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Review:

Damage Scale and Long-term Recovery Plans in Japan: Working with Local People

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After devastating disaster, local governments create their "long-term recovery plans." However, there is no clear threshold showing how severely damaged local governments would establish the plan, and no analysis on what kind of components those plans could include. Another issue about long-term recovery planning is how we compiling ideas or visions of stakeholders of an impacted community into a plan. There exists two aspects in planning, one is how ideas of stakeholders are compiled into a plan, and the other is how a feasible plan is established. This paper discusses about 1) the threshold and components for long-term recovery plans from historical data analysis on the various long term recovery plans in Japan during 1959 Ise Bay Typhoon Disaster to Niigata Chuetsu Earthquake Disaster, and 2) planning scheme to establish feasible plan with stakeholder involvement. As a results about the threshold and components on long-term recovery plans, when 8% house holds suffers major damage within total local government's house holds, local governments could establish "long-term recovery plans," and there exits two kinds of "long-term recovery plans" such as comprehensive plans and disaster reduction+short term recovery plans among recent "long-term recovery plans." And the scheme to develop long-term recovery planning by summing up 1690 of stakeholders' ideas on long term recovery of the community into the plan according to a strategic planning framework were developed from the case study in the Ojiya City long term recovery planning, which suffers severe damage from 2004 Niigata Chuetsu Earthquake Disaster. The planning process which could secure the feasibility and effectiveness of the plan and compile successfully various visions and ideas of stakeholders were compiled into the plan were developed.

Keywords: long-term recovery planning, strategic planning, stakeholder involvement, history of Japanese long-term recovery planning, 1995 Kobe Earthquake

1. Introduction

After devastating disaster, local governments create their "long-term recovery plans." However, there is no clear threshold showing how severely damaged local governments would establish the plan, and no analysis on what kind of components those plans could include. Another issue about long-term recovery planning is citizens involvement in planning process. After the September 11, 2001 World Trade Center collapse in a terrorist attack in New York in the US and after the extensive damage from Hurricane Katrina in August 2005 in New Orleans, nearly 10,000 citizens attended workshops for making long-term recovery plans.

From the historical analysis of long-term recovery plans in Japan, we clarify (1) on what scale a reconstruction plan is to be made and (2) what such a plan should include. We then clarify how to create an action-oriented reconstruction plan in cooperation with citizens[2].

2. Reconstruction Plans Preceding the Great Hanshin-Awaji Earthquake Disaster

Japan's most "famous" long-term recovery plan was that for Tokyo following the 1923 Great Kanto Earthquake and designed by Shinpei Goto and others. It stated that "The matter concerning general principles of

[1] The term "long-term recovery" is mentioned twice in the Act. Article 8 Section 3 (consideration for disaster prevention in policies): "local government should (...) plan to recover facilities and to help victims promptly and make any effort for long-term recovery from disaster." Article 97 (emergency measures in an intense disaster and share of the costs) "The Government is to (...) implement the necessary policies to promote long-term recovery of victims' lives."

[2] This paper is a revision of the following: (1) Norio Maki, Toshikazu Ota, Haruo Hayashi, "Damage Thresholds and Long-term Plans for Disaster Recovery: Experience of Japan," Journal of Social Safety Science, No. 9, pp. 197-206, 2007 (in Japanese); (2) Norio Maki, Haruo Hayashi, Shigeo Tatsuki, Kishie Shigekawa, Keiko Tamura, Shosuke Sato, Satoshi Tanaka, Yoshihiro Sawada, Ikuo Kobayashi, "How Visions of Stakeholders on Recovery and Reconstruction Compiled into a Plan?: Recovery and Reconstruction Planning in Ojiya City," Annual Report B for Disaster Prevention Research Institute of Kyoto University, pp. 137-146, 2006 (in Japanese).

the proposed long-term recovery plan for the Metropolis. 1. Standards of streets and routes of lines. 2. Layout of parks. 3. Layout of markets, planning of inner city. 4. Measures for fire prevention. 5. Location of Keihin coastal area, harbor and canal facilities."[3] Clearly, this plan stipulated the "physical renovation" required to build a new city. It was followed by long-term recovery plans covering the 1925 Northern Tajima Earthquake, the 1934 Hakodate Conflagration, the 1946 Nankai Earthquake, and World War II – all of which focused on "physical renovation." The 1959 Ise Bay Typhoon provided an chance to implement the Basic Disaster Measures Act in 1961 and has influenced postwar disaster prevention policies significantly. In the sections that follow, we analyze how reconstruction plans have changed from the Ise Bay Typhoon to the Great Hanshin-Awaji Earthquake, in which a new issues of "life recovery emerged."[4] **Table 1** reviews long-term recovery plans for related disasters[5].

As **Table 1** indicates, long-term recovery plans for the 1959 Ise Bay Typhoon, the 1964 Niigata Earthquake, on up to the 1975 Sakata Conflagration focused on "physical" recovery of the social infrastructure. Although many measures concern improvement of the social infrastructure, those on economic restoration differed from long-term recovery plans after the Great Kanto Earthquake.

The long-term recovery plan after the Ise Bay Typhoon consisted, in fact, of 6 plans on land use, water management, commerce and industry, agriculture and forestry, education and public welfare, and financial and monetary matters. The prefectural land use plan was consistent with the National Comprehensive Development Plan enacted in 1962. On life recovery issues, the public welfare item mentions only measures for low-income victim – none for general victims[6]. The long-term recovery plan after the 1964 Niigata Earthquake basically dealt with physical. The main movers behind long-term recovery plans after both the Ise Bay Typhoon and the Niigata Earthquake were administrative organizations "based on scientific analysis." Citizens participation in administrative plans have been started from following the 1968 City Planning Act Revision, and their opinions were not reflected in planning at the time[7].

Although the reconstruction plan following the 1975 Sakata Conflagration was basically a "land readjustment project" focusing on physical renovation policies on regional revitalization were put forward couched in such phrases as "establishment of attractive modern shopping streets" and "residential environment improvement," letting some reflection of residents' opinions peak through. A "Sakata bulletin on disaster recovery – a quick report" was distributed to householders telling about a new movement toward restoration, explanatory meetings were held, and consultation offices opened so that part of the project was finally changed to reflect residents' voices[8].

The 1983 Miyakejima Plan mentions "life recovery." Miyakejima Island's Ako district had houses burned and buried in lava following the 1983 Miyakejima volcano eruption, and Tsubota district on the island's western side suffered from falling ash. The situation differed from that at the time of the 2000 eruption after which the island's entire population was evacuated and thrown into years of leading the lives of evacuees. The long-term recovery plan shown in **Table 1** focused mainly on recovery of the Ako district and "physical recovery" such as relocation in groups from the district buried by lava, development of residential areas, and rebuilding of schools, but the idea of "life recovery" also came up as it had not in earlier plans. This supported recovery of victims under three themes: (1) raising and use of funds for recovery, (2) promotion of industry and improvement of the infrastructure, and (3) measures for the aged and inheritors[9]. This was paralleled following the Great Hanshin-Awaji Earthquake for which plans stated the need to consider "life recovery."

The long-term recovery plan contents have changed greatly since the Unzen-Fugendake Eruption. In this series of volcanic activities beginning in 1990 and peaking in 1991, destruction was so extensive that residents were urged to evacuate. Volcanic activity did not subside sufficiently until 1996, one year after the Great Hanshin-Awaji Earthquake, called "the first year of recovery" following the Unzen-Fugendake eruption.

