Urban planning and recovery

In: Recovery two years after the 2011 Tohoku Earthquake and Tsunami: a return mission report by EEFIT

Stephen Platt

Published online March 2015 at: www.carltd.com/downloads

This chapter was published by EEFIT. The complete report may be downloaded at:


Reference:

RECOVERY TWO YEARS AFTER THE 2011 TÔHOKU EARTHQUAKE AND TSUNAMI: A RETURN MISSION REPORT BY EEFIT
Recovery Two Years After The 2011 Tōhoku Earthquake and Tsunami:
A Return Mission Report by EEFIT

Mr. Antonios Pomonis, Cambridge Architectural Research Ltd. (Team Leader)
Mr. Joshua Macabuag, University College London (Editor)
Mr. Carlos Molina Hutt, University College London (Editor)
Prof. David Alexander, University College London
Mr. Anton Andonov, Risk Engineering Ltd.
Dr. Catherine Crawford, University College London
Dr. Stephen Platt, Cambridge Architectural Research Ltd.
Dr. Alison Raby, University of Plymouth
Dr. Emily Kwok Mei So, University of Cambridge
Dr. Ming Tan, Mott MacDonald
Dr. Joanna Faure Walker, University College London
Mr. Jack Yiu, Arup

Report prepared in association with:
Dr. Maki Koyama, Kyoto University
Professor Hitomi Murakami, Yamaguchi University
Dr. Anawat Suppasri, Tōhoku University

Report cover:
Photos of the Crisis Management Department Building in Minamisanriku taken during the 2011 (top) and 2013 (bottom) EEFIT missions.
6. Urban planning and recovery

One of the current issues in Japan is the reform of the city planning system that originated 120 years ago after the 1896 Meiji Sanriku event. The general direction of reform is towards greater 'decentralisation' and 'participation' (Watanabe, 2010). This process may have been accelerated by the Great East Japan Earthquake of 2011.

Urban planning in Japan developed in the early twentieth century in response to strong urban growth. The City Planning Act 1919 had five main components:

- Land Use Zoning (residential, commercial & industrial);
- Urban Buildings Law (height, material etc.);
- Public Facilities designation (improve accessibility);
- Building Line system (build only along 'roads' >2.7m wide);
- Land readjustment system (part of private land as public space).

The result was a strong centralisation of power, a relatively weak civil society and an urban planning system directed from above that has persisted until today (Billsjo et al, 2009). Prefecture Councils were in charge of drawing up regional plans, and there was limited co-operation between prefecture councils and local councils in city planning. However, since 2000 decision-making authority has gradually been transferred from prefecture councils to the local councils, and even to city planning agencies and a more decentralised process was emerging in Japan (Muraki and Takano, 2001).

The prevention of urban disasters is an important feature of urban planning and wooden structures, which account for more than 80 per cent of Japan's housing stock, are exposed to earthquakes, floods, slope failures and to the risk of conflagration (Alden, 1986). Ohsugi (2010) looks towards greater democracy in local planning. If decentralization reform continues there is likely to be further increase in the discretionary powers of local governments and an expansion of their administrative authority, based on the needs of local residents. But Shibata (2008) suggests that all planning objectives in Japan were in the end equated with nation building. While Japan's planners now aim to protect amenity and cultural heritage as well as enhance the quality of life, the legacy of early planning still holds reform. This overarching concern with nationhood may be one of the factors determining the National Government's response to this disaster.

6.1. Post disaster urban planning in Japan

Recovery is to be guided by a new concept that accepts the possibility of disaster and aims at disaster education. It is also to be based on listening to the voices of the people affected. (Reconstruction Design Council, 2011) This report to the Prime Minister also defined five types of region, based largely on topography, for each of which it proposed a different mix of reconstruction measures, particularly in terms of coastal defence and relocation.

Recovering from a disaster involves the kinds of development and planning activities – land use plans, building norms and transport plans – that happen at any time. What is unique in post-disaster situations is that all these activities transpire concurrently in a much more compressed period of time. A key challenge in recovery is balancing the need for both speed and deliberation. Communities must rebuild as quickly as possible in order to maintain existing social and economic networks. But they must also be deliberate in order to maximize the opportunities disasters provide for improvement (Olshansky and Johnson, 2010).

We know from scenario planning with disaster management personnel that people’s appreciation of time is disrupted and changed by a disaster and that time is not compressed uniformly, rather it conforms to a logarithmic scale (Platt et al., 2013). In Japan, the initial search and rescue, clean-up, opening of access and provision of relief and temporary shelter was extremely quick and efficient. And the initial modelling, issuance of guidelines and budget allocation by the central government was also exemplary. But the two worst affected prefectures, Iwate and Miyagi, have now entered a more complex and difficult phase of balancing speed and deliberation and this change of pace was noticeable during the field trip and has meant that displaced people will have to spend longer in temporary accommodation than is generally the norm. This may mean that the resulting changes will
more closely match the opinions of local people or it may result in further decline and shrinkage of already fragile economies and communities.

6.1.1. Planning process: coordination, regional strategy, city plans

In Japan the planning process is complex and relatively slow. Japan has a centralized political structure in which the national government maintains close oversight over the prefectures, cities, and other local governments (Sorensen 2004). Pre-tsunami, the three main components of Japanese planning law were: zoning, land development permissions and urban planning projects (Wakamatsu, 2001).

The government immediately sought to broaden the recovery strategy by setting up an advisory panel composed of a team of respected intellectuals, academics, religious figures, and elected officials. Within two months of the disaster, this council issued ‘Seven Principles for the Reconstruction Framework’. This in turn became the basis for the government’s Basic Guidelines and Basic Act on Reconstruction (GOJ 2011a and 2011b), issued 3.5 months after the disaster (World Bank, 2012a).

