokyo Electric Company were among the least prepared, as everyone knows now. Their "normalcy bias" still prevails, hindering normalization processes, particularly in Fukushima.

The Science Council of Japan, which officially represents all academic fields in Japan and is regarded as the parliament for scientists, held a special open meeting to discuss the disaster only a week after the earthquake, and issued an Executive Committee's statement on the same day. The statement was soon followed by a number of proposals from various disciplinary committees. The well-preparedness of the Science Council of Japan in addressing the disaster can be seen in the Executive Committee's statement (translated into English by the present writer, see Appendix).

Academic societies and research teams concerned were also quick to act, as represented by a research team of Nagoya University which mapped the vast tsunami stricken areas on the 1:25,000 topographic maps in two weeks or so. The researchers observed the gentleman's agreement of refraining from going to the disaster-stricken areas for field surveys till Japan Geoscience Union gives a go, except a few selected pilot surveyors, in order not to obstruct the rescue and relief operations. The Union officially lifted the ban a month after the incidence, and many specialists of various fields started their field surveys. Universities in the disaster area, particularly major ones, have been doing remarkable works in spite of the various difficulties they face both at home and at their universities.

The annual conference of Japan Geoscience Union (JpGU) held through 22-27 May in Makuhari near Tokyo was attended by some six thousand people, and the public sessions on East Japan Earthquake & Tsunami Disaster were always attended by some one thousand people including journalists, indicating strong interest of the society in this issue.

## 3. Relief

There were over half a million people taking refuge in schools etc. soon after the M 9.0 earthquake, and many of them suffered from shortage of heating, blankets, water and food. The effect of the disaster spread wide, and became more and more visible in every aspect of the society as time went. Several oil refineries on the coast of Northeast Japan and on the Tokyo Bay were damaged seriously, and it affected not only rescue and relief operations, but also people's daily lives and industrial activities nationwide. It should be noted that all those oil refineries are on the coastal reclaimed land vulnerable to natural hazards. The damage to manufacturing industry was not limited to the disaster-stricken areas either. Manufacturing industry suffered from lack of fuel and electricity, malfunction of transportation, damages to some car parts factories, etc. Car production in Japan in this month was only half of the last year, although direct damage to car assembly lines was not so serious.

Notable achievements in each week and month since 11th March are outlined:

1st week: improvement of communication networks and electricity supply

2nd week: improvement of transportation systems and fuel supply

3rd week: improvement of daily living conditions of sufferers and of food and water supply

4th week: start of the work of new fiscal and academic year nationwide

5th week: "normalization" of daily lives, economic activities and schools nationwide

2nd month: many volunteers of relief works and surveyors poured into the stricken areas other than Fukushima

3rd month: exchanges of information, ideas, views, research findings, new data, etc.

Relief operation of a large scale disaster is always difficult, but it might seldom equal the present Disaster. The stricken area is extremely large, with complete devastation at many places, and a large number of people were attacked not only by the M9.0 earthquake, but also the gigantic tsunami that followed and repeated aftershocks. Those in Eastern Fukushima Prefecture even suffered from nuclear disaster, which shows no sign of ending to date.

The relief operation was confused and delayed primarily because of the gigantic scale of this unprecedented disaster. However, malfunction of the Government in relief operation during the first few weeks was to a large extent attributed to the extremely serious situation of Fukushima Daiichi Nuclear Power Plant to which Prime Minister himself had to devote much of his energy and time. Tokyo Electric Company was not only incompetent, but also irresponsible and unreliable, and so were the two governmental agencies in charge of safety of nuclear power plant, namely Nuclear Safety Commission and Nuclear and Industrial Safety Agency. These two agencies were supposed to be independent from the electric companies, but they were actually all linked closely with each other, with a common belief in nuclear safety.

The nuclear disaster caused by Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Company is by far the most difficult part of the relief from East Japan Earthquake & Tsunami Disaster. The plant is not yet under control, and it continues to eject radioactive pollutants. The Government and Tokyo Electric Company failed to release important spatial and other data of pollution etc. Accurate and reliable maps, such as those of types and magnitude of pollution and their movement, safer shelters or transportation lines, might have reduced unnecessary confusion or damage to the local people's daily lives, agriculture and other industries, thus might have helped relief operations.

#### 4. Restructuring

Discussion on restructuring the society has just started in Japan, and there will be a major progress in this regard before the Delhi Seminar in July. The following are some of the viewpoints which may prove useful for sustainable development of Japan.

