

Proposals on Disaster Recovery Policy for Great East Japan Earthquake (Second Stage Proposal)

Volunteers from faculty Members (GRIPS)

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Introduction

On April 27, a proposal titled “Urgent Proposal on Framework for Great East Japan Earthquake Recovery” was made public. This proposal titled “Proposals on disaster recovery policy for Great East Japan Earthquake” is made detailing concrete proposals on each specific field. In the process of drawing up this proposal, ideas and inputs were sought and obtained from members of GRIPS faculty. Based on these inputs, the Task Force of Policy Research Center drafted this proposal. Both of this proposal and detail inputs from each faculty member can be accessed on the GRIPS web page.

I. Reform of institutions that are the basis for disaster recovery

Although there are many legal institutions which should be amended for the disaster recovery, this section includes two important proposals that cut across all fields. The other proposals related to the specific areas are presented in the subsequent sections.

Proposal-1 Institutional Amendments of governmental support system for disaster recovery

The basic purpose of disaster recovery institution is to assist local governments. The financial assistance is based on three different provisions instituted in the legal system, such as the basic subsidy ratio by different facilities, degree of damage, and disaster-specific provision as shown in Table 1. This system appears to be arbitrary and lacks consistency. For example the system does not address the privatization issue. Moreover, the system should be reorganized also for the recovery of the completely devastated cities or towns. In addition, the system should include provisions for the best utilization of PFI schemes for in the overall process of disaster recovery.

Table 1 Subsidies for disaster recovery from national government

Facility	Subsidy ratio for disaster recovery in usual-scale disaster case (Law)	Leveling up of subsidy ratio in serious disaster	Subsidy by special acts for specific disaster (e.g. Kobe earthquake)
River Road (municipality)	2/3-1/1 (Act on national government subsidy for disaster recovery of public infrastructures)	Yes	x
Port management (local government)	2/3-1/1 (Act on national government subsidy for disaster recovery of public infrastructures)	Yes	Yes
Sewer	2/3-1/1 (Act on national government subsidy for disaster recovery of public infrastructures)	Yes	x
Airport (air-side) (local government)	8/10 (Airport Act)	x	x
Road (local road management corporations)	2/3 (Local Road Public Corporation Law)	x	x
Public school	2/3 (Act on national government subsidy for disaster recovery of public school)	Yes	x
Water supply	Subsidy rate in guidelines (1/2-) (Water Act)	x	Yes
Farmland	5/10- (Agriculture, Forestry and Fisheries Act)	Yes	x
Medical facility (e.g. public)	Supplementary budget (in outline (1/2, 1/3))	x	Yes
Railway	1/4 (Railway development act)	x	Yes
Private school	x	Yes	x
Port (e.g. Pier Corporation and company)	x	x	Yes
Private Airport Operator (e.g. Narita)	x (assistance through equity, interest-free loan is possible)	x	x
Expressway Company (NEXCO)	x (assistance through Japan Expressway Holding and Debt Repayment Agency is possible)	x	x

Specific details of the proposed revisions are as follows.

1.1 Supports for Service facilities covering wide areas

Under the existing system, regional integration of public service facilities such as hospitals, schools and operation of local railways beyond the administrative boundary are difficult mainly because of problems in coordination of service standards, sharing of cost burden and other procedural matters. Provisions should be made for incentive measures, such as subsidy from central government, to encourage local governments to propose for integrated facilities serving wider areas.

1.2 Support for Integrated of facilities

Because of individual facility-oriented costing and other procedures, integration of welfare facilities such as hospital and housing for senior citizens is very difficult under the current system even during the reconstruction of completely devastated cities and towns. Provision should be made at prefecture and national level for a one-stop window to provide support to local governments and PFI entities for the integrated facilities.

1.3 Expansion of support to cover facilities by private and third sectors

Public subsidies with specified rates for privately managed hospitals, welfare facilities, nursery schools and educational facilities, and transport facilities are allowed by a special law. Without such support system, restoration of living environment would be very difficult.

1.4 Revise the principle of “restoration to the original state” guiding the current budget support system

Revision of institutional provisions is necessary to overcome the constraints for construction of new integrated facilities or enhancement of efficiency for existing facilities. It is also important to prevent inefficient restoration as the cost burden is by national government under principle of restoration to the original state. The principle should be changed from “facility restoration” to “restoration of necessary functions”. The recovery budget should target functional improvements that enhance cost effectiveness. Moreover, new framework should be introduced including setting up of standards in advance for the approval of facility restorations to the original state.

1.5 Prevent an increase in insurance premium for entities suffered from a disaster

As in the case of car accidents, the usual rule of increased insurance premium for the victims may apply for facility operators who suffered disaster damage but is not responsible for the cause. Although the insurance rules are governed by commercial principles and burden of insurance cost is distributed over the portfolios, for the victims of disaster damage are likely to bear disproportionately higher burden. If national government introduces some form of support system for insurance companies, the burden system in relation with disaster insurance should be improved by utilizing this opportunity.

Proposal-2 Re-amendment of PFI bill to support disaster recovery policies

Adoption of PFI approach for disaster recovery can offer benefits to all parties. Government can ease budgetary pressure. Under the condition of large-scale damage of facilities, project proponents can have business diverse kind of business opportunities. And society can get benefits of better services and efficiency. Moreover, as Japan is late in gaining PFI experiences in international comparison, this opportunity should be utilize to gain much needed experience on PFI and thereby enhance international competitiveness.

An amendment bill on PFI system was approved by the Upper House in last April, which was drafted before the disaster. Disaster recovery indeed calls for coordinated restoration of multiple facilities and a short and simplified procedure which is not address by the current bill. The amendment bill should therefore be revised during the deliberation in the Lower House. There are many proposals on the use of private funds for disaster recovery, but implementing such proposals is not possible without revision in the PFI bill.

Specific revisions to be made are as follows.

2.1 Shortening time for project decision

Usually, decision making process for PFI project takes over two years for different steps such as evaluation of PFI project facility (VFM etc), decision on project scheme, and selection of project proponents. For recovery projects, shortening of the process is necessary. For example, urgent proposal can be called through business organization such as Keidanren and Chamber of Commerce. Likewise, authority for selecting project proponent can be delegated to a selection committee like the competition for selecting an architecture firm.

2.2 Combine Projects from multiple authorities

Current form of the amendment bill makes it possible to combine public facilities with private projects; however it was not expected to combine projects under different local governments. For example, projects for combining schools and hospitals, project for combining hospitals, care facilities for aged people and housings under different local authorities, project for combining road development and development and maintenance of high-elevation residential lands, road and railways construction with costal embankment function and so forth should be considered in the new revision. For this, a framework is necessary to select project proponent and to coordinate distribution of cost burden among the project authorities.

2.3 Introduction of bidding system for subsidy and allocation of risks

By introducing bidding system for public subsidy (system of providing subsidy to PFI projects through competitive bidding) like in some overseas countries, we can have real PPP system. For disaster recovery projects, combination of service contracting projects types and user-charging project types is necessary. For subsidy and risk allocation, proposal should be called from the project proponents, and selection should be made based on competition for lower public burden.

II. Drawing up basic policy directions on four major fields for region building

Recovery from a catastrophic disaster means region building covering wide range of fields through regional restructuring from a fresh start. Since the degree of damage and pre-disaster socio-economic condition by region are different, government response should also be accordingly matched. However, if government's basic directions for disaster recovery policy and recovery support system are not well defined, local governments, citizens, and private firms will face difficulty in starting recovery activities. Also, instead of deciding incrementally, it is required to act comprehensively.

