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The Great East Japan Earthquake: Its Damages, Impacts on the Labor-economy and the Restoration Measures of the Government

Shinichi Umezawa ·

1. Unprecedented Disaster

1.1. Overview: What Happened?

On March 11, 2011, the Great East Japan Earthquake of magnitude 9.0¹ occurred, with the hypocenter offshore of the Sanriku coast or Tohoku region² of Japan. The ensuing huge tsunami hit the east coast of Japan³, causing unprecedented damage and nearly 16,000 deaths and less than 3,000 missing people. The tsunami also hit the Fukushima Daiichi nuclear power plant of Tokyo Electric Power Company (TEPCO), causing a complete loss of power and hydrogen explosions. The government instructed local people living within a 20-kilometer radius of the power plant to evacuate from their homes to avoid radiation exposure. Inevitably, such an evacuation lasts a long time, and almost 290,000 people remain unable to return to their homes as of the end of August

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¹ At magnitude 9.0, the earthquake was the fourth largest in the world since 1900. See Table 1.

² Tohoku is the north-east region of Japan.

³ Tsunami of 3.0 meters or higher hit six prefectures, but the hardest-hit were Iwate, Miyagi and Fukushima.

2013⁴. Some of these people are forced to live apart from their families in order to get a job or for their children's education.

As an initial recovery effort, a large supermarket retailer and a "convenience-store" chain company attempted to transport emergency food to some devastated areas, surprisingly on just the second day after the earthquake, but amid the chaos many problems remained for a long time, such as shortages of food, water, and clothing, unsanitary conditions including toilets, no electricity or telephone service, and lack of privacy in the living environment. Many refugees stayed at nearby local schools or community centers as emergency shelters from the first day, but those living in open areas of schools' sports grounds, for example, had to endure a complete lack of privacy in daily life. People continued to live in such public facilities for several months in some areas. Transportation was another serious problem: many roads and railways were destroyed by the tsunami, and some areas were immediately cut off and could not be accessed from the outset. Emergency food and refugee goods were quickly sent, but could not reach the areas easily. Some of the severely destroyed railways, roads and highways took a very long time to reopen.

⁴ In 2013, the government tentatively permitted people to live from August 1 to October 31 in one of the towns in Fukushima prefecture that used to be designated as a prohibited area. This will be the process of de-restricting the areas. Based on the Disaster Measure Basic Law of Japan, two categories of restricted area were designated immediately after the nuclear accident: namely, a strictly restricted area within 20 km from the plant, and an evacuation-prepared area beyond 20 km from the plant where accumulated exposure to radiation is expected to exceed 20 milli-sieverts annually. In April, 2012, the categories were reorganized into three: "return-difficult area" where accumulated exposure is unlikely to fall below 50 milli-sieverts within 5 years, "preferably restricted area" where exposure of over 20 milli-sieverts is expected, and "restriction-release-prepared area" where exposure of less than 20 milli-sieverts may be realized.

Table 1. The World's Major Earthquakes Since 1900.

Year	Place	Magnitude
1960	Chile	9.5
1964	Gulf of Alaska	9.2
2004	Sumatra North (west offing), Indonesia	9.1
2011	Great East Japan Earthquake	9.0
1952	Kamchatka Peninsula	9.0
2010	Mauri offing, Chile	8.8
1906	The offing of Ecuador	8.8
1965	The Aleutian Islands, Alaska	8.7
2005	Sumatra North	8.6
1950	Tibet Assam	8.6
1957	The Aleutian Islands, Alaska	8.6

Source: Author's Own Elaboration.

The emergency shelters were gradually closed within 2011 because the facilities needed to be vacated for schools or for the public. Instead, local prefectural governments soon started to build temporary housing for the refugees. The Iwate prefectural government, for instance, completed the first new temporary housing in early April 2011. However, particularly in the early stages, the local governments as well as local people themselves had to rely on these shelters for housing for some time because there was a severe shortage of temporary housing. The facility that was used as a shelter for the longest period among the three devastated prefectures⁵ was in Fukushima, and did not close until the end of 2011.

The earthquake also had a massive impact on economic activities. The disruption of the supply chain in some manufacturing industries greatly affected markets in Japan and overseas, although some industries such as auto manufacturing recovered quickly. However, the exposure of agricultural food and dairy to radiation severely hit the consumption of such products. Once radiation contamination exceeding the regulated level was identified, the government forbade its shipment; when contamination fell below the regulated level after several examinations, the government canceled the ban. However, consumption did not recover quickly because consumers remained deeply concerned about food safety. Such damaging rumors persisted and prices remained low for a long time. The fishery industry was also seriously affected by the tsunami; many

⁵ The prefectures are Iwate, Miyagi and Fukushima, which were most heavily damaged by the earthquake, as referred to in note 2.

harbors/ports and inland seas along the Sanriku coast were severely damaged by the tsunami and debris, and recovery took a very long time. Many fishermen had to abandon their work because their boats had been lost or destroyed, and some fishermen were too old to take on new debt. Only recently have fishermen restarted their business and harbors restarted operation after new facilities were established.

Another issue is the severe delay in restoration compared with the original plan. The delay had two main reasons: 1) it took municipal cities a long time for technical reasons to draw up restoration plans to be submitted to the government, and 2) even after plans were made, the overall recovery process was delayed by the shortage of construction materials, resources and manpower.

Regarding the government's policies for restoration, the former Democratic Party Cabinet earmarked a budget of 19 trillion yen to be spent over five years, and the planning seems to have made a good start. However, it took municipal governments a very long time to complete plans to be submitted to the government. According to the restoration plans of the central government, local municipal governments were requested to submit overall plans for the restoration and infrastructure, but municipal governments lacked skilled engineers or officials with technical knowledge and struggled to do so. In addition, landowner approval must be acquired before submitting plans, but this was difficult to obtain. Some municipal governments have only recently started to finalize their restoration plans.

Finally, the Fukushima Daiichi nuclear power plant of TEPCO is another serious issue. Even though the worst situation of the first three to four months has passed, the situation is not under control as outlined below⁶. First, the reactor-cooling system is still using temporary equipment built in mid 2011, and the amount of radioactive-contaminated water is increasing. From the beginning, it has been suspected that groundwater might be leaking through the reactor buildings on the site because the amount of water required to cool the reactors, which circulates among the reactors in pipes while its radioactivity is being decontaminated, has been increasing day by day. It has now been announced that 400 tons of

⁶ The nuclear reactors' problem finally passed the worst stage in July 2011, when the first reactor-cooling system, after frequent failures in trials, started to operate stably. Before that, there was a risk of the heavily contaminated water spilling from the cooling water tanks. However, this nuclear-reactor cooling system, developed mainly by a French nuclear company, often failed and was finally replaced by the current one developed by a Japanese company.

groundwater are leaking into the site per day and becoming contaminated, and so TEPCO is constructing tanks on the site to store this water. These tanks are taking up an increasing amount of space at the power plant, but more importantly, it has recently been found that water is leaking from the tanks, and TEPCO has admitted that radioactive-contaminated groundwater may be leaking into the sea. Civil engineering solutions to wall off the contaminated groundwater from the sea are being studied, but this is thought to be extremely difficult⁷.

Second, according to the government's current road map toward decommissioning the reactors, the fuel rods are scheduled to be removed from reactor n.4 in November this year. However, radioactivity levels around the reactors remain extremely high, and it is not clear how the work of decommissioning the reactors can proceed in view of the high risk of exposure to radioactivity.

1.2. Current Crucial Issues

In addition to the main issue of how to speed up the restoration process⁸, the following two issues are also crucial for the mid-term policy.

