

Topic-Setting Program to Advance Cutting-Edge
Humanities and Social Sciences Research

(Responding to Real Society)

Progress Report
(Summary of Final Report)

A Social Scientific Research on
Effective and Prompt Measures for a National Emergency

Core-Researcher: Makoto Saito

Institution: Hitotsubashi University

Academic Unit: Graduate School of Economics

Position: Professor

Research Period: FY2013 - FY2015

1. Basic information of research project

Research Area	The Ideal Method of Social System Enabling Appropriate Correspondence for an Emergency
Project Title	A Social Scientific Research on Effective and Prompt Measures for a National Emergency
Institution	Hitotsubashi University
Core-Researcher (Name, Academic Unit & Position)	Makoto Saito, Professor, Graduate School of Economics
Project Period	FY2013 - FY2015
Appropriations Plan (¥)	FY2013 JPY1,000,000
	FY2014 JPY10,000,000
	FY2015 JPY9,000,000

2. Purpose of research

Why is it extremely difficult for our society to effectively deal with complicated problems arising during emergency periods? A major reason for such considerable difficulty is that most of procedures, which have been devised formally or informally as a preparation for emergency responses for normal periods, might not work effectively during emergency periods. Those procedures may lack flexibility, while they may fail to make the agents concerned to behave properly in emergencies. In the worst case, a complete absence of emergency procedures might induce ineffective and irrational responses.

The research team, consisting of legal scholars and economists, inquires empirically and theoretically into (1) which procedures are needed as a preparation for effective emergency responses, and (2) how such procedures are agreed on among the agents concerned during a normal period.

Besides the above microscopic study, a macroeconomic environment is considered closely in its relation to the scale and scope of emergency responses to a natural disaster. In particular, the extent to which a national government should fiscally support implementation of emergency procedures is examined carefully. Such consideration is highly necessary given enormous amounts of fiscal deficits in the Japanese government.

The study has three research agendas as follows.

(A) Case study of the Great East Japan Earthquake

There emerged a number of instances of failure in administrative responses to emergency problems resulting from the Great East Japan Earthquake (hereafter, GEJE). In this research agenda, possible reasons for those instances are identified carefully, and proper emergency response procedures are proposed concretely. Serious attention is paid to three important institutional elements, which were mostly absent in an emergency situation brought about by the GEJE.

Firstly, formal and informal governance mechanisms by which public and private agents are

disciplined properly during emergency periods lacked seriously in the case of the GEJE. In governance mechanisms, procedures of emergency responses and delegation of authority should be detailed by an effective combination of hard laws which require enforcement and soft laws which afford flexibility. In particular, such procedures should be determined rigorously for a situation where an administrative body coercively enforces residents to make emergency responses such as evacuation and relocation. It is also necessary to properly discipline intermediaries between administrative agents and private agents, such as nonprofit organizations, because they may complement several functions of administrative agents in emergencies.

Secondly, any effective resolution mechanism had not been prepared for a conflict among the agents concerned. In particular, a conflict between the Tokyo Electric Power Company (hereafter, TEPCO) and the victims of a nuclear accident at the Fukushima Daiichi Nuclear Power Plant has been most difficult to resolve. Another serious case was that a settlement of property rights of the areas damaged by the tsunami. A time-consuming conventional court procedure prevented a prompt recovery of the tsunami-damaged areas. It is necessary to enhance the function of civil trials for conflict resolution in emergency responses, and to set up other types of resolution mechanisms such as alternative dispute resolution.

Thirdly, an information infrastructure was developed so poorly that personal information, which was potentially necessary for emergency responses, could not be extracted promptly from public databases, and consequently was not utilized in emergencies. Such a failure to utilize private information prevented effective emergency responses, in particular an evacuation of those aged or handicapped. One important reason for this failure is that local governments failed to recognize that the Personal Information Protection Law basically protected personal information during normal periods, but allowed them to utilize it in an emergency situation.

(B) On consensus building of emergency response procedures during normal periods

As to possible procedures and institutions designed for emergency responses, which would be implied by research results of Research Agenda (A), the study considers (1) how any consensus is built on these procedures, and (2) how residents are guided to prepare for emergency responses along the procedures. For this purpose, local administrative bodies may enforce residents to prepare for emergencies by law or regulation, or it may only mildly intervene in individual decision making for preparation.