Followings are proposals for basic policy directions on four major fields for region building, which includes tsunami countermeasures, policies for community building, policies for industrial revival, and policies for infrastructure development.

Proposal-3 Shift in framework for Tsunami countermeasures

Not all disaster hit regions necessarily prefer for higher breakwater and coastal dikes. For each region, choice should be made in consistent with community building plans. As for the basic direction for tsunami countermeasures, we propose to construct disaster prevention system in each region by combining following policy instruments.

3.1 Shift of the design concept of Breakwater and coastal dikes

After the Kobe earthquake, in order to accommodate the extremely large seismic forces, the design concept of infrastructures and buildings has been changed. The design standards have been divided into two levels; one is the level that if the structure is failed there is no damage to the human life, the other is the level that the structure cannot be failed. This change in the design concept is the reason why the damage on the Shinkansen structure was small in this disaster.

From now on, the effectiveness of breakwater should be verified from the comprehensive viewpoints including psychology, human behavior science and the cost effectiveness. And, it is necessary to change the design concept of breakwater. It is important to have a shift in the design principles for breakwater and coastal dikes according to the situation in each region such as, change in the approach for comprehensive protection including complete protection and soft-countermeasures, protection function to low-level tsunami and the function to lowering the energy of big tsunami and to make a time for evacuation.

It is also possible to choose the option that the region improve the marine environment, revive beautiful cove and become sightseeing hub for yacht and fishing boats by removing the breakwater/dikes as well as residents' moving to the high land areas.

Also, it is necessary to improve the design standard on structural strength considering impact strength, buoyancy, undertow and floating substances.

3.2 Disaster prevention by change in city structure

Where possible, built-up area should be located in high ground. Building structure for housing complex, schools and hospitals, which are located in low-land area and can be used for evacuation facilities should be properly planned and designed. Also it is necessary to consider the introduction of an incentive scheme to promote concrete-structured housing.

3.3 Use of mobile phone for Disaster information and evacuation instruction system

Utilizing GPS function and supercomputer, a system should be developed to alert people anywhere on disaster information and the location of evacuation shelter. With such system, as information can be sent individually, rate of successful evacuation for the residents and travelers can be improved. .

3.4 Review of hazard maps

Tsunami hazard maps are prepared by local governments according to the national manual. This time, the short-comings of the current hazard maps were clearly visible, for example the tsunami height were underestimated, there are the non-scientific hazard maps and some local governments did not prepared the hazard maps. At least, it is more accurate and effective to estimate the height and vulnerable-area of tsunami together with experts in the central government. The local governments without hazard maps should prepare them and also each local government should be required to prepare original hazard maps by based on their judgment on the disaster levels which are stochastic phenomena.

Proposal-4 Basic policy directions for building "Beautiful Village"

The goal of the Great Kanto Earthquake Recovery was "building of a modern city" and that of the Great Hanshin Earthquake was "building of a city for international exchange ".

We would like to propose the concept of "**Beautiful Village**" as the goal of recovery from the Great East Japan Earthquake as This is not just to build beautiful scenery but to build a town where people can have a pride. This concept in fact can be a core element of region-building endeavors in next generation considering various aspects, such as emphasis on the scenery of city, village and landscape, preservation of tangible and intangible cultural heritage, and appropriate allocation of cultural facilities.

In the disaster affected areas, there are a variety of cities and towns including small villages, central city and suburbs of large urban city. We should aim to rebuild cities to make them able to survive with vitality even under the aging society. Specific proposals for "regional development, urban development policies" are as follows.

4.1 Compact and new concept "Central city"

In order to maintain and improve the level of service for commerce, education, healthcare, and welfare under declining population, , it is necessary to expand the service area to secure the threshold level of population. In other words, it is necessary to combine service functions and serve a wider-regional block.

Central city is a core city of wider-regional blocks (1 hour accessible region) proposed in National Spatial Plan from the above-mentioned viewpoints, and also is a core city of Teijyu-Jiritsu blocks proposed by Ministry of Internal Affairs and Communications. People in the village within 1-hour accessible area will choose moving to the central city or commuting to the city center to receive higher order urban services.

For small villages, it will be considered to restructure the village in high-land area through the discussion with the residents. For central cities, it is difficult to move all to high-land area because of the lack of suitable land space. Therefore, in most cases it is necessary to locate city facilities in the low-land areas, for which a comprehensive disaster prevention system should be implemented.

As for central city, realizing the future vision of local municipalities is difficult under the situation of declining population. Realizing the compact city, vibrant downtown area instead of the shuttered town, disaster prevention capabilities and above mentioned residential service functions are some of the important issues. To create city center, the followings should be considered.

- Concentration of various city functions such as government agencies, hospitals, schools, and welfare facilities at a central location;
- Provision of plaza, pedestrian spaces and transit mall in urban area;
- Creation of ARZ (Auto Restricted Zone) and community zone by combining arterial roads and fringe parking

The land use is considered to realize three-generation-interexchange-healthy-city concept (Figure 1) proposed by Prof. Sasada, Shiga Medical Center for Adults, which consist of health and life motivation of elderly, parents working at ease and children educated also in communities. Figure 2 shows the image of a small village as a tourism hub, and figure 3 shows the image of the city center.

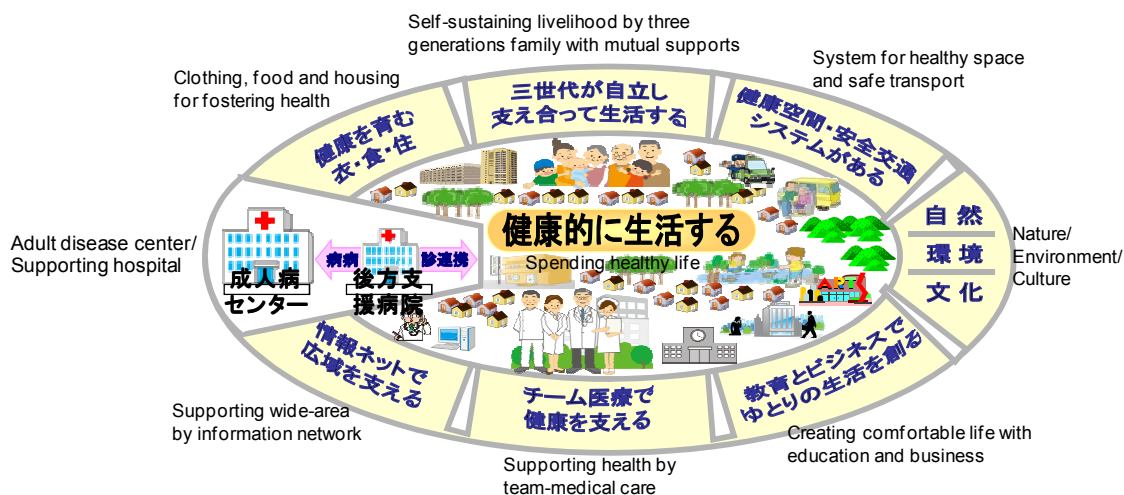


Figure 1: three-generation-interexchange-healthy-city concept (proposed by Prof. Sasada of Kyoto University Professor Emeritus)