Shimabara City based its long-term recovery plan on the three pillars of life recovery, disaster management in urban development, and regional vitalization in 1993 while volcanic activity was still ongoing. The long-term recovery plan prepared before volcanic activity subsided was divided into urgent measures and long-term projects to be implemented once volcanic activity subsided. New

[3] "The matter concerning general principles of the proposed long-term recovery plan for the Metropolis," Yusuke Tsurumi (2006), pp. 264-275.

[4] Hayashi (2003), p. 116.

[5] Long-term recovery plans in the table are limited to those including the term "reconstruction plan" in their names. Although Nagasaki City suffered extensive damage in the 1982 Torrential Rains in Nagasaki and made a Nagasaki City Disaster Prevention Plan in the same year, this plan is not examined here. For collection of the materials on long-term recovery plan, a chronological table on disasters after the Ise Bay Typhoon was first edited based on the Science Chronological Table (National Astronomical Observatory of Japan (eds.), 2007) and "Measures against Disaster in Japan" (Cabinet Office) and then the disasters listed in the table were examined.

[6] Aichi Prefecture (1960), pp. 326-327.

[7] For example, the General Principles Relating to Preparation of Reconstruction Plan in Aichi Prefecture says that "the reconstruction plan aims to clarify scientifically (...) the situation of the damage by the Ise Bay Typhoon and its causes, and based on these findings, to make out a comprehensive plan concerning prevention of disaster, preservation of prefectural land and restoration of industry and culture, and thereby to promote the strength of the prefecture and to improve the welfare of the residents." (underlining by the author). Thus importance was attached to "scientific" planning rather than on the reflection of citizens' opinions in the plan. This term "scientific" is found also in the General Principles Relating to Preparation of Reconstruction Plans in the Niigata Earthquake. Aichi Prefecture (1960), Afterward p. 3; Niigata Prefecture (1964), p. 334.

[8] Meeting for Publication of Records on the Sakata Conflagration and Reconstruction Process (eds.) (1978), pp. 179-183.

[9] Tokyo Metropolitan Government Miyake Village (1984), pp. 142-143.

Table 1. Long-term recovery plans from the 1959 Ise Bay Typhoon to the 1993 Hokkaido Southwestern Offshore Earthquake.

Year	Disaster	Planning organization	Year planned	Objectives	Implementation	Source
1959	Ise Bay Typhoon	Aichi Prefecture	1960.3	Safety of human life	Prefectural land plan: streamlining of land use	Aichi Prefecture, Ise Bay Typhoon Long-term Recovery Plan, 1960
				Restoration of sea and river embankments	Water traffic plan: rivers, roads, railroad, harbor	
				Establishment of measures against flood tide	Commercial and industrial plan: regional arrangement of industries	
				Measures for security of national land	Land plan for agriculture and forestry: review of production foundation and methods	
				Development of Chubu	Plan for education and public welfare: restoration of damaged facilities, facilitation of independence of victims, construction of educational facilities and disaster prevention housing, preparedness for disaster prevention	
				Viable plan adapted for financial situations	Financial plan	
1964	Niigata Earthquake	Niigata Prefecture	1964.12	Safety of life and property of prefectural residents	Land use plan: review on use area, land use in areas zero meters above sea level, redevelopment of inner city	Niigata Prefecture, Niigata Prefecture Earthquake Disaster Long-term Recovery Plan Plan, 1964
				Establishment of basis for development	Plan for security of national land: flood control, erosion due to flood tide, ground settlement, measures for urban waste water	
					Plan for reconstruction of transportation and communication facilities: roads and city planning streets, harbor, railroad, airport	
					Plan for reconstruction of commerce and industry: Measures for industry, commerce, finance and taxation	
					Plan for reconstruction of agriculture, forestry and fisheries: agriculture, forestry, fisheries, financing of these sectors	
					Plan for reconstruction of environment: housing, architecture, waterworks, sewers, cleaning facilities, parks and greenery, town gas, facilities for public welfare and education and medical insurance	
					Finance plan	
1975	Sakata Conflagration	Sakata City	1975.11	Construction of disaster-proof city	1. Improvement of arterial road traffic	Meeting for Publication of Records on the Sakata Conflagration and Recovery Process (ed.), Records on the Sakata Conflagration and reconstruction process, 1978
					2. Formation of modern attractive shopping district	
					3. Improvement of environment in residential area	
					4. Functional connection of shopping district and residential area	
1983	Mid-Japan-Sea Earthquake	No plan				Noshiro City, 1983 May 28 Mid-Japan- Sea Earthquake, Disaster records in Noshiro City – lessons for the future, 1984
1983	Miyakejima Eruption	Miyake Village	1984.3	Formation of new communities	Improvement of communities by self-recovery	Tokyo Metropolitan Government Miyake Village, Report of Basic Surveys on the Ako District Long-term Recovery Plan Plan, 1984
					Improvement of apartment complexes by promotion of group relocation for disaster prevention	
					Improvement of village-run housing	
					Landscape formation accompanied by improvement of communities	
				Improvement of public facilities	Improvement of roads	
					Plan for elementary school, junior high school and school lunch center	
					Plan for day nursery	
					Plan for community center	
					Plan for dental clinic	
					Plan for other public facilities	
				Life reconstruction	Funding for recovery and practical use	
					Promotion of industries and improvement of their foundation	
					Measures for the aged and young	

1990	Unzen-Fugendake Eruption	Shimabara City	1993.3	Life recovery	1. Careful support for life recovery: public housing, permanent housing, rearrangement of foundation for production, measures for the unemployed, creation of employment	Shmabara City, Unzen-Fugendake Eruption Disaster, Shimabara City Long-term Recovery Plan, 1993
					2. Formation of safe and attractive new communities	
				Development of disaster-proof city	1. Reinforcement of measures for evacuation: planning for emergency evacuation, improvement of facilities for emergency evacuation, reinforcement of systems for forecast, warning, and evacuation	
					2. Alleviation of damage by disaster prevention facilities: measures against earth and rock avalanches, afforestation and erosion control, facilities for prevention of fire extension	
					3. Formation of disaster-proof infrastructure: disaster prevention measures for road and lifeline	
					4. Formation of safe living space: regulations on architecture, ground raising, improvement of densely inhabited areas	
					5. Reinforcement of systems for disaster prevention activities	
				Vitalization of the region	1. Introduction of vitalization project: redevelopment of inner city, formation of new inner city, volcano-related sightseeing	
					2. Promotion of disaster-related sightseeing: museum of volcano, disaster memorial	
		Committee for the Shimabara Region Revitalization Action Plan, Nagasaki Prefecture, Shimabara City, Meeting of the Municipalities of Minamitakaki County	1997.3	The Shimabara Peninsula with clean water, abundant greenery and vigorous people: becomint a more affluent city	Vitalization of Shimabara Peninsula by regional exchange	Secretariat of Committee for the Shimabara Region Revitalization Action Plan (ed.), The Shimabara Region Revitalization Action Plan (Gamadasu Plan), 1997
					Vitalization of inner cities in the Shimabara Peninsula	
					Reconstruction and promotion of stricken areas and surroundings	
					Vitalization of agriculture, forestry, and farming villages in the Shimabara Peninsula	
					Vitalization of agriculture, forestry, and farming villages in stricken areas	
					Vitalization of fisheries	
					Restoration and promotion of sightseeing in the Shimabara Peninsula	
					Vitalization of commerce and industry in the Shimabara Peninsula	
					Creation of safe and affluent environment	
					Vitalization of the Shimabara Peninsula by development and exchange of human resources	
					Vitalization of the Shimabara Peninsula by history, culture, and sports	
					Promotion of wide area administration	
					Support of “Gamadasu Plan”	
1993	Hokkaido Southwestern Offshore Earthquake	Okushiri Town	1995.3	Life recovery	1. Rebuilding of housing: public housing, private housing	Okushiri Town, Revival of Dream Island ! The Hokkaido Southwestern Earthquake and outline of recovery, 1996
					2. Rebuilding of core industry: fisheries and agriculture, sightseeing, fostering successors	
					3. Stabilization of life and security of foundation for social life: supply of interest, support for purchasing kerosene, improvement of facilities for medical treatment, education and social welfare	
				Community development for disaster prevention	1. Community development of each district: improvement of community, group relocation, development of building lots	
					2. Measures for evacuation: evacuation plan, improvement of evacuation facilities	
					3. Reinforcement of disaster prevention activities: reinforcement of management, communication and organization of disaster information, improvement of system	
				Promotion of region	1. Promotion of fisheries: rebuilding of cooperative, improvement of the foundation for fisheries, promotion of cultivation fisheries, effective use of local resources (distribution route, construction of processing center, improvement of facility for fish swimming about in the water)	
					2. Promotion of agriculture: comprehensive plan for improvement of fields, farmland conservation project	
					3. Promotion of sightseeing: improvement of sightseeing resources, improvement of sightseeing facilities, promotion of sightseeing events, sightseeing year-round	
					4. Promotion of arts and culture: awareness of culture, preservation of local performing arts, promotion of creative activities	

