

Towards a comparative framework of adaptive planning and anticipatory action regimes in Chile, Japan and the US: an exploration of multiple contexts informing risk-based planning and relocation in coastal areas.

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Table 1: Main natural disasters after the Great East Japan Earthquake in Japan

	Earthquake	Storm and flood damage	Heavy snow damage
2011	<ul style="list-style-type: none"> Great East Japan Earthquake (Mar.11) 	<ul style="list-style-type: none"> Torrential rain in Niigata and Fukushima (Jul.27-30th) Heavy rain by Typhoon No.12 in Kii Peninsula 	
2012		<ul style="list-style-type: none"> Torrential rain in northern Kyusyu(Jul.11-14th) 	
2013		<ul style="list-style-type: none"> Heavy rain in Shimane and Yamaguchi Prefectures (Jul.26-Aug.3rd) Heavy rain in Akita and Iwate Prefectures(Aug.9-10th) Heavy rain by Typhoon No.18 from Shikoku to Hokkaido (Sep.15-16th) Storm and heavy rain by Typhoon No.26 along Japan's Pacific Coast in eastern and northern Japan (Oct. 14-16th) 	
2014		<ul style="list-style-type: none"> Torrential rain in Hiroshima City (Jul.30th-Aug.26th) 	<ul style="list-style-type: none"> Kanto Region
2015		<ul style="list-style-type: none"> Torrential rain in Kanto and Tohoku regions (Sep.7th-11th) 	
2016	<ul style="list-style-type: none"> 2016 Kumamoto Earthquake (Apr.14th,16th) 	<ul style="list-style-type: none"> Heavy rain and storm by Typhoons No.7,11,9 and 10 in Hokkaido and Iwate Prefectures. (Aug.16-31st) 	<ul style="list-style-type: none"> Hokuriku Region
2017		<ul style="list-style-type: none"> Torrential rain in northern Kyusyu (Jun.30th-Jul.10th) 	<ul style="list-style-type: none"> Chugoku Region Frozen Shin Tomei Expressway, which runs from Tokyo to Nagoya.
2018	<ul style="list-style-type: none"> Osaka northern part earthquake(Jun.18th) 2018 Hokkaido Eastern Iburi earthquake (Sep.6th) 	<ul style="list-style-type: none"> Torrential rain in western Japan (Jun.28th-Jul.8th) Storm and storm surge by Typhoon No.21 in western Japan (Sep.3-5th) 	<ul style="list-style-type: none"> Hokuriku Region Tokyo metropolitan areas Hokuriku Region
2019		<ul style="list-style-type: none"> Storm by Typhoon No. 15 in the southern Kanto region Torrential rain by Typhoon No. 19 in Kanto, Koushinetsu and Tohoku regions (Jun.28th-Jul.8th) 	