First, how to procure energy sources and deal with the nuclear power plants. This is outside the realm of expertise of the JILPT, but the energy issue triggered by the stoppage of all nuclear power plants in Japan is critical for the mid-term economic policy.

All reactors that were halted for regular check-ups when the disaster happened were unable to restart, and other plants were also eventually stopped for regular check-ups. As a result, all nuclear power plants in Japan eventually ceased operation. How to procure energy sources and how to deal with the nuclear plants has become a vital policy issue for Japanese society and economic development in the mid to long term. An authorized committee of the government to assess the safety of nuclear power plants, which has recently set a standard⁹ to permit the resumption of operation of the nuclear plants, is now assessing applications from

⁷ However difficult it may be, it should be managed firmly and completely because the prime minister Shinzo Abe expressed commitment to handle the Fukushima nuclear power plant in his speech at the International Olympic Committee (IOC) meeting in September 2013 to choose the city for the Olympic Games in 2020.

⁸ See chapter 4.

⁹ The main principles are that no nuclear power plants are to be permitted on fault lines, exhaust pipes for vents are to be equipped with filters, and nuclear power plants are not to operate for more than 40 years.

power companies and will decide whether to allow them to resume operation.

The second issue is the management of TEPCO. The company has a duty to compensate local victims¹⁰ and decontaminate the radioactivity¹¹ so that evacuees can return home, and is also responsible for decommissioning the reactors and managing the contaminated groundwater. Regarding economic compensation, the government established a financial scheme so that TEPCO can borrow the required money from the government to compensate victims, but otherwise has encouraged TEPCO to manage the situation itself. The government has been cautious about committing itself to compensation because it will inevitably require a huge budget, and might induce TEPCO to neglect its responsibilities. However, the government now seems to realize that TEPCO's response so far has been inappropriate, inadequate and too slow, and has reportedly decided to handle these issues from now.

2. Impacts on Economic Activities

2.1. Impacts across the Country and in the Devastated Areas

Immediately after the earthquake, both industry and the government were deeply concerned about severe, long-lasting impacts on the macro-economy. The devastated area is a center of agriculture, dairy, fishery, and component-manufacturing industries, and the shock to supply chains was serious.

Industrial production as a whole dropped 16.5% in the first month, the largest recorded fall in one month, but economic indicators show that the negative impacts on the macro-economy were quickly reduced due to a variety of factors, including companies and business organizations voluntarily assisting the production of the devastated companies. The auto

¹⁰ However, the Nuclear Damage Compensation Law of Japan stipulates that, in the case of a massive natural disaster, a nuclear power plant company might not be held responsible for the damages caused; therefore, the range of damages for which TEPCO should be responsible is highly controversial. The issue reminds one of J.M. Keynes's *The Economic Consequences of Peace*, which criticized the Versailles Peace Treaty which set the amount of reparations after the First World War, due to the risk of tipping Germany into insolvency.

¹¹ As explained in chapter 4, the government decided to remove the topsoil in residential areas in Fukushima to reduce the radioactive contamination so that evacuees can return to Fukushima and live a safe and normal life.

industry was among the fastest to recover; assembly plants completely stopped production for the first month, but production levels returned to almost normal within three to four months.

Table 2. Major Economic Indicators Related to the Great East Japan Earthquake.

	Production (index)	Real GDP % change from previous quarter	Trade surplus		Electricity sale (% change from previous year)		Nikkei stock average (yen: end of month)	Yen exchange rate (monthly average)	BOJ survey		Bankruptcy % change from previous year	Unemployment rate (%)		Ratio of new job openings to applicants
			(billion yen)	Export (% change from previous year)	Country as a whole	TEPCO area			Business sentiment (DI: large companies)	Employment sentiment (DI: large companies)		Country as a whole	Tohoku region	
2011.1	102.1		▲ 399	2.89	3.0	1.5	10,237.92	82.63			2.85	4.8		0.60
2	102.7		720	9.71	4.6	3.0	10,624.09	82.53			▲ 8.49	4.7		0.62
3	85.8	▲ 2.0	237	▲ 1.36	▲ 1.4	▲ 5.9	9,755.10	81.79	6	4	▲ 9.32	4.7	5.5(0.1)	0.62
4	87.6		▲ 412	▲ 12.66	▲ 6.5	▲ 13.8	9,849.74	83.35			▲ 0.62	4.7		0.61
5	93.6		▲ 771	▲ 9.78	▲ 6.5	▲ 11.9	9,693.73	81.23			9.67	4.6		0.61
6	97.5	▲ 0.8	130	▲ 1.02	▲ 5.1	▲ 10.4	9,816.09	80.51	▲ 9	7	▲ 5.53	4.7	6.0(0.5)	0.62
7	98.7		142	▲ 2.26	▲ 5.0	▲ 11.0	9,833.03	79.47			5.12	4.7		0.64
8	100.4		▲ 690	4.15	▲ 11.3	▲ 16.8	8,955.20	77.22			0.52	4.5		0.65
9	99.5	2.6	372	3.01	▲ 11.4	▲ 16.5	8,700.29	76.84	2	4	▲ 10.18	4.2	5.4(-0.2)	0.67
10	101.3		▲ 209	▲ 2.74	▲ 6.3	▲ 10.6	8,988.39	76.77			▲ 5.63	4.5		0.69
11	99.1		▲ 589	▲ 3.06	▲ 5.4	▲ 7.7	8,434.61	77.54			3.85	4.5		0.71
12	101.1	0.3	▲ 147	▲ 6.95	▲ 3.5	▲ 4.8	8,455.35	77.85	▲ 4	4	▲ 8.85	4.5	4.8(-1.0)	0.72
2012.1	101.5		▲ 1390	▲ 8.49	▲ 3.7	▲ 2.4	8,802.51	76.97			▲ 2.56	4.5		0.74
2	101.3		95	▲ 1.95	▲ 1.4	▲ 2.9	9,723.24	78.45			10.41	4.5		0.75
3	101.1	1.2	▲ 1	7.29	6.1	8.8	10,083.56	82.43	▲ 4	3	▲ 0.10	4.5	5.1(-0.4)	0.76
4	100.6		▲ 437	11.13	1.0	2.8	9,520.89	81.49			▲ 7.53	4.5		0.79
5	98.8		▲ 805	11.56	1.8	5.1	8,542.73	79.70			5.08	4.4		0.80
6	98.0	▲ 0.2	112	▲ 1.46	▲ 0.2	2.0	9,006.78	79.32	▲ 1	3	▲ 12.59	4.3	4.6(-1.4)	0.81
7	97.5		▲ 376	▲ 7.45	▲ 6.3	▲ 6.4	8,695.06	79.02			▲ 2.28	4.3		0.81
8	96.1		▲ 664	▲ 5.25	3.0	7.0	8,839.91	78.66			▲ 12.18	4.2		0.81
9	94.0	▲ 0.9	▲ 475	▲ 10.54	0.6	3.4	8,870.16	78.17	▲ 3	2	0.59	4.3	3.9(-1.5)	0.81
10	94.3		▲ 451	▲ 5.98	▲ 1.4	3.2	8,928.29	78.97			6.07	4.2		0.81
11	93.4		▲ 851	▲ 4.04	▲ 0.7	▲ 0.7	9,446.01	80.87			▲ 3.40	4.2		0.82
12	94.7	0.3	▲ 572	▲ 6.89	3.1	4.2	10,395.18	83.64	▲ 12	4	▲ 4.74	4.3	4.4(-0.4)	0.83
2013.1	94.1		▲ 1,480	6.76	▲ 1.2	▲ 4.6	11,138.66	89.18			▲ 10.20	4.2		0.85
2	94.9		▲ 671	▲ 3.31	▲ 3.8	▲ 2.2	11,559.36	93.21			▲ 12.09	4.3		0.85
3	95.0	0.9	▲ 222	0.33	▲ 6.7	▲ 8.6	12,397.91	94.75	▲ 8	3	▲ 19.62	4.1	3.8(-1.3)	0.86

Source: Author's Own Elaboration.