The Basic Guidelines for reconstruction were decided by the National Policy Unit three months after the disaster (Government of Japan, 2012). It was decided that the main administrative actors were Municipalities and the role of the central government is to present guidelines for reconstruction and provide support on finance, human resources and know-how. The timeframe for reconstruction is 10 years, with a concentrated period in the first five years. The budget allocated of ¥23 trillion overall with ¥19 trillion in the first 5 years reflects this emphasis. It was also decided to create a Special Zone for Reconstruction.

A new governmental agency, called the Reconstruction Agency was established in February 2012 that reports to the Cabinet. Its aim is to plan and coordinate all national reconstruction policies and measures and to support the efforts of afflicted local governments by serving as a ‘one-stop shop’. Japan’s top priority is accelerating the revitalization process and the focus is on policies that benefit economic revival, reconstruction and crisis management. As proof of this commitment the budget for reconstruction in the first five years has been increased from ¥19 trillion to ¥25 trillion (US$266 billion) (MOFA, 2013).

Figure 6.1 Recovery Governance Structure post GEJE (Iuchi, Johnson and Olshansky, 2013).
Iwate Prefecture published the final version of its plan for reconstruction on 11 August 2011 (Iwate Prefecture, 2011). Its principles include promoting safety, tsunami mitigation, coastal protection facilities, and city facilities. It also included a set of recommended reconstruction patterns that are generally consistent with the national reconstruction vision. Miyagi formally adopted its reconstruction plan on 19 October 2011 (Miyagi Prefecture, 2011). The plan proposed distinct patterns of reconstruction for urban and rural areas. In urban areas it proposed moving housing to higher ground on the hillsides and locating industry near the water but behind tsunami levee protection structures. In rural areas it proposed tsunami protections using elevated highways or rail lines to protect agricultural areas. The two plans also include a variety of infrastructure and economic development concepts.

6.1.2. Land use and transport

The fundamental national government directive is that industrial buildings are permitted in the hazard zone, but no housing. New housing can only be located 2m below the Level 2 run-up hazard zone. The new building code requires buildings to be no more than 5 stories with a ground floor shop or parking space and living space above.

Political initiatives for building disaster-resilient towns are underway, including the collective relocation of residential areas to safe places such as higher ground, in 276 districts in 26 Municipalities, and the readjustment and levelling of land for residential areas in 58 districts in 19 Municipalities (MOFA, 2013).

To speed up reconstruction a package of special measures are available to 227 designated municipalities that include regulations/procedures, taxation, financial and fiscal assistance as well as land use restructuring. The measures include relaxing and simplifying regulations and procedures, particularly for the conversion from agricultural land to other uses, tax breaks for employees and new
businesses, grants and interest rate compensation for reconstruction and, most relevant for urban planning, special arrangements for land use restructuring beyond existing land use frameworks (urban area, farming area, forests, etc.) and relaxed requirements for floor area ratio for buildings designated for tsunami evacuation (Reconstruction Agency, 2013).

Figure 6.3 Special measure for land readjustment (Reconstruction Agency, 2013).

The most significant aspect of these is that whereas previously it was unlikely that permission would be granted for urban development in restricted areas or to convert agricultural land to urban use, permits can now be granted in special measure Municipalities. And whereas previously authorization for this kind of change of use was needed from multiple authorities, now all that is needed is public consultation at meetings attended by representatives of the national or Prefectural government if deemed necessary after which permits are processed by a single local authority. As well as special permits, revisions to City Plans, Agricultural Land Utilization Plans and Developing Project Plans can be processed by a single authority.

Table 6.6.1 Principle land use changes envisaged.

<table>
<thead>
<tr>
<th>Land Use Change</th>
<th>Scope</th>
<th>Progress</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land readjustment</td>
<td>20 Municipalities and 58 districts</td>
<td>61%</td>
<td>Urban planning decisions, not implementation</td>
</tr>
<tr>
<td>Collective housing relocation</td>
<td>24 Municipalities and 245 districts</td>
<td>92%</td>
<td>Consent of Minister for Land, Infrastructure and Transport, not implementation</td>
</tr>
</tbody>
</table>

Plans to seek special measures for the authorization of land restructuring can be formulated by Municipalities alone or jointly with the prefecture. The proposed changes have to be announced and displayed in public and there has to be public hearings and consultation before plans are agreed. Special permits are needed for the implementation of reconstruction projects but there is a single point of contact with the authorities instead of the multiple permits needed in normal times.

Municipalities are responsible for detailed land use planning and for producing the plan delineating blue zones where people will be collectively relocated, red zones where there is land readjustment and only commercial or industrial uses will be permitted, and green zones where there are fishermen who are thought to have greater resilience.

Municipalities empowered to apply local regulations, instead of relevant national regulations provided by the Factory Construction Act and the Act for Promoting Enterprise Construction, in terms of the ratio of green belt and environmental facilities provided. Zoning restrictions for industry have also been relaxed if the proposed development is deemed to be ‘compliant with the basic policy provided in the Plan for Promoting Reconstruction’. Two examples of this policy are provided. Example one is
in a commercial zone affected by the disaster, authorization is provided for the construction of a fish processing facility alongside restaurants or shops selling fish, in order to concentrate the manufacture and sale of marine products in a particular zone. Example two authorizes the construction of shops and medium-high story buildings in previously exclusive industrial zones where an embankment has been constructed in order to foster clustering of commercial activities (Reconstruction Agency, 2013). The statutory limit for temporary buildings, such as shops, factories, social welfare facilities and school buildings that are not generally allowed to remain in place for longer than two years and three months, has been relaxed in special measure areas and permission can be extended a year at a time until local infrastructure has been re-established.