“Objectives” and “implementation” are extracted by the authors from reconstruction plans based on the following criteria:
Objectives: contents described as themes to be achieved in plans. Implementation: contents described as methods for realizing objectives.

items such as "improvement of employment measures" and "promotion of sightseeing using the disaster" were added to concrete measures for life recovery and regional vitalization. Taking an opportunity in the first year of recovery, the Shimabara Region Revitalization Action Plan (Gamadasu Plan) was implemented as part of the reconstruction plan, focusing on revitalization in directly affected areas and throughout the Shimabara Peninsula influenced indirectly by the eruption. It consisted of 27 projects and contained measures going beyond "physical recovery." Following the 1993 Hokkaido Southwestern Offshore Earthquake, the reconstruction plan for Okushiri Town, which was practically wiped of the map by the disaster, included such objectives as life recovery, disaster management in community development, and regional promotion.

In reviewing the historical transition in the above long-term recovery plans, starting with the 1923 Kanto Earthquake viewed as an opportunity for city remodeling and consisting mainly of urban remodeling, reconstruction plans proceeded through postwar restoration and the 1959 Ise Bay Typhoon and 1964 Niigata Earthquake, which focused on economic reconstruction, taking "life recovery" in the 1990s.

We focused on large-scale disasters in analyzing the historical transition in reconstruction plans, but also examined whether reconstruction plans existed in cases not analyzed. The collapse of a Tama River embankment during the 16th typhoon in 1974 significantly damaged parts of Komae City, but no rlong-term recovery plan was made[10]. Preceding the Hanshin-Awaji Earthquake, reconstruction plans were the exception rather than the rule. In Okushiri Town, for example, no long-term recovery plan was made until two years after the disaster. Prior to the Great Hanshin-Awaji Earthquake Disaster, administrative organizations concerned with postdisaster activities basically focused on "recovery" – rather different from current considerations typified by the Mid-Niigata Prefecture Earthquake, which involved long-term recovery plans made by 10 local governments.

3. Two Types of Reconstruction Plan for the Hanshin-Awaji Earthquake: Comprehensive Plans and Disaster Reduction Plans

The long-term recovery plan for the Hanshin-Awaji Earthquake is "comprehensive," with the three objectives of urban recovery, life recovery of victims, and economic revitalization[11]. In cities such as Ashiya and Nishinomiya, which suffered extensive damage, a comprehensive plan with similar objectives was made. Even in cities where totally or partially destroyed houses accounted for less than 10%, reconstruction plans were made.

In Kawanishi City, where totally or partially destroyed houses accounted for 8.2%, the so-called "long-term recovery plan" consisted of "disaster reduction plans and recovery plans. The city envisioned its existing comprehensive plan as one of long-term recovery. This is clarified by the fact that Kawanishi City had the long-term recovery plan "examine a comprehensive plan considering disaster-resistant community development and complete the comprehensive plan"[12]. The "comprehensive plan," i.e., a future vision of the community, prepared taking the time needed, is considered a vision of reconstruction and the "disaster management in community development plan" was made to complement the general future vision – an option for local governments like such as Kawanishi City, which did not suffer so much damage that the "future vision" had to be revised. As in Kawanishi City, the long-term recovery plan in Akashi City, which had totally or partially destroyed houses amounting to 9.39%, was called the Disaster Resistant Community Development Plan. These trends indicate a new type of long-term recovery plan emerging from the Hanshin-Awaji Earthquake even if damage was not so significant.

4. Disaster Scale and Long-term Recovery Plan

We look at the scale of disaster that long-term recovery plans envisioned.

Table 2 lists the degree of damage and answers the question of whether local government long-term recovery plans existed following the 1995 Hanshin-Awaji Earthquake and the 2004 Mid-Niigata Earthquake. Among 10 cities and 10 towns to which the Disaster Relief Act applied, 8 cities and 5 towns made long-term recovery plans. Differences existed in the scale of damage based on the long-term recovery plan between urban area and rural area. Kawanishi City had 8.20% totally or partially destroyed houses and was the local government with the lowest rate among cities making long-term recovery plans, while in counties, Goshiki Town with a rate of 14.7% did not make a plan but Tsuna Town with a rate of 26.49% made a long-term recovery plan. One reason for the difference between urban area and rural area lies in the fact that local governments in rural area normally have limited human resources, leaving no room for preparation of a long-term recovery plan in postdisaster confusion.

In the 2000 Western Tottori Earthquake and the 2001 Geiyo Earthquake, no long-term recovery plan was prepared. In Yonago City, which suffered extensive damage in the Tottori Earthquake, only 2.94% of houses were totally or partially destroyed and no long-term recovery plan was made. In counties such as Hino Town, which suffered extensive damage with 36.19% of houses

[10] Komae City (1975).
[11] Hayashi (2001), p. 994.
[12] Kawanishi City (1997), p. 179.

Table 2. Damage scale and long-term recovery plan existence in local governments during the Hanshin-Awaji Earthquake and the Mid-Niigata Prefecture Earthquake.

