Lessons for the Social Sciences from the 2011 Great East Japan Earthquake

(Report of the Social Scientific Research Committee on the Great East Japan Earthquake)

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Social Scientific Research Committee on the Great East Japan Earthquake
Japan Society for the Promotion of Science
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Introduction

On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of northeastern (Tohoku) Japan, unleashing a savage tsunami which hit the Pacific coast of the region, causing massive devastation to people’s lives and property, including over 20,000 dead and missing (excluding secondary casualties that were indirectly caused by the earthquake and tsunami). It was anticipated then that recovery and reconstruction from the devastation would entail tremendous hardship. To make the situation worse, a nuclear meltdown took place at the Fukushima Daiichi Nuclear Power Plant due to the total loss of power caused by the earthquake and tsunami.

Efforts have been made by specialists in disaster prevention engineering and nuclear power to explore the causes of this nuclear disaster triggered by natural calamity in order to obtain lessons for the future. However, it should also be recognized that the entire process surrounding the earthquake and tsunami as well as the nuclear disaster --ranging from their causes and circumstances to steps for recovery and reconstruction -- is, broadly speaking, also a social phenomenon. In fact, such topics as initial responses to damage by the national and local governments, acceptance of both domestic and international assistance, and risk communication to the citizenry are all central to the themes that the social sciences daily deal with as a part of the study of, among others, institutions, policies, coordination, and leadership.

When planning the long-term reconstruction, too, the issue of consensus building during the planning and implementation stages, as well as the division of labor and allocation of burdens, have emerged along with the issue of technological and engineering response. Thus, it is imperative to analyze various political / administrative / economic / social phenomena surrounding the incident in order to decide how best to facilitate consensus building and division of labor.

This means that the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident have presented tremendous challenges to social scientists in Japan. Social scientists have a special role to play in the conceptualization of social mechanisms that can minimize damage, through comprehensive analysis of the entire picture of the current crisis and rehabilitation attempts.
Chapter 1: Background of the Research Survey

On April 10, 2011, when the dust of the disasters had somewhat settled, the Japanese government established the Reconstruction Design Council in Response to the Great East Japan Earthquake, an advisory panel of experts with the aim to propose the direction and content of recovery and reconstruction efforts. The Council’s recommendation, submitted on June 25, proclaimed as the first principle of the reconstruction scheme that Japan should compile comprehensive data on the disaster, scientifically analyze these data with the aid of a broad range of academic specialists, and pass on the lessons learned from these analyses to future generations as well as share them with the domestic and international communities.

Acting on this recommendation, The Ministry of Education, Culture, Sports, Science and Technology decided to “implement a scientific research in various humanities and social science fields that can stand the test of time” and, accordingly, secured a budget that enabled the implementation of the research in the beginning of the 2012 fiscal year.

Based on this decision, the Japan Society for the Promotion of Science, which had already initiated a preliminary survey using its president’s discretionary fund in FY2011, established the Social Scientific Research Committee on the Great East Japan Earthquake in April 2012. This committee is composed of the following academics:

Chair and Vice-Chair:
Ishii Shiro (Professor Emeritus, University of Tokyo), Chairman
Muramatsu Michio (Professor Emeritus, Kyoto University), Vice-Chairman

Members:
Iokibe Makoto (Chancellor, Prefectural University of Kumamoto)
Kanazawa Ichiro (Professor Emeritus, University of Tokyo), who was later replaced by
Kuroki Toshio (Professor Emeritus, University of Tokyo)
Suzumura Kotaro (Professor, School of Political Science and Economics, Waseda University)
Tsunekawa Keiichi (Vice-President and subsequently Senior Professor, The National
Graduate Institute for Policy Studies)

Hirowatari Seigo (Professor, Faculty of Law, Senshu University; former President, Science Council of Japan)

Fujie Koichi (Professor, Yokohama National University)

Fujino Yozo (Professor, University of Tokyo and subsequently Distinguished Professor, Yokohama National University)

To accomplish the mission of the committee, a Research Implementation Committee composed of several subcommittees was established in order to cover as many humanities and social science fields as possible. Thus, the following eight subcommittees were launched:

Subcommittee on Politics and Policy
   Tsujinaka Yutaka (Professor, University of Tsukuba), Chairman
Subcommittee on Administration and Local Autonomy
   Inatsugu Hiroaki (Professor, Waseda University), Chairman, succeeded by Kohara Takaharu (Professor, Waseda University)
Subcommittee on Science/Technology, Politics, and Administration
   Shiroyama Hideaki (Professor, The University of Tokyo), Chairman
Subcommittee on Macroeconomics
   Saito Makoto (Professor, Hitotsubashi University), Chairman
Subcommittee on Environmental Economics and Disaster
   Ueta Kazuhiro (Professor, Kyoto University), Chairman
Subcommittee on Local Community (with Special Emphasis on Education)
   Miyakoshi Eiichi (Professor, Tohoku University), Chairman
Subcommittee on International Relations
   Tsunekawa Keiichi (Vice President, The National Graduate Institute for Policy Studies)
Subcommittee on Media and Networks
   Ikeda Ken'ichi (Professor, The University of Tokyo and, subsequently, Professor, Doshisha University)

Muramatsu Michio and Tsunekawa Keiichi, Vice Chairman and Member, respectively, of the Social Scientific Research Committee on the Great East Japan Earthquake, assumed the responsibility for integrating and coordinating the work of these subcommittees.
For each subcommittee, Muramatsu and Tsunekawa were instrumental in deciding on the division of labor among members, who immediately started working on their respective assignments. As the project proceeded, the Research Implementation Committee (composed of the chairmen of the subcommittees) met several times to compare notes and exchange information, occasionally benefitting from the guidance of outside advisors. It has taken the committee three years to finally publish the current report, “Lessons for the Social Sciences from the 2011 Great East Japan Earthquake”. In all, four years have elapsed since the earthquake and tsunami.

Facing the enormity of the devastation, members of each subcommittee agonized and struggled to decide on the direction and method of research that each was to take. The scars that the nuclear accident has left on Japanese society are particularly profound—so much so that each subcommittee had to spend hours to grasp the true extent of its impact. A macroeconomic view of the entire disaster area shows, as pointed out by the report of the Subcommittee on Macroeconomics, that, while economic recovery of northeastern Japan as a whole has been unexpectedly rapid, many of the local economies in the region still remain at the recovery stage, and will require tremendous efforts in the days to come to restore normal life.

Since surveys and research can do only so much with phenomena that are still ongoing, the Committee has tried to collect as many data and records on the actual disaster and the reconstruction process as possible, sort them out, and organize them so that they can be passed on to future generations. Moreover, each subcommittee has concentrated its efforts to meticulously analyze all the materials and data that have subsequently become available in order to derive wisdom and insights that can be utilized by future generations.

Nevertheless, it should be stressed that the Committee does not regard the publication of this report, four years after the disaster, as representing a definitive conclusion. Neither the accomplishments of the reconstruction nor the study of the disaster have been satisfactory. Indeed both are still far from satisfactory. Return of evacuees to the devastated areas, for instance, has not been realized as originally planned. Most seriously, the full extent of the Fukushima Daiichi nuclear disaster has not yet been grasped, even after
four years, including what has really become of the melted-down fuel. The road map to their eventual decommissioning is also far from being clearly delineated.

Taking the above and other limitations into account, we have nevertheless put muscle into recording and analyzing data on such issues as the actual state of devastation, post-disaster responses of social institutions and mechanisms (including politics and administration), damage to the local and national economies and the degree of recovery from this damage, as well as such issues as livelihood support and other recovery efforts, government budgets, debris disposal, radiation contamination and enduring reputational damage, livelihood of the evacuees, and measures taken for foreign residents and foreign governments. What can be quantified has been quantified, disaster victims and other people directly involved have been extensively interviewed to provide first-hand accounts, and all the available literature, both domestic and foreign, has been studied. During the process, the Committee has benefitted from the input of numerous disaster victims, national and local legislators and administrators who have been engaged in recovery and reconstruction policies and schemes, as well as volunteers and non-profit organizations which have made tremendous contributions from the civil-society side. All have generously shared their own experiences with us. We have also conducted opinion surveys of local citizens, officials of local governments, and local teachers. On behalf of the entire Committee, we wish to take this opportunity to express our heartfelt thanks to all of those who have cooperated with our efforts despite their own indescribable hardships.

In the subsequent section, the outcomes of the research and survey activities of each subcommittee will be discussed. Prior to that, however, we shall touch on several issues which constitute common premises cutting across all the subcommittees.

**Chapter 2**

**Earthquake/Tsunami Strikes and Initial Responses**

By the time the committees’ work started, members had already begun to learn of the tremendous impacts of the 2011 earthquake, tsunami, and nuclear disasters from numerous testimonies and publications. We knew, for
instance, that the earthquake was immediately followed by a giant tsunami with a maximum run-up height of 40 meters in places, which inundated everything as far as four to five kilometers inland on the Pacific coast of the Tohoku region, leaving behind 20,000 dead or missing, before going out. A Japanese TV network’s helicopter coincidentally took off at the time of the earthquake strike and captured the rage of the tsunami on video in real time, which astounded viewers all over the world. Such visuals as coastal towns swallowed by the tsunami, boats and ships carried for inland by muddy waters, and thousands of vinyl greenhouses swept away, left a deep impression on viewers.

Affected regions suffered from such problems as water and food shortages, blackouts, and a dearth of gasoline. Moreover, houses, farms, rice paddies, fishing ports, and roads were all destroyed, public and private offices were devastated, and public services became paralyzed, at least initially, in many locations. Factories and other centers of industrial and economic activity were also lost. Minute-by-minute accounts of devastation in various regions can also be traced by through press releases issued by mayors of affected municipalities uploaded to their respective webpages.

When people talk about the “disaster area,” they usually think of the three Tohoku prefectures of Iwate, Miyagi, and Fukushima. But some ten more prefectures, including Ibaraki and Chiba prefectures in the immediate vicinity of Tokyo, were also hit by an earthquake on the level above “intensity 6-minus” and also suffered heavy damage. While the number of buildings that collapsed was limited to a few in Tokyo, seven persons were killed nevertheless. More salient damage to the capital city was, however, the complete paralysis of public transportation services, depriving some 5 million commuters of means to go home, forcing them to overnight at make-shift shelters and railway stations. At one point, Tokyo had to resort to scheduled blackouts to make up for the anticipated power shortage. Frequent aftershocks of the March 11 earthquake and a sizable earthquake that hit Nagano prefecture also had the effect of spreading fear of a chain reaction of earthquakes.

Initial responses are of the utmost importance when coping with a major disaster. A well-known, recently popularized slogan describing individual initial response is *tsunami tendenko* (every man for himself in case of a tsunami). A number of people are believed to have escaped death or harm by
actually following this slogan as soon as they heard the tsunami alert. On the other hand, hundreds chose to help their wives and children and other family members, juveniles, and the elderly first and lost their lives consequently, with a number of episodes that reminded us of our human bonds. It is a well-known fact that the death toll from the Great East Japan Earthquake was particularly high among public officials and firefighters.

The tsunami's waters receded in three hours. Not only local firefighters, local citizens' groups, and rescue teams dispatched from the Self-Defense Forces and U.S. forces stationed in Japan, but also disaster victims themselves all played important roles in saving people's lives and helping evacuees. What was immediately needed in the disaster areas were means of transportation for disaster victims -- some of whom were sick and injured --, shelters for evacuees, and restoration of the so-called “lifelines” (essential utilities). Volunteers from all over the world rushed in and NPOs started operations even before roads and railways were fully restored. Within only a few days after March 11, disaster prevention experts as well as volunteers arrived in Iwate Prefecture's coastal cities, including Rikuzen Takata, and started their own activities. It is estimated that, at the time of the Great Hanshin-Awaji (Osaka-Kobe) earthquake of 1995, a total of 1.5 to 2 million volunteers rendered their services at one point or another. While it is generally believed that the number of volunteers this time must have exceeded this total, our Subcommittee on Administration and Local Autonomy has not succeeded in confirming the final figure yet.

Only a few quick months elapsed after the first three days of the disaster, (believed to be the limit beyond which prospects for survival of the missing become increasingly dim) before the pace of retrieval of the dead passed a peak. During this trying period, a totally unexpected confusion of information routes emerged, triggered by a chain of seemingly by trivial incidents such as official phones running out of battery power. In many areas, cell phones did not work. Due to these and other problems in their communication channels, rescue workers and volunteers suffered from a chronic dearth of information. Our Subcommittee on Media Networks refers to a phenomenon called “information divide,” i.e, many of the affected areas were ignored or forgotten by mass media which concentrated their reporting on certain specific regions. The Subcommittee’s study also reveals that disaster victims who had weak social bonds or those that were overlooked by
the mass media have tended to show low social adaptability, making them vulnerable to psychological stress.

In their initial reactions, all the institutions and organizations in each affected area sought to make appropriate judgments. After all, any of those judgments could be life or death decisions.

While the case of Okawa Municipal Elementary School is well-known, what happened to a school bus of the private Hiyori Kindergarten of Ishinomaki city, Miyagi prefecture, was equally tragic. Although the driver followed the emergency manual when the evacuation bus departed the kindergarten, (which was situated on higher ground) to deliver children to their parents, the bus was swamped by the tsunami at a low spot and five children were killed. Parents of four of the victimized children sued the kindergarten’s principal and its managing company for compensatory damages. The case was settled when the two parties reached reconciliation at Sendai High Court on December 3, 2014. While the defendants argued that the kindergarten’s response was the only one possible at the time of crisis, the court found that there was room for the kindergarten to have taken safer measures. The defendants recognized their legal responsibility to prepare more thorough disaster-prevention schemes and offered an apology to the families of the victims. Upon the reconciliation between the two parties, the Sendai High Court added a preamble to its decision which said, “The Court believes that the sacrifice of the kindergarteners should eternally remain in people’s memories so that it may be taken into account in future disaster prevention measures.”