In terms of transport-vital infrastructure such as major roads and rail networks, these were quickly restored. The Tōhoku Expressway reopened on 24 March 2011 for limited emergency response use and despite track displacement in over 2,500 places, the Shinkansen was back in operation only 49 days after the disaster (Fischer, 2011). Road transport links are now good and being improved with new highway construction and the national government is building a new motorway. The main railway line is operational but branch lines further up the coast, for example East Japan Railway Company’s Kesennuma line, have been abandoned and will not be reinstated. Japan Railways has decided not to restore the train line and the service is being replaced by bus rapid transit (BRT) and small centres, including Shizugawa and Utatsu that we visited, will lose their rail link. In contrast, in Onagawa they are raising the land and reinstating the railway line.

6.1.3. Use of information and science

All planning decisions about sea defences or relocation are based on site survey and hazard modelling. The modelling software was developed by IRIDeS and the Prefecture has contracted consultants to run the model for each settlement and the data was given to the city. From this the city made hazard maps. These simulated inundation maps are driving the changes. There are 24 bays in Miyagi Prefecture divided into sections. After consultants produced their findings they were checked by engineers from each Prefecture.

Ideally the consultants would do inundation simulations for different heights of embankment since in some places, the schemes have been opposed the local communities. 2012 legislation obliges local authorities to listen to and to a large extent accept what citizens want. Recovery is to be based on listening to the voices of the people affected and to be guided by a new concept that accepts the possibility of disaster and aims at disaster education. If people want something outside the government’s recommended solution then it is important that safety measures are in place and that the community has collectively relocated.

We visited IRIDeS in Sendai and spoke to Deputy Director Fumihiko Imamura; Professors Makoto Okumura, Yuichi Ono and Masato Motosaka; Associate Professors Kanako Iuchi, Anawat Suppasri and Jeremy Bricker.

The two key challenges to smooth land restructuring are that land boundaries are not clearly defined and many people remain unaccounted for or have evacuated to unknown locations. The National Government has been empowered to conduct a cadastral survey on behalf of local authorities. The survey has been completed for 90 percent of areas inundated by tsunami, compared with only 30 percent in Sendai and Miyako City. The clear identification of land boundaries will facilitate land acquisition and reconstruction.

Geographic Information System (GIS) is a basic tool for planning recovery and was first introduced in Japan in the 1970s (Fujisaki, 2011). However, most Municipal government have resources for information management systems (Kugo, Karube and Koshizawa, 2004). A survey of all Japanese local authorities in 1997 showed that 14 percent had implemented GIS. It was being used in three ways: inquiry about the content of urban plan decision, for planning, and for register management (Kohsaka, 2001).

As an example of the many private sector initiatives aimed at supporting local government GIS capability, Hitachi and TerraGo donated their GeoPDF technology to allow local government staff to create a property atlas/database needed to evaluate property losses. TerraGo also combined the
property atlas data with satellite imagery analysis of damage assessment in areas where the radiation levels were too high for field surveys. (TerraGo Technologies, 2011)

The government plans to use data from car navigation systems to monitor post-disaster traffic. Monitoring road and traffic conditions from helicopters and at ground level proved to have limitations immediately after the earthquake and tsunami and the Transport Ministry was able to check conditions on only 79 percent of national roadways by the end of day one. With the data, the transport ministry can find out which sections are impassable, either from damage or traffic jams. Unlike monitoring from helicopters, analysing car navigation data can allow authorities to grasp immediate traffic conditions even at night, and all roads, not just expressways, can be monitored. The information on closed road sections will be shared with expressway operators and local governments (The Japan Times, 2013).

Autodesk Infrastructure Modeller 2012 has been used by various local authorities to create 3D visualisations, for example in Otsuchi, north of the area visited by the EEFIT mission. The modeller can read a variety of data formats, including 2D CAD data, GIS, and raster images such as satellite photographs. It then imports structural models such as embankments and raised roads and produces a 3D image that can be viewed from different angles. This helps non designers understand what proposed engineering works will look like.

Japan is committed to incorporating advanced technologies and new methods into reconstruction initiatives, to ensure that communities are sustainable and energy-efficient (e.g. Future City initiatives in Higashi-Matsushima and others) and that new industries and enterprises benefit from the latest knowledge and technology (MOFA, 2013).

As part of reconstruction efforts, a budget of ¥ 8 billion has been allocated for smart communities that make use of renewable energy. The anticipated schedule is to develop a master plan by April 2013 with selected renewable energy projects, the development of housing that makes the best use of renewable energy and solar power generation.

6.2. Bay of Sendai

In Sendai we visited the main centres from Ishinomaki in the north to Yuriage-Natori and Iwanuma and Sendai Airport in the south. We saw evidence of the terrible power of the tsunami. The whole area looks scarred – the coastal forest we had seen on pre-tsunami aerial photographs has been removed and the few remaining trees are dying and the flat coastal plain has been abraded to a distance of 4-5 kilometres. One can see evidence of previous lives by the side of the road – a toilet brush, a teapot, a shoe. Only the bare footings of buildings and the occasional boarded up house or shrine has survived.

In Arahama, we were told that the government wants to remove everyone back behind a new 6m high embankment, but some people want to return to their homes. There was a woman resident at the roadside seeking signatures to a petition asking the government to reconsider the proposals. Before the tsunami, Arahama Village had a population 2,700. The wave was 10m and the inundation distance 5 km and 200-300 people died. But the four-storey elementary school we visited acted as an evacuation centre and saved the lives of 520 people.

We visited the major works on coastal defence in Yuriage and Iwanuma and also saw evidence of the huge clean-up operation – piles of sorted debris awaiting processing in large well organized processing sites. There was a debris reprocessing plant with an incinerator in Arahama and Yuriage and debris is being sorted into what can be recycled, burnt or buried.