The number of bankruptcies did not rise in the devastated area; rather, the number increased broadly across the country, reflecting the fact that east Japan is a component supplier to Japanese manufacturers as a whole. Thus, the recovery process started smoothly, although structural problems emerged later.

Damage to the local economy of the devastated areas, however, was severe. In addition to the component-manufacturing industries, agriculture, dairy and fishery are also major industries in the region, and farmers and fishermen suffered due to radioactive exposure of their products. Many local crops, vegetables, Japanese tea leaves, beef and fish

were announced to have been exposed to radioactivity exceeding the regulated level, and so shipments were suspended forcibly by the central or local prefectural government until safety could be ascertained.

Even when the ban on shipments was lifted, the farmers and fishermen continued to suffer due to the damaging effects of rumors: consumers would no longer buy food or products that had previously been found to contain radioactivity. These products did not sell well and their prices remaining very low for a long time.

Meanwhile, the fishery industry had a different problem: fishermen lost many facilities ranging from their own ships, processing factories, and facilities such as refrigerators at harbors, to good fishing conditions within harbors. With respect to fishing conditions, the Sanriku coastal area used to have many beautiful, calm inland seas where oysters were cultivated, but these conditions were completely ruined and harbors were filled with the rubble of devastated houses, hindering ships from entering harbors and preventing the cultivation of seaweed, let alone aquaculture of oysters. This situation finally started to recover from mid-2012.

Regarding the macro-economic influence of the earthquake, it brought about two structural changes¹²: namely, the trade balance turned to a deficit, and Japan has been forced to rely on oil as an energy source.

Japan had enjoyed a trade surplus for more than 40 years, but after the earthquake, the nuclear reactors that had generated approximately 30% of total electricity in Japan were stopped, and Japan started to import oil in large volumes, as well as gas and other oil substitutes, thus tipping the Japanese trade balance into the red¹³.

The second economic structural change, namely how to procure energy, is going to become a major problem in the mid to long term, and so electricity saving will be crucial. Looking back on the period from the disaster till the summer of 2011, it is worth mentioning that in the metropolitan area, there were rolling blackouts by area for a couple of hours a day for the first month, and electricity consumption was required to be reduced by a certain rate by government ordinance in the summer of 2011 and 2012. In eastern Japan, saving electricity in those days was very harsh not only for people in general but also for manufacturing industries,

¹² As economic barriers, the high appreciation of the yen in the second half of 2011 was very serious, triggered by the depreciation of the euro following the financial crisis in some southern European countries. This came soon after the disaster, and the strong yen placed serious deflationary pressure on the Japanese economy.

¹³ Currently the trade surplus is in the red and the current account is still in the black because Japan has been enjoying an income surplus.

particularly companies that consumed much electricity, both large and small, which had to adjust their production accordingly.

2.2. Results of the JILPT's Survey

The Japan Institute of Labor Policy and Training conducted a survey by mail of 10,000 companies with 10 employees or more across the country in May 2012, and received responses from 2,716 companies. The main questions concerned the damages caused by the earthquake, the effects of TEPCO's Fukushima Daiichi nuclear power plant accident on production, and countermeasures.

According to the survey results¹⁴, the companies whose headquarters were located in one of the three devastated prefectures accounted for 36.6% of the total. Some 24.5% of companies suffered damage by the earthquake, but the rate differed by type of company: the rate was 48.5% for those with multiple branch offices or factories over the country, and 84.9% for those whose headquarters were located in the three prefectures.

Among the damaged companies, the extent and type of damage were as follows: 42.4% were slightly damaged in general, 35.3% had machinery or equipment partially destroyed in some branch offices, 14.1% had buildings half destroyed in some branch offices, and 3.6% lost employees in some of their branch offices or factories (Table 3).

Table 3. Extent and Type of Damages (No. Of Damaged Companies = 100).

	All damaged companies	Employees died or wounded in some offices or factories	Buildings were completely destroyed in some offices or factories	Buildings were half destroyed in some offices or factories	Machinery or equipment was completely or considerably destroyed in some factories	Machinery or equipment was partially destroyed in some factories	Slightly damaged in general	Others	N.A.
Total	100.0	3.6	8.4	14.1	11.3	35.3	42.4	3.3	1.2
Iwate pref.	100.0	4.5	18.2	11.4	18.2	40.9	29.5	9.1	0.0
Miyagi pref.	100.0	6.5	14.4	20.9	14.4	34.2	39.2	1.9	0.4
Fukushima pref.	100.0	3.3	6.6	18.7	16.5	35.2	35.2	5.5	1.1

Source: Author's Own Elaboration.

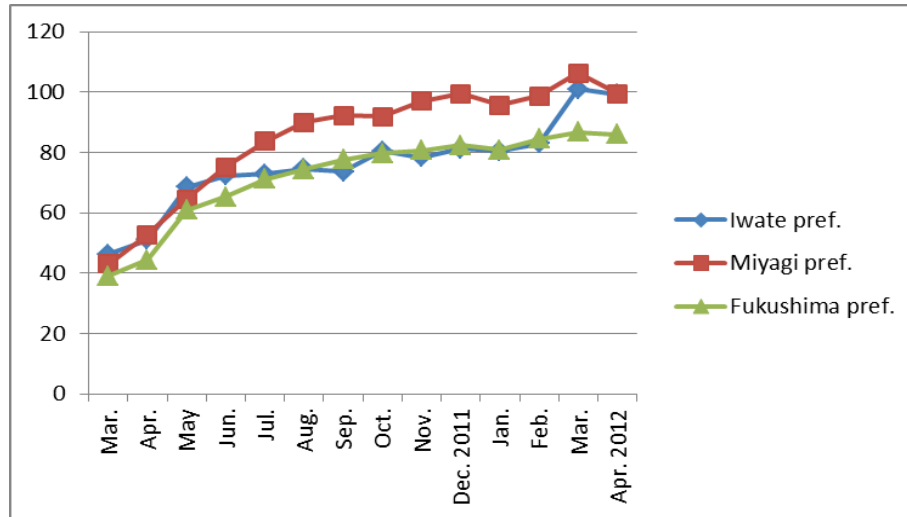
¹⁴ The survey responses were translated by the author; any mistakes are my responsibility.

The questionnaire asked the damaged companies about the effects on the production of the company as a whole or at the most damaged branch office or factory, and the responses were: 25.6% of the damaged companies were “not affected as a whole”, 26.7% “suffered from temporary production reduction”, 35.9% for “temporary suspension”, and 8.4% eventually “abolished the company or branch office concerned”.

As for the level of production among the respondents answering “temporary production reduction” or “temporary suspension”, it was around 40% on average compared to one year ago in each of the three prefectures of Iwate, Miyagi and Fukushima as shown in Figure 1. The figure rose to 90% in Miyagi around August 2011, but the recovery was delayed in Iwate and Fukushima. The situation then recovered to some extent in Iwate around March 2012, but remained at a lower level in Fukushima (Figure 1).

To the same companies that “temporarily reduced” or “suspended production”, we asked whether workers were made redundant or not. As Table 4 shows, workers were temporarily made redundant in 44.0% of those companies, and in the other 3.1% of companies, workers are still redundant, whereas in 46.7% of the total, workers did not become redundant after the recovery started. If we compare the tendency throughout Japan with that in the three devastated prefectures, however, it is clear that there were more worker redundancies in Iwate, and that redundancy persists in some companies in Fukushima, whereas it was not serious in Miyagi.