On March 11, students of Yamamoto-cho Driving School in Miyagi Prefecture were instructed to stay put on the school’s premises. After 50 minutes of standing by, the school’s courtesy buses started taking students back home; four buses were engulfed by the tsunami, killing 23 passengers aged 18 and 19. Two students who decided to walk home were also killed, along with a number of the school’s employees. Taking into consideration that sea walls around the area were 6.2 meters high, while the initial alert reported a 6-meters-high tsunami, as well as the fact that the driving school

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1 The court case against Okawa Municipal Elementary School, Ishinomaki, Miyagi prefecture, has not been concluded as of this writing. Delays in evacuation of the school led to the death of 75 pupils and 10 teachers.
was not inside the inundation hazard areas designated by Miyagi Prefecture, the Sendai High Court decided that it was practically impossible for the school--which was some 750 meters inland--to predict a hit by a tsunami. At the same time, however, given the fact that fire engines had already urged people along the road facing the school to evacuate, the court on December 13, 2014, ordered the school to pay the total of 1.913 billion yen ($US 16 million) in compensation to surviving families of the student and employee victims. This decision is tantamount to the court’s recognition of the school’s negligence in not letting its students evacuate when warned by the fire department. There have been altogether at least 15 court cases questioning the responsibility of school and office administration in Sendai and Morioka District Courts.

Although there were a few other such tragedies, overall, it can be said that the behavior of disaster victims, both individual and organizational, was restrained and proper. Not that altruistic activity emerged instantaneously in the affected communities--nevertheless it appears that disaster victims spontaneously acted in ways that preserved collective order. When shelters for the affected soon began to be opened one after another, spontaneous leadership was also demonstrated in their establishment and management. Mayors of municipalities, local clerks, unofficial local leaders, and school principals (in the case of schools turned into shelters) naturally assumed the responsibility for managing shelters.

Even in the fields in which only medical professionals could render services, organizational responses were seen. The Ishinomaki Red Cross Hospital was the only specially-designated disaster base hospital in the region that remained unscathed after the tsunami. Within 12 hours of the disaster, numerous volunteer doctors, including Disaster Medical Assistance Teams (DMAT, a famous NPO), poured into this hospital from all over Japan.² While there was some confusion in the beginning with so many doctors arriving at once, those doctors provided disaster victims with not only medical treatment but also other assistance well beyond the limits of their medical profession.

² Tohoku University School of Medicine, Gonryo Dosokai Kaishi (Journal of Gonryo Alumni Association), No. 10 (2012). The substance of the medical assistances provided was a large-scale medical/surgical treatment and assistance program by a group of medical professionals, and was thus outside the scope of the current survey.
On the other hand, damage in Fukushima Prefecture, where the Fukushima Daiichi Nuclear Power Plant is located, was particularly severe and the initial responses there faced tremendous difficulties. At the Fukushima Daiichi Nuclear Power Plant, all power was lost for reactors No. 1 through No. 4, which triggered a “severe accident” (defined as severity level 7). Meltdown in reactors No.1 through No. 3 generated radioactive material, which was released out of the reactor buildings by hydrogen explosions in reactors No. 1 and No.3 and the cracking of the pressure suppression chamber in reactor No. 2. Rain and wind, which immediately followed the accident, led to emergence of radioactive “hot spots” in a wide range of areas.

Although the existing law on directives on evacuation stipulates that it is mayors of the affected municipalities that should designate the area to be evacuated, the national government has to respond instead in case of such a large-scale disaster as the current case. While, at first, the government had instructed evacuation of the area in a 3-kilometer range from the Fukushima Daiichi reactors, it was soon expanded to 10-kilometers, 20-kilometers, and, finally, 30-kilometers. However, as it turned out, designation of the evacuation area was not necessarily consistent with the direction and intensity of diffusion of radioactivity. Although the administration was equipped with the System for Prediction of Environment Emergency Dose Information (SPEEDI) and the direction of radioactive diffusion was preliminarily assessed, it had not been prearranged to utilize the information thus collected in the government’s decision-making regarding the area to be evacuated. One of the most important tasks of the government is to collect disaster-related information, process it, and communicate it to citizens accurately with more clarity. For multiple reasons, however, the Japanese government and the prime minister’s office at the time of the Fukushima Daiichi nuclear accident could not obtain vital information. The government’s responses to the nuclear accident were, therefore, full of confusion.

Chapter 3
Governmental Responses to the Disaster
Thanks to experiences during the Great Hanshin-Awaji earthquake of 1995, the Japanese government had instituted legal and institutional preparations for major earthquakes when the 2011 Great East Japan Earthquake struck. The mechanism to help those who lose private property in natural disasters had been deliberated ever since the Great Hanshin-Awaji earthquake, but aid policies were more developed after Japan experienced the Western Tottori earthquake of 2000 and the Fukui Torrential Rain of 2004. This mechanism’s concrete procedures and expected outcomes are introduced in several chapters of the report of our Subcommittee on Administration and Local Autonomy. According to this Subcommittee’s study, support for victims of the Great East Japan earthquake to reconstruct their houses became much more generous because the mechanism allows victims to collect subsidies from a variety of victim support schemes.

It has been pointed out, however, that the scale of the budget for reconstruction would have been much more appropriate had the disaster information, pouring in minute by minute, been utilized immediately to respond to the disaster. The report of the Subcommittee on Macroeconomics points out that the gap between immediate perceptions of the disaster and its true scope could have been narrowed to a great extent had available information been more effectively utilized, even if only a limited amount of information was available. On the other hand, our Subcommittee on Politics and Policies offers an alternative perspective on the political process of budgeting.

The propriety of both the words and deeds of government leaders immediately after the nuclear accident also attracted much attention. Limited space does not permit us to introduce each and every example, but there is, for instance, a view that the relationship between Prime Minister Kan Naoto’s Democratic Party cabinet and central government ministries/agencies was not exactly smooth. In fact, it appears that Kan’s cabinet failed to operate the policy network smoothly and effectively. The national bureaucracy, on its part, appears to have failed to convey critical information to top government leaders in a coherent way. In the background was the overall relationship between the cabinet and the administrative branch, which had not always been smooth. The Administrative Vice-Ministers’ Conference, a traditional organ for top-level policy
coordination, had been abolished by the preceding Hatoyama cabinet, depriving the government of the so-called “deadline function,” which it had performed, that is, of coordinating policies across ministries before they are determined by the cabinet.

Inadequacy of the communication effort was also conspicuous in communication with the international community. As introduced by the report of the Subcommittee on International Relations, some countries instructed their nationals to flee Japan, undoubtedly intimidated, at least to some extent, by mass-media reporting that gave an impression that the entire country had been contaminated. While it is impossible to accurately evaluate how much of this behavior by foreign citizens and foreign governments was attributable to the crisis communication policy the Japanese government took, in hindsight the panicky behavior of some foreign governments and citizens in Japan could have been avoided had the public information outreach to foreign residents been more appropriate.

Whether the information a government provides domestically and internationally is trusted or not depends very much on the communication ability of its top leaders, in their role as the government’s spokespersons. Reviewing the record of hearings conducted by the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations, part of which was publicized in the summer of 2014, the performance of Prime Minister Kan was severely criticized by many. Kan’s own personality might have played some role. But it is not unthinkable, when reliable information is not available, that a sense of mistrust to bureaucrats is magnified among the top leaders. At this point, the information available is not sufficient to evaluate Prime Minister Kan’s leadership in crisis communication. Perhaps, however, history will tell if Kan acted properly or not in time of crisis.

The state of emergency in Fukushima is still in effect four years after the nuclear accident. In order to ease people’s anxiety and prevent the recurrence of similar crises in the future, the government owes it to its people to thoroughly analyze what really happened in Fukushima and disclose its findings in an easy-to-understand form. People will remain anxious and unsettled until enough information is provided. According to a 2014 survey of popular attitudes toward the nuclear accident conducted by Tokyo’s Institute of Statistical Mathematics, 65% of respondents felt either “uneasy” or “very uneasy,” a 10 percentage points higher than in the four
prior surveys. As for the effects of an earthquake and other natural
calamities, two-thirds of respondents indicated that they felt similar
anxiety.\textsuperscript{3}

To summarize the initial actions taken by the Japanese government, an
emergency response team staffed by representatives of each ministry was
organized immediately, under the Deputy Chief Cabinet Secretary for Crisis,
in accordance with the Emergency Manual. This team soon became the work
force of the Extreme Disaster Management Headquarters headed by the
prime minister. Other measures that were taken in rapid sequence
immediately after the disaster by the government one after another included:

March 11, 2011: Extreme Disaster Management Headquarters
   established
March 11: Nuclear Disaster Management Headquarters established
March 11: Fukushima Local Nuclear Emergency Response Headquarters
   and Joint Council for Nuclear Emergency established (in the
Okuma-cho Offsite Center)
March 12: 2011 Local Extreme Disaster Management Headquarters
   established (in the Miyagi Prefectural Government)
March 15: Fukushima Daiichi Nuclear Emergency Response Joint
   Headquarters (which was reorganized into the Government-Tokyo
Electric Power Company Joint Response Office on May 9) established
March 15: Fukushima Local Nuclear Emergency Response Headquarters
   and Joint Council for Nuclear Emergency transfer from the
Okuma-cho Offsite Center to the Fukushima Prefectural
Government

For details on the functions of these headquarters and offices, readers
are urged to read the analyses conducted by the Subcommittee on Politics
and Policy and the Subcommittee on Administration and Local Autonomy.
Roughly speaking, there were two networks at work, one, a mechanism to

\textsuperscript{3} For the gist of findings of the 13\textsuperscript{th} \textit{Nippon-jin no Kokuminsei Chosa} (Japanese
National Character Survey) conducted by the Institute of Statistical Mathematics,
see \url{http://www.ism.ac.jp/kokuminsei/page2/page15/index.html}
assist disaster victims’ livelihood and the other to facilitate measures to
cope with the nuclear accident itself. As pointed out by the Subcommittee on
Politics and Policies, Prime Minister Kan is presumed to have placed the
response to the nuclear accident directly under his authority so that he
could concentrate on this issue. But the problem was, at the initial stage,
that there was not a close partnership between the cabinet as a whole and
the central ministries/agencies in which the former issues instructions and
the latter acts promptly on them. Symbolic of this shortcoming was the
obvious lack of coordination witnessed on March 11 between the Emergency
Response Team, which assembled on the first floor of the Office of the Prime
Minister but received no specific directives from supervisor and the top
echelon of the Kan government which, on the fifth floor of the same building,
was considering measures to be taken. The Kan cabinet soon realized,
however, that the government would function well only when the cabinet
and ministries cooperated with one another and, accordingly, appointed
Sengoku Yoshito, Acting President of the Democratic Party, to concurrently
serve as Deputy Chief Cabinet Secretary in charge of policy affairs on
March 17.

Meanwhile, individual government ministries and agencies had
spontaneously started addressing issues and problems which fell into their
respective jurisdictions. The first step required for reconstruction was
disposal of debris from roads. The Tohoku Regional Bureau of the Ministry of
Land, Infrastructure, Transport and Tourism promptly engaged, from the
beginning, in the restoration of the crucial “lifeline”, utilities and
transportation links, including debris removal, while both the Fire and
Disaster Management Agency and the National Police Agency were engaged
in such activities as assessment of disaster situations, emergency disaster
responses, lifesaving efforts, and firefighting. Cooperation offered by
private-sector groups, including construction businesses, was also
remarkable. One crucially important, albeit mostly invisible, contribution
was made by the Financial Services Agency and the Bank of Japan, which
moved quickly so that the disaster areas would not run out of money, as our

“Operation Comb Teeth,” which cleared several parallel roads from inland to the
Pacific coast, is a well-known example. Overseas media were quick to report on the
prompt recovery of infrastructures: for instance, The Guardian reported on the quick
reopening of highways and other roads as early as March 24, 2011.
Subcommittee on Macroeconomics and Subcommittee on Science/Technology, Politics, and Administration has pointed out.

As the report of our Subcommittee on International Relations reveals, the Kan government's response was quick as far as its request for deployment of the Self-Defense Forces (SDF) was concerned. As many as 100,000 SDF troops were deployed at the peak time, engaged in such tasks as lifesaving, searching for the dead, and disposal of debris. Working closely with the SDF, U.S. military forces stationed in Japan also played an important role in the search for the missing and victim relief activities. While the SDF had made great contributions to relief activities in the past, it gained much more trust and respect among the Japanese people this time by conducting large-scale, organizationally effective operations.

But as for responses to the nuclear accident, even though Prime Minister Kan attempted to exercise leadership, he ended up displaying even greater inconsistencies than in his responses to the earthquake and tsunami. An excessive delay in opening an important vent on Reactor 1 led the Kan government’s top leaders to suspect that TEPCO and the Nuclear and Industrial Safety Agency were hesitant to take necessary actions and share crucial information with the government. It was based on this suspicion and mistrust that Prime Minister Kan took such highly irregular measures as personally marching into TEPCO headquarters on March 15 and setting up a joint nuclear accident response headquarters there. It does appear, however, that the gap between the government and TEPCO diminished somewhat after the establishment of the headquarters inside TEPCO.