(C) On the fiscal capacity during emergency response periods

Besides the microscopic study of (A) and (B), emergency responses are also considered from the macroeconomic perspective. The national government currently carries enormous deficits as a consequence of the emergency responses at the domestic financial crisis in 1997 and 1998, the global crisis deepened by the bankruptcy of Lehman Brothers in 2008, and the GEJE in 2011. Given such exhausted financial conditions of the national government, a major research interest is in the extent to which the government could financially commit itself to a next large-scale emergency. In particular, a major concern is the scale and scope

of a governmental financial commitment to a damage compensation framework, which would be established under the Act on Compensation for Nuclear Damage.

3. Outline of research (Including study member)

The study employed two research approaches. By a case study approach based on historical episodes, institutional constraints in an emergency situation were examined carefully in the research. By an empirical and theoretical approach, on the other hand, two research questions were brought up; (1) which procedures were needed for emergency responses, and (2) how such procedures were agreed on among concerned agents. Based on policy implications from the above research, a constructive proposal on emergency responses was advanced toward the public.

The followings were chosen as research topics:

- (1) Emergency responses by the administration and the Bank of Japan to the domestic financial crisis in 1997 and 1998, and the global financial crisis deepened by the bankruptcy of Lehman Brothers in 2008.
- (2) Administrative emergency responses by local governments at the GEJE in 2011.
- (3) Agreements on disaster damage management and coordination among municipal governments.
- (4) Restrictions on housing construction and residence, and a relocation policy in the tsunami-damaged areas.
- (5) Emergency responses to the accident at the site of Fukushima Daiichi, and its middle-term and long-term recovery from the accident.
- (6) A compensation and loss-sharing framework which had been established under the Act on Compensation for Nuclear Damage.
- (7) An assessment of economic damages which would be caused by a Tokyo inland earthquake using a simulation method.
- (8) A possibility of a fiscal crisis triggered by a large-scale natural disaster

The research team, consisting of an economics group and a legal group, was organized as follows.

<Economics Group>

Makoto Saito, Professor, Graduate School of Economics, Hitotsubashi University, a core researcher, group leader, in charge of Agendas (A) and (B).

Satoshi Watanabe, Professor, Graduate School of Economics and School of International and Public Policy, Hitotsubashi University, in charge of Agendas (A) and (B).

Motohiro Sato, Professor, Graduate School of Economics and School of International and Public Policy, Hitotsubashi University, in charge of Agendas (A) and (C).

Shigeki Kunieda, Associate Professor, Graduate School of Economics and School of International and Public Policy, Hitotsubashi University, in charge of Agenda (C).

Yukinobu Kitamura, Professor, Institute of Economic Research, Hitotsubashi University, in charge of Agenda (C).

Masayuki Nakagawa, Professor, Faculty of Economics, Nippon University, in charge of Agendas (A) and (B).

Keiichiro Kobayashi, Professor, Faculty of Economics, Keio University, in charge of Agenda (C).

<Legal Group>

Hitoshi Noda, Professor, Graduate School of Law, Hitotsubashi University, group leader, in charge of Agendas (A) and (B).

Kazuhiko Yamamoto, Professor, Graduate School of Law, Hitotsubashi University, in charge of Agendas (A) and (B).

Taro Kogayu, Professor, Graduate School of Law, Hitotsubashi University, in charge of Agendas (A) and (B).

Hirosato Kariya, Professor, Graduate School of Law, Hitotsubashi University, in charge of Agendas (A) and (B).

Kazunari Usui, Professor, Graduate School of Law, Hitotsubashi University, in charge of Agenda (A).

Tadashi Okamura, attorney, in charge of Agenda (A).

On the process in research, the team has interacted intensively with not only those inside academic societies, but also those outside them. Tadashi Okamoto, attorney specializing in emergency responses for a natural disaster, participated in the team as a research member. Another attorney, Yu Nomura, who worked as the Legal Affairs and Planning Officer for Ishinomaki City Hall, cooperated closely with the team, and provided the team with expert knowledge on the reconstruction process of the tsunami-damaged Ishinomaki City.

The research team visited the site of Fukushima Daiichi to discuss emergency responses at a nuclear accident with executive officers in June 2014. In addition, Saito visited most nuclear power sites in Japan, and interviewed with the head managers for a research purpose in 2013 and 2014. Kitamura and Saito frequently met those in the Bank of Japan, and the Financial Service Agency, and discussed issues associated with responses to a financial crisis. Professionals in several fields were invited to our internal workshop.

As reported in detail in Section 4, an outreach activity was also developed by conducting a public symposium in Sendai in September 2015, and publishing a comprehensive research report in March 2016.