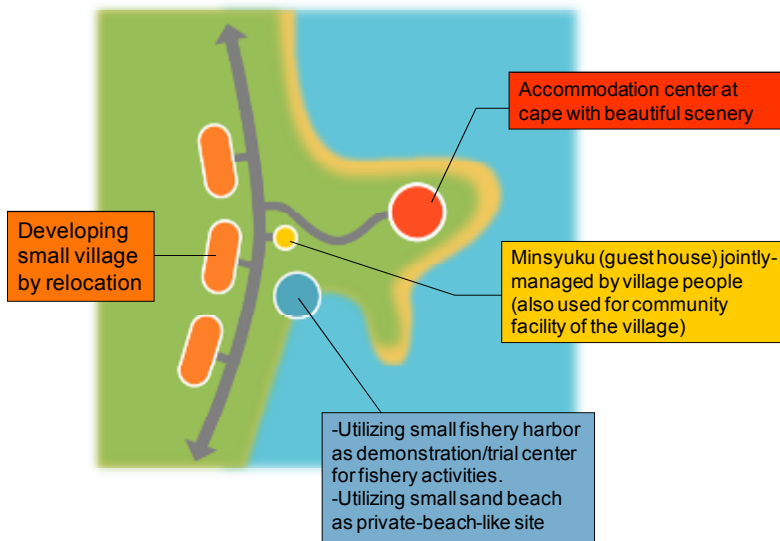


Figure 2 Image of a small village as a tourism hub
 (drawing by Mr.Kezuka and Ms.Watanabe in Institute for Transport Policy Studies)

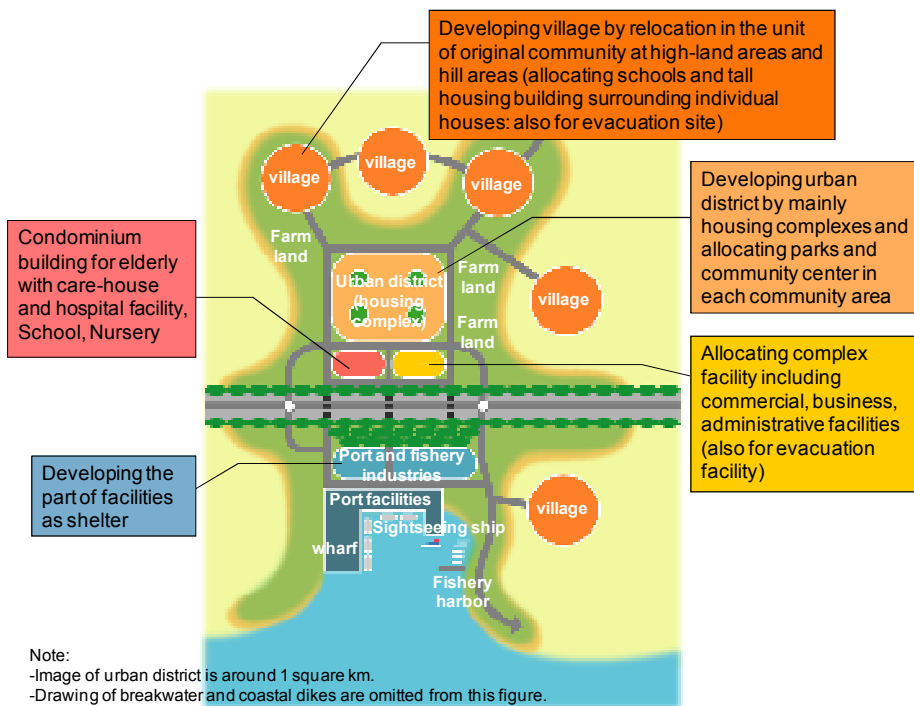


Figure 3 shows the image of the central city
 (drawing by Mr.Kezuka and Ms.Watanabe in Institute for Transport Policy Studies)

4.2 Create “Incentive scheme” rather than land-purchase by government

There are many discussions about nationalization of the land for restructuring villages, but that is just one of the options. The first priority policy is creating an environment that encourages residents to voluntarily move out. Also, there is a misgiving that the entire land from disaster affected area should be nationalized. Government should adopt method of land-nationalization or acquisition by clarifying related issues, such as which area can be the candidates of land-nationalization, how the price is set and the process of consensus building with citizens.

The important factors that influence residents’ decision to choose house-relocation are safety environment in next-generation, an attractive town environment, employment and labor environment, secured environment after aging, preservation of community, and economic burden. The way to realize these environments is to early recovery of industries and employments as well as the above mentioned tsunami countermeasures and attractive region building. In addition to this, we would like to propose the following incentives for land use restructuring and reorganization of the villages.

- Giving the priority choice right for housing and commercial facilities to the candidates of new city center
- Incentives for private building construction such as the house with the function of evacuation
- Giving priority to community groups relocating together for the same housing complex
- Provision of housing complex with welfare facility and hospital for aging population (also considering the payment system by their land income)
- Expansion of employment assistance program for housewives such as jobs related to nursery, kindergarten and school children care.
- Support for relocation of fisheries and the related industries and other industries.

4.3 Opportunities to reform land use (spatial planning system, the expansion of urban planning systems)

In case of the Kobe earthquake reconstruction, "Act on the promotion of disaster prevention town blocks in crowded urban cities" was introduced which weakened the function of the land-readjustment scheme and leased land and house law.. Since in the Great East Japan Earthquake, the areas outside city planning area are also affected, this offers an opportunity to address various issues, such as planning system based on the vertically-segmented administrative system like city planning, agricultural and fishery area planning and port planning, confirmation on the constraint of existing land use, and shuttered city center due to the failure of consensus building with residents. There is also one more option to set up “Land use system reform committee” under the disaster recovery planning committee, that consists of the professionals and discuss the following issues intensively. The specific proposals on each issue are as follows.

- Expansion of land use regulation outside city planning areas

So far, there is inadequate regulation for land use outside city planning area which gives rise to various problems such as sprawl around the city and the loss of beautiful countryside. Consistent planning, regulation and incentive systems should be introduced in order to revive the desirable and beautiful areas for countryside, small villages, city planning area, natural park area, etc.

- Zoning, land-use and floor-area-ratio for completely destructed cities

It is not appropriate to continue the existing regulations for zoning, land-use and floor-area-ratio in cities to be reconstruction completely and new regulations should be drawn up. Together with financial support for disaster recovery, vested interests over the influence of regulation on land-use and land price should be resolved within the overall plan of disaster recovery.

- Introduction of new system for land readjustment and allocation

The risk of tsunami should be managed by coastal dikes, urban spatial structure and evacuation planning. As for urban spatial structure, the evacuation site, evacuation route may need to be leveled up through land fill. Also, in order to apply to the recovery projects such as group relocation to high-land, relocation to central city, redevelopment of devastated cities and new city center development, it is needed to develop land readjustment system combined with advance land acquisition system and flexible system for setting and allocation of project area as follows.

- It is necessary to flexibly use the institutional systems such as purchasing the land (ex. for evacuation site) as a project of land readjustment, and setting project area flexibly (for example, even if there is urbanization control area, public agency may implement land readjustment scheme, or sets project area including separately purchased scattered land.
- The cost to achieve these urban spatial structures should not be burdened by landowners, and should supported by public funds
- It is necessary to implement improved schemes land readjustment that meet the above mentioned conditions and these can perhaps be commissioned by public agency or by Urban Renaissance Agency.