Chapter 4: Recovery and Reconstruction

1) Victim Support

As the initial response phase transitioned into a phase of recovery and reconstruction, the Japanese government and society continued to face the enormous devastation both squarely and boldly. Since the Emergency

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5 For details of the SDF’s works at the disaster areas, see Sakurabayashi Misa, *Nippon ni Jieitai ga Ite Yokatta* (It Was a Good Thing That We Had the SDF) (Tokyo: Sankei Shimbunsha, September 2011)

Disaster Management Headquarters and its secretariat had to deal continuously with enormous long term tasks even after the initial response activities had attained certain goals, a Special Headquarters in Charge of Assisting the Lives of Disaster Victims was set up inside the Emergency Disaster Management Headquarters on March 17. Operations concerning assistance to the lives of disaster victims were concentrated in this organ. This new headquarters, renamed the Team in Charge of Assisting the Lives of Disaster Victims in May, was to coordinate activities among prefectures, municipalities, and the national government ministries/agencies. Its mission passed to the Reconstruction Headquarters in Response to the Great East Japan Earthquake on June 24, 2011. In order to cope with the aftermath of the nuclear accident, a Team in Charge of Assisting the Lives of Victims Around the Nuclear Power Plant was then established on March 29, 2011. It was, however, not until April 11 that a Team in Charge of Responding to the Economic Impact Caused by the Nuclear Power Station Incident was established.

Although the official head of the Special Headquarters in Charge of Assisting the Lives of Disaster Victims and, later, the Team in Charge of Assisting the Lives of Disaster Victims was the Minister of State for Disaster Management (Matsumoto Ryu at first, replaced by Hirano Tatsuo in July 2011), it was Okamoto Masakatsu, then Councilor of the Cabinet Secretariat, who directed actual operations. This Special Headquarters/Team was reorganized, in accordance with the Basic Act on Reconstruction in Response to the Great East Japan Earthquake (Act No. 76 of June 24, 2011), into the Reconstruction Agency in February 2012. It continued to be directed by the Hirano-Okamoto team even after the reorganization. It was envisioned that the Reconstruction Agency would become a one-stop organ for all reconstruction efforts, equipped with the authority to coordinate issues that fell within the jurisdictions of governmental ministries/agencies.  

Table 1 below summarizes the government’s responses to the Great East Japan Earthquake and Tsunami. It was presented to us when one of the authors interviewed Fukuyama Tetsuro, Deputy Chief Cabinet Secretary, at

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Waseda University five months after the March 11 disaster. In coping with the aftermath of the disaster, the Prime Minister’s office tried to draw lessons from past experiences, including the Great Hanshin-Awaji Earthquake of 1995. It is said that, by comparing the damage and the timing of responses during the 1995 earthquake to those of 2011, the government was able to derive rough indications of the type of legislative and budgetary steps to be taken and the timing of these measures. Based on these efforts, the Diet passed dozens of bills related to victim assistance in the months of April and May.

Damage from the March 11 earthquake/tsunami to human lives and property was extremely extensive, affecting numerous coastal municipalities. In the case of the Great Hanshin-Awaji Earthquake, the number of missing persons was not great compared to that of the injured. This phenomenon was attributed to the concentration of the damage in densely-populated urban areas, where building collapse and fire were the main causes of casualties. In contrast, the Great East Japan Earthquake was accompanied by a massive tsunami which devastated a vast expanse of rural areas mainly composed of towns and villages with small populations. This was the major cause of the enormous number of dead and missing. In short, while the human casualties in case of the Great Hanshin-Awaji Earthquake were mostly death in collapsing buildings or death by fire, the majority of deaths during the Great East Japan Earthquake were caused by the tsunami.

Shelters for disaster victims also mushroomed. According to the webpage of the Reconstruction Agency, in 2011 the number of shelters in the affected three prefectures exceeded 1,800 in the first week after the disaster, reduced to 73 only after seven months. Since there were no shelters left after seven months in case of the Great Hanshin-Awaji Earthquake, it can be inferred that recovery from the March 11 disaster was accompanied by tremendous difficulties, including the search for available land. Debris which piled up in the three prefectures amounted to 22.47 million tons, far exceeding that found in the urban areas after the Great Hanshin-Awaji Earthquake.

Naturally, construction of temporary housing for the displaced citizens became a top priority, and here the experiences during the Great

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8 On the Great Hanshin-Awaji Earthquake, numerous documents compiled by the Hyogo Earthquake Memorial 21st Century Research Institute are available, including the four-volume *Saigai Taisaku Zensho* (Complete compendium of Disaster Measures).
Hanshin-Awaji Earthquake were fully utilized. Most noteworthy among them was the pre-March 11 decision to provide public assistance for the restoration of private property, which had not been approved yet at the time of the Hanshin-Awaji earthquake.

The standard duration of stay in temporary housing is set at two years, subject to annual renewal of permission, but an occupant can stay in such housing no longer than five years. Nevertheless, there still remained some 40,000 temporary housing units in the three affected prefectures as of December 2014. Comparing this with the Hanshin-Awaji earthquake, when the all 48,000 temporary housing units disappeared in five years, it cannot be said that the relocation of disaster victims has progressed smoothly, not only in Fukushima Prefecture (which includes radioactive “difficult-to-return zones” and “restricted residence areas”), but in two other prefectures as well. At one point, fully 85% of 470,000 evacuees had no other option than living in temporary housing.

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<th>Table 1: Comparison of the Great East Japan Earthquake and the Great Hanshin-Awaji Earthquake</th>
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<td><strong>Great East Japan Earthquake</strong></td>
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<td>Damage to Residential Houses</td>
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<td>Date</td>
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<td>May 2 (52 days after the disaster)</td>
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<td>passed the Diet on February 28 (42 days after the disaster)</td>
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<td>Plus ¥778.2 billion ($US 6.5 billion) submitted as the second supplementary budget for FY1995 on October 4, 1995 (260 days after the disaster), which passed the Diet on October 18 (274 days after the disaster)</td>
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Source: Author’s calculations, based on materials used at the hearing of Fukuyama Tetsuro, Deputy Chief Cabinet Secretary, on August 22, 2011.9

After three months of intensive deliberations, the Reconstruction Design Council submitted its proposal, *Fukko e no Teigen—Hisan no Naka no Kibo* (Toward Reconstruction—Hope in the Midst of Disaster) to Prime Minister Kan on June 25, 2011. It contains numerous specific proposals on multidimensional recovery and reconstruction efforts in the disaster areas,

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9 This is unmodified reference material as presented at the time of the hearing of Deputy Chief Cabinet Secretary Fukuyama. There are separate, confirmed figures on such items as the damage to residential houses, and some of the dates and figures in the table are now known to be incorrect. For instance, the magnitude of the Great Hanshin-Awaji Earthquake was corrected to 7.3 at the April 23, 2001 meeting of the Japan Meteorological Agency’s committee to reexamine the magnitude of the Great Hanshin-Awaji Earthquake.
including economic recovery, renewable energy development, and relocation of local communities to higher ground, promotion of partnership between fishermen and private business, and designation of special zones for reconstruction. When making these specific proposals, the Reconstruction Design Council took full notice of the need to reactivate the long-stagnant Japanese economy itself. The proposals of the Reconstruction Design Council were adopted in the Basic Policy for Reconstruction from the Great East Japan Earthquake, which has continued to exert significant influence on subsequent city planning by local governments as well as budgetary provisions by the national government and the Diet.

In time, the focus of reconstruction efforts was shifted to the Diet deliberations on the supplementary budget. According to our Research Subcommittee on Politics and Policies, around this time (June 2011), the opposition parties’ demand for Prime Minister Kan’s resignation intensified, making response to the earthquake and nuclear accident an arena of power struggle, instead of a manifestation of national unity. On this issue, many commentators have pointed out that, while both the governing party and the opposition appeared to be eager to join hands to cope with the unprecedented disaster before the Diet session in June, confrontation over dissolution of the Diet and the supplementary budget became so conspicuous, as to be obvious even to the eye of foreign political observers.10

2) From Recovery to Reconstruction

The shift from the phase of recovery to that of reconstruction began around the time when the majority of the evacuees finally moved from shelters to temporary housing. Responsibility for construction of temporary housing is the Government’s because it requires coordination between the national and local governments, acquisition of land by the administrative authority, and various other legal procedures. At this point the government’s disaster compensation scheme became relevant to victims’ long-term efforts to rebuild their lives. In preparation for damage compensation to nuclear accident victims, the Kan government established the Dispute Reconciliation Committee for Nuclear Damage Compensation on April 11, 2011.

Among various reconstruction measures, particularly challenging was...
the provision of long-term residential units for evacuees. Relatively well-to-do evacuees could help themselves by securing their own residences, making their own future plans at an early stage. At the other end of the spectrum were disaster victims, particularly in Fukushima prefecture, who had evacuated to various areas; while under the care of relatives and friends, they retained their registered addresses in the evacuated cities and towns. Where entire areas had been engulfed by the tsunami or contaminated by radiation, not only did the population diminish, but fewer and fewer people even wished to return home. In such places, restoration in the sense of “restoring the original state of affairs” was perhaps unrealistic; what was needed, instead, would be a restoration scheme that facilitated retrieval of a sustainable “normal state of affairs.”

While governmental assistance provided a general framework for recovery and reconstruction of individual disaster areas, each local government set up its own recovery/reconstruction plan according to the state of damage in its own region. As the report of the Subcommittee on Administration and Local Autonomy reveals, the year 2020 became the approximate goal year for most of these reconstruction plans, since many coastal municipalities’ reconstruction plans aimed at accomplishing their goals in eight to ten years. Each local government has striven to realize its respective reconstruction plan, with a target of 2020, by taking up what it could tackle first. Relocation of communities to higher ground and construction of storm-surge barriers, for instance, were important themes of city planning in the devastated areas and consensus was reached in most of the affected regions to pursue these goals.

One of the issues in the recovery and reconstruction efforts that attracted much attention was the so-called “local-to-local support.” The Regional Union of Kansai Governments (Kansai Koiki Rengo), which was founded jointly by the seven Kansai prefectures (Shiga, Kyoto, Osaka, Hyogo, Wakayama, Tottori and Tokushima) with the shared intention of creating a new Kansai-based era, was the first such noteworthy example. However, in the course of time, such intergovernmental coalitions became so numerous that this “local-to-local support” appeared to have become a new norm for local autonomy in Japan. While this is, undoubtedly, a noteworthy development, it should be noted that this type of long-term cooperation was only possible when the national government and such federations of local
governing bodies as the Japan Association of Prefectural Governors facilitated a match-up between aid demand and aid supply. For example, as the Subcommittee on Local Community (with Special Emphasis on Education) and the Subcommittee on Administration and Local Autonomy have shown, it was mainly the robustness of the traditional national government-local government relationship that accounted for the prompt dispatch of additional teachers and administrative personnel to disaster-hit areas.

3) Investigation of the Fukushima Daiichi Nuclear Accident

As recovery and reconstruction from the March 11 disaster progressed, people began to urge investigation into the causes of the Fukushima Daiichi Nuclear Accident. The Kan government launched the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company (AFNPSTEPC) on May 24, 2011. Launching an investigation committee into the nuclear accident was also proposed in the National Diet, which established the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) on December 8 of the same year. Prior to the launching of AFNPSTEPC, a nongovernmental Independent Investigation Commission on the Fukushima Daiichi Nuclear Accident (IICFDNA) had looked into the accident and published its findings at an early stage. Excluding an investigation committee set up by Tokyo Electric Power Company itself, which cannot be regarded as a separate party, altogether three large-scale investigating committees were organized, all of which released final reports between February and July of 2012.

All three of these investigation committees raised the question of why all the reactors at Fukushima Daiichi suffered a total power loss. One important query was why the crisis deepened at Fukushima Daiichi when Fukushima Daini succeeded in controlling the crisis. Was everything attributable to the irresistible force of the earthquake and tsunami? Were there no human errors involved? Both experts and mass media were highly interested in the cause of the total power loss, on which a variety of views have been expounded.

From the angle of reactor design or structural causes of the accident, one problem was the location of the station’s electrical power source, which was
installed on a lower level of the nuclear plant building. Admission of this “design problem” by an American engineer from GE, constructor of the Fukushima Daiichi facilities, had been introduced at an early stage of the investigation. Therefore, serious inquiries were made as to why the power source obviously vulnerable to a tsunami had been left unattended. The backup system for the power source was also found to be appallingly inadequate. Whether the nuclear accident had already been triggered by the damage caused by earthquake vibrations or started by the tsunami was an important point of contention in the judgment of who was really responsible for the accident. Although the committees carried out rigorous investigations, there remain countless questions related to this issue which still remain unresolved.

The process leading to official recognition of the meltdown was also controversial. Although it is common knowledge today that the meltdown had already begun when Prime Minister Kan visited Fukushima, people were provided only with highly ambiguous information at the time. The Nuclear and Industrial Safety Agency (present-day Nuclear Regulation Authority) had openly admitted the high probability of a nuclear reactor core meltdown from the beginning. It remains unclear, even today, if the Prime Minister’s Office’s decision to reprimand the Agency’s announcement to this effect was at fault, or if the Prime Minister’s Office had not been provided with accurate information, due either to confusion caused by uncertainty about the phenomenon itself, or to the presence of some who wished to suppress undesirable facts. In any event, it became apparent to everyone that the public information system was far from satisfactory at a time of crisis fraught with uncertainty. It was not until May 12 that TEPCO and the government finally acknowledged that a reactor meltdown had been in progress from an early stage of the accident. Top government leaders’ decision to forgo the use of the term “meltdown,” knowing full well that a meltdown had been actually taking place, will be a subject of controversy for a long time to come.