Figure 1. Production Level of Companies that Temporarily Reduced Production in the Three Devastated Prefectures (Index Averaged For Each Prefecture with 2010 = 100).



Source: Author's Own Elaboration.

Table 4. Incidence of Redundant Workers in Those Companies that Temporarily Reduced or Suspended Production.

	Total	No redundant workers after recovery	Temporary redundancies but no more now	Redundant workers still exist	No choices are applicable	N.A.
Total	100.0	46.7	44.0	3.1	4.9	1.3
Iwate pref.	100.0	27.8	61.1	0.0	11.1	0.0
Miyagi pref.	100.0	50.0	45.1	2.0	2.0	1.0
Fukushima pref.	100.0	33.3	48.5	9.1	6.1	3.0

Source: Author's Own Elaboration.

Concerning countermeasures against redundancy, we asked those companies where workers had become redundant plus those that had been closed as to what kind of measures they had taken (multiple answers): 54.4% of workers were left “idle on a temporary basis at home or training site”, followed by “rotation to other section inside the company” (27.9%), “reduction of overtime” (18.4%), and “reduction of scheduled working hours” (16.2%). More severe measures were “stopped renewing contracts of fixed-term workers” (9.6%), “induced retirement” (5.1%), “dismissal” (5.1%) or “delayed employment of new recruits” (5.1%), but the incidence was rare.

As regards problems arising from the accident at TEPCO's Fukushima Daiichi nuclear power plant, apart from the direct impact of radioactive exposure, we asked about indirect impacts on production; the responses are shown below (Table 5). "Nothing in particular" (52.9%) is the largest, but some companies suffered from impacts such as: "considerable decrease in sales caused by reduced consumption after the disaster" (21.4%) or "production reduction due to planned blackouts or saving electricity" (12.6%). The situation differed from industry to industry and from region to region. In the tertiary industry such as hotels and restaurants, life-related services, or leisure, the ratio of those that suffered from "considerable decrease in sales caused by reduced consumption after the disaster" exceeded 40%, and "production reduction due to planned blackouts or saving electricity" was relatively high at around 20%. In hotels and restaurants, "considerable decrease in sales caused seemingly by damaging rumors" was also high (24.7%). In contrast, "production reduction due to planned blackouts or saving electricity" was relatively high in manufacturing industries (17.0%), reflecting the nature of production activities.

Among the three devastated prefectures, the ratios of "considerable decrease in sales caused by reduced consumption after the disaster" and "considerable decrease in sales caused seemingly by damaging rumors" are relatively high.

Table 5. Indirect Impacts on Production other than Radioactive Exposure (M.A.).

	Total	Production reduction due to planned blackouts or saving electricity	Sales fell considerably caused by reduced consumption after the disaster	Sales fell considerably caused seemingly by damaging rumors	Others	Nothing in particular	N.A.
Total	100.0	12.6	21.4	6.4	7.7	52.9	9.0
Agriculture and forestry	100.0	11.1	22.2	11.1	-	66.7	-
Fishery	100.0	-	16.7	16.7	-	66.7	16.7
Manufacturing	100.0	17.0	20.1	4.6	9.1	50.2	9.1
Retail	100.0	21.5	20.6	10.8	8.5	47.5	5.8
Hotels and restaurants	100.0	25.3	47.5	24.7	4.3	22.2	9.3
Life-related services	100.0	18.5	44.4	11.1	7.4	38.9	5.6
Leisure	100.0	25.8	41.9	6.5	3.2	29.0	9.7
Three devastated prefectures	100.0	12.7	24.6	16.7	8.7	47.6	4.0
Tohoku region	100.0	13.0	28.7	12.6	7.3	47.0	6.1

Source: Author's Own Elaboration.

In relation to the impact of the planned blackouts and electricity saving on production, it was large in some big companies. Table 6 shows that the

majority of companies (61.0%) were “not greatly affected”, but some (10.3%) were “greatly affected in some offices or factories”. It is also notable that some companies (16.8%) “did not save electricity and production was not affected.” If we compare the data across the regions, the magnitude of the impact of saving electricity in the three devastated prefectures hardly differed from other prefectures, and in Tohoku as a whole, the ratio of greatly affected companies was smaller than the average.

Table 6. Impacts of Saving Electricity in The Summer Of 2011.

	Total	Greatly affected in some offices or factories	Production was not greatly affected	Not affected because could generate own power	Did not save electricity and production was not affected	No choices are applicable	N.A.
Total	100.0	10.3	61.0	0.8	16.8	4.4	6.7
Three devastated prefectures	100.0	6.3	65.1	0.0	22.2	4.8	1.6
Tohoku region	100.0	4.5	69.2	0.4	18.6	2.8	4.5

Source: Author’s Own Elaboration.

Finally, we asked what the companies had done to assist the recovery and restore the devastated areas. “Money donation” (63.0%) was the most common activity; 23.5% of the companies did not do anything special, but some companies took action such as sending supplies to victims (25.9%) or sending a volunteer rescue team from among employees (6.4%), and 7.0% allowed employees to take paid leave to do volunteer work in a devastated area (Table 7).

Some companies reportedly planned to employ victims as a priority, especially new graduates from universities, but according to this survey, such efforts were limited (4.6%). The majority of the companies (70.0%) had no such policy, and 6.7% of the companies tried to employ such persons but without success (Table 8).

Table 7. Companies' Assistance for Victims and for Restoration (M.A.).

	Total	Sent supplies to victims	Sent a voluntary rescue team recruited from the employees	Permitted paid leave when employees volunteered to work in a devastated area	Money donation as a company activity	Others	No special activity	N.A.
Total	100.0	25.9	6.4	7.0	63.0	4.3	23.5	2.1
Size of companies								
below 100	100.0	17.2	2.5	2.6	54.0	4.0	32.3	2.6
100~299	100.0	24.3	3.4	6.1	69.8	4.0	19.7	1.1
300~499	100.0	30.9	9.6	8.5	70.6	4.3	15.2	2.5
500~999	100.0	35.4	11.1	15.5	76.5	5.3	10.2	0.9
1,000 and over	100.0	58.3	23.3	21.7	78.0	6.0	5.0	2.3
Three devastated prefectures	100.0	36.5	9.5	3.2	31.0	4.0	36.5	3.2
Tohoku region	100.0	34.8	8.1	6.5	42.1	4.5	32.0	3.6

Source: Author's Own Elaboration.

Table 8. Prioritized Employment of Local Victims as Company Policy.

	Total	Employed local victims as a priority	Tried to employ victims as a priority, but was not possible	Had no policy of prioritized employment	No employment after the earthquake	N.A.
Total	100.0	4.6	6.7	70.0	12.2	6.6
Three devastated prefectures	100.0	15.9	5.6	57.9	11.1	9.5
Tohoku region	100.0	12.1	5.7	58.3	14.6	9.3

Source: Author's Own Elaboration.

3. Local Labor Market Situation

3.1. Overview

For the first several months after the disaster, many local people in the devastated areas were unemployed or lost their jobs because the companies they worked for were destroyed by the tsunami, facilities and equipment were severely damaged and could not be used, or because the workers themselves had to evacuate from their hometown. Faced with this situation, as an initial emergency measure immediately after the disaster, the government eased the eligibility requirements for both

unemployment benefits¹⁵ to be paid to such people and for subsidies to be paid to employers to maintain employment, and also doubled the duration for which unemployment benefits could be claimed.