- 1) It is important for Tokyo Electric Company and Japanese Government to reflect on their shortcomings in addressing the current disaster, to change their negative



attitudes mentioned above, and to restructure themselves so that they can truly fulfil their duty to the society that intends to be more sustainable.

- 2) Distortions of science, technology and "environment & energy" education in favour of nuclear energy should be checked and corrected with highest level scientific and technological professionalism, social responsibility, humanism and ethics.
- 3) A number of court cases related with nuclear power plant will have to be re-examined.
- 4) Extreme danger of high-vulnerability systems of land use, transportation and industries of Japan, which are a product of the belief in short-term benefit and high efficiency, is obvious. It is necessary to examine the vulnerability of existing systems, and to take right actions to improve the dangerous situation.
- 5) It is hoped that the proposals of the Science Council of Japan related with the current Disaster, particularly "Towards Sustainable Co-existence of Nature and Human on the Land and the Coastal Waters", is read carefully, and that large-scale natural disasters and global environmental problems are addressed under a single framework according to the proposal.
- 6) There is a proverb saying "disaster strikes when you least expect it". Mr. Saburo Mimatsu, the owner of Showa Shinzan, an active volcano grew up in the field in 1943, believes that "disaster strikes because you forget it". The bitter experience of the disaster should be remembered for a long time in future, and be shared worldwide.

More up-to-date information and ideas will be referred to in the lecture.

## Appendix

### Statement of the Executive Committee of Science Council of Japan, Disaster Nuclear Emergency in North East Japan

A gigantic earthquake of magnitude 9.0 occurred on 11 March 2011 off the Pacific coast of Sanriku, Northeast Japan, and it generated huge tsunami, killing a large number of people in and near the coastal areas of Tohoku (Northeast) and Kanto District. We offer our heartfelt condolences to the victims of this unprecedented earthquake and tsunami. Food, drinking water, bedding, medicine, and other emergency relief supplies failed to reach the stricken areas swiftly, and the sufferers are afflicted with cold, hunger, and illness. We wish from the bottom of our hearts that relief reaches them without delay, and that the large number people still missing are found and reunited with their families, soon. We would like to express our sincere thanks to those who are working assiduously for rescue operations with indomitable spirit. Also, we would like to express our special thanks for the warm words of solidarity and encouragement as well as for prompt rescue operations extended from abroad. The Science Council of Japan is prepared to cooperate with every effort aiming at overcoming this tragic situation, keeping all this kindness and good will in mind.

To that end, in light of this disaster, it is essential to reconsider and re-evaluate the

relevance of the socio-economic systems of Japan in countering the shock of hazards, and to rethink calmly how much science can actually contribute to prediction and prevention of disasters. The reevaluation and re-consideration may be a medium to long term issue which requires full-scale challenges, but there are also urgently needed emergency missions needed to address the ongoing crisis effectively.

First, the biggest problem we face now is the emergency of leakage of radioactive materials from the reactors at Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Company. Apart from investigating the causes and counter measures of the nuclear power plant accident, preventive measures to minimize the effect of radioactive leakages on the people's lives and health are of paramount importance. We sincerely hope that nuclear scientists overcome their institutional or other differences, cooperate with each other with their specialist knowledge, and find the best solution from a narrow range of choices.

Second, the sense of insecurity people feel in the face of unprecedented disaster is often attributed to lack of accurate information about the risks and to the inappropriate ways such information is conveyed. Even if the information is serious, or even more so if it is serious, it should be transmitted accurately to the public. We believe that only with such honesty, based on calm recognition of the extreme danger of the situation, will call forth appropriate action by the people. The ongoing incidence of leakages of radioactive materials is the case in point.

Third, we have been struck by the fact that Japan failed to design new socio-economic systems based on the bitter lessons of the Great Hanshin-Awaji Earthquake of sixteen years ago, and to use those systems in the face of the present natural disaster, as evident in the fact that emergency relief supplies, which are sufficient in total quantity, failed to make their ways to the stricken areas painfully indicates. Malfunctions of transportation networks can be explained only marginally by physical damages to the transportation network caused by the earthquake and tsunami; the operational aspects of the systems are found to be no less of the problem.

The Science Council of Japan, which represents every aspect of science, including the humanities and social sciences, intends and is capable of providing advice for these urgent operations.

The Science Council of Japan as the unifying body of academics in Japan humbly acknowledges the fragility of the current socio-economic systems of Japan which have become obvious during the current disaster. The Council seeks measures for improvement seriously, and acts with a sense of responsibility to explain how to use science and technology to build a new society in Japan that can provide confidence to future generations.