Even after some months, it could not be said that either TEPCO or the Nuclear and Industrial Safety Agency clarified the situation and disclosed relevant information in an easy-to-understand manner. Reports of all the investigating committees point out that Prime Minister Kan had given instructions to vent radioactive vapor into the air from Reactor No. 1 at an
early stage. It was, however, 13 hours after the instruction that the venting was actually carried out. And ordinary Japanese citizens learned of tardiness in the venting operations, and the hesitation shown by TEPCO when injecting seawater to cool the reactors, only through the disclosure of videos of TEPCO’s teleconference or portions of hearings by AFNPSTEPC that have been made public since September 2014.

To begin with, the accidents that TEPCO and the Nuclear and Industrial Safety Agency had anticipated were limited to technical ones such as operational errors or malfunctioning of equipment. A severe natural calamity was totally beyond the scope of their assumptions. Given this lack of preparedness, it would have been difficult for decision-makers to accurately assess the information from the field promptly, because what actually happened had been totally unexpected. AFNPSTEPC found it problematic that the emergency manual did not encompass all possible crises and denounced the existing nuclear disaster damage prevention plan for being defective.11 AFNPSTEPC also suggested that national bureaucrats’ provision of information to the prime minister’s aides was inadequate, even questioning the professional competence of central government bureaucrats.

The report of the Independent Investigation Commission on the Fukushima Daiichi Nuclear Accident was the first to come out among the three investigating committees. Its impact was so immense that there was a surge of anti-nuclear power plant opinion after its publication, leading to publication of numerous magazine articles and books. It also inspired a number of dignitaries to participate in anti-nuclear power demonstrations, staged in various locations. The dispute became so politicized that, in the February 2014 Tokyo gubernatorial election, former Prime Minister Hosokawa Morihiro ran for governor, on the single issue of abandonment of nuclear power generation, vocally supported by Koizumi Junichiro, another former prime minister.

When the initial response to the Fukushima Daiichi Nuclear Accident began to wind down, people started focusing on the whereabouts of “hot spots” and degrees of radioactive contamination. Consequently, increasing attention began to be paid to the issue of disposal of contaminated soil and

water which continued to release radiation, as well as the issue of how to decommission reactors with molten nuclear fuel still pooled at the bottom. Also, in the day-to-day life of people in the affected area, decontamination became a very important issue.

Decontamination could not completely eliminate radioactive materials. What could be done, in actuality, was to collect highly contaminated soil and store it in a remote place, as far away as possible from human habitation, and simply wait for natural radioactive decay. Thus, the next questions were: where to start decontamination; how wide the range of decontamination should be; where to transport the contaminated soil; and how to process it. Selection of locations for temporary storage, intermediate-term storage, and permanent disposal became a particularly important issue in contaminated soil management, and was carried out step-by-step with the participation of local residents. As a result, it was decided in March 2015 that the current location of contaminated soil automatically became “the temporary storage” site while, thanks to strenuous efforts by the government and local communities, Ōkuma-machi and Futaba-machi, both of which are located in Fukushima Prefecture, agreed to offer locations for intermediary storage of contaminated soil. In the same month, the authorities started transporting some contaminated soil to Ōkuma-machi. As far as a site for permanent disposal outside Fukushima Prefecture was concerned, however, no promising proposal has been heard as of today. Looking back at the Fukushima Daiichi Nuclear Accident, which contained the above and many other complications, it becomes obvious that disclosure of information was far from adequate, a lesson that should be utilized in future planning.

As for disposal of contaminated water, particularly important issues included disposal of reactor cooling water and contaminated water accumulated underneath the reactor buildings, as well as safety control of tanks filled with contaminated water. Although low-level contaminated water stored in tanks “would not adversely affect human health immediately,” mere addition of more storage tanks cannot provide a permanent solution. (Overseas acquaintances of Muramatsu, one of the authors of this report, often ask him how many more tanks will be added and express fear of future deterioration of the tank structures.) Another water-related headache is the groundwater that constantly flows underneath the damaged reactors. Leakage and discharge of water with high radiation levels are still being
detected even in 2015.

4) Energy Policy

The second Abe Shinzo cabinet was formed in December 2012. In the midst of Diet deliberations on the reform of power and gas markets that had been going on since before March 11, 2011, the Abe cabinet did not choose the path of abandoning nuclear power generation and, instead, positioned nuclear power as an “important basic power resource that can contribute to a stable energy supply.” The Abe government announced its intention to allow suspended nuclear power plants to resume operations once their safety was confirmed. Among the energy-related policies adopted by the Abe government, the retail business of electric power would be completely liberalized in April 2016 and separation of electrical power production from power distribution/transmission would be accomplished in April 2020. How extensively alternative energy sources are to be used under these conditions remains to be seen.

It appears that people’s mistrust of the capabilities of TEPCO and the Nuclear and Industrial Safety Agency to provide information and manage the crisis led to the government’s decision to actively involve itself in the reform of NISA and TEPCO. It was decided in the 180th National Diet in 2012 to abolish the Nuclear and Industrial Safety Authority in order to separate the function of promoting nuclear energy use from the regulating function and, instead, to set up a Nuclear Regulation Authority under the umbrella of the Ministry of Environment. With this change, the organization for nuclear safety— which had been attached to the Agency for Natural Resources and Energy with the mission of promoting nuclear power use— was institutionally separated therefrom. When establishing the Nuclear Regulation Authority, it was disputed whether the new entity should be an “administrative organ of the state” under Article 3 of the National Government Organization Act, or

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12 The Abe cabinet announced in April 2014 that it planned to “utilize nuclear power plants as important basic power resources, provided that their safety is ensured,” and this Basic Energy Plan was adopted by the cabinet. The Abe cabinet also revealed its basic policy to allow resumption of operation by nuclear power plants which were judged to clear new safety standards adopted by the Nuclear Regulation Authority. (p. 21, Basic Energy Plan, April 2014) This basic policy was incorporated in various electric power reform acts in 2015. (Source: http://www.meti.go.jp/press/2014/04/20140411001/20140411001-1.pdf)
“a council system for taking charge of the study and deliberation of important matters, administrative appeals or other affairs”, as stipulated in Article 8 of the same Act. In the end, it was decided to make it an “Article 3” organ, which gave it more autonomous executive power. Thus the Nuclear Regulation Authority was entrusted with the ultimate legal authority in “ensuring safety in nuclear energy use in order to contribute to protection of the Japanese people’s life, health, and property; environmental protection; and Japan’s security.” Its mission included “matters that are related to such operations as smelting, processing, storing, reprocessing, and disposal of nuclear materials, and regulation of nuclear reactors, as well as matters related to regulations which ensure the peaceful use of nuclear power, including the implementation of safeguard measures based on international commitments.”

From the beginning, the Nuclear Regulation Authority, under the chairmanship of Tanaka Shun’ichi, was forced to engage in the challenging task of inspecting suspended nuclear power plants for restart. Although the Authority has power to approve the restart of nuclear power plants that meet the new safety standards, none has been restarted as of May 2015. In several cases, while the Authority is inclined to approve restart, local (prefectural) governments and courts remain undecided. In the case of the Kashiwazaki Kariwa nuclear plant (in Niigata Prefecture), which had been expected to be restarted at an early stage, negotiations between TEPCO and the governor of Niigata have remained inconclusive. In the case of the Takahama nuclear power plant (in Fukui Prefecture), the Fukui District Court maintained its original ruling that, despite approval to restart the plants from the Nuclear Regulation Authority, the approval guidelines issued by the Authority were "lacking in rationality" and "too loose. "Consequently, it remains offline today. In contrast, in the case of the Sendai nuclear power plant in Kagoshima Prefecture, whose restart had been approved by Nuclear Regulation Authority earlier than the Takahama plant, a petition for a temporary injunction to delay its restart has been rejected.

Actual restart of the Sendai nuclear power plant, however, calls for the agreement of the local authority. This leads to a fundamental question of exactly who this “local authority” or “local people” whose consent is needed for restart really are. Is it the local government (or citizens) of the location of the nuclear plant, or does it include adjacent communities (local
governments and citizens) that are liable to radioactive contamination in case of an accident? Even though several investigating committees have looked deeply into the reality of activities inside nuclear facilities, their analyses of measures to improve local people’s evacuation in case of accidents remain inadequate, a theme that should be pursued in days to come.

Chapter 5: Lessons for the Future

In the course of our studies, committee members recognized several issues that should be shared as lessons for the future. Before we summarize the findings of each subcommittee, let us touch on some of these issues.

1) Disaster Preparedness (Anticipation, Preparation, Organizational Setup)

The first lesson to be considered is preparedness against disaster. German sociologist Ulrich Beck has set out the characteristics of a society based on technological and industrial advancement and portrayed them as a paradigm in his most renowned work, *Risikogesellschaft*. While Beck’s argument covers a wide range of fields, including inequality and political culture in modern society in general, and technological development, the most eye-catching among his arguments is his view that nature has been transformed by industrial technology into something to be traded in the worldwide market; thus nature is absorbed by the industrial system. Beck argues that, because industrial technology has attempted to conquer nature, order in industrial society itself becomes liable to devastation by natural calamities. In other words, according to Beck, since industrial society has come into existence by enclosing nature, it now poses a “comprehensive risk” to human society as compared to the individualistic risk posed by, for example, adventure during the Age of Exploration.

Beck continues to characterize toxic materials and environmental destruction as “new forms of nature” and lays out five theses in conjunction

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13 The following works by Yanagida Kunio provide an useful insight into this issue: “Kyodai Tsunami—Mushi Sareta Keikoku” (Giant Tsunami: Warnings Ignored) (Monthly Bungei Shunju, April 2012); “Genpatsu Jiko—Shippai no Honshitsu: Assatsu Sareta Keikoku” (Nuclear Accident—Essence of Failure: Suppressed Warnings) (Monthly Bungei Shunju May 2012); and “Genpatsu Jiko—Shippai no Honshitsu: Hoan’in Kesenai Tsumi” (Nuclear Accident—Essence of Failure: Inerasable Sin of Hoanin) (Monthly Bungei Shunju June 2012)

with the risks that these “new forms of nature” impose. At the top of these five is “radioactivity that cannot be directly perceived,” which no doubt reflected the fact that his book was written immediately after the Chernobyl disaster in 1986. European countries were all shaken by the destructive power of the new energy resource. Particularly heated arguments took place in Germany, where courts, at least temporarily, accepted anti-nuclear arguments and the government declared that Germany would phase out the use of nuclear energy. Given this background, it was only natural for a book like that of Beck to be published at this particular time.

At that time, the wisdom of modern industrial society’s reliance on nuclear energy was also questioned in other European countries. In France, control and promotion of nuclear power generation had long been administered by a single institution, but after the Chernobyl disaster separate institutions were assigned to each task. Across the Atlantic, the United States, which had experienced the Three Mile Island Accident in 1979, intensified surveillance of nuclear power plants, taking advantage of this timing.

There were some arguments over nuclear power plants in Japan, too. Although some in the Japanese government argued for a clear separation of the functions of promoting energy policy and controlling utility companies and assignment of each function to a different organization, this did not materialize. In an interview with the present writer, one scholar who was once in an important committee concerning the electric power expressed an opinion that promotion and regulation should at least have been separated administratively. While the Three Mile Island Accident and Chernobyl disaster-related issues were also deliberated in Japan by councils and committees during this period, they did not succeed in shaking the conviction that “nuclear technology is safe.”

In hindsight, earthquake experts should have spent more time and money examining the Sanriku Earthquake in 869 AD more closely. For instance, when the joint working group on earthquake, tsunami, geology and earth surface of the Subcommittee on Earthquake-Resisting and Structural Design of the Nuclear Safety and Safeguard Division belonging to NISA’s Advisory Committee for Natural Resources and Energy met for the 32nd time on June 24, 2009, the 869 Sanriku Earthquake was referred to during discussion, but this did not lead to additional investigation or more in-depth response. This is attributable to the atmosphere of the time, which tended to discourage negative remarks that might make people worry about the danger of nuclear power plants. The 1990s were the time of the “safety myth” of nuclear power plants.16

Since natural calamities strike human society randomly, they are always accompanied by vast uncertainty. No matter how broadly we prepare, there is a limit to what human wisdom can scientifically forecast. Still, it is imperative to make full preparations, making use of the most advanced scientific knowledge available to take into the fullest possible consideration all the uncertainties and risks.

Nevertheless, neither TEPCO nor the Nuclear and Industrial Safety Agency squarely addressed the possibility of an earthquake comparable to the 869 Sanriku Earthquakes that had struck the Tohoku over 1,000 years earlier. Although many seismologists claimed that the Great East Japan Earthquake and Tsunami was totally unforeseen, we, for one, doubt how true this is. Others have argued that it was totally unforeseen that a giant earthquake would trigger a nuclear accident. Yet others question the validity of the concept of scope of anticipated damages itself. Our Subcommittee on Environmental Economics and Disaster points out that traditional perceptions of “damage” have not paid enough attention to burdens on the

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16 This has been pointed out in various works, including the Science Council of Japan’s Teigen’ Kagaku to Shakaino Yoriyoi Kankei ni Mukatte—Fukushima Genpatsu Saigaigo no Shinrai Soshitsu wo Fumaete— (A Proposal: Toward A Better Relations between Science and Society—In Light of Post-Fukushima Daiichi Nuclear Accident Loss of Trust--) (September 11, 2014). It is pointed out in section ii of this document that, in regard to trust in scientists, loss of trust is attributed to a wide range of scientists’ shortcomings, including their failure to prevent the 2011 accident, their overemphasis on the safeness of nuclear power generation (promotion of the “safety myth”), and failure to respond properly or provide necessary information after the accident.
environment, and proposes to assess and evaluate damages, from a new
viewpoint of a “sustainable development aiming at human-centered
reconstruction.”