- Legal discipline for legal right adjustment <refer the proposals by Prof. Fukui in more details>

Even in the recovery from Kobe earthquake, the difficulty of adjusting legal right distorted the socially desirable urban development, and took a long time, and moreover that led to a vicious circle that made consensus building difficult. Since there are a variety of affected areas, devastating cities, the collapse of land by subsidence and liquefaction and aftershocks and future disaster risk, the situation is even more difficult for adjusting legal rights for the recovery. Therefore the question is how to ensure the legal discipline for adjusting legal rights. It is required to clarify the legal interpretation on the matters shown below.

- Clearly classify what private rights should be regulated and what should be compensated, for example compensation for loss, exercise of eminent domain, land use regulations for the vulnerable areas etc.
- Dealing with the land price before and after the disaster while purchasing land or providing compensations.
- Interpretation of the differences in land price according to the land-use and floor-area ratio in devastating cities.
- Rules for adjustment of legal rights for promoting replacement or large scale renovation of condominium building and so forth.
- Make property taxes in consistent with risk

- The introduction of new techniques for consensus building among residents

The wider-regional block plan for Tohoku area under the National Spatial Plan can be considered a high-level achievement. Re-organization of the wider-regional block plan after the disaster should be carried out along with the recovery plan. It is also necessary to legally consider the relationship between the existing planning system such as prefectural comprehensive plan and urban plan, and the recovery plan.

In EU and US, Spatial Plan is associated also with environmental planning and individual infrastructures planning, and it has been framed as one of the processes of PI (Public Involvement). For example, the necessity of the road that was agreed in spatial plan is never discussed again at the PI stage of road planning.

If such a rule can be established in the recovery plan which is an urgent matter, a culture can be expected to take root with an understanding that the opinions of residents should be sufficiently considered but the opposition for the sake of opposition should not be allowed.

Since a number of community development experts are required for implementation of PI concept, the dispatch from across the country should be called for. However they should be trained for PI techniques before dispatching. In comparison with the time of Great Hanshin Earthquake, the professional knowledge about this field (PI) has been advanced and there have been also many PI training programs implemented.

4.4 Enhancement of medical and welfare systems <refer the proposals by Professor Shimazaki for more details>

The characteristics of medical services in Tohoku are (1) acute shortage of doctors, (2) numerous local government's hospitals (in Iwate, mainly prefectural hospital, in Miyagi, mainly municipal hospital, in Fukushima, public hospitals as well as private hospitals). The hospitals in Sanriku coast which were affected seriously are mostly small-scale hospitals with less than 100 beds and bed occupancy rate is low. These hospitals face much difficulty to secure a doctor. Given these circumstances, we would like to propose the followings.

A simple restoration to the original state is not a wise option. What is necessary is to go for restructuring and networking of medical facilities including cooperation with core medical facilities and possible merging of facilities. If we consider that the hospitals in the affected regions are mostly small-scaled and bed occupancy rate is low, it is necessary to consider that the hospitals should be changed to clinics with beds, care facilities and housing with care.

- Although "Kashiwa model" proposed by the Institute of Gerontology at the University of Tokyo cannot be applied directly to the affected regions, medical, care and welfare policy should be positioned as a part of region building such as compact city development because these areas cannot avoid "Limit-village problem".
- Especially the coordination between medical and care policy and housing policy is indispensable. It should be considered to build facilities like barrier-free housing units with care service in lower floors,

housing complex for elderly in need of nursing care and for securing inhabitation in group home, and housing complex adjacent to hospitals or clinics with beds.

-It is important to prevent the anxiety of residents in the affected areas over the deterioration of medical functions. For example in case of replacing hospitals by clinics with beds, it is necessary to prevent the deterioration of medical functions. This can be achieved by backup system from core hospitals, by dispatching doctors and by using remote diagnostic by IT etc.

- Fukushima Medical University is conducting a pioneer project of training of family physicians. Also in Miyagi and Iwate prefecture it is necessary to consider the project development which can be the model of future vision of their medical policy

- Medical supplies in prefecture are mainly from public medical facilities, but it is important to promote maximum use of private sector's strength such as attracting social medical corporations with high motivation for public welfare.

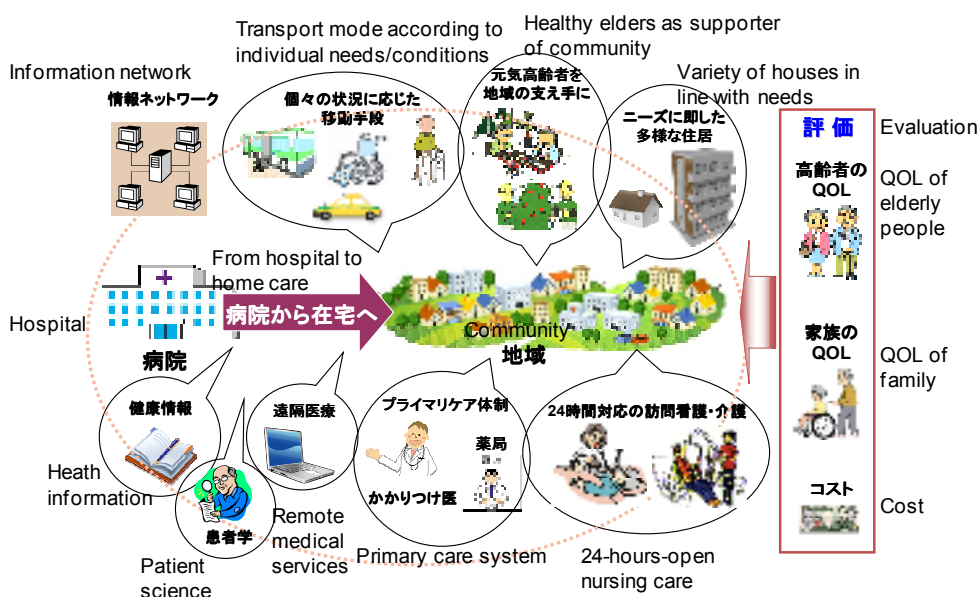


Figure 4 Image of "Kashiwa Project" (Institute of Gerontology at the University of Tokyo)

Proposal-5 Basic policy directions for the urgent issue of industrial revival

Most of the major national companies located in coastal areas hope to restore their operations in the same places, and local companies are also hoping for an early recovery. Also for the regions, it is desirable to secure the restoration of agriculture and the employment prior to the development of living environment. Despite the impending aging society, it is desirable to establish a sustainable and internationally competitive industrial structure. And it is important to respond to the potential risk of industries moving out according to the company's risk management strategy in the context of the tsunami disaster and shortage of electricity, and population outflow due to lack of employment opportunities up to completion of recovery.

5.1 Basic policy directions for the recovery of Fishery industries <Refer the proposals of Professor Komatsu for more details>

The fishing industry is the backbone of the affected areas, and fishery harbor, fishing ship, aquaculture facilities, markets, processing plants are devastated in this disaster. These facilities should be restored keeping in views the long-term strategy of the fishery industries in Japan. Specifically, the following policies are necessary.

- Development of landing pier, production-region's market place, and processing industry complex in the hinterland, and integrated planning of fishery industries.
- Fishing port aggregation and integrated development of port and fishery harbor.
- Introduction of modern resource management system

Fishery industries should be modernized by fishing holiday system, reduction of fish catch amount and ITQ (Individual transferable quota). Also, it is necessary to open the fishing right (aquaculture, stationary fishing) to private companies, and to provide fund to those who retire or temporarily stop fishing job.