City		Houses totally or partially destroyed		Presence of reconstruction plan	Totally destroyed		Destructively destroyed		Partially destroyed		Total houses
		Ratio to total houses	Houses		Ratio to total houses	Houses	Ratio to total houses	Houses	Ratio to total houses	Houses	Hanshin region(1995.1.1) Osaka region (1994 population estimate) Chu-etsu region (2004.3.31)*
Kobe City		39.38%	228,412	Kobe City Long-term Recovery Plan	19.88%	115302			19.50%	113,110	580,012
Amagasaki City		22.47%	43,450	Amagasaki City Long-term Recovery Plan	4.63%	8950			17.84%	34,500	193,337
Nishinomiya City		36.55%	59,869	Nishinomiya City Earthquake Disaster Long-term Recovery Plan	19.90%	32593			16.65%	27,276	163,785
Ashiya City		49.26%	16,708	Ashiya City Earthquake Disaster Long-term Recovery Plan	21.85%	7412			27.41%	9,296	33,916
Itami City		25.45%	17,049	Itami City Earthquake Disaster Long-term Recovery Plan	3.80%	2549			21.64%	14,500	66,992
Takarazuka City		25.58%	18,706	Takarazuka City Earthquake Disaster Long-term Recovery Plan	6.94%	5074			18.64%	13,632	73,119
Kawanishi City		8.20%	3,929	Kawanishi City Earthquake Disaster Long-term Recovery Plan	1.36%	650			6.84%	3,279	47,935
Akashi City		9.39%	9,316	Plan for Construction of Disaster-Proof City	3.24%	3214			6.15%	6,102	99,243
Miki City	Former Miki City	0.53%	122	None**	0.11%	26			0.42%	96	23104
Sumoto City	Former Sumoto City	4.50%	672	None***	0.11%	17			4.39%	655	14927
	Former Goshiki Town	14.71%	454	None***	6.03%	186			8.68%	268	3086
Awaji City	Former Tsuna Town	26.49%	1,496	Have****	10.68%	603			15.81%	893	5647
	Former Awaji Town	40.13%	1,020	Have****	12.98%	330			27.14%	690	2542
	Former Hokudan Town	67.17%	2,208	Hokudan Town Earthquake Disaster Long-term Recovery Plan	30.91%	1016			36.26%	1192	3287
	Former Ichinomiya Town	50.96%	1,532	Have****	25.88%	778			25.08%	754	3006
	Former Higashi-ura Town	28.29%	781	Higashi-ura Town Earthquake Disaster Long-term Recovery Plan	11.66%	322			16.62%	459	2761
Minami Awaji City	Former Midori Town	3.94%	71	None*****	0.94%	17			2.99%	54	1804
	Former Seidan Town	8.25%	311	None*****	3.61%	136			4.64%	175	3771
	Former Mihara Town	2.97%	137	None*****	0.39%	18			2.58%	119	4609
	Former Nandan Town	1.20%	78	None*****	0.14%	9			1.06%	69	6519
Osaka City		0.31%	3,368		0.02%	248			0.29%	3120	1086726
Toyonaka City		10.36%	15,796	Have*****	1.99%	3036			8.37%	12760	152501
Ikeda City		1.11%	450		0.05%	21			1.06%	429	40383
Suita City		0.50%	641		0.01%	14			0.49%	627	127778
Minoh City		0.64%	292		0.20%	90			0.45%	202	45325
Nagaoka City	Former Nagaoka City	10.54%	6,895	Nagaoka City Long-term Recovery Plan	1.42%	927	1.40%	918	7.72%	5050	65,418
	Former Nakanoshima Town	0.84%	26	None	0.00%	0	0.06%	2	0.77%	24	3,098
	Former Koshiji Town	24.84%	986	Contained in Nagaoka City Long-term Recovery Plan because Koshiji City was under combination with Nagaoka City.	3.83%	152	3.25%	129	17.76%	705	3,969
	Former Mishima Town	1.35%	28	None	0.14%	3	0.00%	0	1.21%	25	2,072
	Former Yamakoshi Village	82.61%	575	Yamakoshi New Vision for Reconstruction - aims at creative reconstruction taken its leadership by residents -	40.95%	285	8.05%	56	33.62%	234	696

	Former Yoita Town	0.33%	7	None	0.00%	0	0.10%	2	0.24%	5	2,100
	Former Tochio City	4.72%	345	Tochio City Long-term Recovery Plan	0.62%	45	0.82%	60	3.28%	240	7,315
	Former Teradomari Town	0.46%	15	None	0.00%	0	0.06%	2	0.40%	13	3,246
	Former Oguni Town	35.01%	767	Oguni Region Long-term Recovery Vision for Niigata-Chuetsu Earthquake	5.71%	125	5.66%	124	23.64%	518	2,191
Ojiya City		28.36%	3,471	Ojiya City Long-term Recovery Plan	5.19%	635	3.03%	371	20.14%	2465	12,237
Kawaguchi Town		71.78%	1,152	Kawaguchi Town Earthquake Disaster Long-term Recovery Plan	37.94%	609	9.10%	146	24.74%	397	1,605
Uonuma City	Former Horinouchi Town	11.74%	315	Uonuma City Earthquake Disaster Long-term Recovery Plan	2.09%	56	1.45%	39	8.20%	220	2,682
	Former Koide Town	0.50%	20		0.03%	1	0.03%	1	0.45%	18	3,987
	Former Hirogami Village	3.62%	88		0.49%	12	0.49%	12	2.63%	64	2,432
	Former Sumon Village	2.60%	39		0.40%	6	0.33%	5	1.87%	28	1,500
	Former Irihirose Village	0.72%	5		0.00%	0	0.14%	1	0.57%	4	699
Minami-Uonuma City	Former Muikamachi Town	0.05%	4	None	0.03%	3	0.00%	0	0.01%	1	8,607
	Former Yamato Town	0.18%	7	None	0.10%	4	0.00%	0	0.08%	3	4,000
Tokaichi City	Former Tokaichi Town	8.64%	1,127	Tokaichi Town Earthquake Disaster Long-term Recovery Plan	0.77%	100	1.15%	150	6.72%	877	13,048
	Former Kawanishi Town	4.02%	92	None	0.22%	5	0.26%	6	3.54%	81	2,287
	Former Nakasato Village	0.53%	9	None	0.00%	0	0.00%	0	0.53%	9	1,704
	Former Matsudai Town	0.20%	3	None	0.00%	0	0.00%	0	0.20%	3	1,472
	Former Matsunoyama Town	0.18%	2	None	0.18%	2	0.00%	0	0.00%	0	1,103
Mitsuke City		4.67%	595	Mitsuke City Long-term Recovery Plan	0.41%	52	0.14%	18	4.12%	525	12,748
Kashiwazaki City	Former Kashiwazaki City	1.19%	349	Kashiwazaki City Earthquake Disaster Long-term Recovery Plan	0.09%	27	0.20%	58	0.90%	264	29,274
	Former Takayanagi Town	0.32%	3	None	0.00%	0	0.21%	2	0.11%	1	938
	Former Nishiyama Town	2.07%	45	None	0.51%	11	0.51%	11	1.06%	23	2,169
Izumozaki Town		0.37%	7	None	0.00%	0	0.00%	0	0.37%	7	1,889
Tsunan Town		0.03%	1	None	0.00%	0	0.00%	0	0.03%	1	3,723
Kariha Village		13.34%	198	None	4.58%	68	1.89%	28	6.87%	102	1,484
Tsubame City	Former Tsubame City	0.02%	2	None	0.02%	2	0.00%	0	0.00%	0	13,139
	Former Bunsui Town	0.73%	32	None	0.18%	8	0.20%	9	0.34%	15	4,398
Sanjo City	Former Sakae Town	0.32%	9	None	0.00%	0	0.04%	1	0.28%	8	2,817
Kamo City		0.04%	4	None	0.00%	0	0.02%	2	0.02%	2	9,817

Data is as of occurring of Hanshin-Awaji Earthquake Disaster (March 28, 1995), Chu-etu Earthquake (September 22, 2006)
Disaster Relief Law was applied at Unotani Town, Shiozawa Town, Wajima Village, Yasuzuka Town, Maki Town, Tsukigata Village, Nakanokuchi Village, Yahiko Village, Yoshida Town, Sanjo City, Kakizaki Town, Yoshikawa Town, Kubiki Village, Urakawahara Village, Ohshima Village, Joetsu City, Miwa Village, Maki Village, Kiyosato Village, Itakura Town but omitted at above table because these regions were not damaged over partially destruction.
* Niigata Prefecture Mesures Outline 2003
** Confirmed at Miki City Risk Management Devision
*** Confirmed at Sumoto City Fire Fight Disaster Prevention Devision
**** Confirmed at Awaji Citizens Devision
***** Confirmed at Minami Awaji City Disaster Prevention Devision
****** Toyonaka City Residence Long-term Recovery Plan, Basic Policy for Earthquake Disaster Development and Vision for Disaster Prevention in Shonai Region.

totally or partially destroyed, no long-term recovery plan was made[13]. In the Tottori Earthquake, the prefecture shared the cost for housing rebuilding, but no comprehensive long-term recovery plan was prepared.