Throughout the responses to the nuclear accident, the phrase “totally
unforeseen” has been repeated so many times that one wondered if there
were anything at all that had been foreseen. As a matter of fact, emergency
reactor cooling, using an isolation condenser, was not even included in
manuals.

Throughout the current experience, “totally unforeseen” has become a
keyword in considering crisis management in Japanese society. At least,
questions like what was really “totally unforeseen” and what range of
occurrences was “totally unforeseen” became the subject of earnest argument
and, during the whole process, there has emerged an inclination in Japanese
society in general to revisit and review some of its fundamental assumptions.

Most Japanese people have been too indifferent to the appalling potential
for disaster damages, and, consequently, not enough attention has been paid
to how they should be prepared. Once measures are taken based on what
they think they should be prepared for, people become complacent. For
instance, Miyako-shi had constructed flood-control dikes in preparation for
tsunami. But it was due to the complacency fueled by the dike itself that
some failed to escape from the tsunami and lost their lives. When “what they
should be prepared for” is inadequate as a guideline, the “hazard map” that
is talked about so often nowadays could actually become hazardous itself
instead of helpful.

The above problem underscores the importance of a sound crisis
management regime based on the newest scientific knowledge. Creation of a
crisis management system linking administration, private organizations,
and individual families is not an issue to be left only to technical/engineering
experts. The social sciences also share responsibility for its construction.
Only a few universities in Japan have incorporated crisis management in
their social science curricula today, although it should be noted that the
Japanese Society for Public Administration established an organization to
study response to disasters within itself in the autumn of 2014. It is very
much hoped that this type of practical research will be promoted promptly.

2) The Safety Myth
The “safety myth” was undoubtedly one of the causes of lax preparation for nuclear accidents. And this myth certainly seems to have permeated Japanese society deeply. The word “safety” here is often considered interchangeable with “sense of security.” According to an opinion poll carried out by the Public Relations Department of the Cabinet Office, the percentage of citizens who feel that nuclear power plants are safe rose from 25% in 2005 to 42% in 2009. To a question, “Why do you feel safe,” many answered, “Because nuclear power plants in Japan have an excellent track record,” or “Because nuclear power plants in Japan are safe” and their number was increasing. (Public Relations Department of the Cabinet Office, Enerugi ni Kansuru Yoron Chosa [Opinion Poll on Energy], 2005, and Genshiryoku ni Kansuru Tokubetsu Yoron Chosa [Special Opinion Poll on Nuclear Power], 2009)

“Safety myth” refers to a state of affairs where in the notion that “nuclear power plants are safe” has become a general belief, permeating society. The words and deeds of pro-nuclear power experts and professionals as well as government officials have reinforced the myth by giving the impression to the Japanese people that the safety myth had scientific grounds.

The accounts introduced by the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) were, in my view, a typical explanation of this safety myth. In the foreword of NAIIC’s report (Japanese version), it is stated that, “the way the Japanese government and TEPCO responded to the Fukushima Daiichi Nuclear Accident inadvertently exposed fundamental problems in Japanese society.” In the report, the chairman of NAIIC stressed that the cause of the accident—that should have been foreseen—was the “nearly 50-year-long one-party domination of the government; a distinctive organizational structure in both the government and private businesses such as the practice of employing new graduates all at once and the seniority system of promotion and life-time employment; and the Japanese mindset that takes these things for granted.” In the English version of the report, the chairman of NAIIC went so far as say, “Its fundamental causes are to be found in the ingrained conventions of Japanese culture: our reflexive obedience; our reluctance to question authority; our devotion to ‘sticking with the program’; our groupism; and our insularity.”

Blaming “culture” for the nuclear crisis, however, might dilute the
responsibilities of the operating company of the nuclear power plant, the regulating authorities, and the inner circle of “experts.” For instance, those who were directly involved in the operation of nuclear power plants in Japan had earlier been briefed by the United States on the so-called “B.5.b”, which was a set of anti-terrorist measures that a nuclear power plant must take, but they never took any action. Admittedly, it would have been difficult to openly do a practice run for this or any other crisis, because it could undermine the safety myth. Nevertheless, it should have been possible for them to consider various countermeasures and run exercises internally.

The analysis of our Subcommittee on Science, Technology, Politics, and Administration finds it problematic that the locus of responsibility for risk governance at nuclear power plants was always obscure. To be sure, there emerged for a time a promising form of governance that could be described as a “spontaneous government-private sector collaborative system” in order to meet the challenge of raising operational capacity. However, the Subcommittee suspects that the organizational learning by the business operators of nuclear power plants, including Fukushima Daiichi, deteriorated when cost reduction pressures became increasingly strong in the 1980s and 1990s.

While these arguments are quite persuasive as they are, the role of scientists’ groups must also be examined when discussing the politics surrounding the nuclear accident. This is because, in high technology fields such as nuclear power generation, scientists with professional knowledge play an extremely important role in deciding and implementing policies. In order to make scientists’ roles compatible with democratic principles, however, several mechanisms must be introduced. First of all, even though judgments on highly professional matters might have to be left to specialists, a system needs to be instituted so that judgements by and knowledge of a variety of other experts can be utilized before final decisions are made. Moreover, specialists are accountable to the Japanese people directly, or to the National Diet representing the Japanese people, for the measures they take. This should be a principle of political decisions on highly professional matters in a democratic country.

It is not easy, however, to apply this principle to actual decision-making. And we should be aware that this is where Japanese wisdom is tested. A case in point is the decision to restart nuclear power plants, to be made by the
Nuclear Regulation Authority. Currently, in some of the nuclear power plants under investigation for possible restart, whether the geologic faults found underneath the power plant are active or not has become a decisive factor. Although a council of experts on this matter is instituted under the Nuclear Regulation Authority, the question still remains about who makes the final judgement whether the faults are active or not. Even though it is extremely difficult scientifically to make an accurate judgment of whether a fault found in an old geologic stratum is active or not, scientists are still required to do so. And yet, if scientists judge the faults to be active, it is a highly political decision because it could lead to the decision not to restart or construct a nuclear power plant. This is not a healthy situation for the scientists involved or for democracy as a whole.

Scientists are required to explain the grounds of their decisions to the citizenry as plainly as possible, even though highly technical arguments are involved. At the same time, scientists must be given the option of saying that they cannot make a decisive judgment. It would be unreasonable to force scientists to choose either A or B in cases when a clear cut choice is not possible. In a democratic society, it is political leaders, elected by voters, that should take at least final responsibility. In addition, to guarantee that voices of plural experts, instead of that of a single expert, reach political leaders when the latter make the decision, some advocate a mechanism called “group voice.”

3) Securing Transparency

Another aspect of the nuclear accident is the problem of strong mistrust on the part of not only the Japanese people but also among foreign residents in Japan. Even before the accident, circulation of information on nuclear power plants had been routinely limited to those who were directly involved, leaving the majority of citizens grossly uninformed. To make the situation worse, information available after the accident was very limited and confused, further aggravating people’s anxiety. As our Subcommittee on International Relations reveals, people’s anxiety was aggravated by a dearth

18 Yokoyama Hiromi, “Shakai no Naka no Kagakusha” (Scientists in the Society) in Aesteion, No. 78, 2013.
of trustworthy information, even leading to a rushed exodus of some foreign residents.

Arguably, announcing information without firm foundations could throw people into a panic. However, announcing information in an ambiguous manner would encourage paranoia and, when a situation worsens beyond the nuances of announced information, people simply would not trust it even if additional information is provided. A case in point is the government’s avoidance of the term “meltdown” in the early stage of the Fukushima Daiichi Nuclear Accident. “Core damage” which was used instead, gave an impression to people that the situation was not all that worrisome. Why, then, did Reactors No.1 and No. 3 explode, followed by severe damages to Reactor No.2? Why did the radiation dose count rise sharply around Fukushima Daiichi? Because of the gap between the image that the government tried to project and the actual situation which seemed to be increasingly worsening, residents in Japan-- Japanese or non-Japanese-- became even more anxious about the true situation. When a cataclysmic catastrophe or serious accident occurs, it is imperative to develop and be ready to use some method for sorting out confusing information and providing high-transparency information on the dangers the catastrophe/accident could cause, including the worst case scenarios. As long as people trust the information the government provides as well as instructions based on that information, it should be possible to prevent panic from unraveling public order even when evacuation becomes unavoidable.

In cases that require highly scientific and technological knowledge to cope, reporting based on professionals’ commentaries and technical knowledge plays a particularly important role. I have the impression that professionals in various fields who took part in reporting at all the TV stations, including NHK, had not prepared adequately regard to what and how they should communicate to viewers; as a result, they aggravated the confusion. Overall, reporting and commentaries in the first few days after March 11, including that released through the Internet, were full of inaccurate or incorrect information. People who had no other recourse than relying on TV for information was led to swing between hope and despair by these “professional” commentaries.

Chapter 6: Research Activities of Each Subcommittee
What follows are summaries of the research activities conducted independently by our eight subcommittees under the auspices of the Social Scientific Academic Committee on the Great East Japan Earthquake. On the basis of summary reports prepared by each subcommittee, Muramatsu Michio and Tsunakawa Keiichi compiled the following summary in coordination with the chairmen of the subcommittees. The results of each subcommittee's work are being published as independent volumes as listed below. Obviously, it is impossible for us to pack all the findings and their nuances into a few pages and readers are urged to read individual volumes in order to grasp the entirety of the themes covered by each subgroup.

This series of Lessons for the Social Sciences from the Great East Japan Earthquake is composed of the following eight volumes. All of them are going to be published before the end of FY2015 by Toyo’s Keizai Shimpo Sha, with the first volume appearing toward the end of April 2015.

Volume 1: Political Process and Policies (edited by Tsujinaka Yutaka)
Volume 2: Post-Earthquake Local Governance (co-edited by Kohara Takaharu and Inatsugu Hiroaki)
Volume 3: The Fukushima Daiichi Nuclear Accident and Multiple-Risk Governance (edited by Shiroyama Hideaki)
Volume 4: The Great Earthquake and the Economy (edited by Saito Makoto)
Volume 5: Comprehensive Understanding of Damages and Costs (edited by Ueta Kazuhiro)
Volume 6: Local Communities and Schools in Recovery and Reconstruction (edited by Aoki Eiichi)
Volume 7: International Relations under the Post-Earthquake Crisis (edited by Tsunekawa Keiichi)
Volume 8: Lessons from the Great Earthquake for the Information Media and Networks (edited by Ikeda Ken’ichi)

1) Subcommittee on Politics and Policies
Kan Naoto was Prime Minister of Japan when the Great East Japan Earthquake and Tsunami struck on March 11, 2011; he had formed his cabinet on June 8, 2010, to succeed the short-lived Hatoyama Yukio cabinet,
the first Democratic Party cabinet. Although the appointment of Sengoku Yoshito and Noda Yoshihiko to Chief Cabinet Secretary and Minister of Finance, respectively, was welcomed, the Kan government had been harshly criticized both domestically and internationally ever since its formation, and this became even worse after September 7, 2010, when a Chinese trawler operating in disputed waters near the Senkaku Islands collided with Japanese Coast Guard patrol boats, making the conduct of government all the more challenging. It was amid this political climate that the great earthquake/tsunami hit eastern Japan. Even though the Prime Minister’s Office emergency response team got together under the Deputy Chief Cabinet Secretary for Crisis Management, and the Emergency Disaster Response Headquarters was launched immediately as stipulated by the emergency manual, the Prime Minister’s Office on March 11 was a sea of confusion. And in the wake of the unprecedentedly great earthquake and tsunami came the Fukushima Daiichi Nuclear Accident, presenting the Kan government with multiple, simultaneous challenges.

This subcommittee paid more attention to how the Japanese political system responded macroscopically to the crisis, rather than tracing microscopic political processes in disaster response, and focused on the following four themes: first, activities of the basic structure of the state, i.e., executive (the Prime Minister’s Office as the chief executive and central government ministries and agencies), legislative, and judicial branches of the government. The second theme was comparison of government decisions concerning nuclear accidents before and after the Fukushima Daiichi Nuclear Accident— which became the most controversial element in post-earthquake politics— as well as post-accident developments and investigations. The third theme was the politics in which social actors in the background of the nuclear accident/earthquake/tsunami responses were involved, and the policy outcomes of this politics. (For the responses of each locality, including municipal governments, as well as responses by the Reconstruction Agency and other government ministries and agencies, readers are urged to refer to the report of the Subcommittee on Administration and Local Autonomy.) The fourth theme was the activities of political parties, the central players of democratic politics, and the analysis of national and local elections after the disaster.

The leadership of the Prime Minister and his office is critically important
in time of crisis. Facing the multiple crisis of earthquake/tsunami and nuclear accident, Prime Minister Kan divided policy responses into activities to assist the lives of disaster victims, and countermeasures to the nuclear accident, assigning the former to the Emergency Disaster Response Headquarters (particularly, to its infrastructure, the Team in Charge of Assisting the Lives of Disaster Victims). Kan himself decided to devote his office’s energy to the nuclear accident. However, the pre-existing nuclear disaster response scheme did not function properly, particularly in regard to coordination between the Prime Minister’s Office on the one hand, and TEPCO and the Nuclear and Industrial Safety Agency on the other. Consequently, Kan ended up getting himself involved personally even in technical problems.