- In case that the reconstruction of boats and aquaculture facilities by individuals are difficult, it is necessary to introduce the incentive measures for shifting to cooperation and commercialization.
- Modernization of the fishery and ensuring transparency
- Transparent consultation about fishery compensation for the areas affected by reconstruction works (Also consider the consultation about waiving of fishery compensation for the area affected by reconstruction works)

5.2 Basic policy directions for the recovery of Agriculture

The agricultural land from Aomori to Chiba which was affected by the disaster is seriously damaged with cracks in the soil, land subsidence and destruction of irrigation facilities etc. The damaged area is around 24000 hectares (equivalent to 2.5% of the national agricultural land) including the area which was flooded with the seawater by the tsunami.. In Sendai, Miyaginohara in Sendai plain which is breadbasket in northeastern Japan has been seriously suffered, and this area was originally damp rice-field land and was reclaimed by the drainage projects after the Meiji era. Needless to say, the reconstruction of destroyed agricultural roads, irrigation and intake facilities in this region is a fundamental precondition for the revival of agricultural in the future.

Specific proposals are as follows.

- In case that the reconstruction of farms and farm equipments by individuals are difficult, it is necessary to introduce incentive measures for shifting to cooperation and commercialization.
- For Miyaginohara, the disaster prevention measures combined with reconstruction of villages with circular levee.

5.3 Priority decision on coastal industrial land

Because housing in coastal areas should be undesirable and securing the employment market is an urgent issue, fishery market, food processing, shipbuilding, pulp and oil refineries which have a strong hope to locate in coastal areas should be allowed to be reconstructed prior to the restructuring of land use based on the city master plan. . It is also appropriate to entrust each company to acquire lands for

the adjacent expansion.. The problems for this proposal include, first the coastal subsidence, and second the tsunami by aftershocks and the preparation for big tsunami in the future. As mentioned earlier, if in the central city the reconstruction will be done in the area including low-land area, the development of coastal dikes for normal tsunami will be assumed as the condition of the city reconstruction. In addition, port development and land subsidence measures are possible to start early by utilizing concrete rubble and the soil generated in development of new villages in high-land area by cutting the mountain. Of course, this does not prevent the companies to locate on high ground. This industrial relocation also assumes that fishery ports are aggregated compactly and developed together with the processing industries. What is expected is the incorporation of fisheries, the restructuring of the core organization and modernization of the fishery cooperatives.

5.4 Urban industries such as commerce should be reconstructed by restructuring land use

Urban industries such as commerce should be aggregated in principle in accordance with zoning defined in the reconstruction plan of the central city. In that case, by taking into account that the hollowing out of the city could not be solved before, the aim should be to form a new, attractive and vibrant city center. Specific suggestions are as follows.

- Conversion of large stores located in suburban area to city center
- Introducing competition system for the design of commercial area in city center and role sharing between public and private
- Introducing IT in local commercial business and support to logistics restructuring (strengthening the competitiveness of local companies)
- Securing space for loading and unloading of freights, and aggregation of mandatory parking spaces.

5.5 Countermeasures for the behaviors of large national companies in Tohoku region

The companies are facing the necessity to change BCP strategy, because the impacts of the disaster damages on their manufacturing hub facilities has the global spread and the power shortages problem has emerged. As Tohoku region have had a vision to strength industrial competitiveness in its wider-region block plan, it is necessary to prevent the weakening of its realization due to the exodus of companies. Therefore, In order to discourage the possible exodus of companies, the support and incentive measures for restructuring should be urgently implemented from the viewpoint of crisis management.

5.6 Develop Sanriku region as international tourist destination

The goal of recovery from disaster is the formation of a region which can have pride, and we would like to aim to create further employment in Sanriku region. The number of cities which are possible to have a function as central city within a certain distance increases in the southern area in Sanriku, such as 150km from Hachinohe to Miyako via Kuji, 60km from Miyako to Kamaishi, 40km from Kamaishi to Ofunado, 20km from Ofunado to Rikuzen-takada, and 20km from Rikuzen-takada Kesen-numa. Although the environment in each area is different and not simple such as nuclear power plant and competitiveness among the cities, the Sanriku region has a big potential as tourism site by comparison with fjord coastal area in Norway. We would like to aim to develop this region as an international tourist destination as tourism a key industry in the region. When a goal of international tourism

destination is set along with mobilization of local strengths, government support can be much effective. We would like utilize the increase in the name recognition worldwide by the disaster and great recovery for the international tourism development. Specific recommendations are as follows.

- Allocation of the tourist accommodation in the appropriate size and distance interval (developing central cities and small villages as tourist hubs)
- Development of inland routes and creation of coastal tourism routes.
- Creation of Japanese-like scenery including residential living space in the city and villages.
- Developing fishery harbor and market as tourism facilities
- Development of the monument celebrating the supports from domestic and international donors

Proposal-6 Basic policy directions for infrastructure reconstruction and development

Transportation, water and sanitation, information and energy facilities suffered severe damages, but they have been rapidly restored by the efforts of public and private engineers and Self-Defense Forces (with the exception of nuclear power plants) because there were a series of experiences since Kobe earthquake. Here, we propose the matters that are considered to be important for the recovery.

6.1 Policy directions for the development of Road and rail <Refer the proposal of Professor Hibino for more details>

Since development of transportation network is closely related with the disaster recovery and community development, it is necessary to decide promptly on the routes to be constructed, the level and standard of reconstruction and the time-schedule. The facilities should be not only restored to the original state but also further strengthened, and the subsidy is needed for the purpose. We propose the following measures for road and rail.

- Development of Route 45 Bypass Route in high-land area and the relocation of villages along the route

If the land for village relocation is developed along the Route 45 bypass in highland and new bypass development is linked to these projects, the creation of wider-region inhabitation area can be enhanced and that can also avoid duplicate investments for the development.

- Development of road using the disaster debris that have a function of disaster and tide prevention

Road is developed with embankment that functions as transportation network, shelter site for evacuation and tide-prevention structure. By using disaster debris, a large amount of debris generated can be disposed.

- Development of livelihood services and evacuation function in "Roadside station (Michi-no-eki)"

In addition to traffic information and services such as gift shops, it is necessary to add new functions to Roadside-station in high-land such as livelihood service functions in usual time (city-hall function, post office, bank, etc.), and evacuation function as a shelter.

- Widening of the street for emergency vehicles passage and fire prevention

In the Kobe earthquake, we could observe the many cases that the fire was spread by crossing over less than 8m width roads, and it becomes clear that less than 4m width defined in building standard and moreover 6m width in good residential areas are not enough width. Figure 5 shows the road width and the effectiveness for preventing the spread of fire, and figure 6 shows the collapse of the buildings along the road and the level of road closure. According to these results, for the disaster prevention, it is desirable to secure the width of more than 12m for arterial roads and the width of 8m for town streets. However in case it is difficult, it is necessary to consider to prevent disaster by using private spaces such as by ensuring 1m at both sides between the road and building walls.