4. Research results and outcomes produced

4-1 An outline of research results

A number of issues related to the three agendas proposed as a research purpose have been examined broadly and deeply. As a comprehensive research report, a volume entitled *Social Science of Emergency Response: Joint Study in Jurisprudence and Economics* (hereafter, *SSEER*), edited by Makoto Saito and Hiroshi Noda was published from Yuhikaku in March 2016. A research outline is described below agenda by agenda by citing important results from the corresponding chapters of *SSEER*.

(A) Case study of the Great East Japan Earthquake

For this agenda, the research focuses on administrative responses in an emergency situation and its relation with residents, including suspension of regulations after a natural disaster, the sharing of personal information, a population relocation policy, and cooperation between local governing bodies.

In Chapter 2, Kazunari Usui discusses obligations for national and local governments, designated public institutions, and residents as entities with equal responsibility in upholding the rule of law, so that a number of earthquake regulation suspension measures, such as special cremation permits or identity verification of injured persons based on his or her own personal declaration can be undertaken without disruption. Among these responsibilities, the expansion and strengthening of a disaster response system at the national and local levels should be prioritized. As the planning of disaster prevention activities, a bottom-up approach is preferred to a top-down approach, using such means as regular disaster prevention training sessions or transmission of ancient wisdom in each region.

In Chapter 1, Tadashi Okamoto examines in detail cases where many local governments failed to share personal information for an evacuation purpose during the time of the GEJE, but some succeeded to do so. The differences among the responses by various local governments came from how local governments interpreted the Personal Information Protection Law. Many administrative bodies mistakenly believed that personal information should be protected even in emergencies by the law, although the law permits them to utilize personal information in an emergency situation. Using their authority under the revised Basic Act on Disaster Control Measures, which commenced in April 2014, local governments have now compiled a list of people requiring special consideration during disasters. In addition, legal training are conducted so that governments would understand the numerous obligations of prefecture governors and municipal mayors under this act.

Chapter 3 by Masayuki Nakagawa addresses building restrictions and the revitalization of a declining city. A building restriction may be divided into two categories, (1) a permanent building restriction for disaster-prone areas, and (2) a moratorium limiting or prohibiting construction for a certain period of time due to land readjustment. He uses the Ishinomaki City which was severely damaged by the GEJE, the oil leak accident in the Gulf of Mexico, and New Orleans struck by Hurricane Katrina as examples to demonstrate how moratorium standards were applied in each case. Even though the Ishinomaki City vigorously held all types of public meetings and review committee meetings beginning immediately after the earthquake, the scale of its land readjustment project has been downsized through 2014. As opposed to the new safety standards and drilling techniques developed after the Gulf of Mexico incident, or the special repatriation plan with a premise of zero population growth that was adopted following Hurricane Katrina, Japan has not been able to use its moratorium policy as efficiently, mainly because its legislation was flawed due to an assumption of continued growth.

With intensive help from Yu Nomura, Masayuki Nakagawa and Makoto Saito discuss the relocation

system as a reconstruction plan at a natural disaster emergency in Chapter 4. The Ishinomai City was most adversely affected by the tsunami, and approximately 20,000 residences were destroyed during that time. They point out several problems associated with the current relocation system when it is applied to a large-scale residence relocation. In particular, the current system presumes a relocation of twenty or thirty residences, and requires an exact one-to-one correspondence between a household in a damaged area and a household in a relocated area. Given this relocation framework, the reconstruction plan for residential homes had to be revised over time according to individual circumstances; some residents wanted to leave the relocation plan after participating in an alternative plan. In addition, the current relocation system assumes that land and property rights are properly registered, but no complete registration is often available in a damaged area. Thus, it is necessary to make a review of the system for processing and recording basic real estate rights and an adjustment of related laws to improve disaster preparedness.

Chapter 5 by Nakagawa Masayuki, Motohiro Sato, Takeshi Miyazaki, and Makoto Saito discusses a possible cooperation between municipal bodies in an emergency situation. According to a comprehensive survey which asked all municipal governments about disaster cooperation, even though 80 percent of the local governing bodies were committed to mutual disaster support agreements, actual execution was problematic as many newly elected municipal leaders would not honor the terms negotiated by the previous leaders, and such cooperative efforts were often undermined if a neighboring municipality did not enter the agreement. Finally, a restructuring of the cooperative system and further national-level promotion of local government cooperation during emergencies is proposed.

(B) On consensus building of emergency response procedures during normal periods

Based on a case of the Fukushima Daiichi accident for this agenda, two questions have been explored theoretically and empirically; (1) how emergency response procedures are formed such that concerned agents can behave properly in an emergency situation, and (2) how such procedures are respected as a code of behavior at a very time of emergency.