The central government’s ministries and agencies had been strengthened by administrative reforms and reorganizations before the March 11 disaster and, in carrying out the substance of recovery activities, they played their assigned roles properly. The experiences of the Great Hanshin-Awaji Earthquake also turned out to be useful for them. When the Reconstruction Agency was established as an extension of the Team in Charge of Assisting the Lives of Disaster Victims, an implementation mechanism for reconstruction was fully put in place. However, although the Reconstruction Agency was envisioned to be a “one stop” organization for reconstruction, the actual task-allocation and supply of necessary funds were carried out through the existing ministries/agencies’ “decentralized, horizontal coordination mechanism” and “generalist-oriented bureaucracy.”

Turning our eyes to the legislative branch, the ruling Democratic Party was a minority in the House of Councilors, resulting in a divided Diet, i.e, the two houses of the Diet were controlled by different parties. The Kan cabinet managed to forge a limited coalition with the opposition for earthquake/tsunami disaster-related legislation, and thus succeeded in passing the necessary bills, relying on agreements among the major parties. But inter-party power struggles came to the surface over budget-related legislation, forcing the Kan government to step down in exchange for the passing of a supplementary budget.

The Subcommittee on Politics and Policies also directed its attention to the working of the judicial system, particularly in the area of compensation for nuclear accident victims. Having been somewhat strengthened through
previous judicial reforms, the judicial branch initially attempted to promote the use of a new system called Alternative Dispute Resolution (ADR) at the Nuclear Damage Compensation Dispute Resolution Center. As its limitations gradually became apparent, however, the frequency of traditional settlement through litigation has been increasing.

The Subcommittee also devoted some effort to policy issues surrounding nuclear power generation, location of power plants, safety regulation administration, and accident investigation. To investigate the causes of the nuclear accident, several investigation committees were launched. As one can tell from the composition of the government’s Accident Investigation Committee and the National Diet’s Independent Nuclear Accident Investigation Commission, these investigating committees had not been equipped with the authority to impose reforms on the companies that caused the accident, or the regulatory government agencies, when they commenced their activities.

Among various social actors involved in the nuclear accident, the Subcommittee took up the wide-ranging influence of TEPCO and the so-called “nuclear power village,” i.e. the tight-knit community of legislatures, regulators, and manufacturers involved in the promotion of nuclear power.

On the other hand, business circles in Japan played a truly major role in providing financial and other practical assistance to disaster victims. They turned out to be very helpful in reducing damage, since many local municipal governments had made precautionary arrangements beforehand, such as disaster cooperation agreements with private companies and business organizations.

Turning our attention to the role of individual citizens’ activities and public opinion, anti-nuclear movements showed a great upsurge in the summer of 2012, making full use of the Internet and social media. It may be said that the movements have accomplished their objectives to a certain extent, considering that no nuclear power plant has yet been restarted. But these movements have failed to steer the entire country toward abandoning nuclear power generation.

Finally, the Subcommittee analyzed post-disaster trends in inter-party strife and elections. Prior to the earthquake, Japanese voters had in the September 2009 general election chosen the Democratic Party as the ruling
party in place of the Liberal Democratic Party. When the earthquake/tsunami struck eastern Japan, the Democratic Party government, which had already been in a difficult situation due to a series of political missteps, relinquished its own original policy line and, instead, tried to concentrate on such earthquake/tsunami-related issues as energy and reconstruction. The Noda Yoshihiko cabinet, which succeeded the Kan cabinet, passed a bill that combined consumption tax and welfare policy in one package, before it faced the first general election after the earthquake/tsunami in December 2012. In this election, however, earthquake-related problems did not become major issues and, consequently, the Democratic Party ended up losing its support base and sustained a crushing defeat. In both the subsequent House of Councilors election in 2013 and the general election in 2014, the Liberal Democratic Party dominated, transforming the entire political balance of power. An electoral divide was observed between urban electorates and the disaster area, leading to the emergence of a new political party configuration with small opposition forces on the left and the right of the Liberal Democratic Party. In local elections in heavily-damaged Fukushima Prefecture, a domino-like defeat of incumbent heads of municipalities was seen one after another.

2) Subcommittee on Administration and Local Autonomy

The actual locus of the disaster was local regions in the Tohoku. This Subcommittee attempted to discuss, from the viewpoint of affected regions, what really happened, what recovery and reconstruction really meant to them, and how to accomplish recovery and reconstruction thus defined. From this viewpoint, members of the Subcommittee dealt with such issues as relocation of communities to higher ground; transfer from shelters to temporary housing; livelihood of the evacuees; damaged local government offices; and the recently adopted reconstruction planning and its accomplishments. These are discussions of governance centered on local administration, as seen in the process of reconstruction.

Municipal governments in the affected areas, faced squarely with the disaster victims, had to pursue a tremendous number of tasks. In the period immediately following the disasters, municipal governments were swamped with a mountain of urgent tasks including confirmation of damage; search for the missing; rescue of the sick and injured; firefighting; requests for
scarce human resources and material assistance; liaison and coordination with policemen, firefighters, and SDF personnel; setup and management of shelters; and confirmation of well-being of citizens. These were soon followed by disaster-victim certification; distribution of relief goods, condolence money, and donations; restoration of water and sewage; and cremation and burial of the dead. These were totally beyond the limit of ordinary human power and each municipality had to rely on relief personnel dispatched from other municipalities.

The Subcommittee on Administration and Local Autonomy identified Fukushima Prefecture's Soma city as having experienced all three disasters: earthquake, tsunami, and nuclear meltdown. Using Soma as a fixed point of observation, Subcommittee members visited the city repeatedly to find out what activities its city government, as the public authority closest to the population, had taken. However, the Fukushima Daiichi Nuclear Accident had effectively posed a serious challenge to the very concept of municipality. Before the accident, “territory,” “residents,” and “status as legal entities with the right of self-government” were three requirements of a municipality. As a result of the nuclear accident and evacuation of residents, there emerged within the exclusion zone several towns and villages with no population, subsequently leading to such proposals as the concept of a “virtual town.” To pursue this issue further, the Subcommittee examined what were the crucially important factors to restore municipalities from which the entire population had fled. The group also studied what responses the cities of Yamagata and Yonezawa in Yamagata prefecture, which accepted a large number of non-registered evacuees, had taken.

In case of a major disaster, after the initial responses including rescue operations and restoration of the “lifelines” achieve their major aims, activities such as construction and management of temporary housing; debris disposal; reconstruction of houses and streets as well as roads, ports, and other infrastructure to revive a town; and livelihood rehabilitation via employment and income support become the next important issues. Also in this phase, volunteer workers come to play more important roles than immediately after the disaster; how overall reconstruction funds flow also becomes important. The Subcommittee looked into how the Reconstruction Agency came about and what it aimed at. It also explored how support for affected areas using supplementary budgets and financial endowments was
carried out. While volunteer workers had rushed to shelters and other places where their help was needed immediately after the disaster, they continued to come and participate in various activities including debris disposal so much that there evolved organizational mechanisms, such as volunteer stations, to control traffic and coordinate workers coming from all over Japan.

Residence in provisional housing should not be permanent. It should be only a temporary arrangement. In the subsequent phase, that of reconstructing communities based on the reconstruction of residences, such measures as land-use planning, promotion of collective relocation of communities to higher ground; construction of public housing for disaster victims; and support for disaster victims’ own efforts to rebuild their houses would be the foundation of the systems and policies pursued. The Subcommittee took up and analyzed such residential and house-related measures, Such measures are usually incorporated in reconstruction schemes prepared by each individual municipal government. The Subcommittee, therefore, made detailed inquiries into what types of municipal schemes were decided, how they were decided, and what the goals and objectives of those schemes were.

In the period immediately after the earthquake/tsunami, local citizens’ participation in the decision-making of municipalities was rarely seen. In this period heads of municipalities were required to provide crisis leadership. This might also have been the period in which outside volunteer workers made their most valuable contributions. It was not unusual at the time for ad hoc partnerships between public offices and nongovernmental organizations to be concluded without resorting to conventional decision-making procedures. As time went by, the voices of local legislatures and local residents began to be heard more often in the process of planning for reconstruction and deciding the content of state subsidies. From this experience, it appears that democracy temporarily recedes into the background when the crisis is at maximum intensity, but it becomes gradually normalized as the crisis subsides.

This Subcommittee reconfirmed that, in time of a crisis of this magnitude, local-to-local cooperation partnerships between one municipality and another are extremely important. On top of that, the Subcommittee underscored the importance of properly matching funding from the central
government to local needs in affected areas.

3) Subcommittee on Science/Technology, Politics, and Administration

Today’s socio-economic activities are supported by numerous, mutually-linked technological systems. The Great East Japan Earthquake and Tsunami not only triggered the Fukushima Daiichi Nuclear Accident but also inflicted a chain of serious damages on these large-scale technological systems. This Subcommittee studied the impact the earthquake/tsunami had on the risk governance of the technological systems of energy, medical care, transportation, and finance. On top of these studies, the Subcommittee inquired as to what types of responses would be called for in the future.

Exactly who is responsible for risk governance has been obscure ever since the introduction of nuclear power plants in Japan. Among several possibilities, people expected much from the Japan Atomic Power Company, a company jointly founded by the government and the private sector. As it turned out, however, the company played only a limited role. While the electric companies and manufacturers introduced nuclear reactor technology at a very fast pace in the 1960s and 1970s, the problem of low capacity utilization was a constant problem. How to raise the capacity utilization rate has always been an important issue in the nuclear energy industry. The electric companies themselves grappled with this problem, leading to the adoption of what can be termed a “voluntary collaboration management” system. For this management system to work, the in-house training systems in electric companies were absolutely crucial. But in the 1980s and 1990s, due to mounting pressure to reduce costs, the quality of organizational learning deteriorated.

In nuclear power generation there is a form of governance that centers around regulatory organization. But in Japan, regulatory organizations have had their own problems, including, above all, inadequate response to severe accidents that exceeded the expectations at the time they were designed. Also, as seen in the process of revision of earthquake resistance guidelines, there was also the problem of grossly inadequate communication among professionals such as science specialists and engineering experts. There were also problems in building relationships between electric companies and local governments. For instance, nuclear safety agreements have been concluded between the two parties in various regions but their actual operation has
remained highly nontransparent. In the responses to the Fukushima Daiichi Nuclear Accident, in the midst of all kinds of confusing information, the Japanese government failed to sufficiently communicate the information it had in its possession.

It seems safe to say that transparency and the institutional independence of risk governance was improved due to the reform of nuclear regulation and of the administrative setup after the Fukushima Daiichi Nuclear Accident. Nevertheless, issues such as the reliability of the Nuclear Regulation Authority’s judgment, training of human resources, and clarification of the role of local governments still remain unsolved. Moreover, it should be pointed out that, as seen in responses to the problem of contaminated water, even after the Fukushima accident there still remain problems in on-site management such as too-optimistic assumptions, passive attitudes, and procrastination in problem-solving.

The nuclear accident also had a spillover effect on the safety issue of radioactive contamination of food. The great earthquake and the nuclear accident in 2011 also had an impact on medical and nursing care, causing problems in the evacuation of patients as well as supply of medicines and medical equipment to affected areas.

Transportation infrastructure was also gravely affected by the earthquake. As far as the traffic system was concerned, based on lessons learned from the Great Hanshin-Awaji Earthquake of 1995 and the Mid-Niigata Prefecture Earthquake of 2004, revision of technical standards and reinforcement of earthquake-resistant devices had already been implemented. Nevertheless, even for the earthquake predicted to strike directly in beneath Tokyo in the not-too-distant future, the assumptions and predictions of disaster are too limited, and thus highly problematic.

More positively, in order to prevent adverse systemic effects on finance and real economic activity, the Financial Services Agency and the Bank of Japan not only took proper financial measures for the benefit of the disaster victims but also measures that ensured the settlement functions of financial institutions in the affected areas, taking advantage of past experiences in financial crisis management.

This Subcommittee also took up the issue of a “transition to a medium-to-long-term system,” including the medical care and transportation systems, which emerged as a salient issue after the 2011 earthquake. In the
post-March 11 Tohoku region, major decreases of population and of those engaged in medical services necessitated reforms, including reorganization of medical service zones, in order to cope with long-term problems deriving from the disaster. As for the transportation system, against the background of the harsh business environment of local railway companies due to population decrease, the Subcommittee was urged to look into the future of local railway companies, including options to rely on buses and other non-railway transport.

Through the above analyses of the impact of the Great East Japan Earthquake, it became clear that risk analysis capability in each policy field, as well as inter-disciplinary communication, must be strengthened. For instance, in the field of radioactive contamination of food, communication among a variety of professionals was called for, while coordination with the transportation system was found to be critically important for medical services to be able to supply drugs and medicines to evacuees and patients. Financial services also needed the transportation system and electric power in order to transport cash, to enable the performance of monetary settlement functions. This Subcommittee stressed that it should be a major objective for risk governance to get a panoramic grasp of possible risks in mutually intertwined systems and ensure communications among professionals in diverse disciplines including nuclear power, medicine, seismology, and engineering.