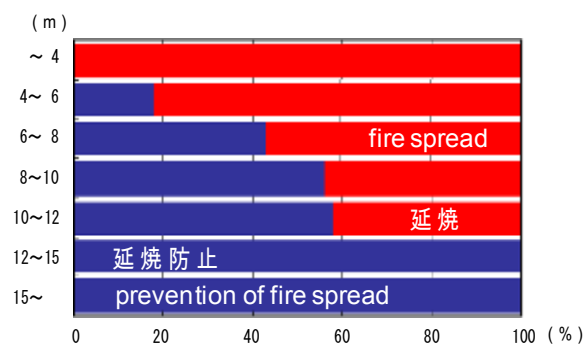


Figure 5 road width and the effectiveness for preventing the spread of fire (Hanshin-Awaji Earthquake: Nagata Ward)

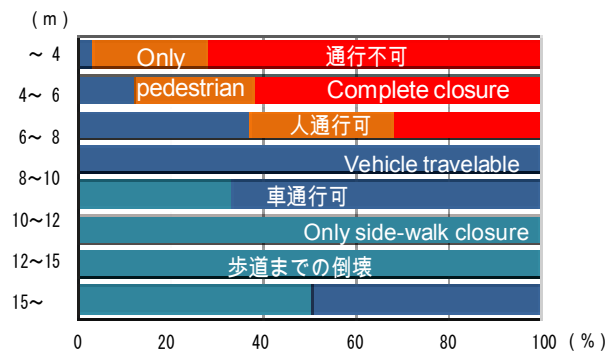


Figure 6 collapse of the buildings along the road and road closure level (Hanshin-Awaji Earthquake: Urban Disaster Handbook)

- Creation of railway subsidy system that enables route change and restoration to strengthened level

Development of railway subsidy system is necessary to enable route change and restoration to the level more strengthened than before the disaster. Also, for the 3rd sector railway companies which are facing severe business conditions, the system for vertical separation and subsidy for operation should be introduced by considering restructuring villages etc.

-Establishment of a national natural disaster insurance scheme for local railway

In order for local railways to survive, the countermeasures for earthquakes, tsunamis as well as flood, etc. is indispensable. After disaster, one should not stop the business of railway, but should consider first whether the railway route is needed or not. And based on that, a national natural disaster insurance scheme should be established by cooperation between public and private.

- Selection of railway routes which should be recovered by considering wider-region inhabitation area, and subsidy to bus company

For aggregation of life service (commercial, cultural, educational, hospital, and welfare etc), it is indispensable to select railway routes which should be recovered. As for the route which cannot be recovered, bus service is needed and the subsidy for its operation is needed.

6.2 Port and Waterfront industrial land <refer the proposals of Professor Inoue in more details>

For disaster recovery, it is important to further strengthen the resistance of port to earthquake and tsunami, but the countermeasure for tsunami should be considered by separating the tsunami level as the same way as the countermeasures for earthquakes which has started after Kobe earthquake. It is technically difficult and not necessarily rational to develop the high-standard tsunami prevention measures for whole area of the port, even though the high-standard measures may be needed for urban areas. While the focus should be on reconstructing the major ports facilities, it is equally important to develop facilities for protecting the people's lives working at ports and to facilitate the strengthening of training for evacuation.

- Measures against earthquake

-The quay which has seismic strength are being developed for ensuring the transporting evacuees and emergency supplies when a large earthquake occurs, but in the Tohoku, Shikoku and Kyusyu region, at the current stage there are many ports which do not have such a strengthened quay. So it is urgently needed to develop that. Also, arterial roads, bridges and tunnels which link to such strengthened quay should be developed with sufficient aseismic resistance.

-For the land subsidence at the port area caused by this earthquake, it is necessary to level-up the land over the wide area. Government should promptly define the newly required elevation of land by considering also the sea-level rise due to global warming, and the leveling-up of the land should be strategically implemented by using the debris in affected areas and the earth generated by various reconstruction projects.

- Measures against tsunami

-Design standard for port structures such as breakwaters and quays must be reviewed by considering impact force of tsunami and backwash effect of the tsunami. The rational and effective planning should be done that is consistent with urban area's tsunami prevention plan for big tsunami (for example, development of breakwater which allow overflow to some extent). Also it should be considered to use multiple dikes system by further strengthening the existing breakwater structures.

-In order to prevent stranding and capsizing large ships moored in the port by backwash of the tsunami, it is necessary to make water depth deeper than the normal extra water depth (0.5m) especially in the wharf in front of the pier with seismic resistance and hazardous goods piers.

-Because many of the sailors in vessels engaged in international trade are foreigners, it is difficult to encourage the ships in the port to evacuate to outside port by tsunami warning in Japanese language. Therefore, an internationally compatible tsunami warning, sirens for evacuation instructions outside port and emergency communication signals should be immediately established in collaboration with UN and other international organizations.

-It is necessary to install a fence around the freight yard to prevent loss of large amount of cargos handled in port, especially containers and cars, to urban area and inside port by tsunami.

- Seafront plants located in port

-The strength of private seawall facing the ocean against earthquake and tsunami should be urgently reinforced. In some cases, by bringing them under public domain, the development should be publicly done as a part of regional coastal disaster management.

-As for the manufacturing facilities and storage tanks for hazardous materials such as oil and gas, the structure and allocation of the facilities should be reviewed in order to prevent the damage from the tsunami in the future. Also, if city is located close to the coast, a buffer zone (used as public recreational facilities in usual time) should be secured in the process of reviewing the land use in coastal areas.

-Waterfront facilities located in Port

-In recovery of waterfront facility located in port, because the terrain of most areas do not have a high-land behind them, it is indispensable to reform the structure which enables many citizens and tourists to evacuate safely at the time of tsunami, or to build evacuation building in the neighborhood.

6.3 Introduction of comprehensive watershed management

Supply of sands (sediments) to the sea is decreasing mainly because of erosion control measures in watershed areas, retention of sediments due to the building of dams and extraction of sediments from the river. , This causes coastal erosion, and we are facing the risk of the loss of beach. To address these issues, the comprehensive soil management is needed.

Also, due to this earthquake, failure of dam occurred for the first time in Japan, and human lives have been lost. There are also cases of water leakage from some other dams, where repair and reinforcement of dam structure have been conducted.

Removing the sediment from reservoirs can enhance its functionality and including reduction of the earth pressure on the dam. However there is only a limited scope of implementation for this measure mainly due to the high cost of its sediment transport. Since a large amount of sediment is now required for the measure to solve the problem of salinity in agricultural lands and the land subsidence problem, the projects for removing the sediment out of reservoirs should be considered.