In Yuriage the spit that protected the harbour entrance is entirely gone and the areas near the sea will be abandoned. The main livelihood is fishing and fish processing and we saw some evidence of the return of the fishing fleet. This was a prosperous area with large detached houses and a population of 7,000. But only the most robust concrete structures survived. The government plans to reduce the built-up area by half and raise the land by 5m. Some people want to return, but the majority want to relocate to a safer area.

We visited an ancient hill that had been over topped by the tsunami and a secondary school where the clock stopped at 2.46 when the earthquake struck. We also went to a second school where lost
property had been laid out and sorted into piles: musical instruments, cameras, bags, dresses, family shrines, footballs, and most disturbing, photo albums.

6.2.1. Yuriage Village, Natori City

We met Sato Hiroshi and Aizawa Yuriya, Municipal Planners, Natori City. The following are notes of their verbal presentation (Hiroshi and Yuriya, 2013).

The town is close to Sendai and the international airport and the population in the area is increasing and is already higher than prior to the earthquake. The height of the tsunami was greater than 9 m in the port of Yuriage. There were 958 deaths and 4,500 people are living in temporary housing, either shelters or rented accommodation. The town has a long history as a fishing port. It had a lovely beach, and an area for cycling. They hope to recover the charm and that tourists will visit the area again.

The future coastal defence will be a triple hard system of embankment, raised road and highway. There will be some industrial use in the yellow hazard zone but the key proposal is to relocate new public housing for displaced people to the blue zone. This is defined by the Level 2 100-1000 year return period inundation hazard minus 2metres.

Decisions about land readjustment are made by the Municipal government. Local government planners started to explain the urban plan to the people in March 2012. Before the disaster most families lived in single private houses on its own plot of land. New housing in the blue zone will be built on land raised 5m above sea level. New plots will be smaller, but in better shape, and families can sell the land and move. The question is, will land values increase sufficiently to compensate for the loss? The planners expect land values will increase but they are not sure when. Public housing will be 5-6 stories in height with no ground level living. These buildings will act as tsunami evacuation points.

There were strong objections because people do not want to return to the area devastated by the tsunami and many want to be relocated further inland. In July 2012, 34 percent said they would be prepared to return to Yuriage. In April 2013 the survey was repeated and only 25 percent said they would like to return. 34 families are opposed to the plan and it is not clear what they are going to do. The planners intend to talk to them and give them information about subsidies. If the residents do not want to stay, the government will purchase the land.

The Municipal government cannot agree to abandon the area but because the proposed protection infrastructure is expensive the plan all depends on the numbers of future residents. If much of the housing is relocated further inland it will mean there are fewer people in the old town and it will be difficult to maintain services and justify the high cost of the protection measures.

The Municipality is pushing ahead with the plan, but need the approval of the Prefecture. If approved, the city administration will fill the ground with approval from landowners. They hope to finish the fill and preparation by spring 2016 so that public and private housing can be built. They are considering other options for people fearful of returning, for example constructing some public housing on the western side of the highway (away from the coast). In fact we saw signs of considerable new private housing development in this area and for families wanting to build their own home there is a loan subsidy.

6.2.2. Iwanuma

Iwanuma covers 61 km² and has a population of 44,000. It is near Sendai airport and has a famous shrine. Tamakura Village was the area that suffered most and 181 people died.

We met the Mayor, Tsuneaki Iguchi, and Vice-Mayor, Tetsuo Kikuchi. The following are notes of their verbal presentation (Iguchi and Kikuchi, 2013).

Many residents are afraid of another tsunami and people from the six residential areas in the hazard zone will be moved to a safer area 3km back from the coast on land raised 3m above the surrounding area. We visited the site and saw that work on the platform was nearing completion. House building
will begin in December 2013. The cost of the new land is ¥10 billion including the land purchase and services for 20 ha which will house 400 households.

Other parts of the risk reduction strategy include a 7.2m embankment along the coast, raising the Municipal road by 4-5m and the Millennium Hope Hills project – a series of fifteen 10m high hills linked by a 3m high embankment constructed using tsunami debris, the rationale for which is to protect the airport, create a memorial park and improve the image of the city. There will be evacuation routes to each of the hills and the surrounding area will be replanted by the national government. They plan to build the first six hills in three years’ time and the rest within 10 years. The hills are constructed in part of debris and we also visited a prototype hill that has been built to monitor pollution emissions. The total budget cost is ¥4 billion and the government has promised a subsidy of ¥2.6 billion. This means that ¥1.4 billion needs to be raised from donations. The Ministry of Land, Infrastructure and Tourism is managing the project.

The Mayor explained that the hills will reduce the power of a tsunami and provide places of refuge. The idea came from Matushima, where a line of small islands helped protect the inland area. There were two natural hills in Iwanuma before the tsunami and people evacuated here and survived. The idea is also to provide an educational facility and a place for reflection – they are literally using part of people’s lives to build these hills and it will be good for people to come and pray and remember their former lives, said Mayor Iguchi. They are in discussion with the Ministry of Environment to change the law about how concrete and timber, that are supposed to be recycled, can be buried in the hills.

**Figure 6.4** (Left) The Millennium Hills master plan, Iwanuma.

**Figure 6.5** (Right) Pilot demonstration hill built to aid fund raising.

The hope is that with increased safety people will return and new industry will locate here if private companies believe safety issues have been adequately addressed. Most people commute to the city to work. Those households who farmed will have difficulty continuing in their new homes.

### 6.2.3. Ishinomaki

We visited Ishinomaki and saw the elementary school that had been burnt by floating debris and visited the large industrial area near the port. We drove past the paper factory, back in production seventeen months after the tsunami, but whose closure had caused a severe paper shortage. We visited the harbour, where major works are underway to raise the level of the dockside by a 1.5m and where fish processing has been relocated in large elegant temporary structures of white canvas on a tubular frame.
We met Tomoya Otsuka in the Reconstruction City Planning Office. The following are notes of their verbal presentation (Otsuka 2013).