The situation greatly improved as the government and local municipal governments started the reconstruction effort. Many jobs were created for construction or removing rubble from the sea or along roads. However, manual work is no longer so common and few people applied for those jobs, leading to localized labor shortages that further delayed the restoration process in the devastated areas.

In Fukushima, people could not take up new jobs easily in the towns to which they evacuated for different reasons. Some of them moved away from Fukushima for their children's health, safety and education, or for their own job opportunities, but did not clearly know how long the situation would continue, and so felt reluctant to take a permanent job, and instead tended to take temporary jobs or remain at home. This choice may have been possible partly because they received some compensation for living from TEPCO.

3.2. The Labor Market in Iwate, Miyagi and Fukushima after the Disaster

This section examines the labor market situation in the three devastated prefectures after the disaster. The data used in this section was taken from job-exchange activities in local public job exchange offices, the so-called "Hello-Work Offices", which were collected by the government. Job-openings, job seekers, and new employment are mainly analyzed here¹⁶.

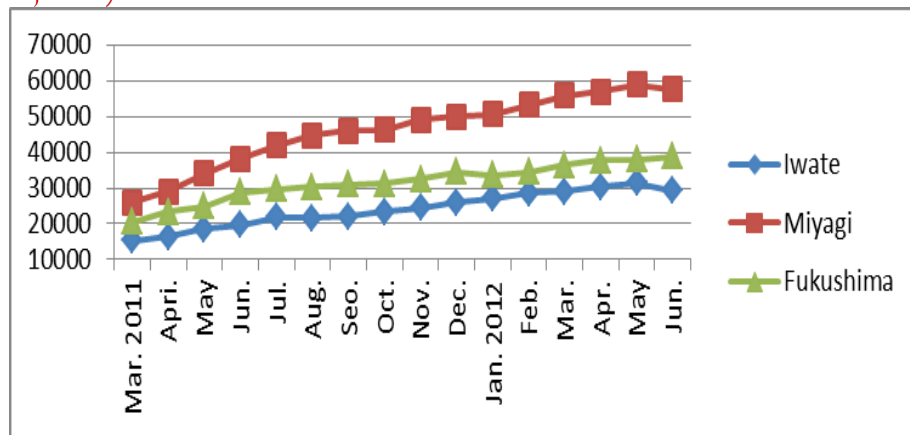
New job openings increased greatly in each of the three prefectures after the disaster, boosted by the demand for restoration-related activities (Figure 2). On the other hand, job applicants increased dramatically in the first quarter immediately after the disaster, because many people were laid off or their workplace had been destroyed or closed temporarily because the owner or president was missing. As noted above, the government

¹⁵ Under the employment insurance law of Japan, recipients must clearly have been dismissed or become unemployed; those who are merely idle because it is not certain whether their workplace will resume operation are not eligible for unemployment benefits. However, this regulation was inappropriate at the time in view of the chaos and disruption to business, so the government decided to ease the regulations immediately.

¹⁶ Unemployment is another important labor-economic indicator, but unemployment data are not available by prefecture in Japan due to the way statistics are administered; the region is the smallest unit for which unemployment data is available. Since the data could not be extrapolated, the data shown here are for between March 2011 and June 2012.

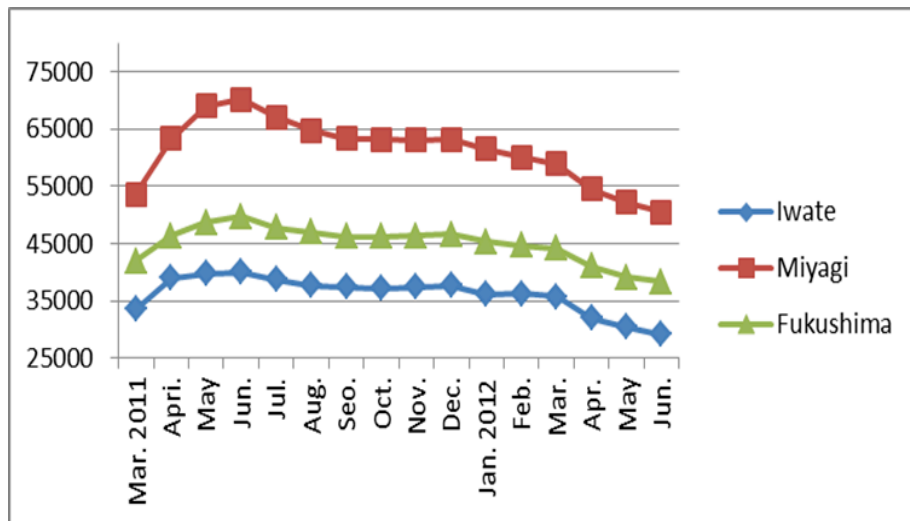
eased the requirements for eligibility for unemployment benefits, and also changed the employment insurance law to prolong the duration of unemployment benefits, thus leading to a surge in the number of unemployment benefit recipients (Figures 3 & 4).

Figure 2. Trend of Job Openings in the Three Prefectures (seasonally adjusted).



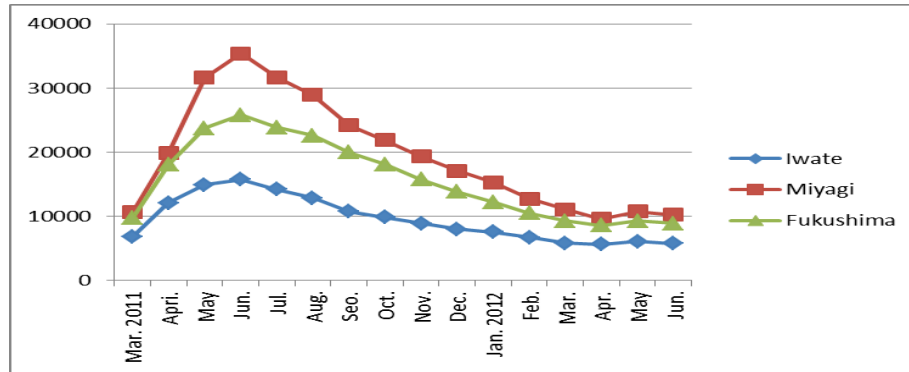
Source: Author's Own Elaboration.

Figure 3. Trend of Job Applicants in the Three Prefectures (seasonally adjusted).



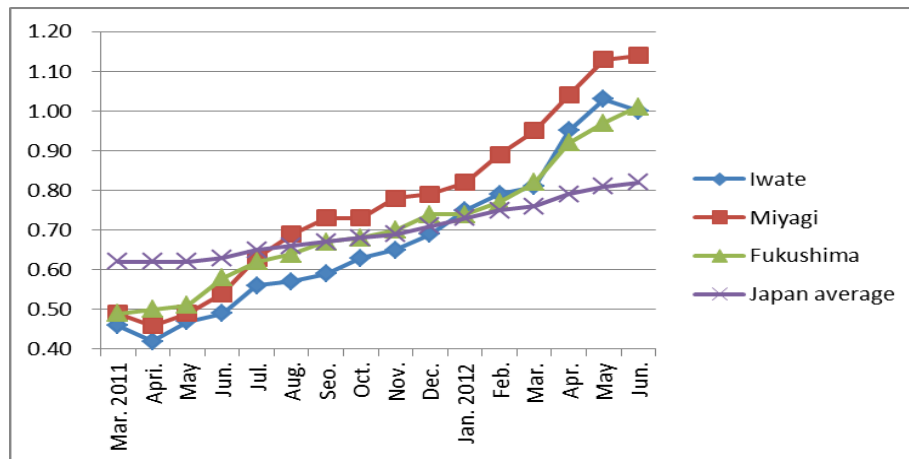
Source: Author's Own Elaboration.