In the 2001 Geiyo Earthquake, in which Kure City suffered extensive damage, totally or partially destroyed households numbered 369, or 0.42%[14] of a total of 87,048 households (as of the end of April, 2001)) and no long-term recovery plan was made.

In cities with 8% or more of houses totally or partially destroyed, long-term recovery plans were made, but in rural area with over 30% of houses totally or partially destroyed, long-term recovery plans were not made partly due to human resources limitations.

The situation changed in the 2004 Mid-Niigata Prefecture Earthquake. Local governments indicated by hatching in **Table 2** had totally or partially destroyed households accounting for more than 8%. In the Mid-Niigata Prefecture Earthquake, even in Kashiwazaki City with 1.19%, Mitsuke City with 4.67%, and Tochio City with 4.72% of houses totally or partially destroyed, long-term recovery plans were made. In contrast, Kariwa Village, which had 13.34% of houses totally or partially destroyed, no long-term recovery plans were made. For reconstruction plans involving the Mid-Niigata Earthquake, Koshiji Town, which had 24.84% of its housing totally or partially destroyed, did not make a long-term recovery plan due to the scheduled merger of local governments in fiscal 2005.

The survey in **Table 2** on long-term recovery plans was conducted with local governments to which the Disaster Relief Act applied. In the Mid-Niigata Earthquake, the Act applied to 9 cities, 29 towns, and 16 villages – 54 local governments in all, which is considerable, given the scale of the disaster and compared to 10 cities and 10 towns in the Hanshin-Awaji Earthquake. In principle, the Act applies – if damaged households – totally destroyed + partially destroyed 1/2 – to all of the population of local government that exceeds a certain level. A special standard is set stating that "a special method for providing relief for victims is necessary (...) because the stricken area is segregated or isolated from other communities." The Act was applied to the Mid-Niigata Earthquake using this special standard[15].

5. Disaster Scale and Long-term Recovery Plan Contents

An analysis of long-term recovery plans in the Hanshin-Awaji Earthquake showed that they can be divided into two types: (1) "comprehensive" represented by that in Kobe City and (2) "disaster reduction + recovery" such as those in Kawanishi, Akashi, and Amagasaki, with the type depending basically on the rate of households adversely affected, i.e., for local governments with less than 8% of damaged houses, no long-term recovery plan is made; for those with 8-20%, disaster management community development + recovery plans were made; and for those with more than 20%, comprehensive plans were made.

In the long-term recovery plan for the 2004 Mid-Niigata Earthquake, the rate of totally or partially damaged households deciding the type of plan differed somewhat from the Hanshin-Awaji Earthquake case, as discussed below. We analyzed the relationship between the disaster scale and long-term recovery plan contents for local governments in the Mid-Niigata Earthquake (**Table 3**). Most long-term recovery plans were "comprehensive."

This may be a result of the fact that 12 years having passed since the Hanshin-Awaji Earthquake, lessons from long-term recovery in the Hanshin-Awaji case had led to comprehensive plans being widely accepted. Most local governments making long-term recovery plans after the earthquake faced mergers in the next fiscal year, and had to prepare plans at any rate, even if local government suffered less damage. Local governments making long-term recovery plans for the Mid-Niigata Earthquake regardless of merger issues were limited to Kawaguchi, where 71.78% of households had been totally or partially destroyed, and Ojiya (valid until the 1995 comprehensive plan), where 28.36% had suffered that fate. Without specific circumstances on the merger of local governments, it is questionable whether local governments with only 1% or 4% of such household would have made long-term recovery plans.

6. Development of Long-term Recovery Vision Jointly with Citizens

As stated the relationship between the scale of damage and the making of long-term recovery plans showed that if totally and partially destroyed houses exceeded 8%, local governments made disaster reduction + recovery plans and if more than 20% had been totally or partially destroyed, local governments made comprehensive plans. Below, we discuss who implements long-term recovery plans with citizens involvement "the procedures how to make reconstruction plans." Based on an analysis of long-term recovery plans made in the past, we found that most were for local governments, i.e., implementation of policies on long-term recovery by local governments. Even though 8 years had passed since the Hanshin-Awaji Earthquake, nearly 20% of citizens still considered themselves victims[16] because they did not have a common vision of long-term recovery. Long-term recovery is not achieved by local governments alone, and cooperation with citizens is indispensable.

[13] Hino Town (2001).
[14] Kure City (2002).
[15] Meeting for the Study of Disaster Relief Practice (ed.) (2006).
[16] Kawanishi City (1997), p. 179.

Table 3. Mid-Niigata Prefecture Earthquake long-term recovery plans.