There has been a fall in population from 163,000 to 151,000 since the tsunami. As well as damage to buildings there has been subsidence on average across the city of 78cm rising to 2m in the fish market and in many areas there is an increased risk of flooding.

About 60 percent of the fish processing capacity is still out of production and because restoration of the fish plants has been delayed, production is only 30 percent that of the previous level. Industrial activity has been much less affected and 48 of the 50 businesses have restarted. Three new residential areas of 108ha have been designated in high safety areas that used to be paddy fields. The city government has already purchased the plots and started construction.

It is responsibility of the Urban Planning Committee of the Municipal Government to prepare a land use plan that goes to the Prefecture for approval. The total budget for reconstruction in the city is US$10 billion. Because there are so many projects, 2012 was a year of designing and planning and in 2013 they started construction. Prior to the tsunami the Reconstruction Department didn’t exist; by February 2011 it had 36 staff and by 2012 it had 137.
Figure 6.7 Plans for housing relocation in Ishinomaki (Toyoshima et al, 2012).

Relocation decisions are made according to the damage survey and hazard map. In all areas where houses were washed away the Municipality have decided it is too hazardous to relocate and they have prohibited the rebuilding of houses. They will rebuild sea defences for harbours and raise roads. They determine how many people need relocating and identify areas suitable for development as extensions to the existing urban area and compare options before finalising a plan.

The Municipal government is still talking to local communities about the use of the remaining ground and they are still unsure about its reuse. There is time for local people to object and comment in the Urban Planning Council before reaching agreement and there is a chance to submit written questions.

Figure 6.8 Zoning Plan for Ishinomaki (Toyoshima et al, 2012).

Mr Otsuka reported that in Japan formal consultation is fairly superficial and decisions are made by the authorities with only token participation. There has been discussion about keeping the elementary school as a remembrance, but some feel it should be removed and a decision is yet to be made. The junior high school will be relocated and other schools will be raised. They will have community space on the ground floor and the evacuation stairs will be external, so people can access them when the school is closed.
In fishing settlements further along the coast there has been extensive discussion with local fishermen, but it is not always possible to provide alternative places. There are cultural heritage issues and there is also a danger of landslides and soil failure that mean they cannot build on some slopes. Civil engineering experts are involved in these decisions. The Regional Planning Authority of Miyagi Prefecture is responsible for 44 fishing harbours and three towns. To reinstate fishing villages the ground has to be raised and drainage works are needed. The Municipality receives 70 percent of the cost in compensation but it is not possible to redevelop all the settlements and choices will have to be made.

In relation to redevelopment of the central business district (CBD) the city government is a shareholder in the private company managing the process and collaborates with the private sector. A plan was submitted to the Prefectural and the National Government for a memorial park along the river and there will be a river embankment and promenade. They are also planning new lines of protection including a new sea wall 7.2m high along the front and 4.5m high along the river and a new road with an embankment of 3.5-4m. In the port where there was subsidence of 2m and the land will be raised by 3.7m. The total budget is ¥9 billion and it will take 10 years to complete.

We met Tomohiro Kariya of the Machidukuri Manibou Development Company, the private sector partner mentioned by Mr Otsuka. The following are notes of his verbal presentation. (Kariya 2013)

One of their key goals is to recover the CBD and the development company is working with a citizen's committee of stakeholders that includes landowners and business owners, as well as residents, Municipal officials and volunteers. There are about 25 active members who have been discussing how to make the city centre more compact. The local community were also involved in an exercise a year after the disaster in community workshops and there was a good discussion about the future of the city. People had already been thinking about the problem of shrinkage before the tsunami and the committee had been formed to address the problem of decline and already had some projects in hand. The strategy is to increase the number of people living and visiting the centre. The majority of people are living in temporary housing so the current population living in the centre may be less than half what it was before the tsunami.

Figure 6.9 Organisation of Stakeholder Committee to redevelop the Ishinomaki CBD (Toyoshima et al, 2012).

There has been discussion about what kind of shops and housing units are needed to make the area more attractive and stable. But it is not easy to decide about the balance because the committee does not have the authority and the city does not involve itself directly government believes these decisions should be market led.

The committee is divided into three groups: street design, open space development, and lifestyle branding and cultural value. The main principles are safety, peace of mind, attractiveness, and the sustainability of the downtown area. They have defined 13 areas for joint reconstruction and there is a
central government subsidy of 40-50 percent of the cost of each project with a deadline of 2015. Two are public and ten are private initiatives. Two are already committed and the others are still being planned. There is also a subsidy for new businesses that includes five years business tax exemption and three years property tax exemption and loan interest assistance for second loans in condominium projects where 50 percent is for social housing.

There are objections to building the proposed 4.5m embankment along the river and discussion about balancing protection and historic value and how to make the area attractive for visitors. Although 13 percent of the city, including most of the CBD was flooded, there was limited damage and this has been repaired. But over 3,000 people died. (World Bank, 2012c) Land in the CBD sank by 10-30cm and there is increased risk of flooding. This is not an easy decision for authorities or the community to make and they are wise to deliberate calmly.

There are plans for a riverfront development with a new fish market and fish food court and a memorial to the tsunami. Ishinomaki has a long history as a port, but there is no particular building or symbol that represents the city. Its strong points are the river, its history, its location near Matsushima, and food—fresh fish.

Young people are leaving the area and the committee has been talking about activities and events to make the area more attractive to the young. They have also discussed activities for visitors. But it is hard to attract new business and it is not clear what the unique selling point of the city is. The main hope is that new people will be interested in moving to the area. Their fear is that they will be unable to resolve the many problems including the increased vacancy, population decline and weak economy. They are afraid of redeveloping too much real estate in case there is insufficient take-up of the shops and there is a difficult balance of investment and viability.