Figure 4. Trend of Unemployment Benefit Recipients in the Three Prefectures (non- seasonally-adjusted).



Source: Author's Own Elaboration.

Figure 5. Ratio of job openings to job applicants in the three prefectures (non-seasonally-adjusted).



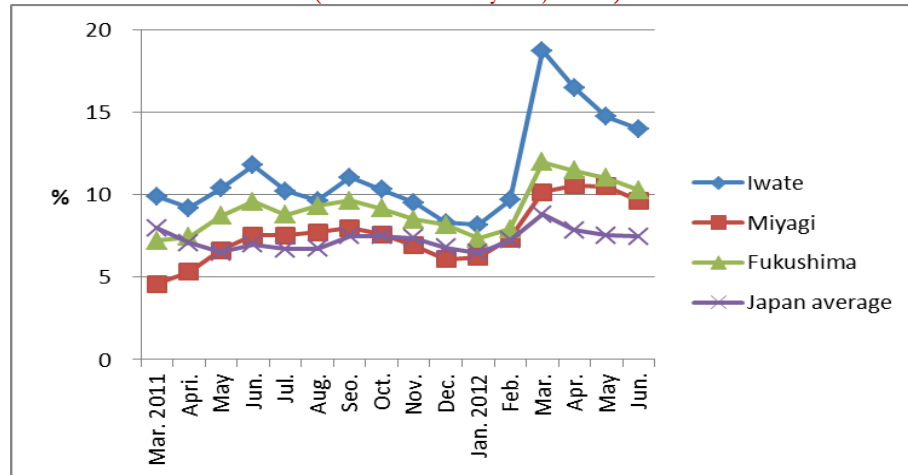
Source: Author's Own Elaboration.

As a result, the ratio of job openings to job applicants dropped in the three prefectures and was lower than the average for Japan for the first three or four months, but the ratio quickly improved and surpassed the national average by around January 2012 (Figure 5).

Concerning new employment, Figure 6 shows the rate of the number of newly employed out of job applicants in the three prefectures compared with the national average. It can be seen that the ratios for Iwate and Fukushima are always higher than the national average, and likewise for Miyagi since March 2012. In addition, there is a notable upsurge around

March 2012, which may have been because the extended duration of unemployment benefits ended for most recipients around this time, so they tried to get a job before such benefits ended.

Figure 6. Rate of the Number of Newly Employed out of Job Applicants in the Three Prefectures (non-seasonally-adjusted).



Source: Author's Own Elaboration.

The employment situation in the devastated three prefectures has not been so bad in general, but as noted above, if broken down by sector or area, the situation was difficult or recovery was slow in industries such as fishery, dairy and agriculture, or in areas with a concentration of such industries.

4. Government Measures for Recovery and Restoration

4.1. Overview

Immediately after the earthquake, the government was fully involved in searching for missing people carried away by the tsunami, helping evacuees evacuate safely including the provision of emergency food and collection of donations, and maintaining the stability of the nuclear power reactors of the Fukushima Daiichi nuclear power plant of TEPCO. However, from mid-April 2011, the government started to work on restoration by establishing a special committee for restoration; the basic principle for the restoration was approved by the Cabinet at the end of July 2011.

Moreover, the government compiled a supplementary budget for restoration¹⁷ four times in fiscal 2011 (April 2011 to March 2012)¹⁸.

The first supplementary budget plan was approved by the Diet very swiftly in early May 2011, focusing on temporary housing, removing debris, and public works for recovering from the disaster.

The largest supplementary budget was the third one, approved by the Diet at the end of November 2011. This budget amounted to 9.2 trillion yen, and the main target of government expenditure shifted at this stage from emergency measures to grander design-based expenditures. As noted above, municipal governments that had been damaged by the tsunami and earthquake were requested to draw up comprehensive designs for restoring the devastated area, both residential and industrial, and to submit their plans to the government. Once a plan is approved, then subsidies will be paid to the municipal governments from the national budget. The projects may differ in content among municipal governments, but for reconstructing infrastructure, actual projects have been summarized for municipal governments to choose in an integrated format across 40 different reconstruction projects, which have been arranged by the five authorized ministries. This third supplementary budget included assistance to small- and medium-sized damaged companies and measures to promote employment in the devastated areas. Regarding the scale of total budget expenditures, the former administration, the Democratic Party, decided to spend 19 trillion yen in total, which was raised to 25 trillion yen by the current coalition government, the Liberal Democratic Party and the New Komeito. It was recently reported, however, that about 35% of the budget for fiscal 2012 was not spent for various reasons, largely because of delays in submitting comprehensive restoration plans to the government, delays in radioactive decontamination work in Fukushima, and shortages of manpower and materials for public works for restoration.

4.2. Problems Facing Local Municipal Governments and Citizens

In addition to the management of the nuclear power plant, the whole restoration process has been delayed in many areas, particularly: (1) the

¹⁷ Under the Japanese budgetary system, once a budget is set, if some public necessities arise during the fiscal year (April to the end of March of the following year), supplementary budget(s) may be drawn up to deal with such necessities.

¹⁸ This was the first time since 1947 that the Japanese government compiled a supplementary budget four times in one year.

delay in radioactive decontamination of soil so that evacuees from Fukushima can return home, (2) procurement of candidate places to store incinerated debris from Fukushima, and (3) the construction of public housing for those still living in temporary housing¹⁹.

Regarding (1), the government decided to remove the topsoil in residential areas in Fukushima to reduce radioactive contamination and encourage evacuees from Fukushima to return home to live normal daily life. However, the decontamination process has been delayed because of the lack of manpower. In addition, the method has been inefficient at reducing radioactive contamination, and so the government is studying more effective ways.

Regarding (2), dealing with debris has been one of the Government's important policies, because debris left in local areas hinders and delays the restoration. The government requested other prefectural governments to cooperate by voluntarily receiving debris from the devastated prefectures and incinerating it, but this has been difficult from the outset. In particular, few municipal governments agreed to accept debris from Fukushima because of strong opposition by local citizens to the governor's request. As a result, the government requested several municipal governments near the nuclear power plant to accept debris from inside the prefecture, incinerate it, and temporarily store it within the municipal city/town area, subject to the condition that the burnt debris will be taken away within 30 years to outside the prefecture.

Finally concerning (3), the construction of public housing has been delayed due to the difficulty in finding good candidate sites, amid time-consuming controversial discussions among citizens for future comprehensive designs²⁰ for towns, and partly due to the shortage of manpower for construction.

¹⁹ About 210,000 evacuees are still living in temporary housing, with 5% moving to newly built public housing.

²⁰ Taking the construction of high seawalls as an example, such plans have been approved in some towns and villages, but rejected in others due to scenic damage.

5. JILPT Research Project to Document the Great East Japan Earthquake: The Interim Report

5.1. Scope of the Project: Seven Research Teams and their Activities

The Japan Institute of Labor Policy and Training has been conducting a documentation project since April 2012²¹, which started with voluntary proposals from various researchers of the Institute; the study was not requested by the government or arranged by the Institute. All of the proposals have been finally approved as formal research activities of the Institute, and have been implemented by seven teams as outlined in the table below.

JILPT's Documentation Research Project.