Name	Disaster	Objectives of long-term recovery	Houses totally or partially destroyed	Form	Merger/comprehensive plan	
Nagaoka City Long-term Recovery Plan		July 13 flood + the October 23 Mid-Niigata Earthquake +disaster due to melted snow	Life reconstruction	10.54% (former Nagaoka City)	Comprehensive	Merger (2005.1.1, 2006.1.1)
			Vitalization of community			
			Restoration of education, culture and community			
			Regeneration of mountainous areas			
			Restoration of infrastructure			
	New Vision of Yamakoshi Village Long-term Recovery	October 23 Mid-Niigata Earthquake	Regeneration and vitalization of “life and culture in mountainous areas” in coexistence with nature	82.61%	Comprehensive	
			To prevent continuous occurrence of new disaster due to rain and snow			
			To make Yamakoshi Village a strong model of rural land development			
			Villagers as leading role and promoters of reconstruction			
			To promote cooperation between regions with the keyword of “reconstruction”			
			To draw a new map of Yamakoshi Village not sticking to “exact restoration”			
	Tochio City Earthquake Disaster Long-term Recovery Plan	July 13 flood + October 23 Mid-Niigata Earthquake	Rebuilding and regeneration of life-security -	4.72%	Comprehensive	
			Regeneration of vigor--development of community of Tochio with attractiveness and prosperity-			
			Impovement of life foundation-disaster-proof life foundation-			
			Disaster prevention community development-reinforcement of disaster prevention in cooperation with citizens and administration-			
	Vision of Long-term Recovery from the Mid-Niigata Earthquake in Oguni Region	October 23 Mid-Niigata Earthquake	To foster readiness for mutual help and to develop hometown to be kind to all people	35.01%	Comprehensive	
			To develop hometown for safe tasty food			
			To develop hometown to welcome tourists by “Hennaka (hearth) tourism”			
			To develop hometown to inherit traditional techniques and use particular ones			
Kawaguchi Town Earthquake Disaster Long-term Recovery Plan		October 23 Mid-Niigata Earthquake	Life rebuilding	71.78%	Comprehensive	Large damage Comprehensive plan (until 2010)
			Development of disaster-proof safe and reliable community			
			Inheritance and development of community			
			Regeneration of vigor of the town			
			Enlargement of exchange			
Ojiya City Long-term Recovery Plan		October 23 Mid-Niigata Earthquake	Reconstruction of civic life	28.36%	Comprehensive	Large damage Comprehensive plan (until 2005)
			Reconstruction of industries and economy			
			Safe and reliable social foundation, restoration and reconstruction of urban foundation			
			Reinforcement of community			
			Development of disaster-proof community			
			Advancint reconstruction			
Kashiwazaki City Earthquake Disaster Long-term Recovery Plan		October 23 Mid-Niigata Earthquake	To restore “civic life and reliability”	1.19%	Comprehensive	Merger (2005.5.1)
			To restore “vigor of region”			
			To restore “attractiveness of Kashiwazaki”			
			To promote “development of community in cooperation”			
Uonuma City Earthquake Disaster Long-term Recovery Plan		October 23 Mid-Niigata Earthquake	“Life environment”, safe and reliable life to live vigorously	11.74% (former Horinouchi Town)	Comprehensive	Merger (2004.11.1)
			“Natural symbiosis”, hometown of Uonuma in which everyone fosters coexistence with nature			
			“Public health, medical treatment, social welfare”, life with smile, which everyone supports			
			“Local industries”, characteristic local industries full of vigor			
			“Education and culture”, history and culture of Uonuma, created through close contacts of residents			
			“Systems for disaster prevention and reconstruction”, regional ties mutually supported and raised			
Mitsuke City Long-term Recovery Plan		July 13 flood + October 23 Mid-Niigata Earthquake	Development of disaster-proof community	4.67%	Reconstruction + disaster prevention	Comprehensive plan (until 2005)
			Reconstruction of civic life			

From Nagaoka City (2005), Study meeting for New Vision of Yamakoshi Village Reconstruction (2005), Tochio City (2005), Oguni Town (2005), Kawaguchi Town (2005), Ojiya City (2005), Kashiwazaki City (2005), Uonuma City (2006), Mitsuke City (2005), Tokamachi City (2005).

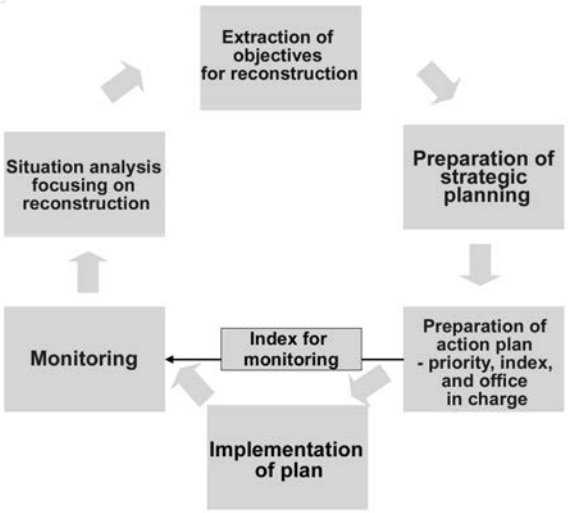

Fig. 1. Flow of long-term recovery planning in Ojiya City based on the Strategic Planning framework.

Long-term recovery plans had to realize the "ideas" to make a desirable "community" based on earthquake experiences of local residents and describing the process of this realization. Planning of long-term recovery plans constitutes the process for determining the "ideas" of "local residents, natives, and workers" (stakeholders) to make a desirable "community" and arranging these ideas into a reconstruction plan.

Given the long time it takes to restore a disaster-stricken area, long-term recovery plans should include both short- and long-term comprehensive plans addressing how to realize visions in the region. Local governments considered comprehensive plans for realizing visions in the region in ordinary times spending the time needed. In the confusion immediately after a disaster and in limited time, it is difficult to decide "visions." Long-term recovery plans should be positioned to realize the vision defined in comprehensive plans.

Based on an analysis on the process of planning reconstruction plans in Ojiya[17] after the 2004 Mid-Niigata Earthquake, in which we provided support, we propose planning of the stakeholders participation long-term recovery plan, i.e., (1) how to grasp "ideas" of stakeholders to make a desirable community and (2) arranging these ideas in the form of a long-term recovery plan.

7. Two Long-term Recovery Planning Viewpoints

Planning of long-term recovery plans involves grasping "ideas" of stakeholders in making a desirable community and arranging them in the long-term recovery plan. And the plan must thus be considered while keeping the plan feasible so its objectives are attained in its implementation.

"Strategic planning," which has become mainstream[18], involves making highly feasible plans featuring

(1) Starting from SWOT analysis and situation analysis.
(2) Objective Oriented Planning
(3) How limited resources are distributed[19].

The Ojiya long-term recovery plan was made based on the strategic planning concept to optimize feasibility (**Fig. 1**).

Once social confusion caused by disaster has settled, victims become concerned with their ideas of how to restore or make a desirable community. Individual ideas for long-term recovery not materialized overtly in language and communicated to planners naturally will not be included in the plan.

The first step for planning a long-term recovery plan is the "generation of ideas," i.e., action converting hopes for long-term recovery into concrete language and communicating them to planners. Ideas generated by stakeholders is not the plan, and individual ideas must be arranged structured to be a plan.

The second step is the "arrangement and structuring of ideas."

The final step is "consensus building" on arrangements and structuring of ideas. It may well occur that the arrangement and structuring, for example in terms of focus points in considering long-term recovery, obtained from the second step would be different among participants. In Ojiya, "consensus building" was made at the end of each workshop by having participants conclude and approve common results.

In Ojiya, though more than 100 people involved the planning process, the long-term recovery plan was made in small group workshops where 5-10 members carried out their work.

[17] Damage in Ojiya City due to the 2004 Mid-Niigata Prefecture Earthquake (as of January, 2006) is as follows:
Dead: 17/citizens: 15
Injured: severely: 120 /slightly injured: 665 Total: 785
Damage to houses: Totally destroyed: 622 (5.71%) Largely destroyed: 370 (3.39%) Partially destroyed: 2,379 (21.83%) Slightly damaged: 7,521 (69.01%) Undamaged:7 (0.06%) Total: 10,899 (100%)/Limited to housing One condominium calculate as one house
Floods: 51/•Inundation above floor level: 20/•Inundation below floor level: 31
Fire: ½ totally burned houses
Areas isolated: 21: 432431 households: 1,472 persons/Settled on October 29, 2004
Evacuation areas: 136 Evacuees: 29,243/As of October 27, 2004 (Dismantled on December 20, 2004)
Relief meals: at peak: 42,680 meals/As of October 28, 2004 (two meals a day)
Recommended evacuation (sites): 29 (districts): 532 households/

[18] In the United States, "master planning" has changed from "Comprehensive Plan" to "Strategic Planning" since the 1980s (Hoch, J. Charles Ed. (2000)). In Japan Bureau of Evaluation in Ministry of Internal Affairs and Communications set the requirement as a criterion of evaluation that the policies of government offices are planned as Strategic Planning. "(2) Evaluation: "policy" that should be evaluated is considered in many cases as the classifications of "policy in a narrow sense," "measures," and "projects." It forms a system as a whole keeping the relationship between objectives and methods appropriate." (Approved by the Liaison Conference of Government Offices on Policy Evaluation (2003)).