6.3. Towns of the Rias Coastline

In the Iwate Prefecture 66 communities were displaced and located in temporary housing. This is a mountainous area of steep valleys running down to small harbours and the topography dictates where people can be relocated. The city governments are involved in conversation with landowners to find land to relocate.

Along the Rias Coast we visited the towns of Kesennuma, Kamaishi and Rikuzentakata. We also visited the smaller centres of Utatsu, Shizugawa, Onagawa and Unosumai.

In Utatsu, Minamisanriku, we saw how the 16m tsunami over topped the storm-surge gate on the river, buckling the massive steel structure and demolishing the flyover road.

In Shizugawa (Minamisanriku) the main town was completely destroyed and the 12m high steel frame disaster management agency building was overwhelmed by the tsunami. It was here that a young woman stayed at her post broadcasting the warnings and died.

In Onagawa they are raising the land and reinstating the railway line. We saw where the 16m platform on which the hospital is built was overwhelmed by the tsunami and were told that staff in the bank in the harbour died when the manager insisted they stayed at their posts. There is a ferry terminal from a nearby island. It was four-storey 12m high steel frame on piles and we saw how it had been overturned and smashed by debris.

In Unosumai a vast urban area has been lost. Out of 6,630 households 2,657 have gone and there is a massive debris clearance in progress. Children from the elementary school ran to the first evacuation point but someone must have realised that they had not gone far enough so they continued on to the second and third evacuation points. Many people died in the disaster management centre, despite being set well back from the sea front behind storm gates on the two canalised rivers.
6.3.1. Kesennuma

We met Miura Tomayuki a community worker in Oya District who lost his home and is managing the Amagasawa temporary housing site on a hill near the sea. The following are notes of his verbal presentation (Tomayuki, 2013).

We visited what had been a beautiful beach south of Kesennuma, at Ohyakaigan and a second beach at Koizumi, at the mouth of the Suja River. At both beaches the pine trees and the beach were washed away, but the sand came back after six months to one year. The height of the tsunami in these areas was quite extreme (>15 metres).

We climbed the 3m temporary beach embankment at Ohyakaigan built of 1 ton black ballast bags. The main issue is the height of the proposed embankment – 9.8m high and 40m wide that will separate the community from the beach. Looking from an embankment less than a third of the proposed height we could appreciate his concern. The beach is the symbol of their identity and they feel connected to the sea. Most of the residents oppose the new embankment but some people were so traumatised that it is hard to get consensus. The population of the district is 3,500, 1,324 of whom signed a petition to the mayor asking the government to halt the plan and to reflect the comments of residents.

But the Oya beach is managed by three different organisations – the Municipal Agriculture and Fisheries Department is in charge of the north end where fishing used to be, the National Forestry Department is in charge of the middle section that used to be a pinewood and the Civil Engineering Department of the Prefecture is in charge of the southern end at the river mouth. Six of Kesennuma’s districts are in a similar position and there is a similar level of concern about losing access to the beaches.

In the town centre we met Akihiko Sugawara, owner of Otokoyama Honten, a Sake Brewery, Vice President of the Chamber of Commerce and Member of Strategy Committee of Municipal Government. He was accompanied by Toshihiko Abe, Senior Research Fellow at the Institute of Urban and Regional Studies at Waseda University. The following are notes of their verbal presentation (Sugawara, 2013).

Ohshima Island protected the harbour and by the time the wave reached the top end of the bay in Kesennuma it was much weaker and everyone managed to evacuate and there were no casualties. But the plan is to build a 5m embankment that will destroy the character of this charming seaside harbour. The people in the neighbourhood are against the plan because they think the plan will destroy the harbour merely to protect a narrow strip of flat land from an event that may occur once every 1,000 years.

The best view of the town is from here and it is important to recover the tourist industry. The problem is people are worried about the delay and think that a high embankment will destroy the scenic value of the place. People are against this kind of structure because it will separate them from the sea and change the character of the area. Although embankments are meant to protect lives and property the proposals will destroy lives and sustainable living conditions and people may leave. The embankment may also give a false sense of security and it might be better if people are aware of the sea and are ready to evacuate. No one died in the neighbourhood because people are aware of the tsunami risk and evacuated immediately.

There used to be many shops in the town centre but recovery will take 5-6 years and many of the shops and restaurants may not return. There has been discussion about speeding up the procedure – how to recover the housing and how to recover the commerce. It had been hoped to rehouse people quickly and recover lives but 9,000 people from across the city are still in temporary housing. Many shops are in temporary accommodation and want to come back to the area. The dilemma is how to speed up decision-making to recover livelihoods. It would be better if the Japanese legal system helped resolve this kind of issue, but the system is bureaucratic and authority budgets are divided and segmented.

We visited Shibitachi, a fishing village of 260 households and interviewed a group of eight fishermen from a cooperative of retired men who fish in an amateur way for abalone and sea urchins in the gulf.
The village is set in a beautiful bay of Karakuwa. The wave here was 9m and a costly 9m sea wall has been proposed. When the warning came people ran up the grass slope behind their homes and practically everyone was able to evacuate easily. Only nine people died. Of these, one was in a wheelchair, some were elderly and some went back to collect something. They believe evacuation is the best measure here.

They said that the residents and city government are in conflict with the Prefecture because people's lives will be ruined if the seawall is constructed and they are separated from the sea. The government plan is for a 9m high wall 40m wide at the base that will fill most of the flat area at risk.