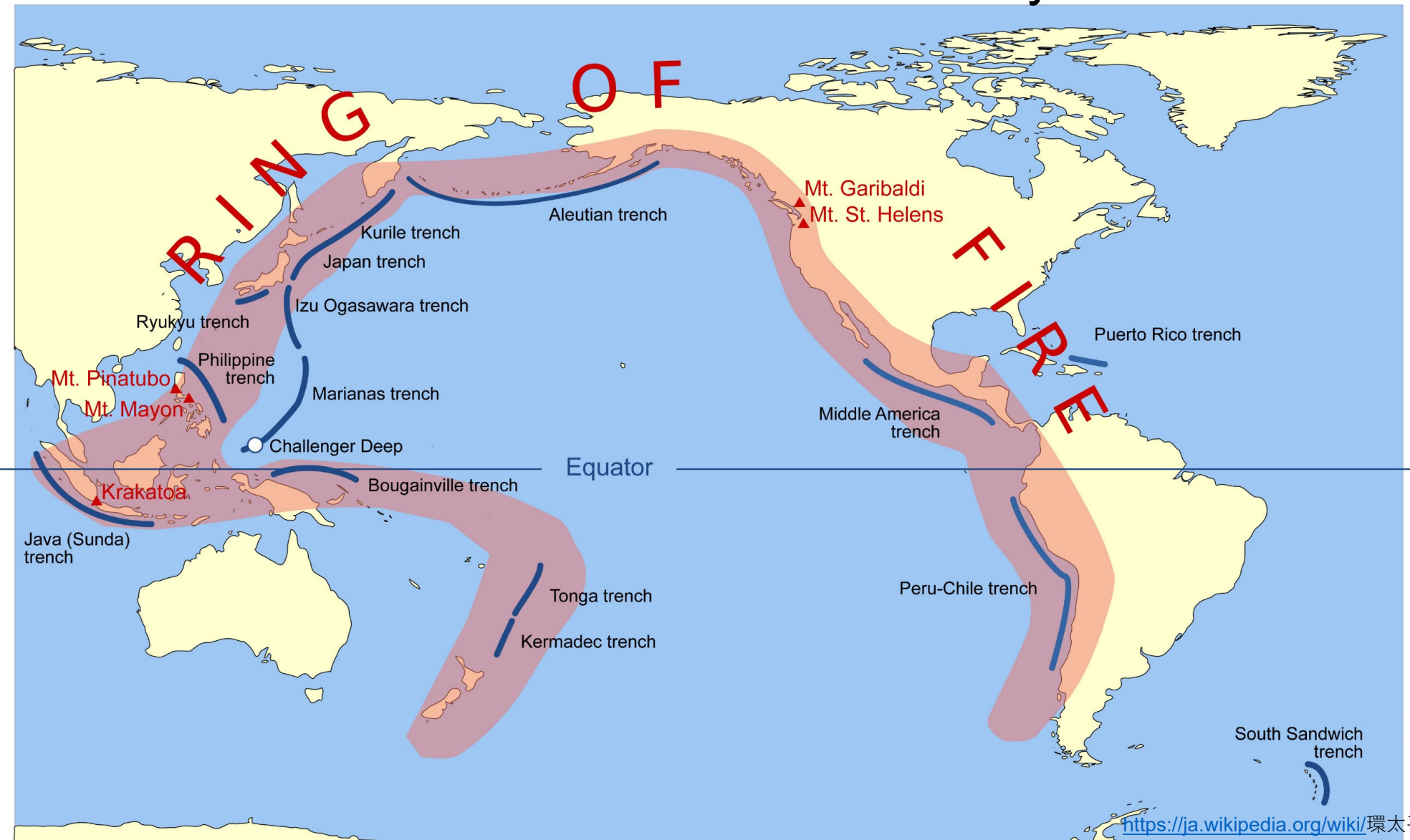
Context for this research

- The application of a disaster-scientific models and engineering solutions to community planning and risk assessment can be advanced through developing a comparative framework.
The comparative framework developed in this project will afford insights into adaptive planning and anticipatory action regimes across the multiple political-economic, cultural and biophysical contexts in **Chile, Japan and the US**.
- Setting the stage for this comparative framework, this initial background research **clarifies the key points regarding multiple contexts of the three countries**, and **provides an outline for future comparative analysis by shared similarities and contrasts**.

Outline

- 1. Introduction of disaster and recovery contexts in the 3 countries
- 2. Social contexts in the target areas in the 3 countries
- 3. Comparison of roles of multiple levels of government in non-disaster and recovery phases
- 4. Policy context- post-disaster housing support, land use and regulations, and buyouts
- (5. Case studies
 - 5.1. Chile
 - 5.2. Japan
 - 5.3 US (Washington State))
- 6. Conclusion

1. Introduction of disaster and recovery contexts



1. Introduction of disaster and recovery contexts

- Great East Japan Earthquake in March 11th in 2011. M9.
- High tsunami. More than 8 meters high.
- The number of the dead: 19689.
The number of missing: 2563.
(Mar.1st, 2019)
- The number of the totally collapsed houses: 121995. (Mar.1st, 2019)
- High Likelihood of a large earthquake occurring in the Nankai trough.
70% chance in the next 30 years.

Information: 「東日本大震災からの復興の状況と取組」 p.1 「東日本大震災の概要」 (2019年8月)、復興庁

http://www.reconstruction.go.jp/topics/main-cat7/sub-cat7-2-1/201908_Pamphlet_fukko-jokyo-torikumi.pdf

Picture: 「みやぎ・復興の歩み5」 3-4 (被災状況)