III. Funding and financing for disaster recovery (Proposal-7)

<refer the proposal of Prof. Igawa for more details>

Before the Kobe earthquake, the financial condition of Hyogo Prefecture and Kobe City was relatively good, but after the earthquake it became worse considerably as shown in Table 2 and 3. With comparison to that situation, the financial condition of the local governments suffered in this disaster is fairly severe even before the disaster. As shown in Table 4, after Kobe earthquake a recovery fund of about 900 billion yen was established by bond the interest of which was burdened by the government, and the return by the fund management became 350 billion yen due to high interest rate (reference: Development bank of japan)

Table 2 Financial condition of local governments suffered from Great East Japan Earthquake (reference: Development bank of japan)

Prefecture	Size of public finance	Debt / fiscal size	Debt / population
Iwate	390 billion yen	3.94	110 million
Miyagi	460 billion yen	3.26	640,000 yen
Fukushima	480 billion yen	2.75	630,000 yen
Sendai	220 billion yen	3.51	760,000 yen

Table 3 Financial condition of local governments suffered from Kobe Earthquake (reference: Development bank of japan)

	Financial scale	Debt / fiscal scale	Debt / population
Hyogo	8100 billion	1.35 (Max 4.96)	20 Million (Max 75 million)
Kobe	3400 billion	2.66 (Max 5.95)	61 Million (Max 163 million yen)

Asset managed (0.1 billion)	Rate of return	Managing period	Return (0.1 billion)
運用財産	運用利率	運用期間	運用益
5,800億円	4.5%	10年間(1995.6.27~2005.6.27) 10yrs	2,610億円
		5.5ヶ月(2005.6.27~2005.12.12) 5.5mos	120億円
3,000億円	3.0%	5年間(1997.3.27~2002.3.27) 5yrs	450億円
		4年間(2002.3.27~2006.3.27) 4yrs	360億円
合計			3,540億円

(備考)(財)阪神・淡路大震災復興基金資料より作成

Table 4 Return by the management of recovery fund for Kobe earthquake (reference: Development bank of japan)

Local governments' financial index (FY 2009) in disaster affected areas are quite lower than that of Hyogo prefecture as 0.63, such as Iwate Prefecture as 0.31, Miyagi as 0.54, Fukushima as 0.46. Also as for the municipalities, the financial index was 0.71 in Kobe, and Sendai has 0.71 that is better than Kobe, but many municipalities in affected areas have low financial index such as Miyako City 0.36, Rikuzentakata 0.28, Kesennuma 0.43, Minami-Sanriku 0.31, and 0.41 Yamamoto-cho.

In addition to the weak financial strength of the local governments suffered from this earthquake, the scale of damage caused by this disaster is estimated to be much higher than that of the Kobe Earthquake.

Under such circumstances, how to secure the necessary financial resources for disaster recovery becomes a big challenge. There is discussion about the introduction of new taxes aiming for the disaster recovery (creation of disaster recovery tax, temporary increase in sales-tax) as well as the fund by issuing national bonds. By considering these points, we would like to propose the followings for securing funding and financing for the disaster recovery, especially for the funding resources for the local governments.

- Increase in the issuance of national bond and introduction of disaster recovery tax
- Decide on the basic stance for securing necessary funding for the recovery of local government bodies, such as fund to be generated with the responsibility of national government but maintain and respect the autonomy of local governments.
- Establishment of earthquake recovery tax and a system for allocation of the tax revenue.
- Establishment of Local Government Fund (Earthquake Recovery Fund, disaster countermeasure fund)
- Establishment of Earthquake Recovery Project bonds (municipal bonds)

As described in Proposal-2, private finance is also important, and the policies to promote its use are also important.

IV. Utilization and further development of new technologies (Proposal-8)

During the recovery process, it is desirable to introduce technologies that are appropriate to a technology-oriented nation like Japan. The situation in fact offers an opportunity to promote technology development. . Through the detail investigations on disaster events, we have already generated new understandings and knowledge such as Tsunami phenomena through real videos and impact force of the tsunami, and the generation and the propagation mechanism of earthquakes. Also the results from the verification of the effectiveness of the countermeasures will be utilized for the structural design in the future. Here, we propose an idea for the development of new technologies which is also strongly reflected in the views of our faculty members.

8.1 Promotion of new technology development for both energy consumption reduction and economic revitalization <Refer the proposal of Professor Sumikura>

Public offering of the ideas of urgently needed technology and product development support, and support dissemination

8.2 Management system to advance recovery projects reliably, swiftly and effectively (WBS)

In order to swiftly formulate the recovery plan, to plan and design a broad range of projects, and to advance them by considering the optimality and priority, use of WBS (Work Breakdown Structure) as a management system could be much helpful. WBS has been used for big or complex projects such as space exploration, which helps to clarify a schedule, role-sharing, costs, progress and priorities.

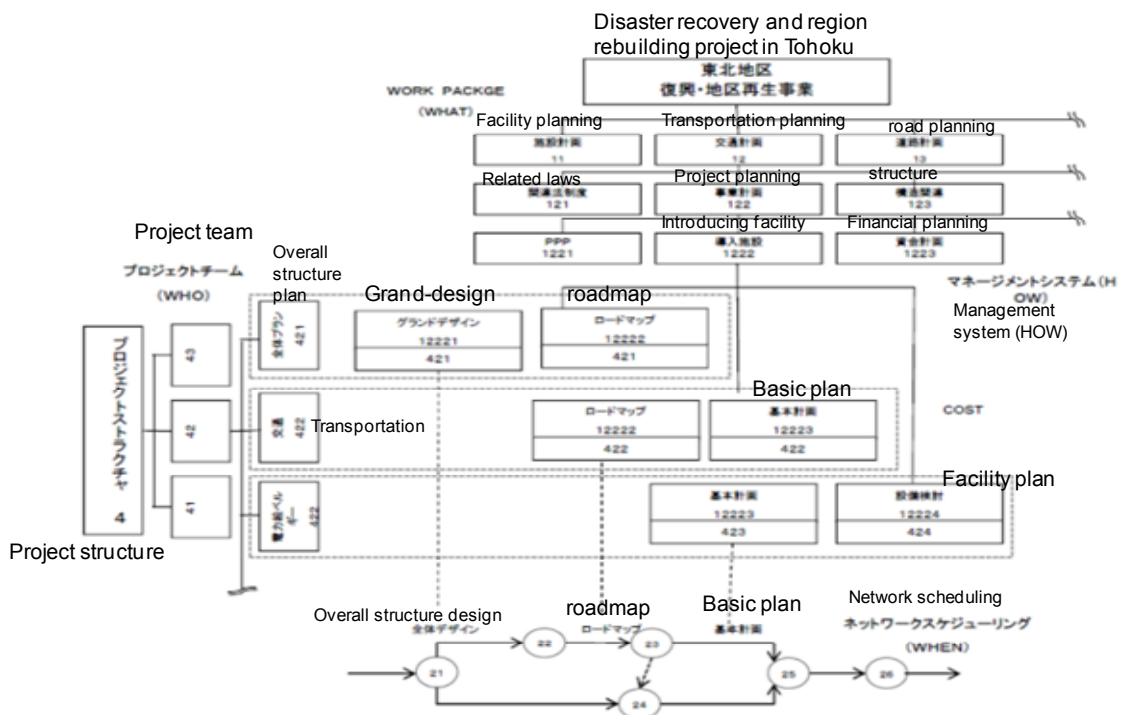


Figure 7 Management system for disaster recovery (WBS)

8.3 Disaster resistant telecommunication network

The utilization of the strength and creativity of private sector to promote PPP type telecommunication network as well as disaster warning and evacuation information system, is important not only for the disaster preparedness but also for supporting the early realization of recovery of Tohoku region. A range of tertiary industries such as IT should be attracted in Tohoku region that can create possibilities for new services and generate employment opportunities in the region.



Figure 8 information and communication systems for disaster prevention and recovery

8.4 Transportation system utilizing the latest mobile technology

This idea is to develop new logistics system by utilizing automatic driving technology linking the new logistics terminals in coastal areas (demonstrated at New-Tomei expressway in 2010). Another idea is to introduce transportation system (BRT) utilizing the same technology, which is expected to be implemented in the Joban Expressway.