We met Ogata Takeshi, an Assembly Member and fish processing plant owner, together with his wife. They lived in the Ogata House a large traditional style house (thatched) built in 1810 that was destroyed by the tsunami and has been adopted by Japan’s National Trust. The following are notes of their conversation (Ogata, 2013).

The priority of the Government's Six Year Reconstruction Plan published in October 2011 is to build hard protective structures and to relocate people. After that there are other priorities. The Mayor of Kesennuma is lobbying for a share of the budget. Families have three options: they can reconstruct their own house, they can move into public housing or they can move to another place. Some people are opposed to plans to build embankments and in the assembly there is as yet no consensus. The government has proposed a 7.2m embankment in front of where their house used to be. Around a third of their house has been recovered and materials transported in Yamanashi prefecture for restoration and storage. Japan's History and Folk Museum (in Sakura-shi, Chiba prefecture) is making a replica of their house. The Ogatas have not yet decided where they will rebuild their traditional house.

We met three community planning professionals from the Iwate Prefecture: Yuki Kawaguchi, Hiroaki Yagi and Atsushi Onodera. The following are notes of their presentation (Kawaguchi et al., 2013).

The city lacks resources and they are here to support the city. The Prefecture is responsible for infrastructure at various levels for example embankments and roads.

The 2011 tsunami topped the barriers and embankments and the new embankment is designed for a Level 1 hundred-year return period tsunami event and evacuation measures are planned for a Level 2 1000 year return period tsunami event. Evacuation routes and temporary camps have not yet been determined and they are still thinking about road design and hazard zoning. They plan to raise the land for living and working.

The concept for public housing is increased density and people will be less self-sufficient on smaller plots and further from the sea. In principle, people will be relocated as close as possible to their previous homes and neighbours. The variety of public housing depends on the land availability. Single
units are expensive. Prior to the tsunami 40 percent of the population rented their housing and 80 percent of this was private. Potentially, some of these people will be moving from private to public housing.

Public housing is seen as a last option but not a change of status. It's called disaster housing so it carries less of a stigma. In fisherman villages most people own their own homes; in the city more people rent. There was a survey in the city asking people if they wanted to live in public housing or not. The qualification is based on income level.

The first issue for planners is balancing speed with reaching consensus. The second is securing land because it is difficult to identify who owns the land because some people are missing and there is inaccurate cadastral information. The city has a schedule for recovery but is facing so many issues that it is impossible to say how long it will take. The biggest industry is Nippon Steel which was not badly affected. But the main employer is fishing and the priority is on getting the fishing industry back into production.

We met Junichō Kano, founder of a community NGO in Kamaishi called RIAS. The following are notes of their presentation (Kano, 2013).

Place making is important to Kano and he had decided to help the recovery by building a meeting space that is open to the community and where they hold concerts and piano recitals and try to respond to what people want.

In the first two weeks the defence force cleared the roads and access was the first priority.

Kano received government funding to manage the centre until the end of March 2013 and now gets some support from the private sector. The centre is also for shop owners and stallholders whose property was washed away. It provides a place at the centre of the old town and is a symbol of regeneration, a beacon of hope and a resource for community activity.

The younger generation want to go to Tokyo. Even if there were higher education in the town there are still no jobs and there is an expectation that jobs can only be provided by large corporations. Small business owners did not get much support and many people have had to leave the city.

The local newspaper has a full-page information sheet twice a week, but people would like to know about the phasing and timing of recovery in the economy, homes, property and safety program. But the Municipal authority only provides piecemeal information and there is no comprehensive strategy. Coordination and leadership in the city council by the mayor and his staff feels inadequate. Few Japanese cities have strong local community associations and traditionally people want government to decide for them. Non-profit organisations like this centre have to provide coordination by sharing information.

6.4. Conclusions

One of the key issues is how much room for adaptation there is in the application of the central government's template for recovery and reconstruction. Japan is a compliant society and there may be more flexibility than bureaucrats or residents realise. But no one has any inkling about the cost-benefit of the huge investment. This is a national response to disaster, but there is a disconnect in the local area in terms of priorities and decision-making. The government feels that it is doing what is right in saving towns that have been here a long time. But there is a time limit for people to decide what to do as the government has set deadlines for spending.

We visited the International Recovery Platform, UNISDR in Kobe and spoke to Sanjaya Bhatia, Knowledge Management Officer; Yoshiyuki Akamatsu, Senior Researcher; and Recovery Experts Shingo Kouchi, Gerald Potutan and Gulzar Qayyum. The following are notes of their conversation. (Bhatia et al, 2013)

The Reconstruction Agency was established by the Prime Minister's Office. It advises government on all basic strategies based on quick lessons. But hard solutions give a false sense of increased security and early warning is an issue. The reaction of government has been self-critical. Instead of defending the system they have been frank about what failed and it is in the character of Japan to always review and look back and learn lessons. For example, ideas about evacuation are changing.
Japan national broadcasting has changed the way it announces the early warning. Rather than giving precise information that is open to error and misinterpretation it will from now on give much simpler direct warning to evacuate immediately.

To date the focus has been on relocating housing and safety measures, whereas the imperative is to strengthen the local economy and address economic and demographic decline. Measures that would strengthen existing local businesses, city centre shops, attract new industry and encourage young people to the city might also have been considered. One thing the central government might have considered is founding a college of higher education, either a new university or a branch of a university in Sendai, preferably one that focused on technology and had practical links with industry and enterprise.

There is a proposal from Kobe University to revitalise small business but people in the affected area do not have the resources or money to take action or to exploit new technology. New people would be most welcome. Do people take the initiative and accept responsibility or do they expect people to come and help solve the problem? People with initiative would be a good thing. People have been here a long time and cannot see how to fix the problem.