4) Subcommittee on Macroeconomics

The Subcommittee on Macroeconomics was composed of a comprehensive study group and seven functional groups (on prices, consumption, labor, the monetary system, corporate finance, local government finances, and behavioral economics). The centerpiece of the comprehensive study group’s work was a data base of basic facts essential for the evaluation of reconstruction policies. Particularly, the group revealed empirically that (1) damage to buildings by the tsunami during the Great East Japan Earthquake was not too different from that in the Great Hanshin-Awaji Earthquake; (2) the negative impact of the tsunami on local productive activities was minor (except that inflicted by the Fukushima Daiichi Nuclear Accident) and, consequently, prompt recovery of the supply chain was possible; and (3) areas hit by the tsunami had already been experiencing
economic decline before March 11.

Eight individual papers compiled by members of the seven functional groups pointed empirically to a great gap between what had been perceived by policy authorities immediately following the Great East Japan Earthquake, and the realities which were known later. More specifically, some of the areas that were perceived to suffer from grave damage actually turned out to be only slightly affected; on the other hand, some areas that people did not worry much about initially actually suffered severe damage. These gaps were caused by serious errors in the grasp of the actual situation immediately after the earthquake.

Examples of the first gap (perceived worse than actual damage) included, first, damage to buildings, which had been anticipated to far exceed that of the Great Hanshin-Awaji Earthquake, but actually turned out to be about the same. Second, adverse effects on financial services were initially feared to be devastating, but, in actuality, the settlement system was restored at a relatively early stage and the impact of the earthquake on corporate finances turned out to be quite limited.

Examples of the latter gap (real damage exceeding perceptions) included, first, serious supply quantity unbalances that were taking place behind the unexpectedly minor price fluctuations caused by price-gouging. Also, although the adverse effects of the March 11 disaster on production activities nationwide were short-lived and limited, they had a grave and lasting impact on the average consumption patterns all over Japan. Third, even though the labor market quantitatively recovered in terms of wages and working hours, it became worse qualitatively, particularly as regards mismatch between job seekers and employers.

The Subcommittee also revealed that reports of cooperative action on various levels, which were highly praised both within and without Japan immediately after the March 11 disaster, were not always accompanied by substance. In fact, conflicting interests often exceeded cooperative actions among municipal governments, causing great obstacles to reconstruction. Although the widespread use of the term “kizuna” (bond) might have given an impression that altruistic behavior became rampant after March 11, this Subcommittee’s analysis revealed that altruistic attitudes had actually declined after the disaster.

By carefully analyzing the gaps between perception and actuality, the
Subcommittee succeeded in identifying the causes of these gaps. Misperceptions in the immediate post-March 11 days quite naturally hampered subsequent implementation of appropriate reconstruction policies. Some in the Subcommittee’s functional groups pointed out that, had information on ongoing developments been effectively utilized, no matter how limited the information might have been, the above-mentioned gaps could have been mitigated to a substantial degree.

To conduct such in-depth analyses of experiences throughout the March 11 disaster from the viewpoint of economics is absolutely essential for the exploration of appropriate responses to future natural calamities.

5) Subcommittee on Environmental Economics and Disaster

Environmental problems begin with the perception of damage. Without awareness of damage, environmental problems would not become a social issue. To perceive damage caused by environmental problems is the starting point of the societal solution of the problems. The Subcommittee on Environmental Economics and Disaster attempted a comprehensive understanding and evaluation of the damage accompanying the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident.

The Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident brought about large-scale devastation of the living environment which fundamentally altered the lives of the disaster victims. Reconstruction of these people’s lives and recovery from the damages required support from the entire society. But nuclear energy-related controversies, including restart of reactors and compensation to the affected, have not yet been resolved even today. In the background is the issue of how to evaluate the damage accompanying the nuclear accident.

The damage wrought by the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Disaster was enormous, as well as widespread and diversified, so much so that even today it cannot be said that its true enormity has been sufficiently grasped. Another way to look at it is that damage was so enormous that it defies comprehension. Nevertheless, comprehension of the actual damage and its evaluation is extremely important in order to plan reconstruction policies; it should be the very foundation of everything to follow.

In order to assess the damages from the Great East Japan Earthquake,
several attempts were made immediately after the disaster to estimate it in monetary terms. For instance, the Cabinet Office estimated the direct damage to physical capital, such as buildings, social infrastructure, and private corporate facilities to be ¥16 to 25 trillion ($US 133 billion to $US 210 billion), while the Development Bank of Japan estimated the total damages in the affected four prefectures to be ¥16 trillion. These estimates were both made on the basis of fixed capital formation in the System of National (Prefectural) Accounts and the housing capital stock in the National Survey of Family Income and Expenditure. While this method of evaluation of the earthquake’s impact in terms of accompanying changes in GDP is convenient when appreciating the magnitude of the damage in comparison with Japan’s national income, it has a number of shortcomings, including its exclusion of the value of assets that are not traded on the market. Damage incurred by the March 11 earthquake and the nuclear accidents were not confined to the physical damage estimated above. This Subcommittee also attempted to grasp the damage and evaluate it from the viewpoint of sustainable development aiming at human recovery.

What makes it difficult to quantitatively grasp and evaluate the damage inflicted by the nuclear accident, and what can be considered as a unique feature of the damage from the Fukushima Daiichi Nuclear Accident, is its qualitative difference from damage from past conventional pollution. One of those qualitative novelties has to do with radioactive contamination and its possible impact on people’s health. Today’s scientific knowledge cannot satisfactorily specify its negative impact on human health. Thus, it is not known whether there will be an adverse effect on people’s health, or when to expect any such effect to manifest itself. Due to these uncertainties, it is necessary to continue health and medical monitoring and care for a long period. Since it is difficult to specify what damages to anticipate and prepare for, people have to be worried about an extremely wide range of health problems. It should also be noted that, aside from influences on physical health, people are also suffering from various mental or psychological pains.

The other new quality of damage has to do with the massive migration and evacuation that the Fukushima Daiichi Nuclear Accident triggered. As of May 2012, 163,500 persons had actually evacuated Fukushima Prefecture alone. It is also noteworthy that this evacuation has become a lengthy one. Because of the extended evacuation, it has become difficult to maintain the
lifestyle and economic relationships that the evacuees had long been accustomed to. Consequently, traditional relations in families and communities were damaged, leading to the phenomena known as “collapse of intra-family relations” and “loss of community/home town.” And these phenomena contributed to a rise of unemployment and resultant exhaustion of local economies, gravely crippling people’s well-being. Moreover, these developments have weakened the foundations of social welfare such as human capital and social relations, endangering the sustainability of local communities.

Therefore, assistance and support to damage victims that takes the above and other characteristics of the damage caused by the March 11 disaster into consideration will be the starting point toward recovery of the affected areas and reconstruction of sustainable local communities.

6) Subcommittee on Human Bonds and Regional Community (with Special Emphasis on Education)

Was there any major change in school education in Japan after the Great East Japan Earthquake? This is the question the Subcommittee on Human Bonds and Regional Community attempted to answer through its studies. According to the Cabinet Office, there are two types of recovery: the “restoration type”, which aims to restore the same functions as existed before a disaster, and the “improvement type”, that aims not only to restore the affected facilities but also improve them in order to prevent future damage. The improvement-type recovery is defined by one Cabinet Office publication as an attempt at qualitative improvement, including “improvement of safety,” “improvement of living environment,” and “regional development.” 19 Applying the above definitions, the Subcommittee’s studies revealed that restoration of pre-disaster functions was emphasized in the field of education, and this goal was attained at an early stage.

This Subcommittee observed that, in the three affected prefectures, an early restart of educational activities was pursued in all regions. In many schools, top priority was given to “restoration-type” recovery in the same locations of pre-existing schools. These were designated as Disaster Restoration Projects and, as recipients of Great East Japan Earthquake

Reconstruction grants, the restoration work could be carried out at a fast pace. As for teachers, additional teachers were assigned steadily, taking advantage of the budget provided by the Ministry of Education, Culture, Sports, Science and Technology for this purpose. It was thanks to these measures that school education functions could continue relatively undisturbed after the earthquake. Policy responses after the earthquake relied on the national government’s existing provision for compulsory education expenses, which shows that a system designed for normal times functioned well during a severe disaster. This “restoration-type” recovery was also opted for in the areas in Fukushima Prefecture which were affected by the nuclear accident.

The Subcommittee found that, in the affected areas, municipal governments continued to set up and run school facilities (maintain them as publicly owned and managed schools) and to provide education by publicly employed teachers following the national standard curriculum even after the earthquake. This recovery/restoration based on the public sector is completely different from the bold injection of private capital seen in some overseas countries after major disaster. Nevertheless, in some parts of the Tohoku region, particularly those that had incurred severe damage, relocation of schools to higher ground or school consolidation was hurriedly pursued as a symbol of reconstruction, resulting in confrontations between pupils, parents, and residents, on one hand, and municipal governments on the other.

As pointed out earlier, while no major change was seen in the overall system for provision of educational functions, support activities emerged both within and without the affected region for pupils and students (and their parents) to cope with the new challenges they faced after the earthquake. For instance, NPOs and volunteer workers started offering learning support to pupils after school hours in shelters and temporary housing, which schools and local communities welcomed. These support activities were funded not only by government money but also a number of donation-based endowments, a phenomenon never seen in earlier major disasters in Japan. In the case of school support, since there had been few cases of successful joint endeavors between school education and support organizations before, a format similar to that of traditional social education was applied. In this sense, this too was a case where past experiences proved
useful.

There were some children whose families were impoverished as the result of the earthquake. Economic assistance to such children included not only governmental school expense subsidies but also privately-funded scholarships. In the area of pediatric mental care, publicly-funded measures have been quite substantial, reflecting realization of the magnitude of the disaster’s impact on the mental health of children, particularly younger ones, and the evolving complications of mental problems with the passage of time. Still, problems which had existed even before the earthquake, such as the maldistribution of specialists, became all the more acute.

Mental and physical health problems of teachers, the chief providers of educational services, were particularly visible in schools in the hard-hit coastal areas. It has been frequently pointed out in the three affected prefectures that impaired mental and physical health was observed among teachers, who had been dedicatedly managing shelters, an abruptly imposed task which had nothing to do with their original duties. Pressures from qualitative and quantitative expansion of tasks contributed to the worsening of teachers' health.

On the other hand, there have also been some conspicuous changes. For example, schools started to conduct emergency drills in collaboration with local residents as a result of the Great East Japan Earthquake. Moreover, the types and timing of disasters anticipated in disaster prevention manuals became much more diversified, and emergency drills today are no longer pro forma as they used to be. While the memory of the Great East Japan Earthquake will gradually fade away, it remains true that the importance of education in the passing on of disaster experiences to future generations, and the promotion of disaster-prevention and reconstruction education have been recognized better by people because of the magnitude of damage caused by the earthquake. There are already signs of changes in disaster-prevention education in Japan, as the archipelago is believed to have entered a period of increased seismic activity.

7) Subcommittee on International Relations

The Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident had the potential to directly influence the entire world and, as such, they captured the attention of the international community. Therefore,
Japan's capacity to properly cope with this catastrophe was a critical issue in Japan's efforts to maintain and improve its international reputation and trustworthiness, demonstrate its security capability to the world, and continue to effectively assert its position in the international arena. From such perspectives, the Subcommittee on International Relations analyzed Japan's international relations during and after the Great East Japan Earthquake from three angles: (1) reception of foreign assistance and cooperation during the crisis; (2) Japan's risk communication and overseas responses; and (3) Japan’s contribution to the improvement of safety of nuclear power plants.

As for the response to offers of assistance from overseas, the Japanese government decided at an early stage to actively accept offers of help from foreign counties as its basic policy, in order not to repeat the mistake of reacting negatively toward them for which it was criticized at the time of the Great Hanshin-Awaji Earthquake. However, the actual damage was so severe and widespread that it turned out to be extremely difficult to grasp the entire picture, including the true needs of the disaster victims. Although mechanisms for coordinating foreign aid inside Japan had been much improved since the Great Hanshin-Awaji Earthquake, they nevertheless remained inadequate, causing various difficulties. When accepting foreign aid in time of crisis, a recipient country has to deal with the trade-offs between the diplomatic need to respond appropriately to overseas goodwill, on the one hand, and the need to prevent extra burdens on individuals/organizations in the disaster-stricken areas incurred by the reception of this aid, on the other.

The most outstanding foreign assistance was that of the United States in terms of substance, scale, and promptness, particularly from the U.S. military. Response to domestic disaster is different from defense against foreign aggression in that weapons are not involved; still, the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident were the first occasions during which both Japan’s Self-Defense Forces and U.S. military forces were mobilized together on a large scale. The success of this joint mobilization was significant in demonstrating, both domestically and internationally, the effectiveness of the U.S.-Japan alliance in crisis as well as the possibility of U.S.-Japan cooperation in the new field of international humanitarian assistance/disaster relief (HA/DR).
Japan’s external communication in time of crisis has been criticized for its tardiness in providing information to foreign media, and the suppression of information. In the early stage of the disaster response, it might not be fair to criticize the shortcomings of the Japanese government’s crisis communication efforts, given the immense uncertainties about what had really taken place inside the nuclear reactors and the spent fuel pool, as well as whether measures like injection of water into the reactors had any positive effect. Nonetheless, it seems natural that foreign residents in Japan, whose information sources are limited due to language difficulties and limited human networks, felt exceptionally insecure, and foreign government representatives in Japan—whose number one concern is the safety of their nationals—were more liable to overreact than the Japanese government. There is a possibility that the Japanese government’s decision to avoid straightforward expressions in describing conditions at Fukushima Daiichi in order to avert panic might have aroused suspicion about intentional suppression of information. In case of a severe accident like this, the Japanese government should not have avoided presenting threatening scenarios, such as core meltdown, even though there was a great degree of uncertainty involved. When the information released by the Japanese government continued to damage Japan’s international credibility, international organizations such as the International Atomic Energy Agency (IAEA), the World Health Organization (WHO), and the International Air Transport Association (IATA) helped to prevent further erosion of Japan’s credibility and reputation by announcing that the Japanese government’s handling of the nuclear accident and radiation contamination was proper. It is believed that behind these announcements was an appreciation of Japan’s longstanding activities in and contributions to international organizations.