Team	Target of research	Visits to disaster areas
1	To collect information from newspapers and analyze statistical data	× (=desk work only)
2	To implement a survey of companies and analyze the results	× (=survey+ desk work)
3	To have interviews with officials of the prefectural labour bureaus concerned	○
4	To have interviews with heads and technical staff, and when possible, trainees of the local vocational training centers	○
5	To visit an employers' federation and national trade union confederations for interviews	× (visit the organizations in Tokyo only)
6	To visit local municipal governments, NGOs or private job placement services for interviews in relation to: (1) temporary job creation subsidy and (2) contribution by job placements	○
7	To interview local municipal governments for restoration projects	○

²¹ It may look too late to start the project. This is due to our Institute's budget system; the budget starts in April and ends in March; to start a new research project, we need to report to and receive approval from the Ministry of Health, Labour and Welfare in advance. Therefore, it was not possible to start this project at the beginning of April 2011.

The first publication from this project was my report under Team 1 issued in October 2012. The report was composed of two parts: daily information collected from two Japanese newspapers from March 12, 2011 to March 31, 2012²², and an analysis of data published for the same period including economic indicators, population surveys published by the three prefectural governments, and disaster reports from the government. Last March 2013, at the end of fiscal 2012, two more reports were published: an interim report of the research activities of Teams 1 to 6, and a more detailed report from Team 4.

In the second fiscal year, which started in April 2013, a report of Team 7 was published on the web last July, and two more reports were published by Teams 2 and 3 last August. The latter two reports are: a detailed report of the JILPT survey results (Team 2) the contents of which were outlined in Chapter 2, and a detailed report of interviews with local labor bureau officials (Team 3). As of September 2013, Teams 4, 6 and 7 are still conducting research; the other teams have finished.

5.2. Main results

The research activities of Team 2 (the JILPT's survey in 2012) were outlined in Chapter 2 above, and the main achievements of Team 1 form the basis of this paper. This section outlines the main results of Teams 3, 4 and 5.

(a) Interviews with Local Labor-related Organizations

i) Prefectural Labor Bureaus

Researchers of Team 3 went to visit the three prefectural labor bureaus of Iwate, Miyagi and Fukushima, and some Hello-Work offices and labor standard inspection offices, all of which are controlled by the prefectural labor bureau concerned.

The researcher noted in Chapter 3 of the interim report that Hello-Work officers met affected people not in the Hello-Work office but at their temporary houses, and provided job advice there as part of the government's assistance to victims. Many unemployed people were concerned about searching for work; some visited more than twenty

²² Information on main incidents from April to July 2012 was included in the report.

employers for a job interview but had not yet got a job. He also noted that some local people were discouraged to work and stayed in their temporary houses all day, and that others were desperate and turned to alcohol because of the complete change in their living environments.

As a policy tool, the researcher referred to a temporary job creation subsidy²³ utilized in the devastated area, and introduced the local situation, particularly in the early stage, when the subsidy was used for creating temporary jobs such as clearing debris, baby-sitting, or visiting and caring for elderly people in temporary houses, and clerical work as assistants in municipal governments.

As for the local labor market and business activities, the researcher pointed out that the labor market for construction was very tight with government expenditure focusing on restoration, that the recovery was generally taking time in fishery, and processing and marine-product manufacturers, and that there was a labor shortage in these companies because very few workers had returned. Regarding wages in local labor markets, he mentioned that the wage level of new job openings was high for construction, but wages for fishery, processing and marine-product manufacturers were far lower than for jobs created by the temporary job creation subsidies, thus preventing local people from returning to work for the local fishery industry.

Finally, he noted the government's achievements in using the national Hello-Work network to gather new job openings throughout Japan and introduce them to job applicants who had been affected by the earthquake.

ii) Local Vocational Training Centers and Polytechnic Colleges

Team 4 visited vocational training centers and some polytechnic colleges in the Tohoku region, and interviewed the staff, and trainees where possible. In my view, among the research teams of this documentation project, this team described most vividly the difficulties these local people encountered, how they felt about it, and how they tried to overcome them.

In Chapter 4 of the interim report and another detailed report, the researchers noted that many trainees and staff behaved in a very orderly manner and evacuated safely when the disaster occurred; most of them

²³ As introduced below, the subsidies are being studied by Team 6, too, as a Cash-For-Work study, focusing on the situations in which the subsidies were used and their effectiveness in generating employment.

had already experienced other big earthquakes. The researchers also pointed out that regular training was generally very useful to ensure orderly behavior in such an emergency. However, one problem was that the training assumed a fire disaster, not an earthquake or tsunami, and did not cover how to secure evacuation routes through fallen objects, or how to deal with flooding of a site; these issues as well as broken transportation infrastructure must be addressed in the future.

The importance of developing curricula for emergencies was noted, and two technical training courses were proposed in the report: namely how to operate heavy machinery to deal with debris, and how to remove topsoil to reduce radioactive contamination.

(b) Interviews with the Japan Business Federation, the Japanese Trade Union Confederation and others about their Volunteer Activities, and Other Analyses

Team 5 visited the Japan Business Federation (Keidanren), and national trade union confederations (Rengo and Zenroren) to hold interviews to collect information on their activities for assisting the devastated areas. The results were compiled in Chapter 5 of the JILPT interim report, and were reported in a bulletin of the Institute, too.

The interim report noted that both the employers' federation and trade union confederations carried out various volunteer activities based on their experience of the Kobe Earthquake, in addition to donating money. Keidanren requested business associations at the industry level to send relief goods, food, and volunteer teams to local devastated areas, and also asked them to carry out their own relief activities, while Rengo and Zenroren each sent volunteer teams. Keidanren also carried out a survey to ask its member companies about their relief activities.

The team also analyzed the impacts of the earthquake on annual wage agreements and on saving electricity in business activities. Regarding wages, the earthquake struck at almost the same timing as the negotiation period; in Japan, employers and labor unions at the central level start to discuss the wage increase for upcoming fiscal year normally at the beginning of each year and collectively conclude their negotiations around the middle of March. Immediately after the earthquake, the trade unions faced the negotiations very flexibly, leaving each industry to make decisions, and in some industries, they postponed or froze the negotiations.

After April 2011, both sides returned to relief work in earnest.

(c) Research for Job Creation in the Devastated Areas by using a Governmental Job Creation Fund (Cash-for-Work Study)

This is a study being implemented by Akiko Ono, who is going to attend a seminar in Sendai in late November. In her presentation, she will describe her research, and in particular, her findings regarding the special government subsidy and its policy appraisal. For details, refer to her paper and presentation on the day.

The subsidy is one of the government's policy tools for generating local employment, with a fixed amount of funds for each prefecture. The government introduced this scheme about five years ago. The main policy target of the scheme has been expanded to include not only employment promotion in the regions devastated by the earthquake but also some other policy targets. The original idea of the government to promote local employment through funding was first introduced about a decade ago when Japan was suffering after the bursting of the IT bubble. In those days, the government sought to create jobs for middle-aged dismissed workers or new graduates from universities. This government experience in the past worked well to improve the situation after the earthquake.

6. Lessons Learned from the Disaster: A Personal View

This paper basically describes what happened during and after the disaster, and raises few policy implications mainly because I have no expertise in this field. In this final chapter, to promote the exchange of opinions and experience in the seminar between the invited guest speakers and the Japanese side, I will focus on the following three subjects based on my research: (1) a practical lesson drawn from all materials that I referred to in my research, (2) two recent changes in Japanese society that I have noticed since the disaster, and (3) comments on the delay in the restoration process.

(1) Practical Lesson: the Importance and Effectiveness of Disaster Training

One practical lesson of the disaster is the importance of regular disaster training: training in offices, schools and local society for things such as evacuation, initial response, and assistance to affected people.