<https://www.pref.miyagi.jp/uploaded/attachment/352938.pdf>

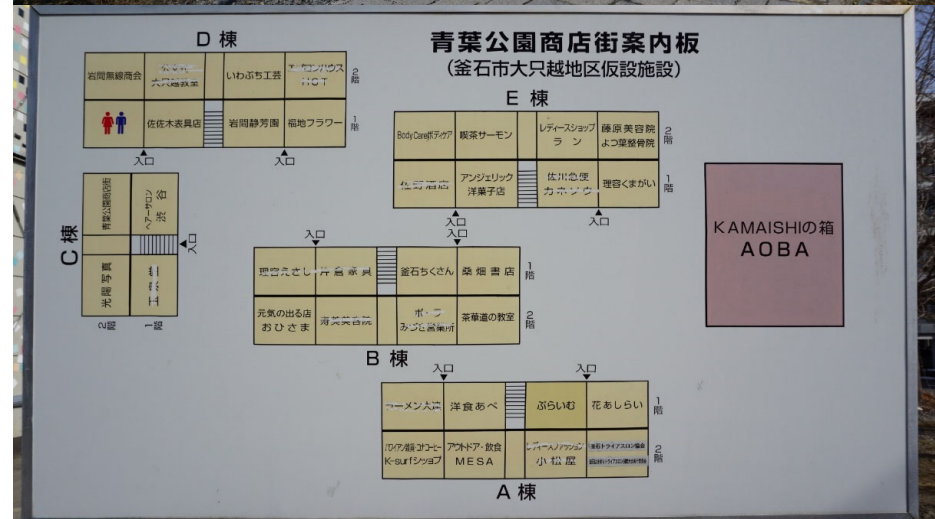


1. Introduction of disaster and recovery contexts

- More than 470,000 people evacuated from their homes, with 350,000 continuing to stay in evacuation shelters in the months that followed.



Temporary housings in Kamaishi City (taken on Feb. 10th in 2018)



Aoba Park Temporary Shopping Mall (taken on Feb. 10th in 2018)

1. Introduction of disaster and recovery contexts

- Residential relocation programs have been implemented at a large scale.



Nobiru District in Higashi Matsushima City is one of the disaster prevention collective relocation programs. (taken on May 26th in 2019)

2. Social Context

- The socio-economic contexts in Japan, Chile, and the U.S. directly inform the risk situation in each country, and more specifically the regions considered for the case studies introduced in later sections.
Across the three countries, coastal areas face serious issues of social vulnerability, including some shared aspects.
- The affected coastal regions of all three communities are each characterized by small communities with an elderly population, in an aging society.
In **Japan**, where the nation as a whole is facing a drastically declining birthrate, **the Tohoku region affected by the 3.11 Great East Japan Earthquake was already experiencing aging and depopulation at an even more accelerated rate than the nation.**
- Similarly, most of the affected areas please explain more in Chile are comprised on only small coastal towns, in aging society. People living in coastal Washington communities are also older.
- Communities in Chile and coastal Washington both experience large social and income inequalities, as coastal Washington residents tend to be only older, and whiter, but in poorer health and with lower incomes than the rest of than the rest of Washington state.
- Compared to Chile and the U.S., the income disparity in the Tohoku region of Japan is less severe, although many disaster survivors face difficult economic situations.

3. Roles of government on multiple levels

Table 2-1. Multi-level responsibility of government for social services and housing welfare (Japan)

	Social services	Housing welfare
Japan: National government	Provided by government for residents. Will become even more necessary in future, although concern for future human and financial resources to provide them.	Social welfare housing support exists; provide Public Housing etc. NGO roles is small.
Japan: Local government	Local governments provide social services to residents, small role of NGOs.	Local government has some role of implementation, policy decided at national level.

3. Roles of government on multiple levels

Table 2-2. Multi-level responsibility of government for social services and housing welfare (Chile and US)

	Social services	Housing welfare
Chile: National government	Provided by national government and local municipalities.	Nationally-funded government subsidies were provided, but only to families in the lowest three income quintiles, covering around 49% of the affected families.
Chile: Local government	Provided by national government and local municipalities.	—
U.S. National government	Federal programs are administered by tribal, state, county and local governments or non-profits.	—

-The national governments all three countries play a major role in forming disaster mitigation policy and funding and implementation of mitigation and post-disaster reconstruction projects.

-In all three countries, disaster policies and projects include various roles and responsibilities at multiple levels of government, and in each case some issues have emerged in regards to coordination between levels of government.