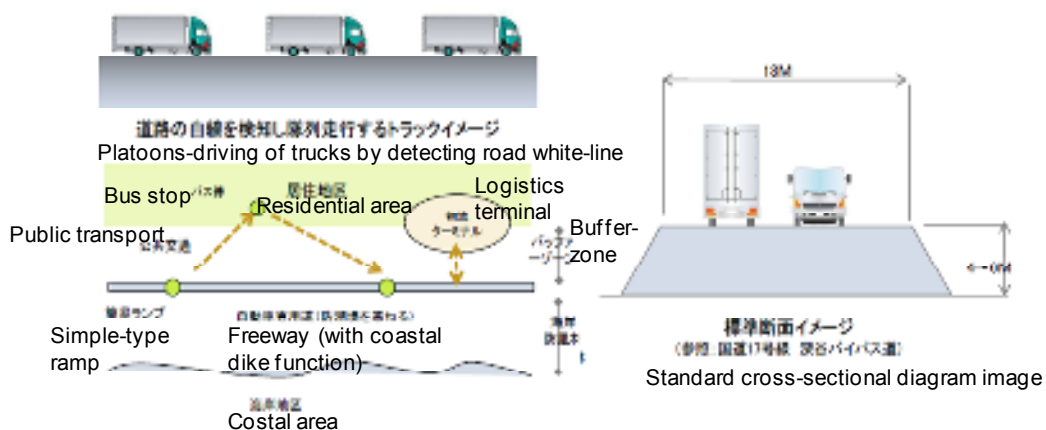


Figure 9 New road transport system

8.5 3D digital databases of infrastructures

The data on the location and shape of infrastructure in the absolute coordinates are not currently well-managed. These data are important to formulate a disaster recovery plan efficiently and rationally as well as for disaster prevention and preparedness. We therefore propose to establish a system of 3D digital data of infrastructures. This can be used not only for design and construction management but also for the inspection and enables organizations to make site management much more efficient. Also this is effective technology for recovery projects which must be completed in short time with limited number of engineers in each municipality.

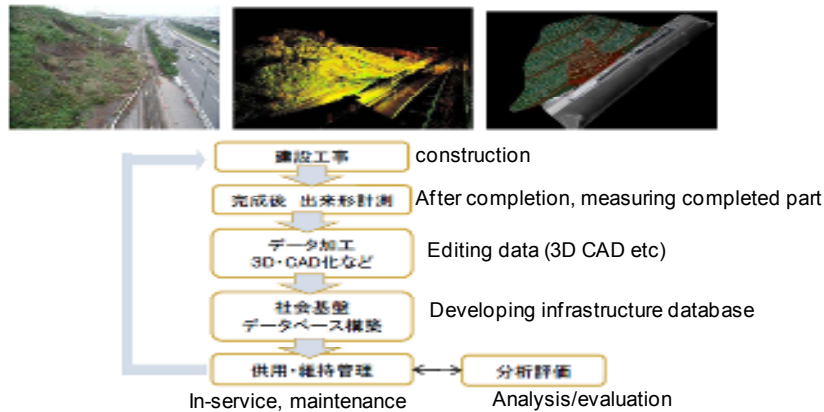


Figure - 10 3-D digital database

<Refer the proposals of Professor Hibino for more details of 8-2,3,4,5>

VI. Conclusions

Finally we would like to add the following three points; **first, the international perspective on disaster information and recovery, second, the drastic review of support system for disadvantaged areas toward post-recovery, and third, the preparedness for Tokai/Tonankai/Nankai earthquake and near-field earthquake.**

- Disaster information and recovery from international perspectives

The issues on the information provision to the world have been clarified such as nuclear power plant and reputational damage issues. Also, much assistance from abroad including technical assistance from developed countries and from developing countries gave us Japanese the opportunity to change our perception about the international society. How to deal with the need assessment on affected areas by many foreign NGO and NPO and how to utilize the financial resources such as donation have not been considered much in the past. It is necessary to consider these responses from the international community's in their entirety. In addition, it is our country's duty to utilize the experience of disaster suffering and recovery for the benefits of international community through international cooperation.

- Drastic revision of institutions for supporting disadvantaged regions looking towards post-recovery era

Most of the affected areas are disadvantaged areas and also facing aging society. Recovery is aiming for a sustainable region, but the affected area needs a continuous support even after the recovery. Although the policy for disadvantaged areas consists of various policy measures such as Mountain Village Promotion Act, Remote Islands Development Act, Peninsula Development Act, and Special Soil Act, it is not exaggeration to say that the contents are only about some abatement of the burden of local areas. What is needed is not a public work projects nor Hakomono, but a support for sustaining the livelihood services such as transport, medical, welfare, education and commerce. The

comprehensive amendment of the abovementioned acts is indeed difficult because they are related to many ministries and agencies, and also include lawmaker-initiated legislations. By taking this opportunity, these acts should be abolished at once and a new law should be enacted to better reflect and address the actual situation of the disadvantaged areas. For example, the new law should accommodate many news proposals such as Teijyu-Jiritsu blocks scheme proposed by Ministry of Internal Affairs and Communications, and the policy should be restructured by considering efficiency such as support for local industries such as tourism and forestry and support for village restructuring. There are examples in overseas to be referred such as Public Service Obligation in EU and Sparsely-populated area policy in South Korea.

- Preparedness for Tokai/Tonankai/Nankai earthquakes and near-field earthquakes

One of the reasons why the damage from the earthquake vibration on the structures was not so severe this time is that the reinforcement after the Kobe Earthquake could work effectively, but there are also some aspects of luck such as that earthquake vibration which causes big damage is localized, that large-scale sediment disaster and fire was limited, and that the damages to trunk routes were relatively mild. However, many problems are occurred such as tsunami, nuclear accident, liquefaction and subsidence over wide areas, failure of dam and the global impacts due to damage on production facilities and resulting disruption on supply chain.

Based on these experiences of Great East Japan earthquake, initiatives should urgently be taken to prepare plans for the prevention and preparedness considering the possibility of big earthquake disaster in future. For this, we would like to bring up the following items as important issues.

(1)Review of the wider-regional block plan

Reassessment of the wider-regional block plans to include the disaster prevention components.

(2)Review of hazard maps

After restructuring the system for the preparation of hazard maps as mentioned above, new hazard maps should be prepared including areas outside the urban areas where railways and roads exist.

(3)Review of tsunami countermeasure and Land Use Control

Strengthening the land use control in accordance with the amendment of hazard maps, and developing the tsunami disaster prevention measures such as securing evacuation site.

(4)Review of disaster prevention level of arterial transport routes

It is necessary to identify the area that cannot secure the rescue road when tsunami occurs in the coastal area such as in Nankai and Shikoku areas. In these areas, it is important to implement measures for emergency evacuation and make provision for high-standard road in the context of disaster prevention functions. For coastal airport, it is necessary to carry out measures against liquefaction of any part of the runway and aprons which are the basic necessity at the time of disaster. , And at the same time it is necessary to designate nearby buildings for evacuation site. Also for ports, it is necessary to implement aforementioned countermeasures.

As mentioned at the beginning, this proposal is drafted by Policy Research Center in GRIPS after calling for ideas from members of GRIPS faculty who are from various disciplines related to policy research. Together with the first-stage proposal, these detail proposals made from individual GRIPS faculty are also accessed in the University's Web Site (<http://grips.ac.jp/jp>).

We hope that these wide-ranging proposals can help for making a recovery policy in the future and the recovery plan in each region.

(Drafted by Shigeru Morichi, Director of Policy Research Center, GRIPS)