As a matter of fact, Japan has indeed actively promoted reforms in the area of nuclear safety, particularly in the IAEA, including the improvement of safeguards in nuclear power plants all over the world and the upgrading of mechanisms for mutual support at the time of nuclear accidents. Japan has also established a training center for nuclear safety experts and practitioners in Fukushima Prefecture and sponsored a number of international conferences on disaster prevention. But the Subcommittee on International Relations concluded its report by emphasizing the need to solve the problems of radioactive contamination and decommissioning of the Fukushima
reactors in order for Japan to persuasively argue for the safety of nuclear power plants.

8) *Subcommittee on Media Networks*

After the Great East Japan Earthquake, the environment of the information media experienced a drastic change. The Subcommittee on Media Networks explored the psychological and social impact this change has had on people in the affected areas as well as other, not directly affected, regions. The Subcommittee analyzed the text data on the comprehensive picture of the information media which emerged after March 11, including the reporting of the mass media and information transactions on the Internet which the Subcommittee had accumulated for some months after the earthquake. At the same time, the Subcommittee looked into what kinds of information media citizens of the affected three prefectures and metropolitan Tokyo were exposed to, whether people understood the information they had obtained, whether they were able to transmit necessary information, and whether people were able psychologically and socially to adapt to the newly emergent information environment. Attempts were made in the Subcommittee’s report to answer these questions, using data that were obtained from an information behavior survey conducted twice, i.e., immediately before and after the great earthquake and then 18 months after the earthquake.

The first thing to be pointed out as a macro change in people’s information media environment after the earthquake is the parallel emergence of regions of “excessive concentration of information,” i.e., certain affected areas on which TV stations exclusively concentrated their reporting, on the one hand, and “areas of information scarcity” or “areas alienated from information,” on the other, which attracted no attention from the mass media. When one compared coverage by national and local papers, the latter were found to be less regionally lopsided and higher in continuity of reporting. Another change observed was a gradually increasing positive tone in references to the recovery from the Great East Japan Earthquake (as symbolized by the slogan “Ganbare Nippon” or “Hang in there, Japan”) in all the mass media. While the mutual exchange of information between Internet news sites and the mass media played a major role, it was also observed that there was not enough linkage between local papers and public organizations.
and Internet sites. Moreover, the Subcommittee’s report pointed out that blogs were more of a tool for selective retransmission and dissemination of information provided by the mass media rather than a medium with original information. In any event, the mass media played the overwhelmingly major role in the reporting on the Great East Japan Earthquake.

In the information environment created by the media, people are not necessarily exposed to all information with equal probability. While there are options available within the same medium, e.g., Mr. A reads newspaper A, while Mr. B relies on daily B, people can also opt to be exposed to various media: some obtain information mainly from the Internet, some obtain it from TV, and yet others rely on word-of-mouth communication. That is, there can be selective exposure to media. Consequently, different persons are exposed to information with different content. This Subcommittee’s report shows that this difference in exposure to information influenced people’s social adaptation even a year and a half after the earthquake. For instance, viewing TV was generally effective in mitigating anxiety and stress. This effect is, however, not observed on the Pacific coast of Fukushima Prefecture which was hard hit by the nuclear accident. TV viewing also had some negative effects on the revival of local activities, particularly in urban areas along the Pacific coast of Miyagi prefecture, perhaps due to TV viewing’s tendency to make viewers stay home. While newspapers contributed to fulfilling people’s need for information, they also had the effect of diminishing people’s trust in government with the presentation of local residents’ anger and grief in their reporting. Although the Internet, like TV, had a negative impact on the revival of local activities in general (particularly in urban Sendai City), SNS (social network services, including Facebook) were found to have the effect of mitigating anxiety across a wide range of users. In metropolitan Tokyo, SNS functioned to inspire users to engage in activities to help the affected areas.

Local residents who had extensive human networks and often participated in groups and organizations clearly showed a tendency to increased psychological and social adaptive behavior. This is attributable to the effects of so-called “social capital.” Particularly noteworthy behavior included increased consumption of information, expansion of human networks, and more active participation in local activities. In addition, informational and psychological support activity, that is, “social support” for
fellow citizens, was widely seen, taking the form of reciprocal cooperation among people. On the other hand, “information underdogs,” who were left out of circles of reciprocal relations, were also observed. Common features of these information underdogs include (1) weak social capital and (2) heavy reliance on the mass media without seeking assistance from others. This group needs support from outside, including the national/local government.

From these observations, it is apparent that mere access to information was insufficient to enable people to take appropriate “information-related action” at a time of major crisis. People need to be able to actively transmit information themselves. Additionally, it is necessary to constantly promote relations for mutual help, taking advantage of social capital. The findings of the Subcommittee on requirements for active transmission of information include, first, the “multiplexing” of information media, i.e., multiple media forms need to be available. Second, it is absolutely essential to have some media which can perform robustly even under extremely severe conditions. And these properties are required not only immediately after a disaster but also for a long period thereafter. It is through the attainment of these two requirements, that is, ability to actively transmit information and to use some media in crisis, that people can avoid “information alienation.” These are also important lessons that should be taken into consideration when planning disaster prevention/disaster mitigation measures, in the future.

Concluding Remarks

Through the research activities of the above eight subcommittees we have confirmed that, despite strenuous efforts in numerous fields by various organizations in Japan to cope with the damage caused by the Great East Japan Earthquake, Japan’s responses to the disaster revealed many shortcomings and problems: inadequate psychological and institutional preparedness for a major disaster; information disparity in the age of social networking service (SNS); and inadequate information disclosure and problematic communication on the part of public organizations, to name a few. Unlike Richard Samuels’ argument that the March 11 incident did not trigger renovation in Japan, however, our studies clearly show that efforts

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20 In one of the most important foreign books on the Great East Japan Earthquake, *3.11: Disaster and Change in Japan* (Cornell University Press, 2013), Richard J.
to go beyond what Samuels calls “staying the course” have been progressing steadily, if slowly.21

Before concluding this document, the present writers wish to revisit Terada Torahiko’s reflections on the 1923 Great Kantō earthquake and the 1896 Sanriku Tsunami in order to consider the contemporary meaning of a great earthquake. We also refer to the case of the Space Shuttle Challenger disaster in 1986. After that, we shall conclude with suggestions on issues to be tackled in the future.

Japanese physicist and essayist Terada Torahiko has left us a number of profound insights on the relations between natural calamities and society. It is believed that the well-known aphorism, “Disaster strikes when you least expect it” was his. When we read Terada’s essays, we cannot help but realize that we in Japan were quite unimaginative about the possibility of experiencing a severe disaster for quite some time after World War II. Of course, we did experience the shock of the Great Hanshin-Awaji Earthquake in 1995 and the Mid-Niigata Prefecture Earthquake of 2004. Even after these experiences, however, we never anticipated an earthquake and tsunami of such unprecedented magnitude and we never even dreamed of a nuclear accident.

In the early morning of March 3, 1933, the Pacific coast of Japan’s Tohoku region was hit by an enormous tsunami. The wave washed away coastal cities, towns, and villages one after another, destroying a great number of lives and property. This appears to have been a natural phenomenon almost identical to the tsunami caused by the Sanriku Earthquake of June 15, 1896. (p.136, Terada Torahiko, Tensai to Kokubo [Natural Calamity and National Defense], Tokyo: Kodansha, 2011) Drawing on these repeated tragedies, Terada warned the Japanese society, in language which might have sounded radical in 1933-34, that it should be more prepared for natural calamities:

While man’s determined efforts might be sufficient to prevent a war, even science cannot stop the strike of a natural calamity. Moreover,

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Samuels analyzes the three policy realms of energy policy, local autonomy, and the U.S.-Japan security regime to find out whether the disaster would trigger reforms in Japan. He concludes that it does not appear that meaningful reforms are taking place.

today, we cannot easily predict what type of natural calamity might hit us—earthquake, typhoon, tsunami, flood, or something else—or when it will occur. It hits with no warning whatsoever. Therefore, no enemy threatens a nation more than do natural calamities. (p.20)

Furthermore:

Even though national defense strategies against foreign aggression may be rigorously studied by the authorities, I feel highly apprehensive when wondering which government authority, if any, is studying and preparing for natural calamities with the potential to affect the nation's fate equal to that of an external enemy. (pp.21-22)

Actually, the Japanese government at that time had begun to pay more attention to the damage done by natural calamities, as exemplified by the establishment in 1925 of a seismological institute at Tokyo Imperial University. Nevertheless even measures against the typhoons which unfailingly struck Japan every year were far from adequate, as Terada pointed out. Even more than that, the very preparedness of the Japanese society and the government for natural calamities was problematic. Even though the Sanriku region had been struck by a deadly tsunami in 1896, people continued to reside in the same coastal region, only to be brutally victimized by a similar ordeal in 1933. What should we make of this? The tragedy was repeated in 2011; this time, relocation of entire communities to higher ground was recommended, and has been partially implemented. But although it is easy today for people to use automobiles to move around, it is still not at all easy to make people change their habitat.

Terada argued that the preparedness to natural calamities is a matter of mindset. Thus, he says (with a forgivably nationalistic prewar turn of phrase):

I believe that, as mankind progresses, so should patriotism and the Japanese spirit. It is undoubtedly a manifestation of the noble Japanese spirit to risk one's life charging the enemy in a rain of bullets and clouds of battle smoke. But I think it would be an equally advanced form of the Japanese spirit for the entire nation to take proper scientific measures
against natural calamities, which are more formidable enemies than Country A or Country B. (p.23)

Although these words are admittedly hyperbolic, we are obliged to face Terada’s warning squarely, as inhabitants of an archipelago prone to natural disasters. On this distinctive property of the Japanese archipelago, Terada issued a warning, using the following metaphor:

From the viewpoint of a man who is daily engaged in seismologic studies, the entire country of Japan looks as if it lies upon a suspension bridge. And I cannot help worrying about the possibility of the cables of this bridge snapping at any moment. When, next year -- or even tomorrow-- a large-scale, extensive earthquake, comparable to the ones in 1707 or 1854, strikes Japan, the damage that the entire nation incurs would be incomparably greater than that of the possible fall of a suspended bridge in Hakone. (pp.37-38)

Terada concludes his book with the following warning:

Following the above observations, we may have to come in a roundabout way to a curious conclusion. It is possible that natural disasters which, at first glance might appear to be beyond man’s power to resist, are actually manmade and, therefore, can be mitigated with the power of science. But, perhaps we need to reverse this logic, and conclude that, because natural disasters are manmade, they are all the more inescapable, because they are controlled by the inescapable laws that control man. (pp.49-50)

In other words, while there are aspects of natural disasters that can be mitigated by the power of science, there is definitely a possibility that human action makes man all the more vulnerable to natural disasters. In short, he may be saying that there is a danger of overconfidence in the power of modern technology, making people complacent about preparations against natural disasters.

Finally, as Japanese social scientists who wish to learn lessons from the Great East Japan Earthquake, we wish to touch on the work of an American counterpart of ours who made a thorough effort to explore the causes of the
Space Shuttle *Challenger* disaster in 1986. Earlier in this paper, we stated that social scientists should actively contribute to preparations for and handling of natural disasters and accidents, and in this 1986 incident we can see a model of the social scientist’s roles. American sociologist Diane Vaughan tackled the task of exploring the causes of the 1986 space shuttle disaster. On the basis of her investigations, Vaughan discovered that, even though it had been known among experts that some of the space shuttle’s parts and components became vulnerable under certain conditions, it was an organizational custom that hampered people to bring the flaw into question. That is, what she found was that the true problem lay in organizational culture and institutions, the very subjects of social science exploration.22

Over 90 social scientists took part in the present research enterprise. Nevertheless, we are humbled by the number of realms and subjects that our attempt failed to include. For example, we did not deal with the relations between recovery/reconstruction and the law. This is a very important element because all the recovery and reconstruction work involved the application of various laws, including compensation for disaster victims. Second, we have failed to pay enough attention to such themes as family, gender, and the activities of local groups, i.e. themes that sociologists commonly take up. Inclusion of these themes is a challenge for the future. Also, in contrast to some other countries, where crisis management is a part of college curricula and a subject of study by experts including social scientists, crisis management in Japan has tended toward the engineering study of disaster prevention, in which participation by social scientists has been very limited. Review of these problems and their remedies are part of the homework that the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Accident have bequeathed to us.

Coordinating Committee Chair  Muramatsu Michio  
Vice Chair  Tsunekawa Keiichi

[ENDNOTE]

This essay is the translation of the Report of the Social Scientific Survey Committee on the Great East Japan Earthquake published in May 2015 by

the JSPS. Since the day the report was put up on the homepage of JSPS, many things have happened, including the restart of the two Sendai nuclear reactors in Kagoshima Prefecture. The two reactors at Takahama in Fukui Prefecture were also allowed to restart in January-February 2016. The government was subsequently sued in both cases, and one of the local courts which had previously ordered a stop at the restarted reactor had its order reversed. As this suggests, we have not been able to follow all the events which have occurred since May 2015, and incorporate them in the Report, even though in some cases important events were observed. Therefore we are putting the translated Report of May 2015 up on the homepage of JSPS essentially as is.