3. Roles of government on multiple levels

Table 3: Responsibilities and general approaches of government for mitigation and recovery(Japan)

	Governance-general/overall	Disaster mitigation plans	Disaster recovery policy
Japan: National government	Provided by national government and local municipalities.	Nationally-funded government subsidies were provided, but only to families in the lowest three income quintiles, covering around 49% of the affected families.	National (Japan) funding; policy creation. The National government created menu of recovery projects. Strong natural guidance.
Japan: Local government	Local government follows national government directives.	—	The local government has the responsibility of making and carrying out recovery plans using the projects provided by national govt. Pressure to decide quickly in order to secure funding; lack of residents' consensus in decision-making; lack of taking the time to think.

3. Roles of government on multiple levels

Table 3-2: Responsibilities and general approaches of government for mitigation and recovery (Chile)

	Governance-general/overall	Disaster mitigation plans	Disaster recovery policy
Chile: National government	—	Mitigation policies are being developed mainly at the local level through non-binding coastal reconstruction plans. There is a lack of guidance at the national level to do this.	Lack of national guidance.
Chile: Local government	Reconstruction plans were developed at the local level, without a clear guidance from the national level. There is a lack of integrated coastal zone management to plan, regulate and manage the coastal border.	—	Chile-reconstruction plans made at local level, without strong role of national government?

3. Roles of government on multiple levels

Table 3-3: Responsibilities and general approaches of government for mitigation and recovery (US)

	Governance-general/overall	Disaster mitigation plans	Disaster recovery policy
U.S.: National government	US- national/local roles, not always linked well.	FEMA requires jurisdictions to write and adopt a <u>Hazard Mitigation</u> plan as a condition for receiving some types of non-emergency grant funding. FEMA will provide funding for L1 or stronger tsunami mitigation.	—
U.S.: Local government	—	Hazard Mitigation Plans (very loosely connected to land use planning) are generally written by a local emergency manager who often works in a public safety department and sometimes a city manager's office. The plans have little impact on land use regulation.	—

3. Roles of government on multiple levels

- Thoughts on comparisons from Table 3:
For all 3 cases, **we can see issues of coordination of responsibility between the national and local government**, including a cases where the national government does not take responsibility (Chile), or the opposite case where **the national government controls the process with less authority to make decisions at the local level (Japan)**, and a general lack of coordination between the national and local levels (Chile and U.S.).

4. Policy context: post-disaster housing support, land use and regulations, and buyouts

Table 4-1. Specific recovery policies and support for housing reconstruction, relocation, and buyouts (Japan)

	Housing recovery policy (housing provision)	Land use regulation and relocation in recovery	Role of buyouts in housing recovery
Japan: National government	Housing repair support was not used much after previous disaster such as 1995 Hanshin Awaji; programs improved after 3.11, still not as common as rebuilding or moving to new areas. Disaster Recovery Public Housing (government subsidized rental housing based on income) is provided for disaster survivors who can not rebuild on their own	Recovery projects include land use control, especially those that deal with residential relocation. Tsunami inundated land designated as “hazardous.”	General, market-based housing provision; Government programs buy out tsunami devastated residential lots, and provide new housing lots for rent or purchase in high land areas
Japan: Local government	Implementation of national plans.	Local government has some limited control over how to use these simulations.	Local governments are the ones who implement the buyout and relocation projects, as part of their municipal recovery plans.

4. Policy context: post-disaster housing support, land use and regulations, and buyouts

Table 4-2. Specific recovery policies and support for housing reconstruction, relocation, and buyouts (Chile)

	Housing recovery policy (housing provision)	Land use regulation and relocation in recovery	Role of buyouts in housing recovery
Chile: National government	Housing subsidy programs to repair damaged houses or acquire new houses in case of total loss. No relocation was implemented.	Identification of tsunami flood zones as risk areas. Some reconstructions plans do not allow residential uses or key infrastructure in tsunami floods zones. Others only use tsunami flood zones as a base for designing evacuation strategies. Inclusion of “anti-tsunami” engineering solutions. There is a lack of integrated coastal zone management to plan, regulate and manage the coastal border.	Housing subsidy programs to repair damaged houses or acquire new houses in case of total loss. No relocation was implemented. Relocation can only be implemented through public intervention in the form of expropriation (condemnation). People unwilling to sell their lands.
Chile: Local government	–	–	–

4. Policy context: post-disaster housing support, land use and regulations, and buyouts

Table 4-3. Specific recovery policies and support for housing reconstruction, relocation, and buyouts (US)

