Lessons from the Great Hansin-Awaji Earthquake

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1. Outline of Rehabilitation

The Great Hanshin-Awaji Earthquake has occurred on 17 January 1995, early in the morning along the fault line from Awaji Island to north part of Osaka with magnitude 7.3. Kobe City has experienced intensity 7 (maximum grade in Japan) and urban fire was spread. Approximately 200 thousand houses and buildings were totally or partially collapsed and caused 6400 casualties. The author involved in the coordination of rapid temporary housing construction at the Ministry of Construction (current MLIT). It took five years to close the final temporary house within 50 thousand in total because of the process of rehabilitation of urban area and construction of recovery houses.

The ordinary process of recovery of livelihood, i.e. evacuation place to temporary house to recovery house, from evacuation refugee where foods are provided to a temporary house where resident needs pay food, electricity, gas and water fees except housing fee then to a recovery house (public rental house) where resident pays rent even though it is often reduced at low level, provides gradual self-management process in a sense.

2. Urban Disaster

The major characteristics of Hansin-Awaji earthquake is pointed as “urban disaster”. Japanese disaster management system was established based on the experiences of 1963 Ise Bay Typhoon, and main cause of disasters in Japan was floods and typhoons. However, in 1995 an earthquake resulted in the largest human and economic losses. Although an earthquake struck Miyagi prefecture in 1978, and the new seismic building code was created in 1981, the intensity did not reach 7 and no subway, no urban high way was collapsed.

Urban disaster tends to 1) become huge damage because of concentration of population and investment, 2) examine new complex systems that have not experienced a disaster, 3) bare weaker local community if compared to rural regions, 4) need consensus among various stakeholders on the recovery plan and community redevelopment. In many case of urban recovery, land readjustment (Kukaku-seiri) projects were utilized to disaster or post-war recovery and new-town development in Japan. Therefore, Kukaku-seiri is called as “mother of urban planning”.

The topics of recovery in Kobe are shown in the following chapters since the author

worked for UNCRD Hyogo Office in Kobe HAT area for almost five years.

3. Collapse of Structure

Many urban structures had damages during the Great Hanshin-Awaji Earthquake for the first time. The Hanshin Expressway was collapsed then the seismic standard was amended and retrofit of expressways and bridges has been carried out. Fortunately the shake occurred early in the morning the human losses by train and subway were few though they had physical damages. The same cases happened at the old office buildings in Sannomiya or at the Kobe City Hall.

More than 80% of casualties were caused due to collapse of old houses. Most of people were in bed as it was 5:46 AM of winter morning. Old houses killed many residents, on the other hand few damages were observed in the buildings that follow 1981 seismic code even in the heavily shaken area as intensity 7.

These facts can introduce the following lessons, for the hardware "(1) there is no region in Japan where earthquake will not occur, and every filed of hardware should prepare against the maximum seismic intensity". And "(2) existing constructed structure should be assessed and retrofitted if necessary in order to protect human lives under maximum intensity". As the former lesson has been applied to the building code in 1981, the ratio of necessary retrofit is lower than the case of infrastructures. However, owners of building are mainly private sectors and it is hard to promote retrofit by governmental initiatives. Then, a new law on promotion of seismic retrofit was established in 1995. And several additional budgets enabled to promote seismic retrofitting after under the depression after bubble economy. Since number of schools constructed before 1981 is huge, retrofit of schools required long time as well as buildings of the private sectors.

Concerning software, "(3) as public assistance cannot be expected so much immediately after a large disaster, when a house was collapsed self-help and/or mutual assistance by neighbors is effective". This is the reason why "community based disaster management" is now in popular after the Great Hanshin-Awaji Earthquake, though it is very hard.

4. Urban Fire in the Densely Populated Area

Japanese cities have suffered from urban fire since before Edo era, as the traditional structures use timber as main material. Sever experiences in 1923 at the Great Kanto Earthquake and World War II when all cities in Japan except Kyoto, Nara, Kanazawa were burned out, Building Standard Law (BSL) and City Planning Law (CPL) of Japan aim at establishing fire-preventive measures in every urban area. For instance, Fire Prevention Districts are designated in most of city centers where wooden structure is

prohibited to construct. However old districts where remained from past urban fire still exist under dangerous situation.

The earthquake often stops water supply or destroys supply system, and it cause quite difficult condition for fire-fighting in the densely populated area with old houses as we have experienced during the Great Hansin-Awaji Earthquake. The day of earthquake in Kobe, it was no wind and the fire stopped within a certain extent. If it was windy, all city areas would be burned out. The local government widened streets and planned evacuation parks and water streams in the burned areas. In addition, recovery projects provided fire-proof and earthquake-proof middle-rise houses to have more open spaces in the formerly old houses aggregated zone. However some areas are now suffered from decrease of population although lower density achieved safer district.