[19] Shinichi Kamiyama, Tomonobu Izeki (2003), p. 18.

Table 4. Generation of ideas for long-term recovery planning in Ojiya City.

First WS for citizens "I would like to make Ojiya like…."	110
First WS for citizens "necessary items to make better community to overcome earthquake disaster" (correct, stop, correct, grow)	445
Public invitation for opinions of citizens concerning long-term recovery	148
Public invitation for opinions of the City officials "implementation of long-term recovery"	448
First WS for city officials "key points in considering long-term recovery of Ojiya City" (external factors, internal factors)	341
Vision for long-term recovery of Niigata Prefecture (basic policies)	6
Implementations proposed in second WS for citizens	192
Total	1690

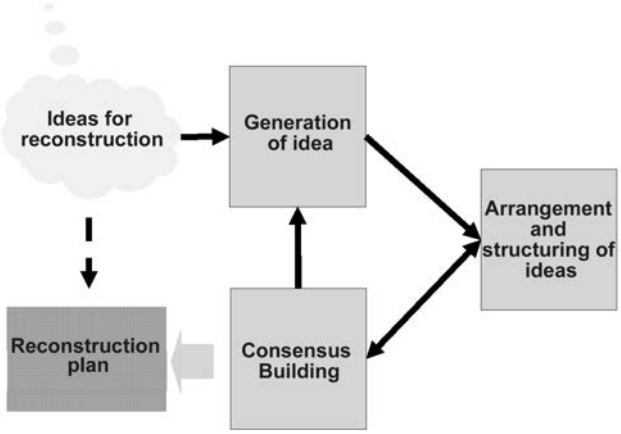

Fig. 2. Making plans considering stakeholder ideas.

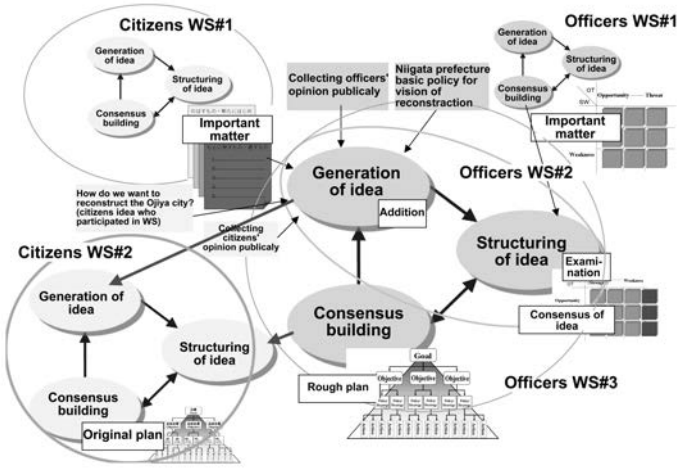

Fig. 3. Arrangement and structuring of ideas.

8. Stakeholder Ideas in Long-term Recovery Plan Considerations

Ideas of stakeholders were implemented from the viewpoint of "materializing ideas in the long-term recovery plan (**Fig. 2**).

Ideas were generated using 6 opportunities (**Table 4**) and "indistinct hopes for long-term recovery" were generated on 1,690 idea cards.

Arrangement and structuring of the ideas generated (**Fig. 3**) was done based on strategic planning. Structuring was done by (1) arranging findings of "situation analysis" to make a matrix and (2) reasoning relationship between objective and method in ideas to make strategic planning. In the arrangement and structuring of ideas, results of arrangement and structuring were also examined – (1) examination of differences in ideas among different stakeholders (vision of long-term recovery held by citizens, civil servants, and the prefecture) and (2) reexamination of the relationships already reasoned between objective and method in ideas

For consensus, at the end of each workshop, results obtained through the "generation of ideas and arrangement and structuring of ideas" were approved through "presentation to all and approval of final results."

Both (1) generated ideas and (2) results arranged and structured at each workshop were used in subsequent workshops, resulting in the "Ojiya City Long-term Recovery Plan (original proposal)" after 5 workshops.

Figure 4 shows how ideas generated by stakeholders were structured to be prepared as these "Essential Points."

9. Discussions

We have examined the transition of long-term recovery plans through their history, the relationship between the scale of damage and long-term recovery plan contents, and ways for "arranging ideas for long-term recovery of stakeholders to make long-term recovery plans."

On October 23, 2007, three years will have passed since the 2004 Mid-Niigata Earthquake. Verification of the long-term recovery situation is now being planned in Ojiya. We plan to examine problems of how to monitor the progress of reconstruction, i.e., stakeholder participation in long-term recovery management.

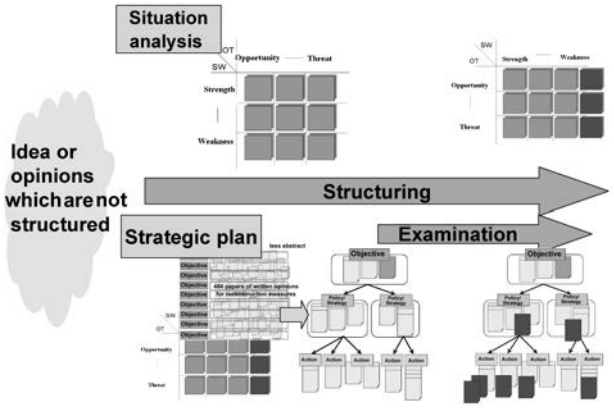

Fig. 4. Stakeholders ideas and long-term recovery plans.

References:

[1] Aichi Prefecture, "The Ise Bay Typhoon Disaster Long-term Recovery Plan," Aichi Prefecture, 1960 (in Japanese).

[2] Amagasaki City, "Records of the Great Hanshin-Awaji Earthquake in Amagasaki City," Amagasaki City, 1998 (in Japanese).

[3] S. Kamiyama and T. Iseki, "Strategies for regeneration of local governments; Evaluation of administration and reform of management," Japan Review Publishing Company, 2003 (in Japanese).

[4] Uonuma City, "Uonuma City Earthquake Disaster Long-term Recovery Plan," Uonima City, 2006 (in Japanese).

[5] Okushiri Town, "Revival of dream island! The Hokkaido Southwestern Offshore Earthquake and outline of long-term recovery," Okushiri Town, 1996 (in Japanese).

[6] Oguni Town, "Vision of long-term recovery from the Mid-Niigata Earthquake in Oguni region," Oguni Town, 2005 (in Japanese).

[7] Ojiya City, "Ojiya City Earthquake Disaster Long-term Recovery Plan," Ojiya City, 2005 (in Japanese).

[8] Kashiwazaki City, "Kashiwazaki City Earthquake Disaster Long-term Recovery Plan To overcome the Mid-Niigata Earthquake Be vigorous, Kashiwazaki!," Kashiwazaki City, 2005 (in Japanese).

[9] Kawaguchi Town, "Kawaguchi Town Earthquake Disaster Long-term Recovery Plan," Kawaguchi Town, 2005 (in Japanese).

[10] H. Kawata, "The Basic Disaster Measures Act and the basic plans for disaster prevention," Disaster Prevention Research Institute of Kyoto University (Ed.), Lectures for Disaster Prevention Study Vol.4, disaster prevention plan, Sankaido Publishing Company, 2003 (in Japanese).