	Housing recovery policy (housing provision)	Land use regulation and relocation in recovery	Role of buyouts in housing recovery
U.S. : National government	Housing recovery in the U.S. focuses on the repair/ replacement of damaged private property (focus on property owners).	Risk designations not usually used to forbid development or require relocation.	FEMA buy-out program for flooded properties program is administered by participating local emergency management agencies.
U.S.: Local government	–	Shoreline Master Program; required by WA Shoreline Management Act Comprehensive Planning (Zoning); required in urban growth areas (both local municipalities and unincorporated counties) by WA Growth Management Act Coastal WA Tribes want to relocate to higher ground and a proposed congressional bill , if passed, can help them accomplish their goals.	Currently, the four counties along the coast do not have a home buy-out program however, they could apply for one after an event. This is a significant amount of people living in substandard housing, trailers, and mobile homes along the coast.

4.1 Buyouts

- Table 4 shows that the approaches to buyouts and relocation projects vary greatly between the 3 countries.
- In all 3 countries, there are also some buyout programs available to purchase the damaged property of affected residents, however the scale of these programs varies between the 3 countries.
- In Japan, relocation programs are being implemented on a large scale, and as a main component of the residential relocation which is in turn a primary part of post-tsunami recovery, while in Chile there is little relocation. The case of coastal Washington is different as the tribe is planning anticipatory relocation to higher land.