6.4.1. Demographic and economic issues

About half of victims of this earthquake were elderly people of sixty-five years or more. In planning it is necessary to try to anticipate the future population. Based on the statistics presented by Statistical Information Institute for Consulting and Analysis depopulation has extended over the whole region, excluding large metropolitan areas such as Sendai. Forty percent of all Municipalities will experience a population decrease of 20 percent or more. In coastal areas of Pacific Ocean population is anticipated to decrease even further since local economies were destroyed and young people will leave (Masateru, 2011).

Population emigration due to the disaster is largely occurring among young people. The International Recovery Platform pointed out the issues being faced by the affected areas following the Great East Japan Earthquake are compounded by the problem of shrinkage confronting most rural towns in Japan. In addition to issues of safety and relocating housing, population decline, ageing and economic shrinkage pose special planning challenges (International Recovery Platform, 2012).

It is hoped that tackling these issues by reordering land use, improved transportation links and urban centre regeneration projects will have a positive impact on the prospects of these places as well as make them more resilient to a future disaster.

Not all places that were affected by the tsunami are the same, however. The area around Sendai in Miyagi Prefecture is a flat plain and has a strong economy, good transport links and a growing population. Further north in Iwate Prefecture there are steep slopes and fiords, a declining population and a weak economy. In each there are differences of scale with a few larger cities and towns and many more smaller settlements and villages. This suggests that different places face different issues of recovery.

These differences in socio-economic prospects, demography, topography and scale suggest that approaches to both safety issues and economic development assistance might be fine-tuned to meet local circumstances.
Table 6.6.2 Places visited classified by relative strength of economy and size.

<table>
<thead>
<tr>
<th>Stronger economy</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iwanuma</td>
<td></td>
<td>Villages in Iwate</td>
</tr>
<tr>
<td>Natori</td>
<td>(part of the population commuting to city)</td>
<td></td>
</tr>
<tr>
<td>Yuriage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weaker economy</th>
<th>Ishinomaki</th>
<th>Villages in Miyagi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kesenumuma</td>
<td>(dependent on fishing and agriculture)</td>
<td></td>
</tr>
<tr>
<td>Rikuzentakata</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kamaishi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4.2. Citizen involvement in decision making

In the areas affected by the 2011 tsunami, consultations between governments and communities were the rule, and community representatives were invited to serve alongside experts on recovery planning committees from the earliest stages. The most common ways of collecting residents’ opinions were surveys and workshops. The central government and local governments outside the disaster-affected area helped affected Municipalities plan their recovery by conducting research, seconding staff, and hiring professionals to provide technical support. University faculty members, architects, engineers, lawyers, and members of NGOs participated in the Municipal planning process (World Bank, 2012a).

Along the Rias coast the response of the majority is that the government has already decided so they can't do anything. Some even admire the colossal infrastructure. But the younger generation, in their forties, is opposed to large embankments and tall sea walls, but they are not the decision-makers. In Japanese community associations it is elderly men who make the decisions. In Ohyakaigan near Kesenumuma the community association meets twice a month and tries to involve children as well as older people. The plan is to collectively relocate the 120 households and to have the land cleared by 2015-16. The Japanese Institute of Architects (AIJ) is considering using this as a model of participation. Unfortunately people ca not wait and they are now down to 100 households and the community may fall apart because of the delay. The group decided they would not oppose the proposed embankment but suggested it be moved back. Initially the city was not happy but changed their minds after receiving the petition. The proposed Municipal plan is now for a much lower embankment further back but this needs cooperation between the Ministry of Forestry, Japan Railways, the National Highways Agency and the Prefecture (Tomayuki, 2013)

In Kesennuma the citizens' committee oppose the planned harbour embankment and they are in talks with the Municipality and prefectural government. The majority of residents are against the proposal and it is not settled yet. Planning arrangements cannot proceed while there is a dispute but city officials are making land use plans assuming the embankment will go ahead. Because there has been so much opposition a new deadline has been set for October 2013. In other places plans are proceeding more rapidly.

In Kamaishi the three community workers for the Prefecture explained that local authorities have to accept what citizens want. Ideally they would simulate different heights of embankment since communities in some places have opposed the plans. If people want something outside the government's recommended solution planners have to be careful that safety measures are in place and that the community has collectively relocated.
Partly because of citizen opposition, reconstruction of sea embankments, which suffered extensive damage, has been considerably delayed. Local governments in devastated areas cannot decide on the details of restoration plans, as discussions continue on whether to prohibit people from returning to coastal areas. Reconstruction work has started on only 31 percent of destroyed embankments. According to the Fisheries Agency, which has jurisdiction over sea embankments, the design of embankments will depend on whether people will live nearby (Daily Yomiuri, 2013).

Local governments were tasked with recovery by the National Government who asked them to develop local plans based on consultation. The problem is they lack the technical capacity, especially in effective methods of involving citizens in strategic decision making. Voluntarily urban planners and architects from all over Japan surged to provide missing capacity. Local government has lots of problems with consultation, which is time-consuming and it is not easy to convince communities to relocate. Local governments want to consolidate communities to make it more efficient and economical to deliver services, but many of these places were in decline before the tsunami. They have to provide facilities to each community so the cost is considerable (Bhatia et al, 2013). But the fundamental problem is that the authorities do not really know what size population they are reconstructing for.

6.5. References


Billsjo, R. Diab, N., and Takeuchi, Y, (2009), Urban planning culture of Japan. SGC SSIE SAR ENAC INTER 25 Mars 2009,


Recovery Two Years After The 2011 Tōhoku Earthquake and Tsunami


Redevelopment of downtown Ishinomaki. [Interview]. 3rd June 2013.


Sugawara, A. (2013). Owner of Otokoyama Honten, a Sake Brewery, Vice President of the Chamber of Commerce and Member of Strategy Committee of Municipal Government. Verbal report 3 June 2013.