[11] Kawanishi City, "Records of the Great Hanshin-Awaji Earthquake in Kawanishi City – we will never forget it–," Kawanishi City, 1997 (in Japanese).

[12] Kure City , "The 2001 Geiyo Earthquake (2001, March 24) Damage in Kure City and records of reconstruction plan," Kure City, 2002 (in Japanese).

[13] The National Land Agency, "Survey on emergency measures against earthquake disaster in the southern Kanto region, surveys on case studies of long-term recovery from earthquake disaster etc.," The National Land Agency, 1984 (in Japanese).

[14] The National Land Agency Disaster Prevention Bureau, "The fiscal 1996 report of review on implementations for long-term recovery for the measures against urban-type large-scale earthquake," The National Land Agency, 1997 (in Japanese).

[15] The National Land Agency Disaster Prevention Bureau, "The fiscal 1997 report of review on implementations for long-term recovery for the measures against large-scale volcano disaster," The National Land Agency, 1998 (in Japanese).

[16] The National Land Agency Disaster Prevention Bureau, "The fiscal 1998 report of review on implementations for long-term recovery for the measures against storm and flood damage," The National Land Agency, 1999 (in Japanese).

[17] The National Land Agency Disaster Prevention Bureau, "The fiscal 1999 report of review on implementations for long-term recovery for the measures against tsunami disaster," The National Land Agency, 2000 (in Japanese).

[18] The National Land Agency Disaster Prevention Bureau, "The report of survey on planning of long-term recovery preparation against earthquake directly below the southern Kanto region," The National Land Agency, 2000 (in Japanese).

[19] The National Land Agency Disaster Prevention Bureau, "The guidelines on planning of long-term recovery preparation against the Tokai Earthquake etc.," 2001 (in Japanese).

[20] The National Land Agency National Astronomical Observatory of Japan (Ed.), "Science Chronological Table The 2007 edition," Maruzen Publishing Company, 2007 (in Japanese).

[21] Kenji Koshiyama, "Case studies concerning urban long-term recovery plan and housing supply plan after disaster, doctoral dissertation of Kobe University," Privately printed, 2001 (in Japanese).

[22] Komae City, "Records on embankment collapse along the Tama River," Komae City, 1975 (in Japanese).

[23] Study Meeting for Disaster Relief Practices (Ed.), "Management and practice of disaster relief, the 2006 edition," First Legislation Publishing Company, 2006 (in Japanese).

[24] (Foundation) Society for Commemoration of the Great Hanshin-Awaji Earthquake Disaster, "Report on long-term recovery from the Great Hanshin-Awaji Earthquake Disaster vol.8 the 2002 edition," (Foundation) Society for Commemoration of the Great Hanshin-Awaji Earthquake Disaster, 2003 (in Japanese).

[25] Meeting for Publication of Records on the Sakata Conflagration and Reconstruction Process (Ed.), "Records on the Sakata conflagration and long-term recovery process," Sakata City, 1978 (in Japanese).

[26] Shizuoka Prefecture, "Report on the Kanogawa Typhoon disaster," Shizuoka Prefecture, 1962 (in Japanese).

[27] Shimabara City, "The Unzen-Fugendake Eruption Disaster," Shimabara City Long-term Recovery Plan, Shimabara City, 1993 (in Japanese).

[28] Secretariat of Committee for the Shimabara Region Revitalization Action Plan (Ed.), "The Shimabara Region Revitalization Action Plan," Nagasaki Prefecture, 1997 (in Japanese).

[29] Approved by the Liaison Conference of Government Offices on Policy Evaluation, "Standard guidelines concerning policy evaluation," Ministry of Internal Affairs and Communications, 2003 (in Japanese).

[30] Tokyo Metropolitan Government Miyake Village, "Report of basic surveys on the Ako district long-term recovery plan," Miyake Village, 1984 (in Japanese).

[31] Tokamachi City, "Tokamachi City Earthquake Disaster Long-term Recovery Plan," Tokamachi City, 2005 (in Japanese).

[32] Tochio City, "Tochio City Long-term Recovery Plan," Tochio City, 2005 (in Japanese).

[33] Central Disaster Management Council, "Basic Plan for Disaster Prevention," Central Disaster Management Council, 2005 (in Japanese).

[34] Yusuke Tsurumi, Definitive biography of Shinpei Goto 8, "The era of political moralization," Fujiwara Publishing Company, 2006 (in Japanese).
[35] Cabinet Office, "(Proposed) guidance on implementations of disaster restoration and long-term recovery," Cabinet Office, 2006 (in Japanese).
[36] Cabinet Office, "Measures against disaster in Japan," Cabinet Office (in Japanese).
[37] Nagaoka City, "Nagaoka City Long-term Recovery Plan," Nagaoka City, 2005 (in Japanese).
[38] K. Narumi, M. Murozaki et al., "Issues and problems in making out reconstruction plans The first anniversary of the Great Hanshin-Awaji Earthquake Disaster," City planning, vol.200, 201, pp. 15-72, City Planning Institute of Japan, 1996 (in Japanese).
[39] Niigata Prefecture, "Niigata Prefecture Long-term Recovery Plan," Niigata Prefecture, 1964 (in Japanese).
[40] Noshiro City, "The 1983 May 28 Mid-Japan See Earthquake Records on disaster in Noshiro City – the lessons for the future," Noshiro City, 1984 (in Japanese).
[41] H. Hayashi, "Long-term recovery process from earthquake disaster and plan for its measures," Journal of Geography, vol.110(6), pp. 991-998, 2001 (in Japanese).
[42] H. Hayashi, "Study on earthquake disaster prevention for life protection," Iwanami Publishing Company, 2003 (in Japanese).
[43] Hino Town, "The 2000 October 6 Western Tottori Prefecture Earthquake Record on disaster and long-term recovery in Hino Town," Hino Town, 2001 (in Japanese).
[44] Hyogo Prefecture, "Report of findings on life recovery," Hyogo Prefecture, 2003 (in Japanese).
[45] Social Meeting for Planning of Vision of Earthquake Disaster Reconstruction, "Niigata prefecture vision of long-term recovery from the Mid-Niigata Earthquake," Niigata Prefecture, 2004 (in Japanese).
[46] N. Maki et al., "Construction of method to make out the reconstruction plan of stakeholder participation type – a trial in Ojiya City," Annual Report No.49 B for Disaster Prevention Research of Kyoto University, pp. 137-146, 2006 (in Japanese).
[47] Mitsuke City, "Mitsuke City Long-term Recovery Plan," Mitsuke City, 2005 (in Japanese).
[48] Study Meeting for New Vision of Yamakoshi Village Long-term Recovery Plan, "New vision of Yamakoshi Village Long-term Recovery Plan – toward creative reconstruction under leadership of residents," Study Meeting for New Vision of Yamakoshi Village Long-term Recovery Plan, 2005 (in Japanese).
[49] H. J. Charles (Ed.), "The Practice of Local Government Planning," p. 18, 2000.

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"Inochi wo Mamoru Jishin-Bousai-Gaku(Earthquake Disaster Prevention Study saving lifes)," ISBN: 4000050486, Iwanami Shoten, 2003.
Juni-Sai karano Hisaisha-Gaku(Suffers Study from 12~years old)," Memorial Conference in Kobe, ISBN: 4140112077, NHK Shuppan, 2005.

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Japan Society for Civil Engineers (JSCE)