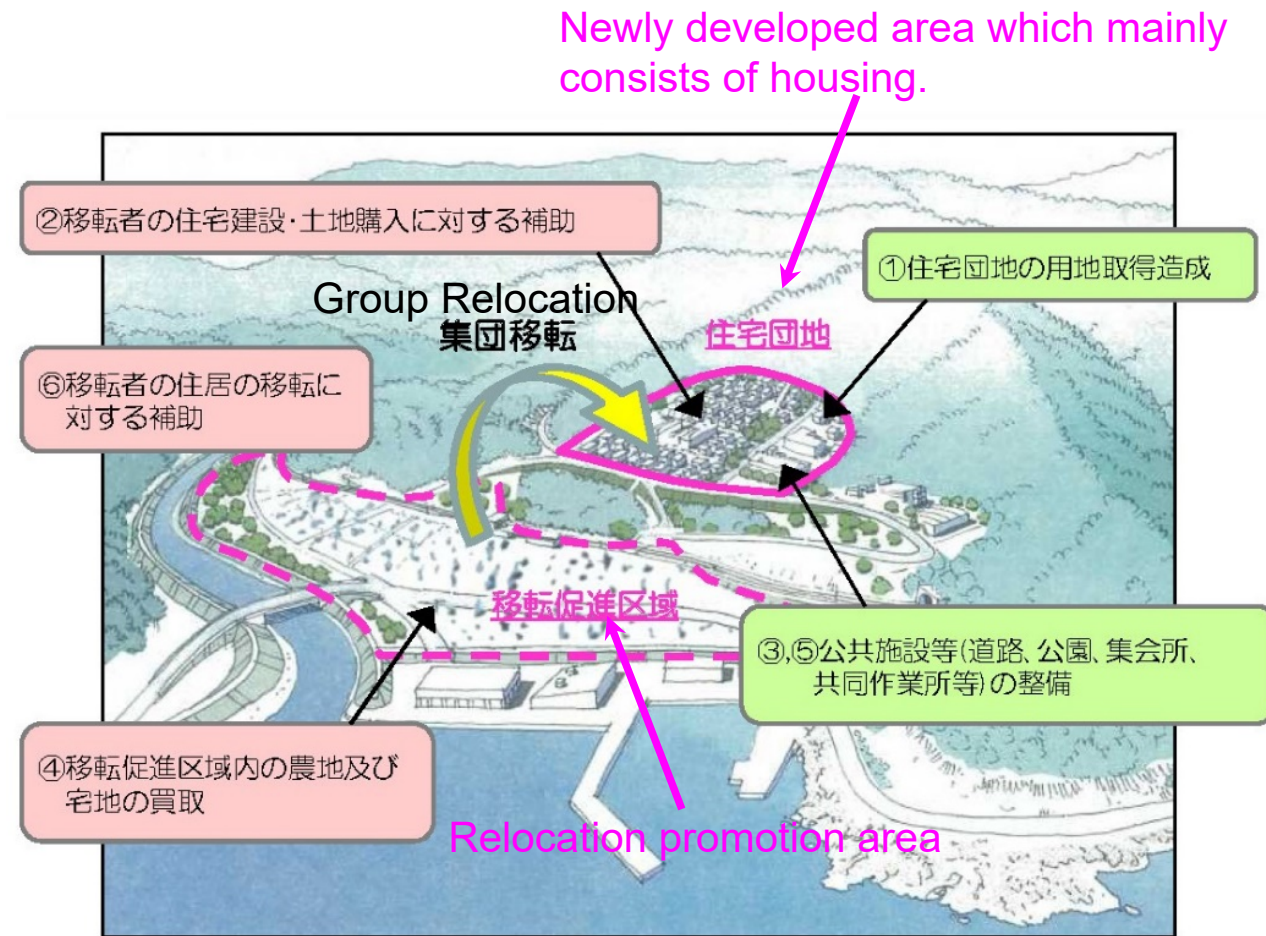


Image of Disaster Prevention Group Relocation Promotion Project.

4.1 Buyouts

- Not only the scale of buyouts, but the process and mechanisms to acquire land also vary between countries.

In **Japan**, where large scale buyouts are occurring, **these programs are part of a 2 step process that includes acquisition of the former, designated “hazardous” land, and provision of new residential lots for sale or rent;**

buyouts in the U.S. usually end at the acquisition of land, with residents on their own to find new homes (there are some current exceptions involving 3rd party actors supporting the relocation to new land areas)



Image of Disaster Prevention Group Relocation Promotion Project.

4.1 Buyouts

- **Japanese policy** rarely uses expropriation; programs such as buyouts for collective relocation rely on residents' volunteering to sell their land. In the case of holdouts, projects must go around these individual parcels.

However, after 2011, with these areas designated as hazardous, future new construction for residential use was forbidden by law, so the economic advantage of keeping these parcels was minimal.

In the community-oriented decision-making process, there may also be strong social pressures to “agree” and “come to a consensus” in the case of a relocation projects that is supported by most of the community members.

This may be different from the case of the other countries.

Upper picture: Upper part is Nobiru District in Higashi Matsushima City. Lower part is the original district designated as relocation promotion area. Lower picture: A few houses in the original district were rebuilt, because the owners decided not to participate in the group relocation program. (taken on May 26th in 2019)