For the first half of this research agenda, our interest lays in examining how those at the TEPCO had behaved properly or improperly in response to the nuclear accident at Fukushima Daiichi during an emergency period as well as in a long-term recovery process. For its second half, issues associated with the Act on Compensation for Nuclear Damage (hereafter, ACND) have been focused on in various contexts.

Chapter 6 by Makoto Saito carefully raises two questions involved in an emergency response to the nuclear accident, (1) whether a particular situation Fukushima Daiichi faced by the earthquake and the subsequent tsunami had been taken into consideration in original emergency operating procedures, and (2) if it is a case, how those in Fukushima Daiichi, the TEPCO headquarter, and the regulatory body had been respecting a sequence of procedures which were specified by emergency response manuals they had at hand. After his intensive reading of three sets of the operating procedures, the investigation report of the nuclear accident by the

government committee, a record of the video conference between Fukushima Daiichi and the TEPC headquarter, and a record of the so-called Yoshida hearing, it concludes that the situation was considered explicitly in the emergency operating procedures (hereafter, EOP), and that they did deviate substantially from what was specified in the EOP mainly for behavioral reasons.

Taking a measure against contaminated water at Fukushima Daiichi as an important case, Chapter 7 by Hiroshi Noda discusses a long-term aspect of emergency responses. After his careful investigation of a process for selecting a wall-like frozen soil, it concludes that a technological choice might have been distorted severely as a consequence of a weak fiscal commitment to prevention measures by the national government. It also points out an extremely difficult aspect of consensus building over how the water treated at the site is discharged to the sea.

Four chapters devote a discussion on various subjects related to the ACND from the viewpoint of both economics and jurisprudence. Given that the ACND did not work as an effective compensation scheme in the accident, the latter two chapters address how the act should be revised from a legislative point of view.

Chapter 10 by Satoshi Watanabe discusses a compensation scheme for a nuclear accident from the viewpoint of law and economics. It theoretically determines an appropriate level of safety regulation at which a marginal benefit of regulation equals its marginal cost. Considering a compensation scheme as an institutional mechanism by which a social cost of a nuclear accident may be minimized, he argues that the scale and scope of compensation which is covered by this scheme should be restricted to any damage whose occurrence probability and resulting scale can be well controlled by a nuclear power company. Any damage beyond this criterion should be covered by not a compensation scheme, but a sort of social policy.

In Chapter 11, Hirosato Kariya explores a historical background that the ACND was legislated in an extremely poor form, and had not worked as a proper compensation scheme for the accident of Fukushima Daiichi. He points out that an ambiguous commitment by the national government was most responsible for this inadequate legislation. Consequently, the ACND had worked as not a solid basis for a compensation scheme, but instead an implicit persuasion scheme by which people were made too optimistic toward nuclear risks.

Chapter 12 by Kazuhiko Yamamoto discusses a possibility that the TEPCO would have been bankrupt after the accident of Fukushima Daiichi. Although the TEPCO became obviously insolvent by legal liability for damage of the accident of Fukushima Daiichi, it had never been subject to a legal bankruptcy procedure. Accordingly, the creditors and shareholders of the TEPCO were protected much more than under a normal procedure. By a carefully designed insurance scheme in which premiums are paid by electric power users and benefits are paid to victims, a nuclear power company could be bankrupt even after a severe nuclear accident, and consequently its creditors and shareholders may not be protected more than necessary.

In Chapter 13, Taro Kogayu proposes a drastic change in the order of priorities among claimants for damage of a nuclear accident. He argues that a claimant for damage arising from a tort, in particular from bodily injuries should be granted priority over other claimants, and

suggests that this legislative consideration may be complementary to a resolution scheme backed by injection of public funds such as the resolution of failed financial institutions.

(C) On the fiscal capacity during emergency response periods

For this agenda, two issues and their linkage were considered from the macroeconomic perspective. Firstly, taking financial and fiscal crises as emergency events, the research targeted response procedures according to which a national government and a central bank should behave during emergency periods. Secondly, it focused on the extent to which fiscal commitment is required for responses to a large-scale natural disaster. Finally, as a possible linkage between the two issues, a possibility that a heavy governmental response itself would trigger a fiscal crisis was examined carefully.

In Chapter 8, Yukinobu Kitamura takes a unique approach to find a possible procedure for a financial crisis by paying attention to a potential linkage between a nuclear compensation scheme and a response procedure to a financial crisis. He carefully examines how the ACND had been applied to the accident at Fukushima Daiichi as a compensation scheme, and derives potentially important implications for a response procedure of a financial crisis.