A medical doctor who was working at a hospital in the heart of Ishinomaki, one of the most heavily devastated cities of Miyagi, wrote a

book [reference 5] after the disaster and noted that regular in-house training at his hospital on disaster evacuation and management of medical care proved to be very helpful. In particular, his hospital now holds training together with other related organizations in the local area, including the municipal government. He wrote that such training was useful: the evacuation operations worked cooperatively, efficiently and smoothly through face-to-face relationships. I also believe that such disaster training worked very well after the disaster because all the doctors, nurses and other medical coworkers instantly knew what they had to do quickly for patients and local people, and the hospital played an outstanding role even in such an extreme situation.

In the book, the doctor also described his own experience as a disaster medical coordinator appointed by the Miyagi prefectural government, to “manage” the activities of medical doctors’ teams who came to the hospital from around the country to serve as medical volunteers. First, he walked around the city to find out in roughly which areas patients remained without care and to assess the conditions of the patients. He then gave this information to the doctors’ teams, and did not manage anything. Instead, he left it to each team²⁴, with different medical expertise, to decide which area to visit and what medical care to give, but asked the teams to make a report about where they went and what they did. The point is that the doctor himself did not try to manage the entire operation of the center; instead, he left it to the judgment and medical treatment of each professional team.

The doctor recollected in the book that it was a major challenge for him and each doctors’ team as well, but he seemed to successfully avoid the chaos that could have occurred had he tried to control everything by himself, such as the schedule and areas to be visited by the doctors’ teams. The performance of his effort amid the disaster is worth studying in more detail.

Finally, for reference, the Tokyo Metropolitan Government implemented major disaster training on a weekday in February 2012 around the three large railway stations of Tokyo, Shinjuku and Ikebukuro, assuming that huge numbers of evacuees could not return home because transportation

²⁴ This reminds me of another reference [4] which discussed the so-called one-to-one cooperation principle practiced by the Chinese government after the Great Shisen Earthquake in 2008. According to this book, the Chinese government established the principle that the provincial governments around Shisen Province should enter and assist specific areas of Shisen province in their own way with full responsibility, and that no other assisting province should duplicate the same activity for the same area.

services had broken down, and many people participated in the training. The training considered the fact that over three million people could not return home and had to stay in Tokyo after the Great East Japan Earthquake. According to the world history of massive earthquakes, another major earthquake is likely to occur in the next five years, so this kind of training for citizens is essential.

(2) New Social Phenomena after the Disaster

I have noted various new social phenomena in Japan since the disaster, and the following three phenomena in particular. I also include another reference at the end, which has a legal rather than a social aspect.

First, after the disaster, many municipal cities and towns exchanged partnership agreements for mutual assistance and cooperation in case of a disaster. Although such mutual cooperation was common among businesses for component supplies or substitute production, after the disaster many municipal cities exchanged partnership agreements. I hope this will provide good security and function effectively.

Second, volunteer activities are becoming more common in Japan among both individuals and companies, as well as helping the victims after the Great East Japan Earthquake. In fact, since the disaster, various natural disasters such as typhoons, floods and tornados have hit many places throughout Japan amid global warming, and there have been many volunteer activities in those areas. There is a growing tendency among companies, too, to introduce paid leave for volunteer activities by their employees.

Finally, through this dreadful experience, many Japanese people have learned more about the history of great earthquakes that struck Japan in the past. The Great East Japan Earthquake was indeed an unprecedented catastrophe for all Japanese people, but it is also true that large earthquakes frequently hit the Tohoku region in the long term such as one century. After the disaster, some local people said that their ancestors had warned them not to build houses below a certain altitude, based on their ancestors' experience of being hit by huge tsunami that caused many deaths, but that they had forgotten this lesson over a long period.

Finally, I wish to add a comment regarding a legal aspect. When policy makers and government officials discuss new policy issues, they often

refer to “special zones²⁵” nowadays. This tendency has become more common during arguments on restoration policy since the earthquake. In principle, it is reasonable to utilize the “special zone” scheme for restoration because geographic and natural conditions, ways of living, and preferences of local citizens for restoration priorities vary from area to area. However, some policy makers and government officials now wish to try applying special zones to other fields such as labor law. Theoretically, such a possibility may be worth considering; legislation could be made to cover a specific area “as a trial” for various reasons, and to judge, based on “experiments”, whether it should be introduced throughout the country. However, all people should be equal before the law, and laws should likewise be applied to the whole of Japan. If trials are conducted because something seems too difficult to start by legislation, I believe it would constitute a misuse and wrong understanding of the special zone system. I am deeply concerned about the future of the special zone system.

(3) Comments on the Delay in Restoration

Among the huge earthquakes in Japan’s history, the Great Kanto Earthquake which hit the Tokyo area in September 1923 stands out: Tokyo, especially its eastern part, burned to the ground with over 100,000 deaths²⁶.

At that time, Shimpei Goto, a well-known statesman and once a mayor of Tokyo city, took a very strong leadership in the restoration of Tokyo as a senior minister in the Cabinet. Particularly impressive was the speed with which he drew up the restoration plan²⁷, and more importantly, his grand design for arterial roads through the city, with public parks and wooded

²⁵ This is a governmental scheme to apply a policy exclusively to a special zone or to a case which happens in the special zone by designating the zone by a law or government scheme. The concept of special zones was introduced in Japan about a decade ago when the government was struggling to promote deregulation and structural reform of the government. In the fields covered by the Ministry of Health, Labour and Welfare, this policy of designating special areas was not uncommon; before 2000, the Ministry often designated areas to pay special subsidies to employers in certain industries, for example, although these were not called “special zones”.

²⁶ Learning from the past and in preparation for the future, the government organizes disaster training every year throughout Japan on one day in September.

²⁷ According to historical materials, his restoration plan faced strong opposition from business groups and landowners, and its budget was considerably reduced.

areas, provided the structural foundation that still functions in Tokyo today.

As the restoration process was delayed last year, I thought it was due to the bureaucratic paperwork demanded by the central government of municipal governments, compared with the swift restoration of Tokyo in a top-down manner after the Great Kanto Earthquake. As many municipal governments lacked manpower skilled in civil and urban engineering, the delay is attributable mainly to technical paperwork. It is also true that the government needs to learn from this earthquake and study more efficient and much easier procedures for future disasters.

During my research, I have found differences between the Great East Japan Earthquake and the Great Kanto Earthquake. The former hit a much wider area, and restoration is underway in many different cities with different socio-economic backgrounds. Another major difference is that people in general were equally poor in the old days in Japan, and the government had strong sovereignty, whereas economic development has caused disparities among people, and people are well aware of their rights now. Infrastructure cannot be the target of restoration planning alone; the whole restoration process requires adjusting different interests among landowners, residents and public interests, which is time-consuming.

For the next time, therefore, I propose studying the restoration process through two stages. The governments, both central and municipal, should identify those processes that will require a long time to deliberate and study, and those which may not. For the latter group of restoration, the governments should identify barriers in the current system, including outrageous amounts of procedural paperwork. At this first stage, the central and municipal governments as a whole quickly study the basis of the infrastructure reconstruction scheme for which they already have 40 different options. Municipal governments should also report to the government on how they handled the procedures, what they felt about their usefulness, and the difficulties and problems to be improved.

On the other hand, the former part of the restoration process may take a long time because legal adjustments among landowners, residents and public interests are not easy; changes in government procedures and the legal system will be necessary to overcome the difficulty. The central government, therefore, should start by listening to municipal governments to learn about the difficulties they faced or are facing now regarding restoration, what issues remain unsolved, and identify what legislation or governmental regulation acts as barriers, and then take time to study changes in the legal system to induce land supply for restoration after a disaster.

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²⁸ Translation of the reference titles here is all of my own; any mistakes should be attributed to me.



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