4.2 Designation of risk and relocation

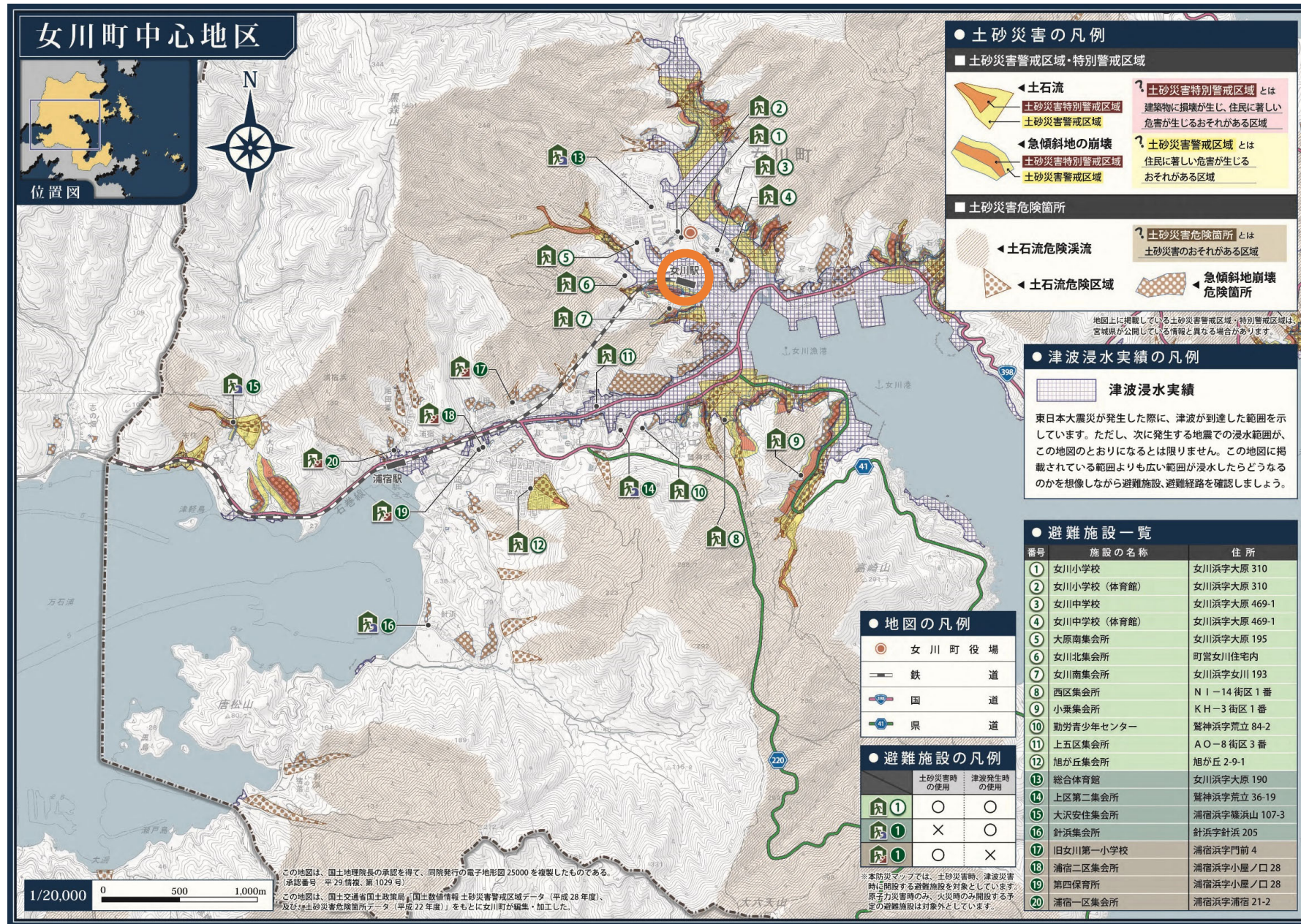
- Between the three countries, the role of land use regulation in risk designation, and how this shapes recovery policy and impacts residents' lives and choices, varies greatly.
- In Chile, there is identification of tsunami flood zones as risk areas. Some reconstruction plans do not allow residential uses or key infrastructure in tsunami flood zones. Others only use tsunami flood zones as a base for designing evacuation strategies. There is also the inclusion of “anti-tsunami” engineering solutions.
- Similarly, in the Tohoku area of Japan, post-tsunami recovery projects include land use control, especially those that deal with residential relocation, and changing the allowable use in areas at risk from tsunami to allow commercial but not residential uses.

Onagawa Town Disaster prevention map

Blue area means the tsunami inundation area.

Orange circle area is Onagawa Station.

女川町防災マップ
http://www.town.onagawa.miyagi.jp/pdf/bousai/2018_bousaimap_onagawa.pdf





Future center is built near Onagawa Station.
This center consists of co-working space, meeting rooms for the community and so on.
The residential area is developed in the upper part.
(taken on May 26th, 2019.)

Hotel which consists of containers near Onagawa Station.
The residential area is developed in the upper part.
(taken on May 26th, 2019.)



4.3. Infrastructure vs. Environmental Management

- National level plans mainly emphasis safety through large scale infrastructure and engineering solutions, with less consideration of local lifestyle and townscape.
- To different degrees, in all three countries have reconstruction projects that rebuild and/or strengthen infrastructure.
- In Japan after 3.11, large scale engineering projects are a major focus of recovery, with the construction of huge levees, mountain top removal, massive modification of landscapes and townscapes, in the process destroying not only the landscape, but the views of the sea. Recovery projects are not required to engage in a rigorous environmental impact study.
- In Chile, reconstruction plans also include public infrastructure (water, sewage, electricity, etc.), as part of a Laissez faire policy within a neoliberal development model. There is a lack of protection of critical areas (e.g. wetlands).
- In the U.S., the Army Corps of Engineers... Shoalwater Bay Tribe project. Soil erosion is a huge problem
- Similarity between Chile-laissez-faire lack of protection, and Japanese lack of environmental protection. There is a strong focus on engineering solutions.



5. Discussion/ Conclusion

- From the project statement: *Important indicators of successful application of disaster science in planning and risk assessment include: (1) increasing social inclusivity in decision-making, (2) reducing wealth and power disparities; and (3) increasing the regime's capacity to respond to new, probabilistic, and uncertain disaster information with (4) creative, robust, and locally-appropriate policies, programs and environmental/structural designs.*

Thank you for your attention.