In Chapter 9, on the other hand, Keiichiro Kobayashi first points out that around 30 percent of a consumption tax is required to maintain sustainability of the Japanese fiscal position, and that a failure of agreement on such taxes increase might result in a fiscal crisis. He details a crisis management conducted by a national government during a fiscal crisis, and emphasizes the importance of a governance mechanism by which administrative bodies are properly disciplined. In addition, he relates issues of a fiscal crisis management to a national emergency act.

In Chapter 14, Oguro Kazumasa and Motohiro Sato quantitatively examine a possibility that a fiscal crisis would be triggered by a large-scale Tokyo inland earthquake using a Keynesian-type macroeconomic model. Their unique approach treats an implicit fiscal commitment to a large-scale reconstruction plan as a hidden national debt, more precisely a state-dependent public debt. They call for a substantial revision of the current reconstruction scheme accompanied by an implicit fiscal commitment, which would deter a revitalization process substantially.

In Chapter 16, Shigeki Kunieda also points out a possibility that a government would be bankrupt immediately after an occurrence of a large-scale natural disaster. If such a possibility is reflected in government bond pricing by chance, a yield on government bonds jumps up immediately and sharply. Then, the ability for a government to prepare for a future natural disaster would deteriorate with extremely weak fiscal positions.

4-2 Research outcomes

Articles (4)

- (1) Makoto SAITO, 2014, "A nuclear crisis as a technological disaster," in Sawada Yasuyuki, ed., *Great Disaster: Risks and Economy*, pp. 165-196, Nihon Keizai Shinbun Shuppan. (in Japanese)
- (2) Makoto SAITO, 2014, "How should we deal with a nuclear crisis?" *Mita Gakkai Zasshi*, Vol. 107, No. 2, 233-243.

- (3) Makoto SAITO, Masayuki NAKAGAWA, et al., 2014, "On the estimation methods and results of the economic damage caused by the Great East Japan Earthquake," Discussion Paper 2014-09, Graduate School of Economics, Hitotsubashi University. (in Japanese)
- (4) Makoto SAITO, Masayuki NAKAGAWA, and Gu TAO, 2014, "On the social and economic impacts of the Great East Japan Earthquake," Discussion Paper 2014-13, Graduate School of Economics, Hitotsubashi University. (in Japanese)

Books (4)

- (1) Tadashi OKAMOTO, 2014, *Disaster Recovery and Revitalization Law*, Keio University Press, 320 pages.
- (2) Makoto SAITO (ed.), 2015, *Great Earthquake and Economy*, Toyo Keizai Shinpo Sha, 290 pages.
- (3) Makoto SAITO, 2015, *Political Economy of Reconstruction from the Great Earthquake*, Nihon Hyoron Sha, 346 pages.
- (4) Makoto SAITO and Hiroshi NODA, 2016, *Social Science of Emergency Response: Joint Study in Jurisprudence and Economics*, Yuhikaku, 430 pages.

Presentation (4)

- (1) Makoto SAITO, "On economic issues of the Great East Japan," Spring Meeting of Japan Association of Applied Economics, Tokushima University, June 22, 2014.
- (2) Masao OGAKI, Naoto ABE, Shunsuke MANAKI, Makoto SAITO, and Michio NAOI, "The Great Earthquake and Economics: What should economists have done and have they learned?" Autumn Meeting of Japan Economic Association, Seinan University, October 12, 2014.
- (3) Fumio OHTAKE, Mika AKESAKA, and Makoto SAITO, "On effects of the Great East Japan Earthquake on economic preferences," Annual Meeting of Association of Behavioral Economics and Finance, Keio University, December 7, 2014.
- (4) Makoto SAITO, "On Great Earthquake and Economy," A symposium organized by Japan Society for the Promotion of Science, Tokyo University, March 28, 2015.

Symposium (1)

- (1) Makoto SAITO, Hiroshi NODA, Motohiro SATO, Kazunari USUI, Masayuki NAKAGAWA, Tadashi OKAMOTO, Yu NOMURA, "Administrative Response to Emergencies: Through Joint Efforts of Jurisprudence and Economics," Hotel Metropolitan Sendai, September 4, 2015, attended by 166 including 17 academic researchers and 69 officers of local governments. An outline of this symposium was reported as "Administrative response to emergencies: Through joint efforts of jurisprudence and economics" by *HQ 2016*, the Hitotsubashi University's public relations magazine. (<http://www.hit-u.ac.jp/eng/hq/2016/>)