One of the special topics of recovery in Kobe is "Two Steps Urban Planning" that means to decide frame of recovery within two months during the normal restriction term of construction control for preparing recovery plans and later hundreds of land owners and city office decided detailed recovery programs. This new flexible urban planning was developed by well-trained local government officials in this region.

The issue on densely populated area with old houses unfortunately still remains in many cities in Japan. The lessons may be "(4) disaster management issues cannot be solved by only restriction (in a short term)". Experiences of the Great Hanshin-Awaji Earthquake suggest that rapid recovery and mutual help will be observed during an emergency situation in the densely populated area or high risk area against disasters, if residents, city officers and local companies discuss and carry out community activities.

5. Housing and Economic Recovery

It is observed that it took three-year for infrastructure recovery, five-year for housing recovery and ten-year for recovery of population. In other words, recovery of electricity, gas and water/sewerage system that have repaired in an early stage and other main infrastructure such as train, port facilities and expressway were reconstructed within three years. While construction of approximately 30 thousand recovery houses and end of temporary houses were achieved within five years, the population of Kobe city could not be returned to the same level of 1995 for ten years.

Housing and economic recovery tend not to follow the governmental plan even though the governments prepare temporary assistance and tax exemption etc., as the private sectors are the key actors in these fields. Moreover, macro economy in 1995 focused on the investment and/or restructuring of factories to China under higher yen rate. Kobe city experienced decrease of 100 thousand residents after 1995 and the population has

recovered in 2005. Some removal space of factory in Kobe city could be utilized as the site for recovery houses. However, houses cannot provide so many employments than factories, number of employees and enterprises are still under the level of 1995.

Kobe city is the leading city for its development planning and economic policies, such as new town and artificial lands development at the same time, and community planning system called "community council" that was developed by Kobe city and now it's popular in Japan. Such experiences formed background of recovery from the disaster in 1995. It is also noted that the role of prefectural government (Hyogo) was also significant in the recovery including promotion of international communication and dissemination. The lessons can be "(5) recovery of infrastructure can be achieved in a short period (based on the proper budget), housing and economic recovery need middle-long term since the main actors are the private sectors. The cooperative action of prefecture, municipalities with the private sectors are important".

6. Social Rehabilitation and Volunteers

Recovery includes not only physical and economic recovery but also social aspects. The Great Hansin-Awaji Earthquake served as an opportunity to establish "NPO Law" in 1998 since many voluntary activities emerged in the affected area and the year of 1995 is entitled as the first year of Volunteer.

One of the best practices in the field of voluntary activities, CODE is recommended to introduce as the United Nations (UNCRD) Hyogo Office has been working with them for a long time. The NPO CODE was established after the earthquake and developed many international cooperation with disaster affected regions in the world. The motto is "until the last one person". CODE tries to find small but key demands of the people through preserving hearing activities using foot massage, and provides livelihood assistance.

In addition, "disaster education", "disaster culture", "Tell-NET" and "international cooperation" are key words of the social aspect, among them traumatic care took place after the Great Hanshin-Awaji Earthquake. The lesson in the psychological issue helped a lot at the Indian Ocean Tsunami that many survivors suffered from the trauma (why only I survived). Hyogo prefecture established the "Institute for Traumatic Stress".

Other social lessons from the Great Hanshin-Awaji Earthquake include "prevention of solitary death in the temporary or recovery houses" and "continuously introduce the disaster experience to children or other parts of Japan through Disaster Reduction and Human Renovation Institution (DRI)" and so on.

The lesson will be summarized as "(6) even physical recovery has finished, a long span policy including traumatic care and disaster education should be established in the field

of social (cultural, psychological) rehabilitation.
Furthermore, the following lesson will be pointed out as the common issue for all lessons, also this is common for every community and regional development, "(7) we must thank to assistance from outside as well as self-help mutual and public assistance at the recovery stage, and all stakeholders should discuss for the happiness and future of our next generation (sustainable development)."

7. Conclusion (Comparison to the Great East Japan Earthquake)
The difference between the Great Hanshin-Awaji and the 2011 East Japan earthquakes will be analyzed as 1) though shakes spread wider area the major damages were caused by tsunami, 2) role of national government becomes larger including accident of nuclear power plant, 3) financial condition at national and local levels worsen than case in 1995, 4) most affected areas suffered from aged society and need vitalization, and 5) most of affected regions are not urban area but agricultural or fishery areas (in the case of 1995, Awaji Island was similar to this.) However, the lessons of the Great Hansin-Awaji earthquake can be also applied to the recovery from the Great East Japan Earthquake.

(1) Other Japanese coastal regions need prepare against future tsunami from this case.
(2) Existing structures must be prepared / retrofitted against a certain level of tsunami.
(3) Preparedness includes evacuation drill, self-, mutual-, public help against tsunamis.
(4) Control is effective in recovery under infrastructure, economic / investment support.
(5) In the process of recovery, local experts play key role among city office and residents.
(6) Keep introduce disaster experience to the next generation. Don't forget the disaster.
(7) Intention (willingness) to make region safe for future generations, is the key for all.

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